3 ENVIRONMENTAL SETTING, IMPACTS, AND MITIGATION MEASURES

3.1 APPROACH TO THE ENVIRONMENTAL ANALYSIS

As required by California Environmental Quality Act (CEQA) (State CEQA Guidelines Section 15126.2), this PEIR identifies and focuses on the potentially significant direct and indirect environmental effects of the proposed CalVTP. This PEIR considers the full range of treatment types and activities included in the proposed CalVTP to provide a broad, comprehensive analysis of environmental impact issues. Where relevant to address variations in resources in different parts of California, the existing conditions and impact analysis are organized by ecoregion. This approach is designed to provide CEQA review streamlining by planning for future use of the PEIR in connection with later vegetation treatment activities. This approach is consistent with State CEQA Guidelines Section 15168, "Program EIR," which allows for the use of a Program EIR in connection with a series of actions that can be characterized as one large project and are related to, among other things, the issuance of general criteria to govern the conduct of a continuing program or individual activities having generally similar environmental effects that can be mitigated in similar ways.

As contemplated by State CEQA Guidelines Section 15168(c), CAL FIRE and other public agencies proposing treatment activities (i.e., project proponents) will examine proposed vegetation treatments in light of this PEIR to determine whether any additional environmental review document(s) must be prepared. CAL FIRE or other project proponent may use the Project-Specific Analysis (PSA) (Appendix PD-3) of this PEIR, or another similar documentation, to document evaluation of the site and the proposed treatments to determine whether the proposed treatment project is consistent with the descriptions in Chapter 2, "Program Description," and whether the environmental effects of the proposed treatment have been sufficiently evaluated in this PEIR. The PSA for a streamlined CEQA review of site-specific, later vegetation treatment activities that are consistent with the proposed program will document a project's environmental effects and how they have been addressed in the PEIR. This will include documenting the application of environmentally protective Standard Project Requirements (SPRs) and relevant mitigation measures from the PEIR. The PEIR discloses and analyzes the proposed CalVTP's reasonably foreseeable effects on the environment that would occur from any of the treatments within the treatable landscape. Through the PSA, the project proponent will document whether and how the proposed treatment would be consistent with the program description and evaluation of impacts in the PEIR. If the proposed treatment meets the criteria in State CEQA Guidelines Section 15168(c) to be within the scope of the program description and impact analysis, the PSA will document this determination. The Guidelines state the criteria this way:

> If the agency finds that pursuant to Section 15162, no subsequent EIR would be required, the agency can approve the activity as being within the scope of the project covered by the program EIR, and no new environmental document would be required. Whether a later activity is within the scope of a program EIR is a factual question that the lead agency determines based on substantial evidence in the record. Factors that an agency may consider in making that determination include, but are not limited to, consistency of the later activity with the type of allowable land use, overall planned density and building intensity, geographic area analyzed for environmental impacts, and covered infrastructure, as described in the program EIR.

A "within the scope" finding would shorten the time needed for CEQA review of later treatment activities consistent with CalVTP, which would support the objective to increase in the pace and scale of project approvals in a manner that includes environmental protections. Where a later vegetation treatment project does not qualify for a "within the scope" finding, a negative declaration, mitigated negative declaration or EIR may be prepared that focuses on the environmental impacts not adequately considered in the PEIR.

3.1.1 Scope of the Analysis

As noted in Chapter 2, "Program Description," the CalVTP would be implemented within the 20.3-million-acre treatable landscape. This CalVTP PEIR employs a programmatic approach to evaluation because the specific characteristics and locations of actual treatment projects are not known at this time. As such, the level of detail of the environmental impact analysis is also programmatic in that it addresses the full range of potential environmental effects of implementing the CalVTP. Environmental impact conclusions are broadly and comprehensively applied to types of treatments and treatment activities that would occur. As described above, this approach is consistent with the State CEQA Guidelines provisions for a Program EIR, as described in Section 15168.

3.1.2 Impact Analysis Approach

This section explains the approach for conducting environmental impact analyses and determining the significance of environmental effects resulting from implementation of the proposed CalVTP. In doing so, it describes how the SPRs are considered in the impact analysis and when it is appropriate to identify mitigation measures for impacts resulting from vegetation treatments.

ROLE OF SPRS AND DETERMINATION OF SIGNIFICANCE IN THE PEIR

Section 2.7 of Chapter 2, "Program Description," presents the SPRs for the CalVTP. The SPRs will be incorporated by CAL FIRE or other project proponents into all proposed vegetation treatments seeking to qualify for coverage under the CalVTP PEIR. SPRs would be implemented for all treatments to the extent they are applicable, analogous to standard operating procedures or best management practices. The applicable treatment activities and treatment types are identified within each SPR, typically at the end of each SPR. SPRs are intended to avoid and minimize environmental impacts and, in some cases, promote compliance with applicable laws and regulations. For example, a prescribed burn may cause smoke in the vicinity of a public roadway, raising a potential traffic safety effect. Because SPR TRAN-1, Implement Traffic Control during Treatments, requires preparation of a Traffic Management Plan for prescribed burns, including temporary signage, traffic controls along public roadways, and flag personnel for traffic management, its implementation would avoid or minimize significant impacts to public safety and residual impacts (with SPRs) are analyzed against the identified threshold of significance accounting for the SPR's environmental protective influences.

Refer to the Section 3.4.1, "Terminology Used in the PEIR" for definitions of these terms used in the impact analysis.

3.1.3 Analysis Contents

Sections 3.2 through 3.17 of this PEIR present a discussion of existing conditions, regulatory background, environmental impacts associated with implementation of vegetation treatments, SPRs, mitigation measures to reduce the level of impact, and residual level of significance (i.e., after application of mitigation, including impacts that would remain significant and unavoidable after application of all feasible mitigation measures). The environmental resource topics evaluated in Chapter 3 are consistent with those identified in the Notice of Preparation (NOP) prepared for this PEIR (see Appendix A) and consider relevant comments provided on by agencies, organizations, and the public during NOP review.

Sections 3.2 through 3.17 follow the same general format:

Environmental Setting presents the existing environmental conditions within the treatable landscape in accordance with Section 15125 of the State CEQA Guidelines. The CalVTP would apply to all CAL FIRE Administrative Units and the jurisdictions of other project proponents. The degree of specificity under this EIR's programmatic level analysis is more generalized than a site-specific analysis, because the exact locations and proposed treatment prescription of later vegetation treatments are not yet known. Nonetheless, the analysis comprehensively considers the full range of treatments potentially implemented within the modeled treatment areas for each treatment type (see maps in Section 2.5.1 of Chapter 2, "Program Description."

Where applicable and helpful for conducting the impact evaluation, the setting description and environmental analysis for the CalVTP are organized into geographic regions reflecting different environmental characteristics. For instance, the ecological regions or "ecoregions" established by the U.S. Forest Service (USFS) are used to organize natural resources information for biological resources. The USFS Ecoregion system is based on geomorphology, soils, geology, hydrology, and vegetation and classifies California into 19 Ecological Sections and 190 Ecological Subsections. Other topics use different geographic region approaches appropriate to the subject (e.g., air basins for air quality or watersheds for water quality), or address the State as a whole, if dividing California into smaller regions does not provide value for the particular environmental issue (e.g., for greenhouse gas emissions).

Regulatory Setting presents the laws, regulations, plans, and policies that are relevant to each environmental resource. Regulations originating from the federal, state, and local levels are each discussed where applicable. When state agencies, including CAL FIRE, are conducting governmental activities under the authority of state law or the state Constitution, such as treatments implemented by CAL FIRE under the proposed CalVTP, they are exempt from local government plans, policies, and ordinances (unless a constitutional provision or statute directs otherwise). Nonetheless, CAL FIRE voluntarily seeks to operate consistently with local governance to the extent feasible. Given its statewide extent and the possible number of local and regional responsible agencies, this PEIR does not identify potential individual local government plans, policies, and ordinances. This PEIR assumes that any vegetation treatments proposed by local or regional agencies under the CalVTP would necessarily be consistent with local plans, policies, and ordinances, as required by SPR AD-3.

Impact Analysis and Mitigation Measures identifies the thresholds of significance used to determine the level of significance of the environmental impacts for each resource topic, in accordance with the State CEQA Guidelines (Sections 15126, 15126.2, and 15143). The thresholds of significance used in this PEIR are primarily based on the checklist presented in Appendix G of the State CEQA Guidelines, best available data, applicable regulatory standards of relevant public agencies, and professional judgement. The significance of each impact is determined by evaluating the physical changes in the environmental setting that would be caused by implementation of treatments under the proposed CalVTP and analyzing those effects against the identified threshold. Key methods and assumptions used to frame and conduct the impact analysis as well as issues or potential impacts not discussed further (such issues for which the program would have no impact) are also described. In addition, as discussed above, SPRs applicable to each resource section are identified.

Impacts are organized by letter convention for each resource (e.g., in Section 3.2, "Aesthetics," impacts are numbered as follows Impact AES-1, Impact AES-2). A bold-font impact statement, a summary of each impact, and its level of significance before application of any necessary mitigation precedes the discussion of each impact. The discussion that follows the impact summary presents the substantial evidence supporting the impact significance conclusion.

If an environmental impact cannot be avoided or maintained at a less-than-significant level assuming implementation of the SPRs, then it would be a potentially significant impact, and the PEIR must describe any feasible measures that could avoid, minimize, rectify, reduce, or compensate for potentially significant adverse impacts. The measures are to be fully enforceable and adopted as a condition of approval (PRC Section 21081.6[b]). Mitigation measures are not required for effects that are determined to be less than significant. Where feasible mitigation for a potentially significant impact is available the mitigation measures are presented. Each identified mitigation measure is labeled with the same letter convention to correspond with the number of the impact that would be mitigated by the measure (e.g., Mitigation Measure AES-1 for Aesthetics). Following the mitigation measure, the measure's effectiveness at reducing the impact is described and compared again against the identified threshold to determine the level of significance after mitigation. Where sufficient feasible mitigation is not available to reduce an impact to a less-than-significant level, or where CAL FIRE or other project proponent may lack the ability to ensure that the mitigation is implemented when needed, the impact is identified as remaining "significant and unavoidable."

Chapter 4 of this PEIR, "Cumulative Effects Analysis," presents an analysis of CalVTP's impacts considered together with other past, present, and probable future projects producing related impacts, as required by Section 15130 of the State CEQA Guidelines. Chapter 5, "Significant Effects and Growth-Inducing Effects," includes an analysis of the project's growth-inducing impacts, as required by Public Resources Code (PRC) Section 21100(b)(5). Chapter 6, "Alternatives," presents a reasonable range of alternatives and evaluates the environmental effects of those alternatives relative to the CalVTP, as required by Section 15126.6 of the State CEQA Guidelines.

3.1.4 Terminology Used In the PEIR

Following are key terms used in this PEIR to describe important components of the CalVTP:

Project proponent: Refers to CAL FIRE or other public agency funded by a CAL FIRE grant or with land ownership/management responsibilities in the treatable landscape and seeking to implement vegetation treatments consistent with this PEIR for CEQA compliance.

Treatable landscape: the approximately 20.3-million-acre area of the State Responsibility Area within which proposed CalVTP treatments could be implemented (refer to Section 2.4 of Chapter 2 "Program Description" for additional description)

Qualifying treatment (also qualifying project): a later vegetation treatment project that is consistent with the treatment methods described in this PEIR, would not result in new or substantially increased significant effects relative to those identified in this PEIR, and would otherwise be considered within the scope of this EIR pursuant to State CEQA Guidelines Section 15168(c)(2).

Treatment type: wildland-urban interface fuel reduction, fuel break, ecological restoration (each is described in Section 2.5.1 of Chapter 2 "Program Description")

Treatment activity: prescribed burning, manual treatments, mechanical treatments, prescribed herbivory, herbicide application (each is described in Section 2.5.2 of Chapter 2 "Program Description"); any of these activities could be used in various combinations to implement a treatment type.

This PEIR uses the following terminology to describe environmental effects of the program:

Less-than-Significant Impact: An impact is considered less than significant when it, either on its own or with incorporation of SPRs, does not exceed the defined thresholds of significance (no mitigation required), or that is potentially significant and can be reduced to less than significant through implementation of feasible mitigation measures.

Potentially Significant Impact: A potentially significant impact is an environmental effect that may cause a substantial adverse change in the physical conditions of the environment. In this PEIR, a potentially significant impact is treated as if it were a significant impact. "Potentially" is used to convey that not every qualifying treatment will result in impacts to the reasonably maximum degree that they are disclosed in this PEIR; it is expected that most treatments would result in effects that are less severe than those disclosed, but some treatments could result in significant impacts consistent with the severity described in this PEIR. Potentially significant impacts are identified by the evaluation of treatment effects in the context of specific significance thresholds. Mitigation measures and/or alternatives are identified to reduce these effects to the environment below the threshold of significance where feasible.

Significant and Unavoidable Impact: An impact is considered significant and unavoidable if it would result in a substantial adverse change in the environment that cannot be feasibly avoided or mitigated to a less-than-significant level. If a lead agency decides to approve a project with significant unavoidable impacts, it must adopt a statement of overriding considerations to explain its actions (State CEQA Guidelines, Section 15093(b)).

Mitigation Measures: State CEQA Guidelines (Section 15370) define mitigation as:

a) avoiding the impact altogether by not taking a certain action or parts of an action;

b) minimizing impacts by limiting the degree of magnitude of the action and its implementation;

c) rectifying the impact by repairing, rehabilitating, or restoring the affected environment;

d) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and

e) compensating for the impact by replacing or providing substitute resources or environments.

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3.2 AESTHETICS AND VISUAL RESOURCES

This section evaluates the potential for implementation of the proposed CalVTP to affect aesthetic and visual resources. It describes the visual environments found in the treatable landscape and the nature of potential impacts that could occur to visual resources as a result of treatment activities. This section also examines potential impacts related to light and glare. Information used in this section was obtained from resource data compiled by CAL FIRE and widely used visual assessment guidelines.

Comments on the Notice of Preparation related to aesthetics and visual resources requested coordination with the California Department of Transportation (Caltrans) when tree removal or trimming within a state scenic highway is proposed (see Appendix A). Impacts related to scenic resources in or along state scenic highways are addressed in Section 3.2.3, “Impacts and Mitigation Measures,” below.

3.2.1 Environmental Setting

GENERAL METHODOLOGY FOR VISUAL IMPACT ANALYSIS

When evaluating the impacts of vegetation treatments on the visual environment, the focus is on three overarching parameters: existing visual conditions; how these would be altered by implementing a treatment; and the significance of the change on scenic qualities of the landscape and publicly available viewpoints. Visual resources considered in an evaluation include those features in the natural and cultural landscapes that comprise the visible world and contribute to a person’s understanding of and reaction to the scene before them. Visual resources include both natural elements, such as topography, vegetation, and water, and constructed features, such as earthworks, roads, and structures.

Two basic factors involved in determining a visual impact are (1) the susceptibility of the setting to impact based on its existing characteristics and (2) the degree of visible change anticipated as a result of a treatment. These two factors are identified respectively as visual sensitivity (of the setting and viewers) and landscape change (due to the treatment) that is visible from public viewpoints.

This visual analysis considers visual quality, viewer concern, visibility, number of viewers, and duration of view. These are ranked as being high to low. These and other elements of the visual analysis methodology are described below.

Visual quality is an expression of the visual impression or appeal of a given landscape and the associated public value attributed to the resource. A high rating is generally reserved for landscapes viewers might describe as picture-perfect. Landscapes rated high generally are memorable because of the way the components combine in a visual pattern. In addition, those landscapes are free from encroaching elements that would compromise the landscapes’ visual integrity. In contrast, landscapes rated low often are dominated by visually discordant alterations that have been introduced by humans. Visual quality is evaluated using the approach to visual analysis adopted by the Federal Highway Administration and Caltrans, employing the concepts of vividness, intactness, and unity.

- **Vividness:** The extent to which the landscape is memorable. This is associated with the distinctiveness, diversity, and contrast of visual elements. A vivid landscape makes an immediate and lasting impression on the viewer.
- **Intactness:** The integrity of “visual order” in the landscape, which is the extent to which the natural landscape is free from visual intrusions. If all the various elements of a landscape appear to "belong" together, there will be a high level of intactness.
- **Unity:** The extent to which visual intrusions are sensitive to and in visual harmony with the natural landscape. Unity, in other words, represents the degree to which the visual elements maintain a coherent visual pattern.

Visual quality is evaluated based on the relative degree of vividness, intactness, and unity, as modified by its visual sensitivity. High quality views are highly vivid, relatively intact, and exhibit a high degree of visual unity.

Viewer sensitivity represents the reaction of a viewer to landscape changes in the viewshed (defined as the area visible from a fixed vantage point). For example, viewers have a high expectation for scenic quality of areas designated as a scenic area, scenic travel corridor, park, open space, recreational, and residential areas. Travelers on non-scenic highways and roads generally have moderate viewer concerns and expectations. Viewer sensitivity is lower for more heavily urbanized, non-residential areas, such as commercial or industrial uses.

Viewer exposure is a function of three elements: visibility, number of viewers, and duration of view. These elements are described below:

- **Visibility** is a measure of how well an object or site can be seen. It depends on the angle or direction of the view; extent of visual screening; and the topographical relationship between the object or site and existing vantage points. Visibility is determined by considering any obstructions that may be in the sightline, such as trees and other vegetation, buildings, landforms, and haze or fog. Distance becomes a factor; with increasing distance from the viewer, objects become less prominent in the view and less clearly distinguishable.
- **Number of viewers** is a measure of the number of viewers per day who would have a view of the proposed activity. As indicated in Appendix G of the State CEQA Guidelines, visual analysis focuses on public viewpoints, which emphasize locations with higher numbers of accessible viewers (as opposed to private views, such as residential viewers).
- **Duration** of view is the amount of time available to view the site or activity. For example, a high or extended view of a site may be 2 minutes or longer. In contrast, a low or brief duration of view occurs in a short amount of time — generally less than 10 seconds. For stationary locations, such as public vista points, the duration is extended. For travelers on a highway, the duration may be very short.

Visual Change is a function of contrast, dominance, and view blockage or disruption. Contrast and dominance contribute more to the degree of visual change than view disruption.

- **Contrast** concerns the degree to which a treatment's visual characteristics or elements — such as its form, line, color, and texture — differ from the same visual elements in the existing landscape. The degree of contrast can range from low to high. A treatment resulting in forms, lines, colors, and textures similar to those of the existing landscape is more readily visually absorbed. When characteristics or elements are similar to those of the existing condition, a treatment or treated site is more capable of being accepted in the landscape as compared to a landscape in which similarities are absent. Generally, visual absorption is inversely proportional to visual contrast.
- **Dominance** is a measure of the proportion of the total field of view occupied by a treatment, a feature's apparent size relative to other visible landscape features, and the conspicuousness of the feature due to its location or position in the view. A feature's level of dominance is lower in a panoramic setting than in an enclosed setting with a focus on the feature itself. As the distance between a viewer and a feature increases, its apparent size decreases, decreasing its dominance. Objects seen against the sky are more prominent or dominant than objects viewed against trees, landforms, and buildings.
- **View blockage** is concerned with the extent to which previously visible landscape features become blocked from view. View disruption also occurs when view continuity is interrupted, such as when a treatment might break the line of a sweeping vista.

SCENIC VIEWS AND VISTAS

A scenic view is a high-quality visual environment experienced beyond an observer's immediate surroundings. Scenic views are often available along trails and roads. For a hiker or roadway traveler, a scenic view would not include only the trail or road, but also the terrain immediately surrounding the trail or road.

Scenic vistas are broad, long-range scenic views that can be described as panoramic and having exceptional landscape-scale scenic quality. Sometimes, scenic vistas are recognized by public agencies through designation with protective policies in land management plans or placement of special destinations for viewers, such as an elevated vista point.

AFFECTED ENVIRONMENT

The treatable landscape comprises multiple counties and includes a variety of landscapes that present a wide assortment of visual conditions. These range from areas having few landforms or structures and little vegetation that would limit viewing distances (such are found in large expanses of open grasslands or chaparral), to heavily forested areas where trees and other vegetation limit viewing distances, to areas with a heterogeneous mix of development, open space, vegetation, and topography that may or may not limit viewing distances (such as in suburban communities, foothills, and Coastal Ranges valleys).

As described in Section 2.4.1 "Vegetation Formations," in Chapter 2, three broad categories of vegetation (also called "fuel types") comprise the treatable landscape: tree, shrub, and grass. However, the treatable landscape is in varied geomorphic and ecological regions throughout the SRA in California; therefore, the visual setting of the treatable landscape varies widely. The treatable landscape is in mountainous areas, valleys, along coastlines, near sandy beaches, and near urban areas. Some areas within the treatable landscape have ocean views; some have lake views; some have mountain views; and some have expansive views from hilltops, ridgelines, and mountaintops (refer to Figure 3.2-1). Because the treatable landscape exhibits such a diverse visual setting, it is not feasible to attempt to describe every specific visual resource contained within it. Instead, this environmental setting discussion focuses on two general aspects of visual resources: scenic views (generally panoramic, but sometimes more limited views, either of a notable feature or sweeping landscape) and visual character (defining features of a place, such as trees and other flora, water and other geologic features, and cultural features).

Treatment activities currently occur within the treatable landscape and are occasionally visible to public viewers. As described in Chapter 1, "Introduction" and Section 2.3.1, "Past and Current Treatments," vegetation treatment currently occurs around the state under several other wildfire risk reduction programs implemented by various federal, state, and local agencies. In 2017–2018, CAL FIRE treated approximately 33,000 acres in California using the same treatment activities as proposed under the CalVTP.

Scenic Views

As previously described, scenic views are the visual environment experienced beyond an observer's immediate surroundings and are often available along trails and roads. For a hiker or motorist traveling along a scenic corridor, a scenic view would not include only the trail or road, or the terrain immediately surrounding the trail or road, but any high-quality, more distant, often panoramic view. Caltrans Scenic Highway Program identifies over 60 officially designated scenic routes in California; some of these scenic routes pass through the treatable landscape. With respect to the treatable landscape, there are many more scenic views apart from those visible from a State Scenic Highway, including scenic vistas, which are often a trail user's destination. Refer to Figure 3.14-1 in Section 3.14, "Recreation," and Figure 3.2-2 herein for visual representations of recreation areas and state scenic highways in proximity to the treatable landscape.

Because the treatable landscape encompasses large areas of undeveloped land, it is common for scenic views of and within the SRA to exhibit substantial scenic quality with high levels of vividness, intactness, and unity. Landscape characteristics are diverse, distinctive, and naturally attractive. Scenic views of the treatable landscape in most areas generally exhibit high scenic quality. Figure 3.2-1 illustrates the types of scenic views available within and in the vicinity of the treatable landscape as well as examples of the diverse landscape characteristics and scenic views of the treatable landscape. These photographs illustrate the wide range of views available in the vicinity of the treatable landscape and scenic landscapes in the treatable landscape, from prominent ridgelines often forming the edges of a viewshed for a community, trail, or public vista point; to expansive rolling hillsides stretching as far as the eye can see.

Figure 3.2-1 Examples of Scenic Views in the Vicinity of the Treatable Landscape (continued)

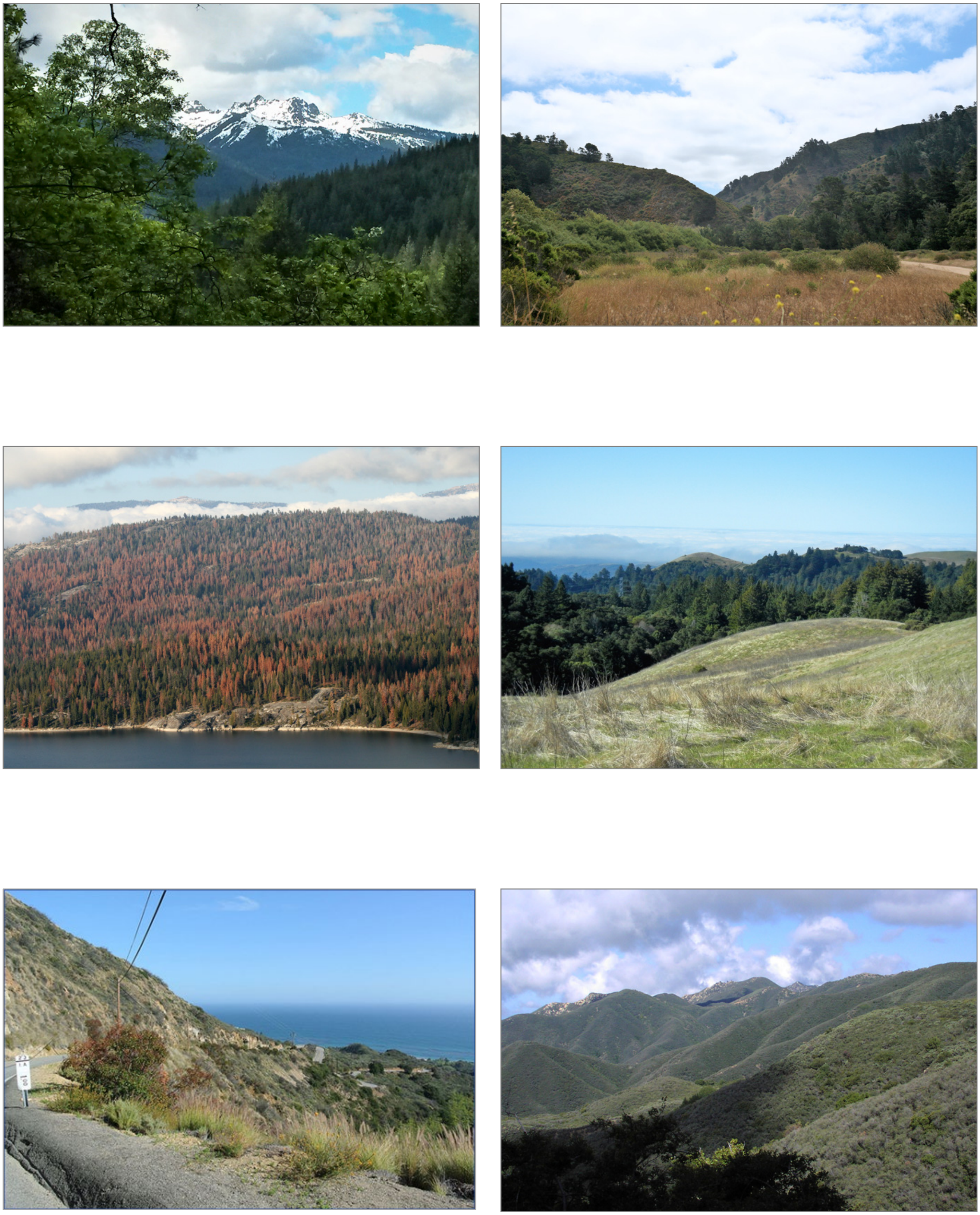
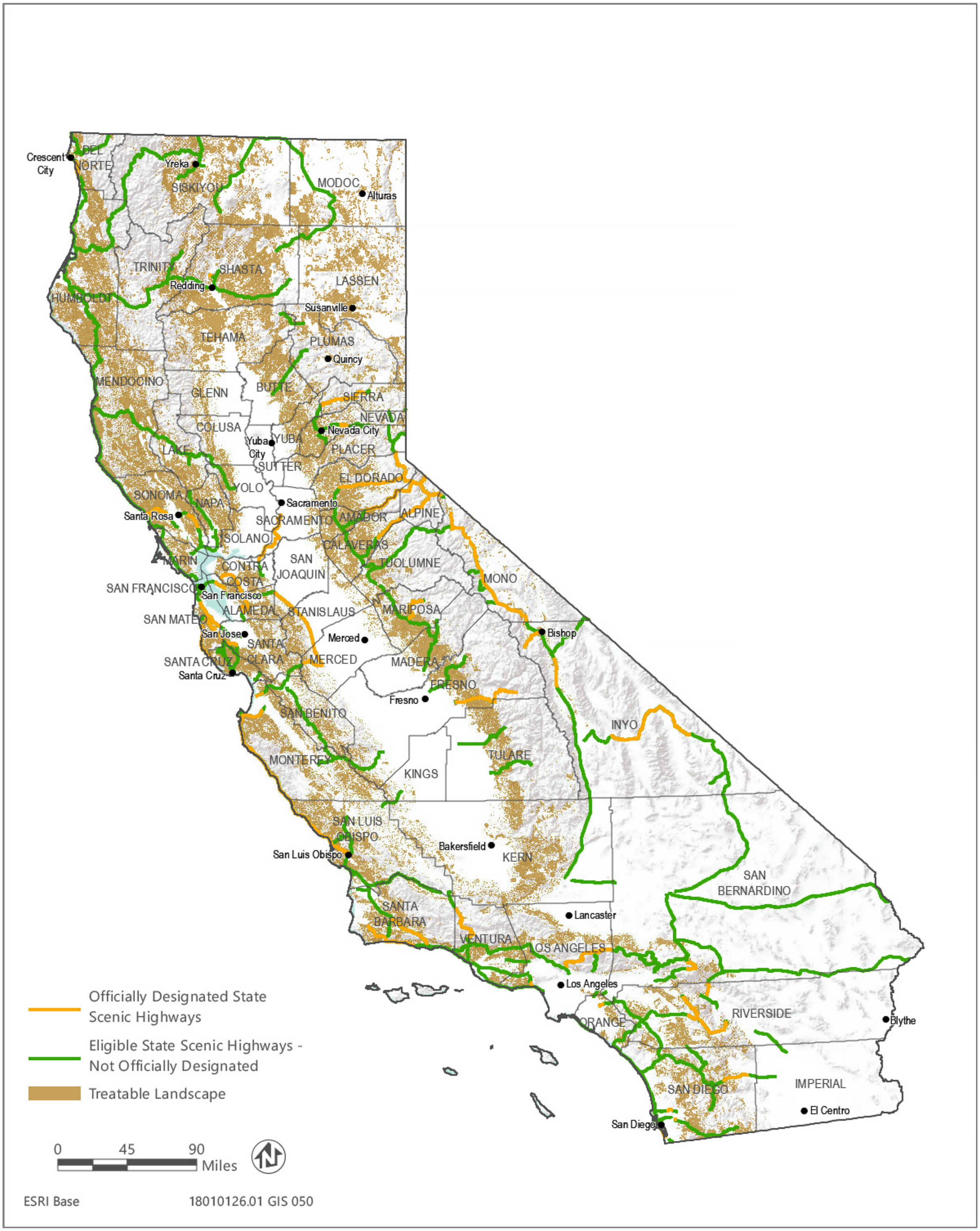


Figure 3.2-1 Examples of Scenic Views in the Vicinity of the Treatable Landscape



Source: Data downloaded from Caltrans in 2015 and received from the Department of Forestry and Fire Protection in 2019

Figure 3.2-2 State Scenic Highways in the Vicinity of the Treatable Landscape

Generally, views of the different fuel types differ as the elements that comprise the vegetation differ in stand height, relative bulk, form, color, and other visual characteristics. Grass fuel types tend to be low to the ground and thus do not impede long-range views. Grass fuel types are typically uniform in color, and often appear green or light brown with varying textures from smooth to rough and patchy. Shrub fuel types are taller than grass and may partially obscure views but often still allow for long-range views. They vary in color from shades of greens to shades of brown and tend to be rough looking in texture with many sharp edges, and can also be patchy in places. Depending on the density of trees, tree fuel types can completely obscure views out of the immediate forest viewshed, or can only partially obscure potions of a viewshed. They typically vary in shades of green and brown; however, leaves may appear in yellows and reds during autumn months. Tree dominated views tend to be dominated by the vertical shapes of trees, which can result in sharp looking treetop lined views from afar, or several lines of vertical tree trunks with intermixed greenery and horizontal branches in dense forests. Refer to Figure 3.2-3 for example photos of the grass, shrub, and tree fuel types.

Because of the geographically expansive nature of the treatable landscape, views of the treatable landscape are available to a variety of public viewer groups, including motorists, trail users, and recreationists, all with varying degrees of viewer sensitivity from low (e.g., commuting motorists) to high (e.g., recreationists).

Visual Character and Quality

Most of the treatable landscape is privately owned; however, portions are under the jurisdiction of local and regional agencies and conservation groups as park, open space, and recreation areas. Because of the varied landscape characteristics across the treatable landscape, existing visual character and quality of developed and undeveloped private lands and public lands managed as parks and open space is characterized in the following sections.

Private Lands

Portions of the treatable landscape across private lands are adjacent to developed areas, including residential communities, commercial and industrial parks, roadways, and freeways and highways. Residences and other buildings, roadways, transmission lines, and urban infrastructure are in some more developed areas of the treatable landscape. These are encroaching elements that have been constructed and can be visually discordant with the natural environment. The visual character in and adjacent to developed areas is defined by patches of varied greenery and small rolling hills with intervening disruptions such as paved transportation corridors, transportation related signage, wood and metal and fencing, linear vertical and horizontal elements such as overhead transmission lines, stop lights, streetlights, and buildings (refer to Figure 3.2-4). Therefore, colors and shapes are varied, including shades of green, brown, gray, silver, red, white, and yellow. Given the variety of colors, shapes, and patterns and presence of intervening urban elements, vividness, intactness, and unity of views in these areas tends to be low to moderate. Overall, visual character and quality are low to moderate.

Other portions of private lands in the treatable landscape are undeveloped and rural in nature. These areas are composed of dense forests, grasslands, and other vegetation and generally have little urban intrusion. Because these undeveloped areas are on private lands, no public access is permitted, and few trails or roadways are present. The visual character of the treatable landscape across private, undeveloped lands is defined by a variety of colors, textures, and patterns, including smooth rolling hills, large trees and dark forests, and natural colors in varying shades of greens, browns, grays, and blues (refer to Figure 3.2-5). Although some residences, water tanks, equipment, and other signs of rural development and infrastructure may be present and contrast with the natural elements of the treatable landscape, there is generally little urban intrusion relative to the expanse of natural areas. For these reasons, private, undeveloped areas of the treatable landscape tend to exhibit high vividness, intactness, and unity as they primarily remain in their natural form with little human alteration. Overall, visual character and quality are considered moderate to high.


Examples of tree fuel types.


Examples of shrub fuel types.


Examples of grass fuel types.

Figure 3.2-3 Examples of Tree, Shrub, and Grass Fuel Types in the Treatable Landscape

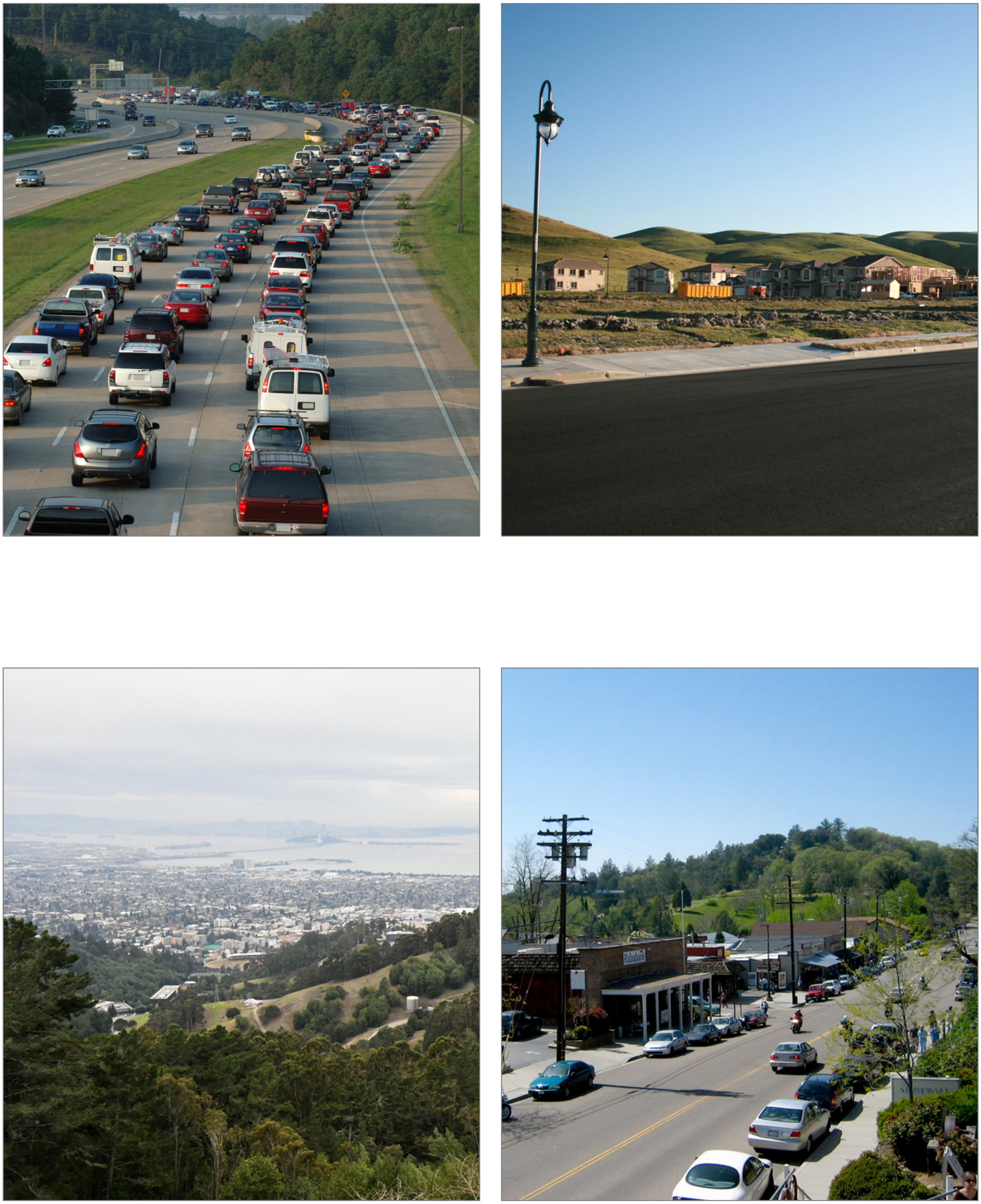


Figure 3.2-4 Examples of Development in the Vicinity of the Treatable Landscape

Figure 3.2-5 Examples of Rural Private Lands in the Vicinity of the Treatable Landscape

Public Lands

In public parks and open space areas, the visual character of roads and trails tend to be high quality, crossing remote and sometimes more pristine settings, particularly if a trail provides access to a scenic destination. The visual character of the treatable landscape across public lands is defined by a variety of colors, textures, and patterns, including smooth rolling hills, patterns of mountain top and tree-lined skylines, prominent ridgelines, sharp rocky outcroppings, dense and dark forests, visually captivating waterfalls, and natural colors in varying shades of greens, browns, grays, and blues (refer to Figures 3.2-1 and 3.2-6). Although some utility lines, roads, park buildings, water tanks, and other development and infrastructure may be present and contrast with the treatable landscape, they are typically most prevalent near a park entrance and public parking areas. Once inside a park and hiking or engaging in some other type of recreation, there is generally little urban intrusion relative to the expanse of natural areas, although vegetation treatments do occur under existing conditions and equipment may be visible when actively occurring. However, because of the undeveloped and often pristine nature of the treatable landscape in these areas, views are generally highly vivid, relatively intact, and exhibit a high degree of visual unity. Overall, visual character and quality in public parks and open space areas are high.

Light and Glare

For the purposes of this analysis, light refers to unnatural nighttime lighting, which may intrude into sky darkness when added to an area that currently contains little or no artificial lighting (also known as light pollution). Glare refers to unnatural light or reflected natural light that can be annoying or distracting. Lighting and glare levels tend to be much lower in undeveloped areas of the treatable landscape particularly as these areas occur further from developed areas. Lighting and glare are also lower near most trails and forested areas. Because the treatable landscape is in natural and vegetated areas, no substantial light or glare is currently generated from these areas. Urban areas in the vicinity of the treatable landscape contain varied light sources, such as street lights, car head lights, and in more urbanized areas, sky glow may be present (sky glow is an area-wide illumination of the night sky from human-made light sources). Particularly within or near the WUI, light, glare, and urban sky-glow may be visible from the treatable landscape.

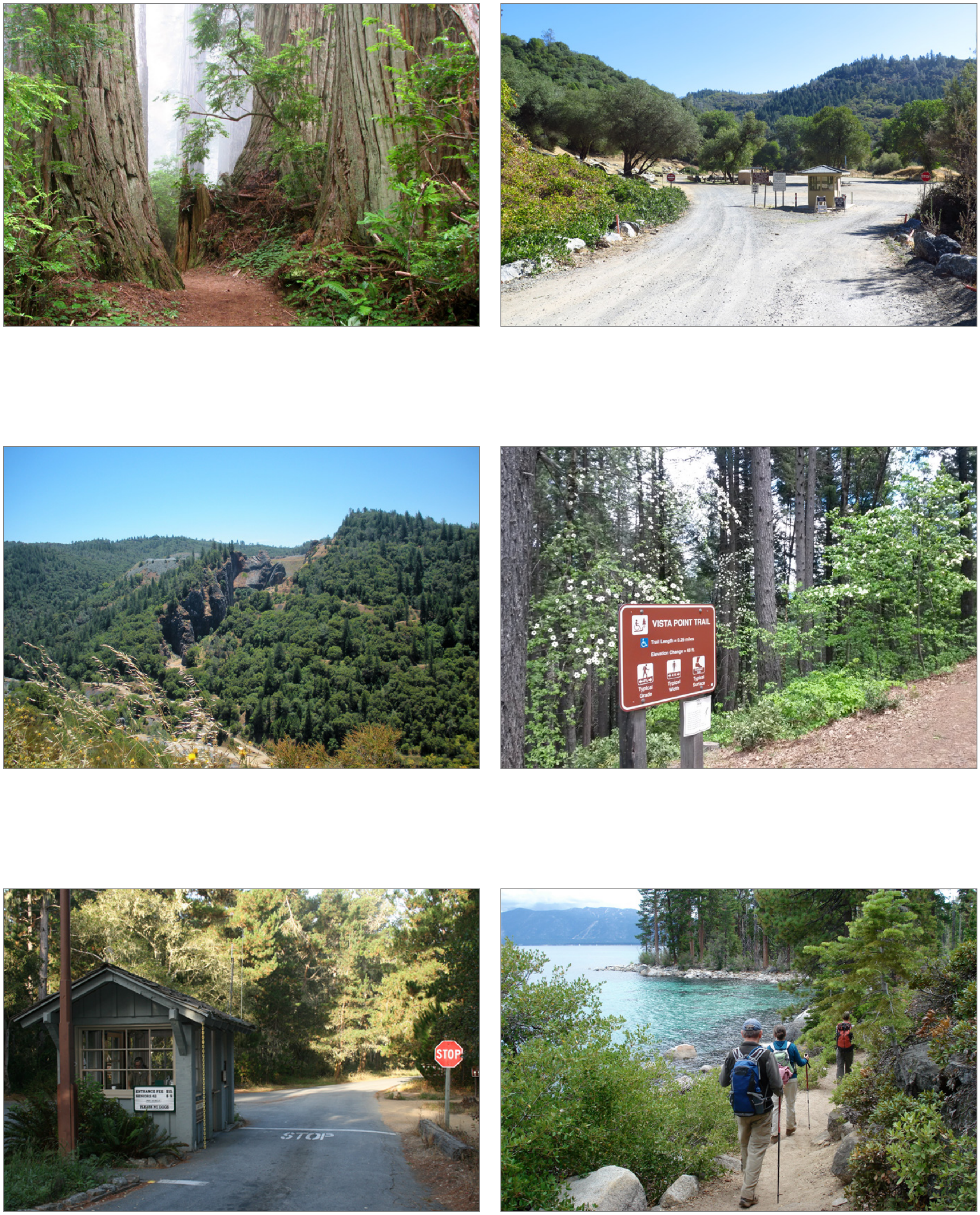


Figure 3.2-6 Examples of Public Lands in the Vicinity of the Treatable Landscape

3.2.2 Regulatory Setting

STATE

California State Scenic Highway Program

Created by the Legislature in 1963, the California Scenic Highway Program preserves and protects areas of natural scenic beauty of State highways and adjacent corridors. A highway may be designated as scenic depending upon how much of the natural landscape can be seen by travelers, the scenic quality of the landscape, and the extent to which development intrudes upon the travelers' enjoyment of the view (Caltrans 2017).

For a highway to be officially designated as a scenic resource, the local city or county must adopt a scenic corridor protection program and apply to Caltrans for official designation (Caltrans 2017). Without official designation and the attendant scenic corridor protection program, development and other activities can degrade scenic value despite the highway's "eligible" designation. Thus, the fact that a highway was at one time deemed eligible for the scenic highway designation does not mean that it retains its original scenic value. Implementation of treatments under the CalVTP would require compliance with this program if treatments occur within and would affect vegetation within a state scenic highway.

California Coastal Act

Section 30251 of the Coastal Act sets forth the Act's aesthetic requirements. Under Section 30251, the scenic qualities of coastal areas must be considered and protected in the development process. Permitted development must be located and designed to protect the scenic and visual qualities of coastal areas. This includes protecting views to and along the ocean and scenic coastal areas, matching the visual character of surrounding areas, and, where feasible, restoring and enhancing visual quality in visually degraded areas. Pursuant to the Coastal Act, cities and counties within the Coastal Zone must develop local coastal plans. Portions of the treatable landscape lie within the Coastal Zone, and treatment activities may be subject to Coastal Act requirements in these areas.

California Wild and Scenic Rivers Act

The California Wild and Scenic Rivers Act (Public Resources Code Sec. 5093.50 et seq.) was passed in 1972 to preserve California's designated rivers possessing extraordinary scenic, recreation, fishery, or wildlife values. This act was patterned after the 1968 National Wild and Scenic Rivers Act, and both share similar criteria and definitions regarding the protection of rivers, the process used to designate rivers, and in the prohibition of new water impoundments on designated rivers. Unlike the national act, the California Wild and Scenic Rivers Act provides protection only up to the first line of permanent vegetation and does not require a management plan for designated rivers. The California Legislature is responsible for classifying or reclassifying rivers by statute, though the Resources Secretary may recommend classifications. State designated rivers may be added to the federal system upon the request of the state Governor and the approval of the Secretary of the Interior. Adding state rivers to the federal system under this act does not require approval of the Legislature or Congress. State rivers added to the federal system are managed by the state. Implementation of treatments under the CalVTP would require compliance with this Act if treatments occur within and would affect protected vegetation.

LOCAL

When state agencies, including CAL FIRE, are conducting governmental activities under the authority of state law or the State Constitution, in this case, treatments implemented under the proposed CalVTP, they are exempt from local government plans, policies, and ordinances (unless a constitutional provision or statute directs otherwise). Nonetheless, CAL FIRE voluntarily seeks to operate consistently with local governance to the extent feasible. Given its statewide extent and the possible number of local and regional responsible agencies, this PEIR does not identify potentially applicable local government plans, policies, and ordinances. Types of local regulations relevant to aesthetics and visual resources include design guidelines for new development and general plan policies. This PEIR assumes that any vegetation treatments proposed by local or regional agencies under the CalVTP would be consistent with local plans, policies, and ordinances to the extent specific projects are subject to them, as required by Standard Project Requirement (SPR) AD-3.

3.2.3 Impact Analysis and Mitigation Measures

ANALYSIS METHODOLOGY

The analysis of environmental impacts on aesthetics and visual resources focuses on the potential for substantial adverse effects to a scenic vista, substantial degradation of scenic resources within a state scenic highway or degradation of existing visual character or quality, and the creation of a new source of substantial light or glare. Significance determinations account for the influence of relevant SPRs, which are incorporated into treatment design and listed below.

- SPR AD-3 Consistency with Local Plans, Policies, and Ordinances: The project proponent will design and implement the treatment in a manner that is consistent with applicable local plans (e.g., general plans), policies, and ordinances to the extent the project is subject to them. This SPR applies to all treatment activities and treatment types.
- SPR AD-4 Public Notifications for Prescribed Burning: One to three days prior to the commencement of prescribed burning operations, the project proponent will: 1) post signs along the closest public roadway to the area describing the activity and timing, and requesting persons in the area to contact a designated representative of the project proponent (contact information will be provided with the notice) if they have questions or smoke concerns; 2) publish a public interest notification in a local newspapers or other widely distributed media source describing the activity, timing, and contact information; 3) send the local county supervisor a notification letter describing the activity, its necessity, timing, and measures being taken to protect the environment and prevent prescribed burn escape. This SPR applies only to prescribed burn treatment activities and all treatment types.
- SPR AES-1 Vegetation Thinning and Edge Feathering: The project proponent will thin and feather adjacent vegetation to break up or screen linear edges of the clearing and mimic forms of natural clearings as reasonable or appropriate for vegetation conditions. In general, thinning and feathering in irregular patches of varying densities, as well as a gradation of tall to short vegetation at the clearing edge, will achieve a natural transitional appearance. The contrast of a distinct clearing edge will be faded into this transitional band. This SPR only applies to mechanical and manual treatment activities and all treatment types.
- SPR AES-2 Avoid Staging within Viewsheds: The project proponent will store all treatment-related materials, including vehicles, vegetation treatment debris, and equipment, outside of the viewshed of public trails, parks, recreation areas, and roadways to the extent feasible. The project proponent will also locate materials staging and storage areas where they will minimize or avoid visual impacts. This SPR applies to all treatment activities and treatment types.
- SPR AES-3 Provide Vegetation Screening: The project proponent will preserve sufficient vegetation within, at the edge of, or adjacent to treatment areas to screen views from public trails, parks, recreation areas, and roadways as reasonable or appropriate for vegetation conditions. This SPR applies to all treatment activities and treatment types.
- SPR AQ-2 Submit Smoke Management Plan: The project proponent will submit a smoke management plan for all prescribed burns greater than 10 acres or estimated to produce more than 1 ton of particulate matter, in accordance with 17 CCR Section 80160(b). Burning will only be conducted in compliance with the burn authorization program of the applicable air district(s) having jurisdiction over the treatment area. Example of a smoke management plan is in Appendix PD-2. This SPR applies only to prescribed burning treatment activities and all treatment types.

- **SPR AQ-3 Create Burn Plan**: The project proponent will create a burn plan using the CAL FIRE burn plan template for all prescribed burns. The burn plan will include a fire behavior model output of First Order Fire Effects Model and BEHAVE or other fire behavior modeling simulation and that is performed by a qualified fire behavior technical specialist that predicts fire behavior, calculates consumption of fuels, tree mortality, predicted emissions, greenhouse gas emissions, and soil heating. The project proponent will minimize soil burn severity from broadcast burning to reduce the potential for runoff and soil erosion. The burn plan will be created with input from a qualified technician or certified State burn boss. This SPR applies only to prescribed burning treatment activities and all treatment types.
- **SPR REC-1 Notify Recreational Users of Temporary Closures.** If a treatment activity would require temporary closure of a public recreation area or facility, the project proponent to will coordinate with the owner/manager of that recreation area or facility. If temporary closure of a recreation area or facility is required, the project proponent will work with the owner/manager to post notifications of the closure approximately 2 weeks prior to the commencement of the treatment activities. This SPR applies to all treatment activities and treatment types.

THRESHOLDS OF SIGNIFICANCE

Thresholds of significance are based on Appendix G of the State CEQA Guidelines. A treatment implemented under the proposed CalVTP would result in a significant impact on aesthetics and visual resources if it would:

- have a substantial adverse effect on a scenic vista;
- substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway;
- in non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings (public views are those that are experienced from a publicly accessible vantage point);
- in urbanized areas, conflict with applicable zoning and other regulations governing scenic quality; or
- create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

ISSUES NOT EVALUATED FURTHER

The CalVTP has identified the areas in the SRA that are suitable for implementation of treatment activities; the treatable landscape includes undeveloped areas composed of grass-, shrub-, and tree-dominated vegetation. Although treatment activities would occur in the WUI near urban areas, no treatment activities would occur within urban areas. Therefore, the CalVTP would not conflict with applicable zoning or other regulations governing scenic quality in urban areas. This issue is not discussed further.

The CalVTP would not result in any new, permanent structures or lighting; therefore, no new permanent sources of light or glare would be created. During treatment activities there would be equipment and vehicles at treatment sites. Light reflected from vehicles and equipment could result in glare to nearby viewers; however, it would be temporary and often located in rural areas and within vegetation, thereby reducing its visibility. Prescribed burning could also temporarily produce light/skyglow in areas adjacent to burning activities. However, prescribed burning would typically occur in rural areas and away from large numbers of viewers. Furthermore, prescribed burning is ceased early to mid-afternoon for effective smoke management; therefore, no substantial light or skyglow would occur. Creation of light and glare is not discussed further.

IMPACT ANALYSIS

Impact AES-1: Result in Short-Term, Substantial Degradation of a Scenic Vista or Visual Character or Quality of Public Views, or Damage to Scenic Resources in a State Scenic Highway from Treatment Activities

Varying degrees of temporary degradation of public views would result during active implementation of vegetation treatment activities under the proposed CalVTP. Herbicide application and prescribed herbivory would occur intermittently and move throughout a project area. These types of activities would not block any views, dominate a viewshed, or significantly disrupt views from a scenic vista or state scenic highway. Equipment and vehicles associated with manual and mechanical treatments and prescribed burning could be visible to public viewers at scenic vistas, along a state scenic highway, or other public view points. However, activities would be temporary, lasting from 1 week to 6 months, and implementation of SPR AES-2 would avoid and minimize visual impacts from the presence of treatment equipment. In addition, smoke from prescribed burns would not result in substantial short-term aesthetic impacts, because burning would temporary, lasting up to 1 week but typically only 1 day, and project proponents would be required to prepare and adhere to a smoke management plan (SMP) (SPR AQ-2) and a Burn Plan (SPR AQ-3) which prescribe the conditions under which prescribed burning can occur to reduce the generation and visibility of smoke. Therefore, this impact would be **less than significant**.

Varying degrees of degradation of public views would result during active implementation of vegetation treatment activities under the proposed CalVTP, as described below. This impact focuses on the short-term aesthetic effects of each of the treatment activities during active implementation whereas Impact AES-2 below addresses longer-term aesthetic effects of the result of these treatments activities being used in combination to implement a treatment type.

Herbicide Application

Under the CalVTP, herbicides would only be applied on the ground from equipment on vehicles (including all-terrain vehicles and tractors) or by manual application devices, and no aerial application would occur. Herbicide application would be temporary, intermittent, and continuously move throughout a project area. Herbicide application and would often occur within vegetation and thus be largely screened from view. For these reasons, herbicide application itself would not dominate a view or block any views from a scenic vista or a state scenic highway, nor would it substantially degrade the existing visual character and quality of the treatable landscape. Furthermore, CAL FIRE would incorporate SPR AES-2 during implementation of vegetation treatments, which would avoid the staging of equipment within a viewshed thereby reducing the visual presence of treatment-related materials and equipment. Because herbicide treatment would only use ground-level application, and be continuously moving throughout a project area, visibility in one location would be brief and it would not result in a substantial degradation of a scenic vista, of visual character and quality, or substantially damage scenic resources in a state scenic highway.

Prescribed Herbivory

Prescribed herbivory would be used to reduce target plant populations using domestic livestock such as cattle, horses, sheep, or goats. Prescribed herbivory would be temporary, intermittent, and often be screened from view by vegetation or barely perceptible due to distance from a scenic vista or temporarily visible because of the speed of passing vehicles along a state scenic highway. Furthermore, because livestock are a component inherent in natural landscapes, they would not contrast with the visual setting the way equipment and vehicles can. Relative vividness, intactness, and unity of views would remain intact, and thus visual character and quality would remain high. Because prescribed herbivory would be temporary, intermittent, and utilize livestock (as opposed to large equipment or machinery), it would not result in substantial degradation of a scenic vista, of visual character and quality, or substantially damage scenic resources within a state scenic highway.

Manual and Mechanical Treatment

During manual and mechanical vegetation treatment activities, hand-held and vehicle-mounted equipment would be used, such as chainsaws, loppers, tractors, and other specially designed vehicles with attached implements designed to cut, uproot, crush/compact, or chop vegetation. Examples of such equipment in use are shown in Figures 2-11 through 2-13 in Chapter 2, "Program Description." A 260-acre manual treatment typically occurs over 3 to 6 months, depending on the type of vegetation being treated, and tends to utilize small hand equipment, such as a chainsaw. Equipment typically used in manual treatment activities (refer to Figure 2-13) would not be visible from a scenic vista, degrade visual character or quality, or degrade views from a scenic highway. Mechanical treatments use larger equipment than manual treatments (refer to Figures 2-11 and 2-12), but occur over a shorter duration than manual treatments, lasting typically between 1 week and 3 months in a project area. Treatments are faster when conducted in grass fuel types relative to shrub or tree fuel types. Although the presence of large mechanical equipment could contrast with the natural environment within a viewshed if visible (such as in the grass fuel type or adjacent to a roadway), the treatment and its visibility would be temporary and would not dominate a view or block any views from scenic vistas or state scenic highways. It also would not substantially degrade the existing visual character or quality of an area given that the activity would be limited in geographic extent. Furthermore, manual and mechanical treatments currently occur within the treatable landscape under existing vegetation treatment programs; the increase in pace and scale of treatments under the proposed CalVTP would not introduce a new feature on the landscape. However, the overall number of acres treated per year would increase. SPR AES-2 would be implemented during treatment activities to avoid staging equipment within a viewshed and to minimize the visual presence of treatment-related materials and equipment. Therefore, manual and mechanical treatment activities would not result in a substantial degradation of a scenic vista or of visual character and quality, or substantially damage scenic resources within a state scenic highway.

Prescribed Burning

As described in Chapter 2, "Program Description," prescribed burning typically requires the construction of fire containment lines using manual or mechanical equipment in advance of burning. Workers must be on-site to implement and monitor the burn. Typical equipment used for a prescribed burn would include fire engines, bulldozers and bulldozer transports, masticators or track chippers (to create fuel break perimeter), and a water truck for fire suppression. Prescribed burning at any one site typically lasts one day, and may occur for up to one week and is usually conducted during late spring, or during the fall or winter. Figure 2-10 in Chapter 2, "Program Description," and Figure 3.2-7 show typical prescribed burning operations, including broadcast burning and pile burning.

Within the tree fuel type, it is unlikely that the equipment and vehicles associated with a prescribed burn would cause significant degradation of a view from a scenic vista or a state scenic highway, due to the cover provided by trees and the wide ranging and expansive nature of views from scenic vistas. In addition, equipment and vehicles would be only temporarily visible due to the speed of vehicles traveling along a state scenic highway. Within shrub and grass fuel types, the equipment associated with prescribed burning, as well as fire and smoke (addressed below), may be visible from a scenic vista or a state scenic highway. However, as previously described, views from scenic vistas are expansive and the duration of the view from a passing vehicle along a state scenic highway would be short; therefore, the presence of equipment and vehicles at a prescribed burn site would not block any views nor dominate a viewshed. Although their presence could contrast with the existing visual setting and associated visual character and quality of a treatment site, presence would be temporary, lasting the duration of a given burn (up to 1 week). Per SPR AES-2, equipment would be staged outside of viewsheds to the extent feasible. In addition, implementation of SPR REC-1 would require a project proponent to identify public recreation areas near prescribed burning operations, coordinate with the agency with jurisdiction over the recreation area to minimize conflicts with recreation, and notify potential users prior to beginning prescribed burning. Although prescribed burning could temporarily degrade the existing visual character and quality of an area, public viewer exposure could be reduced through notification, affording potential viewers the choice to avoid treatment areas. Furthermore, prescribed burning currently occurs within the treatable landscape under existing vegetation treatment programs; the increase in pace and scale of prescribed burning under the proposed CalVTP would not introduce a new activity on the landscape, but would expand the areas being treated by prescribed burning.

Figure 3.2-7 Examples of a Typical Prescribed Burn (Broadcast Burn and Pile Burning)

Varying levels of smoke would be generated by prescribed burning, which could affect scenic vistas, state scenic highways, and other public view points by dominating or blocking a view if excessive smoke is generated. Pursuant to SPR AQ-2, prior to obtaining air district permission to burn, an agency must prepare, submit, and get approval of a SMP. The SMP specifies the "smoke prescription," which is a set of air quality, meteorological, and fuel conditions needed before burn ignition may be allowed, which are developed with the intention of minimizing smoke emissions. Depending on the size and complexity of the burn, the SMP would contain useful information for managing smoke, such as burn monitoring procedures, smoke travel projections (including maps), smoke minimization techniques, and public notification procedures. Once areas suitable for prescribed burning are selected, prescriptions (e.g., wind direction, humidity, weather conditions) are developed in conjunction with modeling in a program such as BEHAVE to provide specific parameters for burning, which are included in a Burn Plan (SPR AQ-3). If conditions ever deviate from the Burn Plan, also called "going out of prescription" (e.g., winds change direction, humidity decreases), the burn is rescheduled, and crews transition from active burning activities to patrolling and extinguishing. Adherence to the Burn Plan and SMP would minimize smoke emissions from prescribed burning. Although smoke emissions could substantially increase if conditions go out of prescription, such increases would be temporary as active burning would cease and crews would begin extinguishing the fire; therefore, smoke would quickly dissipate. Compliance with the SMP and the Burn Plan, as required by SPRs AQ-2 and AQ-3, would minimize smoke emissions and smoke-related impacts by only allowing prescribed burning to occur when the conditions are appropriate to minimize smoke. In addition, implementation of SPR REC-1 would require coordination with local park and open space jurisdictions to reduce viewer exposure as well as public notification prior to prescribed burning. Furthermore, prescribed burning would be temporary, lasting up to one week (but typically 1 day) in a given area, and any associated smoke emissions would dissipate once burning is complete. Therefore, prescribed burning would not result in a substantial degradation of a scenic vista or visual character and quality, or substantially damage scenic resources within a state scenic highway.

Summary

All of the treatments described and evaluated above could be used in various combinations to implement the treatments types (i.e., WUI fuel reduction, ecological restoration, and fuel breaks), which could potentially degrade short-term public views if visible as described above. However, because of the temporary nature of treatment activities, and incorporation of SPRs into qualifying projects under the CalVTP, short-term impacts from treatment activities to scenic vistas, to visual character or quality of public views, or to scenic resources in a state scenic highway would remain less than significant. Long-term effects of the treatment types are evaluated below in Impact AES-2 and Impact AES-3.

Mitigation Measures

No mitigation is required for this impact.

Impact AES-2: Result in Long-Term, Substantial Degradation of a Scenic Vista or Visual Character or Quality of Public Views, or Damage to Scenic Resources in a State Scenic Highway from WUI Fuel Reduction, Ecological Restoration, or Shaded Fuel Break Treatment Types

Long-term effects to aesthetics would occur from implementing WUI fuel reduction, ecological restoration, and shaded fuel break treatment types in the treatable landscape. Because ecological restoration would be designed to improve habitat quality and create a landscape appearance closer to native conditions, it would result in long-term beneficial visual impacts. WUI fuel reduction activities would reduce vegetation near communities. However, it would not be significantly noticeable because sufficient vegetation would remain and could aid in the visual transition from wildlands to urban environment. Prescribed burning in the grass fuel type would result in the most substantial visual change as grasses would turn a dark charcoal/black color directly following prescribed burning. However, grasses would regrow during the next growing season(s), and wildfire and prescribed burning currently occur within the treatable landscape, thus burned vegetation of all types is occasionally visible. Requirements from SPR AD-4 and SPR REC-1 would be incorporated into prescribed burning projects and ensure notification to the public prior to the commencement of burning operations.

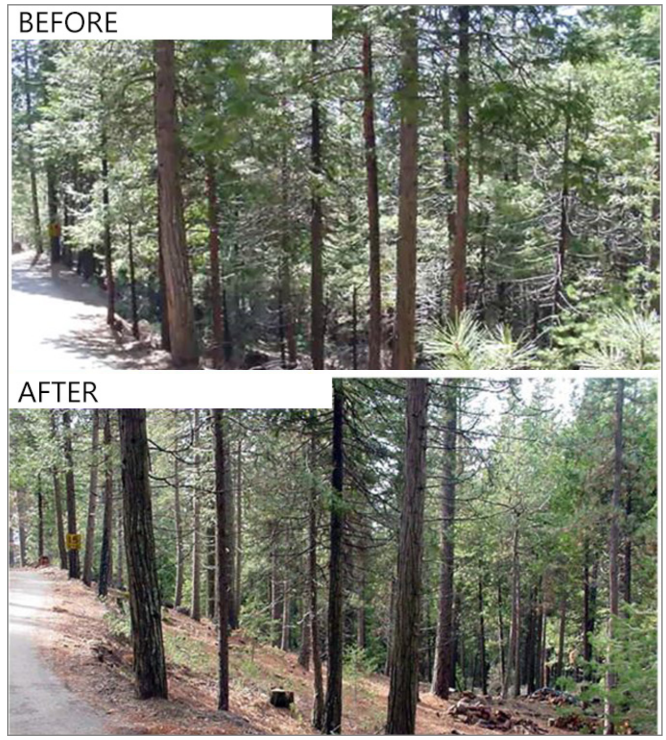
In the case of shaded fuel breaks, because not all of the existing vegetation would be cleared, and large trees would remain, vividness, intactness, and unity of views would remain, and their presence would not substantially affect views from a scenic vista or from a state scenic highway. Requirements from SPR AES-1 and SPR AES-3 would be incorporated into vegetation treatments to break up or screen linear edges of a clearing and screen views from public view points as feasible. Therefore, these treatment types would not result in a long-term or substantial degradation of a scenic vista, substantially damage resources in a state scenic highway, or degrade the existing visual character and quality of a site. This impact would be **less than significant**.

Ecological Restoration and Wildland Urban Interface Fuel Reduction

Ecological restoration would involve vegetation treatments that seek to return the landscape closer to native conditions where natural fire processes can be reestablished, and habitat quality is improved. This treatment type could be implemented through various combinations of any of the treatment activities proposed under the CalVTP (i.e., herbicides, prescribed herbivory, manual and mechanical treatments, prescribed burning). Because ecological restoration would retain most visually dominant vegetation as shown in Figure 2-8 in Chapter 2, “Program Description,” and would likely be a barely perceptible change for viewers from a scenic vista or a state scenic highway, and would not substantially degrade the visual character and quality of a site.

The focus of WUI fuel reduction treatments is to reduce fuel loads and slow or prevent the spread of fire between wildlands and structures and vice versa. Also, where existing habitat within the WUI is degraded, such as by the infestation of non-native plant species (which poses a wildfire risk), WUI treatments would also enhance habitat quality. This treatment type could be implemented through various combinations of any of the treatment activities proposed under the CalVTP. As shown in Figure 3.2-4 above, views of the WUI as seen from a scenic vista can vary widely with the stark contrast between wildland vegetation, and buildings, transportation corridors, and other contrasting elements. It may not even be possible to identify the precise location of a WUI fuel reduction treatment from a scenic vista given the variety of colors, forms, shapes, patterns and topography. Although various levels of vegetation thinning would likely occur, it would not be significantly noticeable against the elevated view of wildlands and development, and it could aid in the visual transition from wildlands to urban environment. Some WUI fuel reduction treatments could occur along a state scenic highway. Given the viewer sensitivity and overall exposure in these areas, there could be an adverse visual impact to the existing visual character and quality of views from scenic highways and other public view points. However, the landscape would be only temporarily visible due to the speed of vehicles traveling along a state scenic highway. In addition, although less vegetation would be present where these treatment types occur, the visual change would not be substantial because large trees would mostly remain and successional vegetation would establish (refer to examples shown in Figure 2-3 in Chapter 2, “Program Description,” and Figure 3.2-8). Furthermore, SPR AES-1 would be implemented to break up or screen linear edges of clearing and mimic forms of natural clearings, as feasible and reasonable.

View of a manual/mechanical treatment area.



Before and after manual/mechanical treatments.

Figure 3.2-8 Example Views of Treatment Areas

Where prescribed burning occurs in tree and shrub fuel types to implement ecological restoration or WUI fuel reduction treatment types, the visual change would be minimal because typically approximately 70 percent of vegetation would remain following a prescribed burn and there would be no new features contrasting with or blocking views of the existing environment from a scenic vista or state scenic highway. Long-range and expansive views from scenic vistas would continue to be dominated by the existing visual resources, including trees and other vegetation. In grass fuel types, prescribed burning would temporarily change the color of grasses from green or brown to a dark gray/black (refer to Figure 3.2-7), which could result in a short term and temporary adverse change in the visual character or quality of an area and could be visible from a scenic vista, state scenic highway, or other public view points. However, without treatment, annual grasses typically die off and turn brown each summer and regrow each winter; therefore, if prescribed burning of grass occurs in the fall, it would change the grass from a brown to a darker gray/black for a few months, until the grasses return in the winter. If prescribed burning of grass occurs in the spring, the grasses would become the darker gray/black color earlier in the year, may transition to brown over the summer months, and would be expected to regrow again during the winter or sooner. Furthermore, wildfire and prescribed burning currently occur within the treatable landscape under existing conditions, thus burned vegetation of all types is occasionally visible. SPR AD-4 and SPR REC-1 would be incorporated into prescribed burning treatments and requires notifying the public, including recreational users, prior to the commencement of burning operations of the timing and location of the prescribed burning activities thus affording potential viewers the choice to avoid recently treated areas. Therefore, ecological restoration and WUI fuel reduction would not result in a long-term, substantial degradation of a scenic vista, substantially damage resources in a state scenic highway, or degrade the existing visual character and quality of a site.

<u>Shaded Fuel Breaks</u>

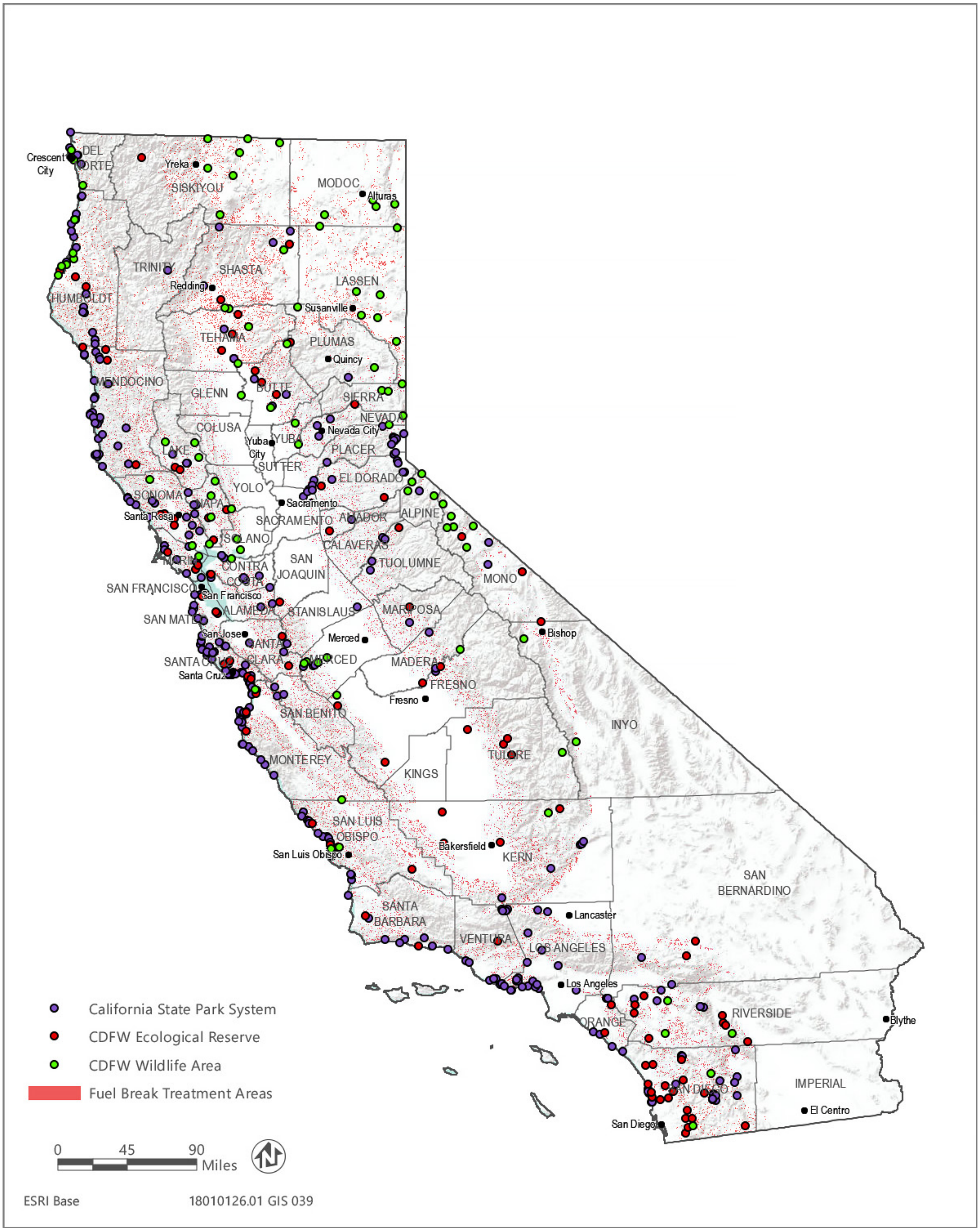
As shown in Figures 3.2-9 and 3.2-10, several recreation areas and state scenic highways intersect with areas modeled for the fuel break treatment type. Therefore, this treatment type could be visible from a scenic vista, state scenic highway, or recreation areas with public view points. Shaded fuel breaks could also be visible from scenic vistas in the treatable landscape outside of established recreation areas. Shaded fuel breaks are typically used in forest settings and the tree canopy is thinned to reduce the potential for a crown fire to move through the canopy; larger trees are left in place. Because not all of the existing vegetation would be cleared, and large trees would remain within shaded fuel breaks, vividness, intactness, and unity of views would likely remain high and it is unlikely that they would substantially affect views from a scenic vista or from a state scenic highway (refer to Figure 2-6 in Chapter 2, "Program Description," and Figure 3.2-11 for example views of shaded fuel breaks). Furthermore, SPR AES-1 and SPR AES-3 would be incorporated into vegetation treatment projects (including fuel breaks), as feasible, to break up or screen linear edges of a clearing, achieve a natural transitional appearance, and screen views from public trails, parks, recreation areas, and roadways as reasonable or appropriate for vegetation conditions. Therefore, establishment of shaded fuel breaks would not result in a long-term, substantial degradation of a scenic vista, substantially damage resources in a state scenic highway, or degrade the existing visual character and quality of a site.

<u>Summary</u>

Any of the proposed treatment types could be implemented in close proximity to public viewpoints and could result in long-term degradation of public views, as described above. However, because vegetation would remain under these treatment types and SPRs would be integrated into qualifying projects under the CalVTP to avoid and minimize aesthetic impacts and reduce viewer exposure, long-term degradation would not be substantial. Impacts from the proposed treatment types to scenic vistas, to visual character or quality of public views, or to scenic resources in a state scenic highway would be less than significant. Long-term effects of the non-shaded fuel break treatment type are evaluated below in Impact AES-3.

Mitigation Measures

No mitigation is required for this impact.



Source: Data downloaded from CDFW and CSP in 2019

Figure 3.2-9 Public Recreation Areas in the Vicinity of Modeled Fuel Breaks

Source: Data downloaded from Caltrans in 2015 and received from the Department of Forestry and Fire Protection in 2019

Figure 3.2-10 State Scenic Highways in the Vicinity of Modeled Fuel Breaks

Figure 3.2-11 Example of a Shaded Fuel Break

Impact AES-3: Result in Long-Term Substantial Degradation of a Scenic Vista or Visual Character or Quality of Public Views, or Damage to Scenic Resources in a State Scenic Highway from the Non-Shaded Fuel Break Treatment Type

Implementation of non-shaded fuel breaks would remove all of the vegetation within a treatment area and could be visible from scenic vistas, state scenic highways, or other public view points. Because non-shaded fuel breaks remove all vegetation, this treatment type could lead to a long-term adverse visual change in the landscape by resulting in a contrasting linear element in an otherwise natural environment. This change would constitute substantial degradation of a scenic vista or the visual character and quality of public views, or substantial damage to scenic resources within a state scenic highway to the extent a non-shaded fuel break is visible to the public. This would be a **potentially significant** impact.

Non-shaded fuel breaks would be implemented in strategic locations within the treatable landscape, which unlike shaded fuel breaks, remove all of the vegetation from within the treatment area and are often established along ridgelines. Non-shaded fuel breaks can be visible from several vantage points including from a scenic vista, a state scenic highway, or from other public view points. As shown in Figure 3.2-9 and Figure 3.2-10, modeled fuel break treatment areas (some of which would be non-shaded) are located in areas potentially viewable from several recreation areas and state scenic highways. Non-shaded fuel breaks could also be visible from other scenic vistas in the treatable landscape outside of established recreation areas.

As shown in Figure 2-5 in Chapter 2, "Program Description," and Figure 3.2-12, non-shaded fuel breaks can change the landscape by introducing a contrasting linear element in an otherwise natural environment, which could reduce vividness, intactness, and unity. This adverse change could constitute substantial degradation of visual character and quality, which could be visible from a scenic vista, a state scenic highway, or from other public viewing points in recreation areas or near the WUI. Non-shaded fuel breaks could also substantially damage scenic resources (i.e., trees and other vegetation) along a state scenic highway by directly removing trees and other vegetation. If this occurred from establishment of non-shaded fuel breaks, the impact to aesthetics and visual resources from would be **potentially significant**.

Figure 3.2-12 Example of a Non-Shaded Fuel Break

Mitigation Measures

Mitigation Measure AES-3: Conduct Visual Reconnaissance for Non-Shaded Fuel Breaks and Relocate or Feather and Screen Publicly Visible Non-Shaded Fuel Breaks

The project proponent will conduct a visual reconnaissance of the treatment area prior to implementing non-shaded fuel breaks to observe the surrounding landscape and determine if public viewing locations, including scenic vistas, public trails, and state scenic highways, have views of the proposed treatment area. If none are identified, the non-shaded fuel break may be implemented without additional visual mitigation

If the project proponent identifies public viewing points, including heavily used scenic vistas, public trails, recreation areas, and state scenic highways with lengthy views (i.e., longer than a few seconds) of a proposed non-shaded fuel break treatment area, the project proponent will, prior to implementation, attempt to identify any feasible change in location of the fuel break to reduce its visibility from public viewpoints. If no feasible location changes exist that would reduce impacts to public viewers and achieve the intended wildfire risk reduction objectives of the proposed non-shaded fuel break, the project proponent will implement, where feasible, a shaded fuel break rather than a non-shaded fuel break, if the shaded fuel break would achieve the intended wildfire risk reduction objectives. With the shaded fuel break, the project proponent will thin and feather adjacent vegetation to break up the linear edges of the fuel break and strategically preserve vegetation at the edge of the fuel break, as feasible, to help screen public views and minimize the contrast between the fuel break and surrounding vegetation.

Significance after Mitigation

As previously discussed, non-shaded fuel breaks would be established in strategic locations, typically where there is a natural change in vegetation type, to reduce fire spread to structures and natural resources and to provide access for fire suppression efforts. Because of the strategic nature of non-shaded fuel break siting, it may be infeasible to relocate a non-shaded fuel break to avoid public visibility, per Mitigation Measure AES-3. Further, converting a planned non-shaded fuel break to a shaded fuel break may not achieve the wildfire risk reduction objectives of the fuel break and vegetation feathering techniques may not fully and effectively mitigate the adverse visual impact from implementation of a non-shaded fuel break to public viewers. Therefore, if Mitigation Measure AES-3 is necessary to reduce a potentially significant impact and cannot be implemented in a way that would feasibly reduce the visual impact below significance, a substantial degradation of a scenic vista or visual character or quality of public views, or damage to scenic resources in a state scenic highway from the non-shaded fuel break treatment type could be unavoidable. Accordingly, the impact, if it occurred, would remain **significant and unavoidable**.

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3.3 AGRICULTURE AND FORESTRY RESOURCES

This section describes existing agriculture and forestry resources within the treatable landscape, including identification of any Prime Farmland, Unique Farmland, Farmland of Statewide Importance, timberland, and forest land. The analysis includes a description of the existing environmental conditions including applicable regulatory requirements, the methods used for assessment, and the potential direct and indirect impacts of program implementation on agriculture and forestry resources.

No comments received on the Notice of Preparation were related to agriculture and forestry resources (see Appendix A).

3.3.1 Environmental Setting

FARMLAND CLASSIFICATIONS

California Wildlife Habitat Relation System Agricultural Designations

The California Wildlife Habitat Relation (WHR) system, managed by California Department of Fish and Wildlife, is a system that classifies vegetation types. WHR was developed to recognize and logically categorize major vegetative complexes at a scale sufficient to predict wildlife-habitat relationships. There are a total of 59 habitat types identified by the WHR system, including 10 agricultural land habitats (CDFW 2018). As discussed in Chapter 2, "Program Description," of this PEIR, the treatable vegetation types were selected based on similar fire characteristics and include tree-dominated, shrub-dominated, and herb-dominated habitat types. The WHR agricultural habitat types were excluded from the treatable landscape, because their wildfire risks in agricultural lands are considered negligible by CAL FIRE.

Farmland Mapping and Monitoring Program Agricultural Classifications

The California Department of Conservation (DOC) Farmland Mapping and Monitoring Program (FMMP) prepares maps and statistical data for analyzing land use impacts on California's agricultural resources. The FMMP categorizes agricultural production potential based on a combination of physical and chemical characteristics of the soil and climate that determine the degree of suitability of the land for crop production. FMMP updates the agricultural data and maps for each county every two years. The most recent update occurred in 2016. The farmland classifications under FMMP are as follows:

- Prime Farmland: land that has the best combination of features for the production of agricultural crops;
- Farmland of Statewide Importance: land other than Prime Farmland that has a good combination of physical and chemical features for the production of agricultural crops but that has more limitations than Prime Farmland, such as greater slopes or less ability to store soil moisture;
- Unique Farmland: land of lesser quality soils used for the production of the state's leading agricultural cash crops;
- Farmland of Local Importance: land of importance to the local agricultural economy; or
- Grazing Land: existing vegetation that is suitable for grazing.

Table 3.3-1 includes the approximate acreages of each farmland type located within the treatable landscape organized by County.

Table 3.3-1 Agricultural Land within the Treatable Landscape by County (acres)

County	Prime Farmland	Farmland of Statewide Importance	Unique Farmland	Farmland of Local Importance	Grazing Land
Alameda	62	58	190	0	149,636
Amador	150	136	537	652	165,531
Butte	68	122	450	0	232,635
Colusa	198	167	75	110,720	994
Contra Costa	195	4	479	24,790	106,902
El Dorado	133	398	1,060	52,623	166,164
Fresno	115	32	260	2,504	361,659
Glenn	67	60	191	2,745	88,122
Kern	710	126	579	0	707,455
Kings	2	0	3	0	30,089
Lake	58	11	1,115	0	142,763
Los Angeles	272	15	83	238	114,403
Madera	24	1	138	47	226,824
Marin	0	5	74	6,247	55,560
Mendocino	456	48	1,537	0	1,138,280
Merced	414	152	1,780	991	81,989
Monterey	725	253	1,145	0	467,331
Modoc	704	791	421	136,931	241,786
Mariposa	0.09	2	30	0	256,503
Napa	767	596	4,456	7,060	131,666
Nevada	86	288	130	3,866	114,204
Orange	15	11	108	0	25,611
Placer	126	347	197	48,780	6,129
Riverside	212	140	2,409	35,568	53,890
Sacramento	100	35	269	952	42,744
Santa Barbara	1,084	322	3,097	2,074	345,662
San Bernardino	95	45	99	11	119,789
San Benito	428	65	334	987	228,261
Santa Clara	85	4	197	837	223,765
Santa Cruz	191	86	426	72	13,383
San Diego	436	434	3,789	55,176	64,076
Shasta	952	183	53	1,318	318,141
Siskiyou	523	352	568	408,724	178,958
San Joaquin	393	2	3,563	4,677	53,937
San Luis Obispo	1,051	708	5,777	8,442	476,037
San Mateo	198	12	264	208	41,874
Solano	170	27	159	0	57,340

Table 3.3-1 Agricultural Land within the Treatable Landscape by County (acres)

County	Prime Farmland	Farmland of Statewide Importance	Unique Farmland	Farmland of Local Importance	Grazing Land
Sonoma	382	782	3,695	9,205	327,612
Sierra Valley	47	2	6	15,141	38,487
Stanislaus	1,202	341	11,090	1,300	163,625
Tehama	1,219	342	2,145	54,909	718,955
Tulare	299	365	372	26,172	305,620
Ventura	653	412	3,380	7,156	156,628
Yolo	281	308	1,241	1,518	89,683
Yuba	142	22	84	0	90,763
Total	*15,490*	*8,612*	*58,055*	*1,032,641*	*9,121,467*

Notes: Farmland data for Imperial County was not available.
Source: DOC 2016

Williamson Act Contract Lands Farmland Classifications

The California Land Conservation Act (Williamson Act) recognizes the importance of agricultural land and includes provisions to protect and ensure the orderly conversion of agricultural land. The Williamson Act allows a property owner to commit, via contract with the County, to not developing a subject property in exchange for a guarantee that the property will be taxed at agricultural values under minimum 10-year rolling term contracts. The contracts may be cancelled to allow a limited number of public uses, such as open space and natural resource conservation, and a cancellation fee may apply. The process for exiting the contracts involves nonrenewal, which takes place over a 9-year period. According to DOC 2016 Status Report, more than 14 million acres of land were enrolled under Williamson Act Contract throughout the state in 2015 (DOC 2016:39). The treatable landscape includes land enrolled under Williamson Act in each of the designated farmland categories. The farmland classifications under Williamson Act are as follows:

- Prime Agricultural Land: Land which is enrolled under California Land Conservation Act contract and meets any of the following criteria (as set forth under California Government Code Section 51201):
  - qualifies for rating as class I or class II in the Natural Resources Conservation Service land use capability classifications;
  - qualifies for rating 80 to 100 in the Storie Index Rating;
  - supports livestock used for the production of food and fiber and which has an annual carrying capacity equivalent to at least one animal unit per acre, as defined by the United States Department of Agriculture;
  - planted with fruit or nut-bearing trees, vines, bushes or crops which have a nonbearing period of less than five years and which will normally return during the commercial bearing period on an annual basis from the production of unprocessed agricultural plant production not less than two hundred dollars per acre;
  - has returned from the production of unprocessed agricultural plant production and has an annual gross value of not less than two hundred dollars per acre for three of the previous five years.
- Non-Prime Agricultural Land: Land which is enrolled under California Land Conservation Act contract and does not meet any of the criteria for classification as Prime Agricultural Land. Non-Prime Land is defined as Open Space Land of Statewide Significance under the California Open Space Subvention Act. Most Non-Prime Land is in agricultural uses such as grazing or non-irrigated crops. Non-Prime Land may also include other open space uses which are compatible with agriculture and consistent with local general plans.
- Farmland Security Zone: Enrolled parcels containing either Prime or Non-Prime agricultural land restricted by a 20-year contract pursuant to Government Code Section 51296.

- Mixed Enrollment: Enrolled lands containing a combination of Prime, Non-Prime, Open Space Easement, or other contracted or enrolled lands not yet delineated by the county.
- Non-Renewal: Enrolled lands for which non-renewal has been filed pursuant to Government Code Section 51245. Upon the filing of non-renewal, the existing contract remains in effect for the balance of the period remaining on the contract. During the non-renewal process, the annual tax assessment gradually increases. At the end of the 9-year non-renewal period (or 19-year non-renewal period if FSZ), the contract expires, and the land is no longer restricted.

FOREST AND TIMBERLAND IN CALIFORNIA

California has approximately 33 million acres of forest. Federal agencies, including the US Forest Service, US Bureau of Land Management, and National Park Service, own and manage 19 million acres (57 percent). State and local agencies including CAL FIRE, local open space, park and water districts and land trusts own approximately 990,000 acres (3 percent). The remaining 13 million acres (40 percent) is owned by private landowners, Native American tribes, or companies (UC ANR 2019). Of the 33 million acres of forest land within the state, approximately 6 million acres are located within the treatable landscape.

Timberland (forest that is available for and capable of growing a crop of trees for commercial purposes) within California, include approximately 9 million acres (55.5 percent) under federal ownership, 141,057 acres (0.8 percent) under state and local ownership, and 7 million acres (43.7 percent) under private ownership (CDFW 2018). Of the 9 million acres of timberland within the state, approximately 7 million acres are located within the treatable landscape. Non-commercial vegetation treatment may occur in timberland; however, the proposed CalVTP excludes commercial timber removal.

EXISITING VEGETATION TREATMENTS IN THE TREATABLE LANDSCAPE

Treatments currently occur within the treatable landscape, but generally do not occur in agricultural vegetation types because land designated for agricultural use is generally outside the SRA. As described in Chapter 1, “Introduction” and Section 2.3.1, “Past and Current Treatments,” vegetation treatment currently occurs around the state under several other wildfire risk reduction programs implemented by various federal, state, and local agencies. In 2017–2018, CAL FIRE treated approximately 33,000 acres in California using the same treatment activities as proposed under the CalVTP.

3.3.2 Regulatory Setting

FEDERAL

No federal laws or regulations related to agriculture and forestry resources are applicable to the project. The treatable landscape does not include federal land.

STATE

California Department of Conservation Farmland Mapping and Monitoring Program

Important Farmland in California is classified and mapped according to the DOC’s FMMP. Authority for the FMMP comes from Government Code Section 65570(b) and PRC Section 612. Government Code Section 65570(b) requires DOC to collect or acquire information on the amount of land converted to or from agricultural use for every mapped county and to report this information to the legislature. PRC Section 612 requires DOC to prepare, update, and maintain Important Farmland series maps and other soils and land capability information.

California Land Conservation Act of 1965

As discussed in Section 3.3.1, the California Land Conservation Act of 1965, or the Williamson Act, preserves agricultural and open space lands through property tax incentives and voluntary restrictive use contracts. Private landowners voluntarily restrict their land to agricultural and compatible open space uses under minimum 10-year rolling term contracts. In return, restricted parcels are assessed for property tax purposes at a rate consistent with their actual use rather than potential market value.

California Public Resources Code

Agricultural and forestry land within California are defined by the California Public Resources Code (PRC) as follows:

- Section 21060.1(a) defines "Agricultural land" as prime farmland, farmland of statewide importance, or unique farmland, as defined by the United States Department of Agriculture land inventory and monitoring criteria, as modified for California.
- Section 21060.1(b) states the following: In those areas of the state where lands have not been surveyed for the classifications specified in subdivision (a), "agricultural land" means land that meets the requirements of "prime agricultural land" as defined in paragraph (1), (2), (3), or (4) of subdivision (c) of Section 51201 of the Government Code.
- Section 12220(g) defines forest land as land that can support 10 percent native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits.
- Section 4526 defines timberland as land, other than land owned by the federal government and land designated by the board as experimental forest land, which is available for, and capable of, growing a crop of trees of a commercial species used to produce lumber and other forest products, including Christmas trees.

Z'berg-Nejedly Forest Practice Act

Although the proposed CalVTP excludes timber removal for commercial purposes, the Z'berh -Nejedly Forest Practice Act (Forest Practice Act) may be pertinent as it relates to identifying operating methods and procedures that seek to protect fish, wildlife, forests, and streams within timber harvesting areas where qualifying CalVTP treatments may also be implemented. The Forest Practice Act is intended to achieve "maximum sustained production of high-quality timber products…while giving consideration to values relating to recreation, watershed, wildlife, range and forage, fisheries, regional economic vitality, employment and aesthetic enjoyment" (PRC Section 4513[b]). The regulations created by the Forest Practice Act define factors such as the: size and location of harvest areas, include measures to prevent unreasonable damage to residual trees, and address the protection of riparian areas, water courses and lakes, wildlife, and habitat areas.

Timberland Productivity Act

Although the proposed CalVTP excludes timber removal for commercial purposes, the Timberland Productivity Act may be pertinent as it relates to compatible uses, such as management for watershed or habitat purposes. The Timberland Productivity Act represents the Legislature's declared intent "to fully realize the productive potential of the forest resources and timberlands of the state." The Act imposes mandatory restrictions on parcels zoned as timberland production. Such parcels "shall be zoned so as to restrict their use to growing and harvesting timber and to compatible uses." (Gov. Code, Section 51115.) In exchange, property owners are required to pay property taxes on the land based solely on its value for timber harvest, and not for its development potential, as is the case with qualifying agricultural and open space lands under the Williamson Act (discussed above). Government Code Section 51104(g) of the defines "timberland production zone" as an area which has been zoned pursuant to Section 51112 or 51113 and is devoted to and used for growing and harvesting timber, or for growing and harvesting timber and compatible uses. Compatible uses are defined under Section 51104(h) and include management for watershed; management for habitat or hunting and fishing; access roads and staging areas for timber harvesting; gas, electric, water, or communication transmission facilities; grazing; or a residence or other structure necessary for timber management.

Z'berg-Warren-Keen-Collier Forest Taxation Reform Act

Although the proposed CalVTP excludes timber removal for commercial purposes, timberland zoning may be pertinent as it relates to avoidance of land use conflicts. According to the Z'Berg-Warren-Keene-Collier Forest Taxation Reform Act (California Government Code - Sections 51110-51119.5: Article 2), enacted in 1976, counties must provide for the zoning of land used for growing and harvesting timber as Timberland Production Zones (TPZs). TPZs were established to preserve and protect timberland from conversion to other uses and avoid land use conflicts.

LOCAL

When state agencies, including CAL FIRE, are conducting governmental activities under the authority of state law or the state Constitution, in this case, treatments implemented under the proposed CalVTP, they are exempt from local government plans, policies, and ordinances (unless a constitutional provision or statute directs otherwise). Nonetheless, CAL FIRE voluntarily seeks to operate consistently with local governance to the extent feasible. Given its statewide extent and the possible number of local and regional responsible agencies, this PEIR does not identify potentially applicable local government plans, policies, and ordinances. Types of local regulations relevant to agriculture and forestry include City and County General Plans, zoning ordinances, and policies adopted to protect agriculture and forestry resources. This PEIR assumes that any vegetation treatments proposed by local or regional agencies under the CalVTP would be consistent with local plans, policies, and ordinances, as required by SPR AD-3.

3.3.3 Impact Analysis and Mitigation Measures

ANALYSIS METHODOLOGY

The analysis of environmental impacts on agriculture and forestry focuses on the potential for conversion of farmland to non-agricultural uses, conversion of forest land to non-forest uses, and conflicts with policies and regulations intended to protect farmland and forest land. Significance determinations account for the influence of relevant SPRs, which are incorporated into treatment design.

THRESHOLDS OF SIGNIFICANCE

Thresholds of significance are based on Appendix G of the 2019 State CEQA Guidelines. A treatment implemented under the proposed CalVTP would result in a significant impact on agricultural and forest (including timber) resources if it would:

- convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use;
- conflict with existing zoning for agricultural use, or a Williamson Act contract;
- conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g));
- result in the loss of forest land or conversion of forest land to a non-forest use;
- involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use.

ISSUES NOT EVALUATED FURTHER

Implementation of the CalVTP would consist of vegetation treatment activities that would modify portions of the treatable landscape to reduce wildfire risk. As discussed in Section 2.4 of Chapter 2, "Project Description," agricultural land is excluded from the treatable landscape because wildfire risks within agricultural lands are considered negligible. Therefore, CAL FIRE, or other project proponent, would not implement treatment activities on land classified as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, and this issue is not evaluated further.

As stated above, wildfire risks within agricultural lands are considered negligible by CAL FIRE and agricultural vegetations types as designated by the California Wildlife Habitat Relationship (CWHR) system as are generally excluded from the treatable landscape. It is not expected that treatments would occur on land under active agricultural production (as wildfire risk is negligible). However, as discussed in Section 3.3.1, "Environmental Setting," the treatable landscape includes land enrolled under Williamson Act in each of the designated farmland categories and may encompass areas zoned as agriculture despite not being identified as an agricultural land type by CWHR and these designations do not necessarily indicate whether the land is under agricultural production. In these cases, if a treatment is implemented on land zoned as agriculture or under a Williamson act contract, the treatment would occur to existing vegetation and would not change the land use. Therefore, conflicts with zoning or Williamson Act contracts are not evaluated further. Also, because there would be no change in land use there would be no conversion of agriculture to a non-agricultural use and this issue is not evaluated further.

The treatable landscape is divided into three fuel types that exhibit similar fire behavior characteristics: grass, shrub, and tree. Within these primary fuel types, the tree fuel type encompasses approximately 40 percent of the SRA and is the largest of the three types. Treatment activities that could occur within tree fuel type include prescribed burning mechanical treatment, manual treatment, prescribed herbivory, and herbicide application. As discussed in Section 3.3.1, "Environmental Setting," the treatable landscape includes 6 million acres of forest land and 7 million acres of timberland. CAL FIRE, or other project proponent, could implement treatment activities on land zoned for forest land and/or timberland located within the SRA, which are under CAL FIRE's jurisdiction. However, the proposed CalVTP does not include actions that would remove trees for commercial purposes. Additionally, treatment activities would maintain the current use of the land and would not require rezoning of forest land or timberland to another use. In addition, implementation of treatment activities would not involve development that would conflict with existing zoning for forest land or timberland. Therefore, implementation of the proposed CalVTP would not conflict with existing zoning for forest land or timberland, and this issue is not evaluated further.

IMPACT ANALYSIS

Impact AG-1: Directly Result in the Loss of Forest Land or Conversion of Forest Land to a Non-Forest Use or Involve Other Changes in the Existing Environment Which, Due to Their Location or Nature, Could Result in Conversion of Forest Land to Non-Forest Use

The WUI fuel reduction, ecological restoration and non-shaded fuel break treatment types would inherently retain some vegetation within treatment areas. Establishing a non-shaded fuel break would require complete removal of vegetation within the limited area of the fuel break. Untreated vegetation surrounding the fuel break within forest land would remain intact. Although, treatment activities would alter forest land through vegetation removal, the area would generally support 10 percent of native tree cover thereby maintaining consistency with the definition of forest land as defined by PRC Section 12220(g). Treatment activities under the CalVTP would not result in the loss of forest land or conversion of forest land to a non-forest use. This impact would be **less than significant**.

Treatment activities would modify portions of the treatable landscape to reduce wildfire risk. As previously discussed, appropriate areas within which to implement vegetation treatments were identified using the CWHR system and divided into three fuel types: grass, shrub, and tree. Within these primary fuel types, the tree fuel type encompasses approximately 40 percent of the SRA and is the largest of the three groups. The tree fuel type encompasses forest land as defined by PRC Section 12220(g) and considered in this analysis. Pursuant to, PRC Section 12220(g). forest land is defined as land that can support 10 percent native tree cover of any species under natural conditions. Treatment activities that could occur within the tree fuel type include prescribed burning, mechanical treatment, manual treatment, prescribed herbivory, and herbicide application. As discussed in Section 3.3.1, "Environmental Setting," the treatable landscape includes 6 million acres of forest land. Implementation of treatment activities within forest land would involve vegetation removal, such as trees, shrubs, and undergrowth. The WUI fuel reduction, ecological restoration and non-shaded fuel break treatment types would inherently retain some vegetation within treatment areas. Establishing a non-shaded fuel break would require complete removal of vegetation within the limited area of the fuel break (typically up to 300 feet wide but in some cases wider) to achieve the strategic and functional objectives of the fuel break. Untreated vegetation surrounding the fuel break within forest land would remain intact. Although, treatment activities would alter forest land through vegetation removal, the area would generally support 10 percent of native tree cover thereby maintaining consistency with the definition of forest land as defined by PRC Section 12220(g). Therefore, implementation of the CalVTP would not directly result in the loss of forest land or convert forest land to a non-forest use or involve other changes in the existing environment that could result in conversion of forest land to non-forest use. This impact would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

3.4 AIR QUALITY

This section describes existing air quality conditions within the treatable landscape and identifies regulations applicable to the types of emissions-generating activities that could occur in the CalVTP. It presents an analysis of potential air quality impacts associated with implementation of the CalVTP and describes feasible mitigation measures to reduce potentially significant impacts to air quality.

Comments on the Notice of Preparation related to air quality included concerns about cumulative impacts to air quality and smoke impacts from prescribed burning (see Appendix A). These topics are addressed in Section 3.4.3, "Environmental Impacts and Mitigation Measures." Cumulative air quality impacts are addressed in Impacts AQ-1, and AQ-2; and smoke impacts from prescribed burning are addressed in Impacts AQ-2 and AQ-3.

3.4.1 Regulatory Setting

Air quality in California, including within the treatable landscape, is regulated by federal, state, regional, and local government agencies. These agencies work to improve air quality through legislation, planning, policy-making, education, and a variety of programs. The regulations of the agencies responsible for improving air quality in the treatable landscape are discussed below.

FEDERAL

Clean Air Act

The U.S. Environmental Protection Agency (EPA) is responsible implementing national air quality programs. EPA's air quality mandates draw primarily from the federal Clean Air Act (CAA), which was enacted in 1970, and the major amendments made by Congress in 1990. EPA's air quality efforts address both criteria air pollutants and hazardous air pollutants (HAPs). EPA regulations concerning criteria air pollutants and HAPs are presented in greater detail below. The CAA is applicable to the CalVTP, because treatment activities have the potential to generate criteria air pollutant and HAP emissions through use of off-road equipment, machine-powered hand tools, helicopters, vehicles for worker commute, trucks for materials delivery and hauling, and prescribed burning.

Criteria Air Pollutants

The CAA required EPA to establish national ambient air quality standards (NAAQS) for six common air pollutants found all over the U.S., referred to as criteria air pollutants. EPA has established primary and secondary NAAQS for the following criteria air pollutants: ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable particulate matter with aerodynamic diameter of 10 micrometers or less (PM_{10}) and fine particulate matter with aerodynamic diameter of 2.5 micrometers or less ($PM_{2.5}$), and lead. Criteria air pollutants (or precursors) would be generated by treatment activity implemented under the CalVTP. The NAAQS are shown in Table 3.4-1. The primary standards protect public health and the secondary standards protect public welfare. The CAA also required each state to prepare a State Implementation Plan (SIP) for attaining and maintaining the NAAQS. The federal Clean Air Act Amendments of 1990 added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. California's SIP is modified periodically to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. The map in Figure 3.4-1 shows the locations of air basins in California. EPA is responsible for reviewing all SIPs to determine whether they conform to the mandates of the CAA and its amendments, and whether implementation will achieve air quality goals. If EPA determines a SIP to be inadequate, EPA may prepare a federal implementation plan that imposes additional control measures. If an approvable SIP is not submitted or implemented within the mandated time frame, sanctions may be applied to transportation funding and stationary air pollution sources in the air basin.

Table 3.4-1 National and California Ambient Air Quality Standards

Pollutant	Averaging Time	California (CAAQS) [a, b]	National (NAAQS)[c]	
			Primary [b,d]	Secondary [b,e]
Ozone	1-hour	0.09 ppm (180 μg/m^3)	–[e]	Same as primary standard
	8-hour	0.070 ppm (137 μg/m^3)	0.070 ppm (147 μg/m^3)	
Carbon monoxide (CO)	1-hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	Same as primary standard
	8-hour	9 ppm[f] (10 mg/m^3)	9 ppm (10 mg/m^3)	
Nitrogen dioxide (NO_2)	Annual arithmetic mean	0.030 ppm (57 μg/m^3)	53 ppb (100 μg/m^3)	Same as primary standard
	1-hour	0.18 ppm (339 μg/m^3)	100 ppb (188 μg/m^3)	—
Sulfur dioxide (SO_2)	24-hour	0.04 ppm (105 μg/m^3)	—	—
	3-hour	—	—	0.5 ppm (1300 μg/m^3)
	1-hour	0.25 ppm (655 μg/m^3)	75 ppb (196 μg/m^3)	—
Respirable particulate matter (PM_{10})	Annual arithmetic mean	20 μg/m^3	—	Same as primary standard
	24-hour	50 μg/m^3	150 μg/m^3	
Fine particulate matter ($PM_{2.5}$)	Annual arithmetic mean	12 μg/m^3	12.0 μg/m^3	15.0 μg/m^3
	24-hour	—	35 μg/m^3	Same as primary standard
Lead [f]	Calendar quarter	—	1.5 μg/m^3	Same as primary standard
	30-Day average	1.5 μg/m^3	—	—
	Rolling 3-Month Average	–	0.15 μg/m^3	Same as primary standard
Hydrogen sulfide	1-hour	0.03 ppm (42 μg/m^3)	No national standards	
Sulfates	24-hour	25 μg/m^3		
Vinyl chloride [f]	24-hour	0.01 ppm (26 μg/m^3)		
Visibility-reducing particulate matter	8-hour	Extinction of 0.23 per km		

Notes: CAAQS = California ambient air quality standards; NAAQS = national ambient air quality standards; μg/m^3 = micrograms per cubic meter; km = kilometers; ppb = parts per billion; ppm = parts per million.

a California standards for ozone, carbon monoxide, SO_2 (1- and 24-hour), NO_2, particulate matter, and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

b Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based on a reference temperature of 25 degrees Celsius (°C) and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

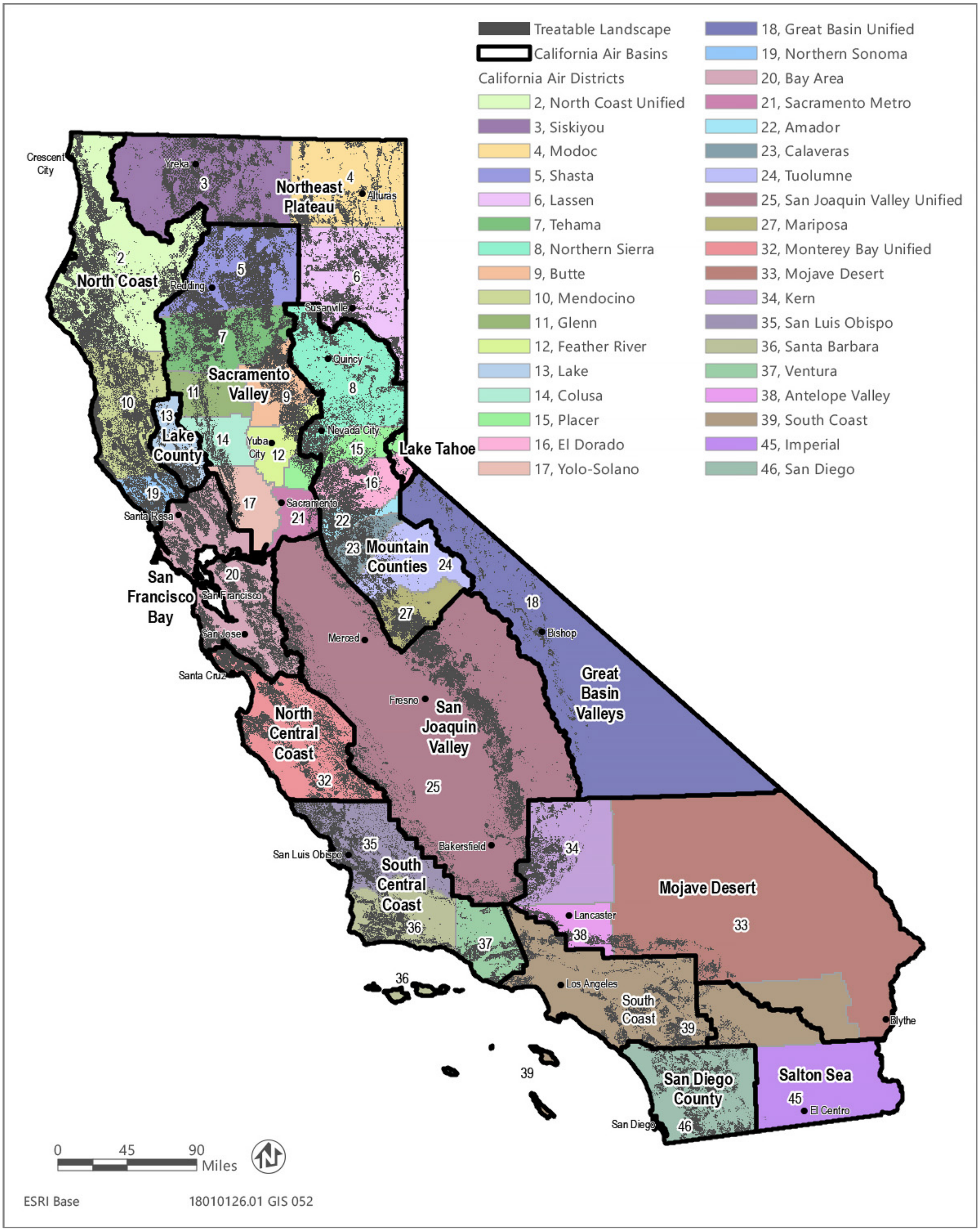
c National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic means) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration in a year, averaged over three years, is equal to or less than the standard. The PM_{10} 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 μg/m^3 is equal to or less than one. The $PM_{2.5}$ 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. Environmental Protection Agency for further clarification and current federal policies.

d National primary standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

e National secondary standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

f The California Air Resources Board has identified lead and vinyl chloride as toxic air contaminants with no threshold of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

Source: CARB 2016a



Source: Data downloaded from CARB in 2018

Figure 3.4-1 California Air Basins, Air Districts, and the CalVTP Treatable Landscape

<u>Toxic Air Contaminants and Hazardous Air Pollutants</u>

Toxic air contaminants (TACs), or in federal parlance, hazardous air pollutants (HAPs), are a defined set of airborne pollutants that may pose a present or potential hazard to human health. TACs would be generated by treatment activities implemented under the CalVTP. A TAC is defined as an air pollutant that may cause or contribute to an increase in mortality or in serious illness, or that may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air; however, their high toxicity or health risk may pose a threat to public health even at low concentrations.

A wide range of sources, from industrial plants to motor vehicles, emit TACs. The health effects associated with TACs are quite diverse and generally are assessed locally, rather than regionally. TACs can cause long-term health effects such as cancer, birth defects, neurological damage, asthma, bronchitis, or genetic damage; or short-term acute health effects such as eye watering, respiratory irritation (a cough), running nose, throat pain, and headaches.

For evaluation purposes, TACs are separated into carcinogens and non-carcinogens based on the nature of the physiological effects associated with exposure to the pollutant. Carcinogens are assumed to have no safe threshold below which health impacts would not occur. This contrasts with criteria air pollutants for which acceptable levels of exposure can be determined and for which the ambient standards have been established (Table 3.4-1). Cancer risk from TACs is expressed as excess cancer cases per one million exposed individuals, typically over a lifetime of exposure.

EPA regulates HAPs through its National Emission Standards for Hazardous Air Pollutants. The standards for a particular source category require the maximum degree of emission reduction that the EPA determines to be achievable, which is known as the Maximum Achievable Control Technology standards. These standards are authorized by Section 112 of the CAA and the regulations are published in 40 Code of Federal Regulations (CFR) Parts 61 and 63.

Federal Advisory Committee Act

Established through a charter, the purpose of the Federal Advisory Committee Act (FACA) Wildland Fire Issues Group was to provide EPA recommendations for revising its policies for implementing the current NAAQS for PM_{10} and any new NAAQS for $PM_{2.5}$, with respect to prescribed burns and their impact. Although the Charter for the FACA for Ozone, Particulate Matter, and Regional Haze has expired, the findings of the Wildland Fire Issues Group pertain to prescribed burn in relation to air quality. Most importantly, the *Interim Air Quality Policy on Wildland and Prescribed Burns* was produced by the group and is the national standard when local guidelines have not been established. The document outlines the following: Smoke Management Programs; who is accountable when a prescribed burn results in exceedances of the NAAQS; and overall objectives for prescribed burns in relation to air quality (EPA 1998). Treatment activities implemented under the CalVTP would include prescribed burns. Although local guidelines have been established and are discussed below, the *Interim Air Quality Policy on Wildland and Prescribed Burns* is included to provide context on how prescribed burns are regulated at the federal level.

Prescribed Burn Smoke Management Guide

The National Wildfire Coordinating Group was originally chartered by the U.S. Secretaries of the Interior and Agriculture in 1976. In 2001, NWCG's Fire Use Working Team sponsored the creation of the *Smoke Management Guide for Prescribed and Wildland Fire* (NWCG 2018). The guide outlines why fire is important to the ecosystem, regulations that impact smoke management, best management practices for reducing emissions during prescribed burn, and ways to monitor air quality during prescribed burns. The EPA advises that this guide be consulted when calculating emissions for prescribed burn. Treatment activities implemented under the CalVTP would include prescribed burns; thus, the NWCG's *Smoke Management Guide for Prescribed and Wildland Fire* was consulted for emissions calculations, as detailed in Appendix AQ-1.

STATE

California Clean Air Act

The Mulford-Carrell Air Resources Act of 1968 created the California Air Resources Board (CARB) and required it to adopt statewide air quality standards, which are referred to as the California Ambient Air Quality Standards (CAAQS). CARB is the agency responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the California Clean Air Act (CCAA). The CCAA, which was adopted in 1988, required local air districts to develop and implement plans to achieve the CAAQS. The CAAQS are presented with the NAAQS in Table 3.4-1.

As shown in Table 3.4-1, CARB has established CAAQS for sulfates, hydrogen sulfide, vinyl chloride, visibility-reducing particulate matter, and the above-mentioned criteria air pollutants. For most criteria air pollutants, the CAAQS are more stringent than the NAAQS. Differences in the standards are generally explained by the health effects studies considered during the standard-setting process and the interpretation of the studies. In addition, the CAAQS incorporate a margin of safety to protect sensitive individuals.

The CCAA requires that all local air districts in the state endeavor to attain and maintain the CAAQS by the earliest date practical. The CCAA specifies that local air districts should focus attention on reducing the emissions from transportation and area-wide emission sources. The CCCA also provides air districts with the authority to regulate indirect sources. The CCAA and CAAQS are applicable to the CalVTP, because treatment activities would generate criteria air pollutants and precursors that could affect the attainment status of air basins. The map in Figure 3.4-1 show the locations of air districts in California, as well as air basins, and the treatable landscape.

Tanner Air Toxics Act of 1983 and Air Toxics Hot Spots Information and Assessment Act of 1987

TACs in California are regulated primarily through the Tanner Air Toxics Act (Assembly Bill [AB] 1807, Chapter 1047, Statutes of 1983) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588, Chapter 1252, Statutes of 1987). TACs would be generated by treatment activities conducted under the CalVTP. The Tanner Air Toxics Act sets forth a formal procedure for CARB to designate substances as TACs. Research, public participation, and scientific peer review are required before CARB can designate a substance as a TAC. CARB has adopted all EPA-identified HAPs as TACs and identified 21 additional substances as TACs, including particulate matter exhaust from diesel engines (diesel PM) (CARB 2011a).

After a TAC is identified, CARB then adopts an airborne toxics control measure for sources that emit that particular TAC. If a safe threshold exists for a substance at which there is no toxic effect, the control measure must reduce exposure below that threshold. If no safe threshold exists, the measure must incorporate best available control technology for toxics to minimize emissions.

The Hot Spots Act requires that existing facilities that emit toxic substances above a specified level prepare an inventory of toxic emissions, prepare a risk assessment if emissions are significant, notify the public of significant risk levels, and prepare and implement risk reduction measures.

CARB has adopted diesel exhaust control measures and more stringent emissions standards for various transportation-related mobile sources of emissions, including off-road diesel equipment (e.g., tractors, generators). Over time, the replacement of older vehicles and equipment will result in a vehicle and equipment fleet that produces substantially lower levels of TACs than under current conditions. Mobile-source emissions of TACs (e.g., benzene, 1-3-butadiene, diesel PM) have been reduced significantly over the last decade and will be reduced further in California through a progression of regulatory measures (e.g., Low Emission Vehicle/Clean Fuels and Phase II reformulated gasoline regulations) and control technologies. With implementation of CARB's Risk Reduction Plan, it is expected that diesel PM concentrations will be 85 percent less in 2020 than they were in 2000 (CARB 2000). Adopted regulations are also expected to continue to reduce formaldehyde emissions emitted by cars and light-duty trucks. As emissions are reduced, it is expected that risks associated with exposure to the emissions will also be reduced. CARB diesel exhaust control measures and mobile-source emission reduction regulatory measures are applicable to the CalVTP because treatment activities include the use of diesel-powered equipment and would result in mobile-source emissions of TACs.

California Code of Regulations Title 17

Title 17 of the California Code of Regulations (CCR) addresses public health issues. Division 3 of Title 17 specifically addresses issues related to air resources. Topics most relevant to treatment activities conducted under the CalVTP would include: Air Basins and Air Quality Standards (Subchapter 1.5), Smoke Management Guidelines for Agricultural and Prescribed Burning (Subchapter 2), Toxic Air Contaminants (Subchapter 7), and Asbestos (Subchapter 7.5). These topics are relevant because treatment activities could result in criteria air pollutant and TAC emissions that affect air quality and health, include prescribed burning, and could occur in areas where naturally-occurring asbestos (NOA) is present.

CARB oversees California's Smoke Management Program, which addresses potentially harmful smoke impacts from agricultural, forest, and rangeland management burning operations. The legal basis of the program is found in 17 CCR Section 80100 et. seq., *Smoke Management Guidelines for Agricultural and Prescribed Burning*, adopted by CARB in 2000 (CARB 2011b). Under these guidelines, air districts implement a daily burn authorization system under which they specify the amount, timing, and location of burns for the purposes of minimizing smoke impacts on sensitive areas, avoiding cumulative smoke impacts, and preventing public nuisances from occurring. Through the burn authorization system, air districts authorize no more burning on a daily basis than is appropriate considering meteorological and air quality conditions (CARB 2000).

Adoption of the amendments to the Smoke Management Guidelines for Agricultural and Prescribed Burning by CARB in 2000 triggered a CEQA analysis. CARB concluded that adoption of these guidelines would not cause significant adverse environmental impacts. CARB further concluded, in regard to air quality impacts, that compliance with the guidelines should result in reduced smoke impacts, improved air quality, and progress towards achievement of CAA and CCAA requirements, and also posited that potential benefits from the program may accrue from a reduction in risk of wildland fires due to increased prescribed burning activities (CARB 2000).

Prescribed Fire Incident Reporting System

The Prescribed Fire Incident Reporting System (PFIRS) was developed in response to Title 17 of the CCR and serves as an interface between air quality regulators, land management agencies and individuals that conduct prescribed burning in California. The system facilitates communications by providing access to a database containing information on burn planning, burn approvals and emissions information. PFIRS enables individuals involved in prescribed burning the ability to view this information on a statewide level. The majority of air districts in the state use PFIRS. CARB is working to enroll more air districts in the use of PFIRS. CAL FIRE is providing information to PFIRS for all prescribed burns.

Senate Bill 1260, Statutes of 2018

SB 1260 was adopted in September 2018 in response to the devastating California wildfires, and seeks to address wildfire prevention by increasing the use of prescribed burning as a vegetation treatment tool. SB 1260 directs CAL FIRE to work cooperatively with nonprofits and others on planning and implementing prescribed burning on federally and privately-owned property in the state. Additionally, the bill establishes training standards for personnel authorized to conduct prescribed burns and clarifies liability for landowners operating under a CAL FIRE permit. The bill also mandates that CAL FIRE and CARB, in coordination with local air pollution control and air quality management districts, develop a program to enhance air quality and smoke monitoring and to provide a public awareness campaign regarding prescribed burns. In response, CARB and CAL FIRE have established a joint monitoring program that couples air quality measurements taken near prescribed burns with on-site measurements of short-and long-term effects on fire hazard and ecological characteristics. Additionally, SB 1260 specifically identifies this PEIR, when certified, to serve as the programmatic environmental document for prescribed burns initiated by a third party.

2016 Mobile Source Strategy

CARB adopts mobile source strategies as part of each SIP submitted to the EPA, as required by the CAA. On May 16, 2016, CARB released the updated *Mobile Source Strategy*, which addresses exhaust emissions from on-road light-duty and heavy-duty vehicles, off-road federal and international sources (i.e., aircraft, locomotives, and ocean-going vessels), and off-road equipment. The strategy is pertinent to the types of on-road vehicles and off-road equipment that would be used in treatment activity conducted under the CalVTP. The strategy demonstrates how the state can simultaneously meet air quality standards, achieve greenhouse gas emission reduction targets, decrease health risk from transportation-related emissions, and reduce petroleum consumption over the next 15 years. The strategy provides the reductions necessary from mobile sources to achieve federal health-based air quality standards for ozone in 2023 and 2031, reduce greenhouse gas emissions from on-road vehicles by over 40 percent below 1990 levels by 2030, decrease regional and near-source health-risk from exposure to toxic air contaminants, and reduce transportation-related petroleum use by up to 50 percent by 2030 statewide.

CARB staff developed the mobile source strategy using a multi-pollutant scenario planning tool that quantifies changes in ozone and $PM_{2.5}$ precursor emissions, greenhouse gas emissions, diesel toxics emissions, and petroleum usage as various technologies become widespread in vehicle and equipment fleets. CARB's analysis illustrates a scenario for meeting the state's public health, climate, and petroleum reduction goals through cleaner vehicle technologies, energy sources, and fuels. The strategy consists of actions to establish regulatory requirements for cleaner technologies, deploy these technologies, require cleaner fuels, and ensure in-use performance. For off-road equipment, actions include increasing the use of renewable fuels, increasing worksite efficiencies, reducing emissions from small off-road equipment such as logging equipment, cleaner engine technology, and deployment of zero-emission vehicle technologies into target equipment categories such as forklifts and airport ground support equipment (CARB 2016b:11). The 2016 Mobile Source Strategy serves as the basis for emission reduction commitments that CARB has included in two adopted SIPs: the 2016 Air Quality Management Plan for Ozone and $PM_{2.5}$ in the South Coast Air Basin and the Coachella Valley, and the San Joaquin Valley 2018 Plan for the 1997, 2006, and 2012 $PM_{2.5}$ Standards (CARB 2016b:2, 22–23).

California Air Districts

There are currently 35 air districts across California, all of which include some portion of the treatable landscape of the CalVTP and regulate emissions of air pollutants within their jurisdiction. The CCAA requires that all local air districts in the state work towards achieving and maintaining the CAAQS by the earliest practical date. The act specifies that local air districts should focus particular attention on reducing the emissions from transportation and area-wide emission sources. It also provides districts with the authority to regulate indirect sources. Area wide sources have emissions spread out over wide areas. Prescribed burning is categorized by CARB as an area wide source under the miscellaneous processes category and is managed through the local districts burn authorization system. The CCAA provides districts with the authority to regulate indirect sources.

Air districts attain and maintain air quality conditions in their respective jurisdictions through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. The clean air strategy implemented by air districts includes the preparation of plans for the attainment of CAAQS and NAAQS, adoption and enforcement of rules and regulations concerning sources of air pollution, and issuance of permits for stationary sources of air pollution. Air districts also inspect stationary sources of air pollution and respond to citizen complaints, monitor ambient air quality and meteorological conditions, and implement programs and regulations required by the CAA, CAAA, and the CCAA.

Mass Emissions Thresholds of Significance

Most California air districts recommend mass emission thresholds for determining whether a project's emissions of criteria air pollutants and precursors would be significant under CEQA and result in, or contribute to, an increase in the ambient concentrations of criteria pollutants to levels that exceed the NAAQS and/or CAAQS. A summary of the mass emission thresholds recommended by air districts in California is provided in Table 3.4-2.

Table 3.4-2 California Air District Mass Emissions Thresholds for Criteria Air Pollutants

Air District	ROG		NO_X		PM_{10}		$PM_{2.5}$		SO_X		CO	
	Construction	Operational	Construction	Operational	Construction	Operational	Construction	Operational	Construction	Operational	Construction	Operational
Amador County APCD	No thresholds											
Antelope Valley APCD* (North Los Angeles County)	137 lb/day or 25 tpy		137 lb/day or 25 tpy		82 lb/day or 15 tpy		65 lb/day or 12 tpy		137 lb/day or 25 tpy		548 lb/day or 100 tpy	
Bay Area AQMD (Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Southern Sonoma, and Southwest Solano County)	54 lb/day	54 lb/day 10 tpy	54 lb/day	54 lb/day or 10 tpy	82 lb/day (exhaust) BMPs for fugitive dust	82 lb/day or 15 tpy None for fugitive dust	54 lb/day (exhaust) BMPs for fugitive dust	54 lb/day or 10 tpy None for fugitive dust	No threshold		No threshold	9.0 ppm (8-hour average, 20.0 ppm (1-hour average)
Butte County AQMD	137 lb/day or 4.5 tpy	25 lb/day	137 lb/day or 4.5 tpy	25 lb/day	80 lb/day	80 lb/day	80 lb/day	80 lb/day	No threshold			
Calaveras County ACPD	150 lb/day	150 lb/day	150 lb/day	150 lb/day	150 lb/day	150 lb/day	No thresholds					
Colusa County APCD	No thresholds											
Eastern Kern APCD	No threshold	137 lb/day (mobile source emissions)	No threshold	137 lb/day (mobile source emissions)	No thresholds							
El Dorado County AQMD*	82 lb/day		82 lb/day		No thresholds							
Feather River AQMD (Sutter and Yuba County)	25 lb/day multiplied by project length; not to exceed 4.5 tpy	25 lb/day	25 lb/day multiplied by project length; not to exceed 4.5 tpy	25 lb/day	80 lb/day	80 lb/day	No thresholds					
Glenn County APCD	No thresholds											
Great Basin Unified APCD (Inyo, Mono, and Alpine County)	No thresholds											
Imperial County APCD	Implement mitigation	137 lb/day	Implement mitigation	137 lb/day	Implement mitigation	150 lb/day	Implement mitigation	550 lb/day	Implement mitigation	150 lb/day	Implement mitigation	550 lb/day
Lake County AQMD	No thresholds											
Lassen County APCD	No thresholds											
Mariposa County APCD	100 tpy		100 tpy		100 tpy		100 tpy		100 tpy		100 tpy	
Mendocino County AQMD[1]	No threshold	40 tpy (stationary)	No threshold	40 tpy (stationary)	No thresholds							

Table 3.4-2 California Air District Mass Emissions Thresholds for Criteria Air Pollutants

Air District	ROG		NO_X		PM_{10}		$PM_{2.5}$		SO_X		CO	
	Construction	Operational	Construction	Operational	Construction	Operational	Construction	Operational	Construction	Operational	Construction	Operational
Modoc County APCD	No thresholds											
Mojave Desert AQMD* (North Eastern San Bernardino and Eastern Riverside County)	137 lb/day or 25 tpy		137 lb/day or 25 tpy		82 lb/day or 15 tpy		65 lb/day or 12 tpy		137 lb/day or 25 tpy		548 lb/day or 100 tpy	
Monterey Bay Unified APCD (Santa Cruz, Monterey, and San Benito County)	No threshold	137 lb/day	No threshold	137 lb/day	82 lb/day	82 lb/day	No thresholds		No threshold	150 lb/day	No threshold	550 lb/day
North Coast Unified AQMD (Del Norte, Humboldt, and Trinity County)	No thresholds											
Northern Sierra AQMD* (Nevada, Sierra, and Plumas County)	<24 lb/day (Level A) 24-136 lb/day (Level B) >136 lb/day (Level C)		<24 lb/day (Level A) 24-136 lb/day (Level B) >136 lb/day (Level C)		<79 lb/day (Level A) 79-136 lb/day (Level B) >136 lb/day (Level C)		No thresholds					
Northern Sonoma County AQMD	No thresholds											
Placer County APCD	82 lb/day	55 lb/day	82 lb/day	55 lb/day	82 lb/day	55 lb/day	No thresholds					
Sacramento Metropolitan AQMD	No threshold	65 lb/day	85 lb/day	65 lb/day	80 lb/day or 14.6 tpy (following application of all feasible BMPs)	80 lb/day or 14.6 tpy (following application of all feasible BMPs)	82 lb/day or 15 tpy (following application of all feasible BMPs)	82 lb/day or 15 tpy (following application of all feasible BMPs)	Concentrations below CAAQS for SO_X		Concentrations below CAAQS for CO	
San Diego County APCD*	75 lb/day or 13.7 tpy		25 lb/hour, 250 lb/day, or 40 tpy		100 lb/day or 15 tpy		55 lb/day or 10 tpy		25 lb/hour, 250 lb/day, or 40 tpy		100 lb/hour, 550 lb/day, or 100 tpy	
San Joaquin Valley APCD (San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Western Kern County)	10 tpy	10 tpy	10 tpy	10 tpy	15 tpy	15 tpy	15 tpy	15 tpy	27 tpy	27 tpy	100 tpy	100 tpy
San Luis Obispo County APCD[2]	137 lb/day or 2.5 tons per quarter	137 lb/day or 2.5 tons per quarter	25 lb/day or 25 tpy	25 lb/day or 25 tpy	No threshold	25 lb/day or 25 tpy	No thresholds					550 lb/day

Table 3.4-2 California Air District Mass Emissions Thresholds for Criteria Air Pollutants

Air District	ROG		NO_X		PM_{10}		$PM_{2.5}$		SO_X		CO	
	Construction	Operational	Construction	Operational	Construction	Operational	Construction	Operational	Construction	Operational	Construction	Operational
Santa Barbara County APCD	No threshold	>25 lb/day from mobile sources	No threshold	>25 lb/day from mobile sources	No thresholds							
Shasta County AQMD*	25 lb/day (Level A) or 137 lb/day (Level B)		25 lb/day (Level A) or 137 lb/day (Level B)		80 lb/day (Level A) or 137 lb/day (Level B)		No thresholds					
Siskiyou County APCD	No thresholds											
South Coast AQMD (Southwest San Bernardino, South Los Angeles, Orange, and Western Riverside County)	75 lb/day	55 lb/day	100 lb/day	55 lb/day	150 lb/day	150 lb/day	55 lb/day	55 lb/day	150 lb/day	150 lb/day	550 lb/day	55 lb/day
Tehama County APCD*	≤25 lb/day (Level A/MND or ND) >25 lb/day (Level B/MND or EIR) >137 lb/day (Level C/EIR)		≤25 lb/day (Level A/MND or ND) >25 lb/day (Level B/MND or EIR) >137 lb/day (Level C/EIR)		≤80 lb/day (Level A/MND or ND) >80 lb/day (Level B/MND or EIR) >137 lb/day (Level C/EIR)		No thresholds					
Tuolumne County APCD*	1,000 lb/day or 100 tpy		1,000 lb/day or 100 tpy		1,000 lb/day or 100 tpy		No thresholds				1,000 lb/day or 100 tpy	
Ventura County APCD*	25 lb/day (Ventura County minus Ojai and Simi Valley planning areas) 5 lb/day (Ojai planning area) 13.7 tpy (Simi Valley)		25 lb/day (Ventura County minus Ojai and Simi Valley planning areas) 5 lb/day (Ojai planning area) 13.7 tpy (Simi Valley)		No thresholds							
Yolo-Solano AQMD* (Yolo and Eastern Solano County)	10 tpy		10 tpy		80 lb/day		No thresholds				Violation of CAAQS for CO	

Notes: ROG = reactive organic gases; NO_X = oxides of nitrogen; PM_{10} = respirable particulate matter; $PM_{2.5}$ = fine particulate matter; SO_X = sulfur oxide; CO = carbon monoxide; APCD = air pollution control district; AQMD = air quality management district; tpy = tons per year; lb/day = pounds per day; ppm = parts per million; BMP = best management practice; CAAQS = California ambient air quality standards; MND = mitigated negative declaration; ND negative declaration; EIR = environmental impact report.

* Thresholds of Significance within these air districts are not specific to construction or operational emissions of criteria air pollutants. Thresholds of significance may apply to both activities.

[1] Mendocino County AQMD thresholds for ROG and NO_X only apply to stationary sources of criteria air pollutants and would not apply to treatment activities under CalVTP.

[2] San Luis Obispo County APCD also lists a threshold of significance for operational diesel PM of 1.25 lb/day

Sources: AVAQMD 2016, BAAQMD 2017, BCAQMD 2014, Calaveras County 2018, EDCAPCD 2002, FRAQMD 2010, ICAPCD 2017, KCAPCD 1996, MCAQMD 2013, Mariposa County [No Date], MDAQMD 2016, MBUAPCD 2008, NSAQMD 2009, PCAPCD 2016, SBCAPCD 2015, San Diego County 2007, SLOCAPCD 2012, SCAQMD 2015, SJVAPCD 2015, SMAQMD 2015, Tehama County APCD 2015, Tuolumne County APCD, VCAPCD 2003, YSAQMD 2007

Burn Day Designations and Smoke Management Plans

Each air district maintains its own specific regulations regarding open burning, including the types of prescribed burns that would be implemented under the CalVTP. Open burning regulations encompass both agricultural burning and prescribed wildland burning. Each air district controls emissions by regulating the amount, timing and location of burn events to minimize air quality impacts from smoke. All open burning is restricted to permissive burn days, marginal burn days, or through variances permitted by local air districts. CARB and local districts use information about existing air quality conditions and meteorological predictions to determine whether to allow burning, and if so, the volume and locations of burning on any given day. Each air district, fire control agency, or burning permit agency has the authority to be more restrictive than CARB to avoid or minimize impacts to air quality. Land managers who seek to conduct prescribed burns must register yearly or seasonally with their local district and, when applicable, submit a smoke management plan (SMP) for approval prior to burning (see Appendix PD-2 for an example burn plan and SMP). Even on otherwise permissive burn days, land managers (or his/her designee conducting the prescribed burn) must ensure that all conditions and requirements agreed to in the approved SMP are met on the day of the burn event prior to ignition ([17 CCR Section 80160(j)]).

Under the California Smoke Management Program, each air district is required to regulate prescribed burning through adoption of its own Smoke Management Program that adheres to the overall objectives and goals of the California Smoke Management Program. Prior to obtaining district permission to burn, a burn manager must register their burn with the local air district, obtain an air district and/or fire agency burn permit, submit an SMP to the air district, and obtain air district approval of the SMP.

The SMP specifies the "smoke prescription," which is a set of air quality, meteorological, and fuel conditions that must exist before burn ignition may be allowed. SMPs for prescribed burns greater than 10 acres in size or estimated to produce more than one ton of particulate matter are required to include the following information: location, types, and amounts of material to be burned; expected duration of the burn; the contact information of responsible personnel; and identification of all nearby smoke-sensitive areas. SMPs for burn treatments greater than 100 acres or estimated to produce more than 10 tons of particulate matter are required to include the following additional information: meteorological conditions necessary for burning; projections of where the smoke is expected to disperse during both daytime and nighttime conditions; and contingency actions to be taken if smoke impacts occur or meteorological conditions deviate from those specified in the SMP. SMPs for burns greater than 250 acres in size or near smoke-sensitive areas must also include a monitoring component (17 CCR Section 80160).

After the applicable local air district approves all burn planning requirements, including the burn permit and SMP, the burn manager may begin making the final preparations to conduct the burn. Preparation includes mobilizing the equipment and staff resources needed to conduct the burn, notifying the public about the planned timing and specifics of the burn, and obtaining a final authorization to burn from the air district. The burn manager works with the local air district and CARB to obtain forecasts of meteorology and air quality that are needed to safely conduct the burn. CARB and larger air districts determine permissive burn, marginal burn, and no burn days based on smoke dispersal conditions (as specified in statute) and the risk of a burn escape.

Air district authorization to conduct a prescribed burn is provided to the burn manager no more than 24 hours prior to the burn. The burn manager is responsible for assuring that all conditions in the SMP and burn permit are met throughout the burn. It is through this real time, site-specific burn authorization system and associated SMP that prescribed burning is treated differently from other potential treatment activities that would be performed under the CalVTP. The local air district is the ultimate arbiter of whether a burn can occur as proposed, or in a limited capacity, or must be postponed based on the predicted transport and placement of pollutants from the activity relative to sensitive receptors that may be impacted by smoke.

In addition to obtaining authorization from the local air district, the burn manager must ensure that the prescribed burn meets the conditions set forth in the approved SMP before the burn is ignited. That is, even with authorization from the local air district to conduct the prescribed burn, ignition is prohibited if the conditions and requirements of the SMP are not met on-site (17 CCR Section 80160[j]). After the burn is ignited, the burn manager must make all reasonable efforts to ensure that the burn stays within the prescription of its SMP. If the burn fails to stay within the prescription, or if adverse smoke impacts are observed, the burn manager shall implement smoke mitigation measures as described in the SMP. A comprehensive study of prescribed burns nationally indicate that 99 percent of burns were accomplished within the prescription and did not report escapes or near misses (Dether 2005).

LOCAL

When state agencies, including CAL FIRE, are conducting governmental activities under the authority of state law or the State Constitution, in this case, treatments implemented under the CalVTP, they are exempt from local government plans, policies, and ordinances (unless a constitutional provision or statute directs otherwise). Nonetheless, CAL FIRE voluntarily seeks to operate consistently with local governance to the extent feasible. Given its statewide extent and the possible number of local and regional responsible agencies, this PEIR does not identify potentially applicable local government plans, policies, and ordinances. Types of local policies relevant to air quality may include general plan measures that require coordination with the local air district to achieve state and federal air quality standards, implementation of fugitive dust control measures, and reductions of vehicle miles traveled (VMT) and associated air pollutant emissions. This PEIR assumes that any vegetation treatments proposed by local or regional agencies under the CalVTP would be consistent with local plans, policies, and ordinances to the extent the project is subject to them, as required by SPR AD-3. However, most cities and counties in California do not have rules or regulations that specifically address emissions generated by equipment that would be used in treatment activities or emissions generated by prescribed burns.

3.4.2 Environmental Setting

Vegetation treatments conducted under the CalVTP would occur in a portion of each of California's 15 air basins. The ambient concentrations of air pollutant emissions within these basins are determined by the amount of emissions released by the sources of air pollutants and the atmosphere's ability to transport and dilute such emissions. Natural factors that affect transport and dilution include terrain, wind, atmospheric stability, and sunlight. Therefore, existing air quality conditions within the treatable landscape are determined by such natural factors as topography, meteorology, and climate, in addition to the amount of emissions released by existing air pollutant sources. Air pollution can also move freely within and between air basins; therefore, air pollution generated in one basin made degrade the quality of air within an adjacent basin.

CLIMATE, METEOROLOGY, AND TOPOGRAPHY

California includes a wide range of geophysical features such as oceans, valleys, mountains, and deserts. The Pacific Ocean forms the state's western boundary, spanning over 1,200 miles. The Central Valley is located within the middle of the state and is enclosed by various mountain ranges, including multiple coastal mountain ranges to the west, the Sierra Nevada to the east, the Cascade Range to the north, and the Tehachapi Mountains to the south. The boundary between California and Nevada is generally defined by the Sierra Nevada.

California also has expansive deserts, such as the Mojave Desert located in southern California, and vast forests of redwood and Douglas fir located in the northwest portion of the state. Major rivers include the Sacramento, San Joaquin, and Colorado Rivers. Major lakes include Lake Tahoe, Salton Sea, and Clear Lake. Elevation varies greatly in California from Mount Whitney at 14,494 feet (the highest elevation point in the contiguous 48 states) to 282 feet below sea level at Death Valley (the lowest elevation point in the United States).

These landform features affect direction of air flow and, thus, directly affect the distribution of air pollutants. For example, air above low-lying lands surrounded by mountains is often more atmospherically stable, which can result in the accumulation of more pollutants.

California features a Mediterranean climate characterized by hot, dry summers and cool, rainy winters, with some portions of the state experiencing more extreme temperature difference that others. Coastal portions of the state often experience summer fog as a result of the cool marine currents from the Pacific Ocean, and more moderate temperatures, whereas inland portions of the state, such as the high desert, southern San Joaquin Valley, or northern Sacramento Valley experience more extreme temperature differences. Precipitation in California generally occurs in the winter months and, on average, about two thirds of the state's total rainfall occurs in the north.

CRITERIA AIR POLLUTANTS

Concentrations of criteria air pollutants are used to indicate the quality of the ambient air. A brief description of key criteria air pollutants is provided below. Table 3.4-3 summarizes the emission source type and the foreseeable health impacts that result from exposure to concentrations of criteria air pollutants that exceed the applicable CAAQS and NAAQS.

Table 3.4-3 Sources and Health Effects of Criteria Air Pollutants

Pollutant	Sources	Acute[1] Health Effects	Chronic[2] Health Effects
Ozone	secondary pollutant resulting from reaction of ROG and NO_X in presence of sunlight. ROG emissions result from incomplete combustion and evaporation of chemical solvents and fuels; NO_X results from the combustion of fuels	increased respiration and pulmonary resistance; cough, pain, shortness of breath, lung inflammation	permeability of respiratory epithelia, possibility of permanent lung impairment
Carbon monoxide (CO)	incomplete combustion of fuels; motor vehicle exhaust	headache, dizziness, fatigue, nausea, vomiting, death	permanent heart and brain damage
Nitrogen dioxide (NO_2)	combustion devices; e.g., boilers, gas turbines, and mobile and stationary reciprocating internal combustion engines	coughing, difficulty breathing, vomiting, headache, eye irritation, chemical pneumonitis or pulmonary edema; breathing abnormalities, cough, cyanosis, chest pain, rapid heartbeat, death	chronic bronchitis, decreased lung function
Sulfur dioxide (SO_2)	coal and oil combustion, steel mills, refineries, and pulp and paper mills	Irritation of upper respiratory tract, increased asthma symptoms	There is insufficient evidence linking SO_2 exposure to chronic health impacts.
Respirable particulate matter (PM_{10}), Fine particulate matter ($PM_{2.5}$)	fugitive dust, soot, smoke, mobile and stationary sources, construction, fires and natural windblown dust, and formation in the atmosphere by condensation and/or transformation of SO_2 and ROG	breathing and respiratory symptoms, aggravation of existing respiratory and cardiovascular diseases, premature death	alterations to the immune system, carcinogenesis
Lead	metal processing	reproductive/ developmental effects (fetuses and children)	numerous effects including neurological, endocrine, and cardiovascular effects

Notes: NO_X = oxides of nitrogen; ROG = reactive organic gases.

[1] Acute health effects refer to immediate illnesses caused by short-term exposures to criteria air pollutants at fairly high concentrations. An example of an acute health effect includes fatality resulting from short-term exposure to carbon monoxide levels in excess of 1,200 parts per million.

[2] Chronic health effects refer to cumulative effects of long-term exposures to criteria air pollutants, usually at lower, ambient concentrations. An example of a chronic health effect includes the development of cancer from prolonged exposure to particulate matter at concentrations above the national ambient air quality standards.

Sources: EPA 2018

Ozone

Ozone is a photochemical oxidant (a substance whose oxygen combines chemically with another substance in the presence of sunlight) and the primary component of smog. Ozone is not directly emitted into the air but is formed as a secondary pollutant through complex chemical reactions between precursor emissions of reactive organic gases (ROG) and oxides of nitrogen (NO_X) in the presence of sunlight. ROG are volatile organic compounds that are photochemically reactive. ROG emissions result primarily from incomplete combustion and the evaporation of chemical solvents and fuels. NO_X are a group of gaseous compounds of nitrogen and oxygen that result from the combustion of fuels.

Emissions of the ozone precursors ROG and NO_X have decreased over the past several years because of more stringent motor vehicle standards and cleaner burning fuels. Emissions of ROG and NO_X decreased from 2000 to 2010 and are projected to continue decreasing from 2010 to 2035 (CARB 2013).

Nitrogen Dioxide

Nitrogen dioxide (NO_2) is a brownish, highly reactive gas that is present in all urban environments. The major human-made sources of NO_2 are combustion devices, such as boilers, gas turbines, and mobile and stationary reciprocating internal combustion engines. Combustion devices emit primarily nitric oxide (NO), which reacts through oxidation in the atmosphere to form NO_2. The combined emissions of NO and NO_2 are referred to as NO_X and are reported as equivalent NO_2. Because NO_2 is formed and depleted by reactions associated with photochemical smog (ozone), the NO_2 concentration in a particular geographical area may not be representative of the local sources of NO_X emissions (EPA 2012).

Particulate Matter

Respirable particulate matter with an aerodynamic diameter of 10 micrometers or less is referred to as PM_{10}. PM_{10} consists of particulate matter emitted directly into the air, such as fugitive dust, soot, and smoke from mobile and stationary sources, construction operations, fires and natural windblown dust, and particulate matter formed in the atmosphere by reaction of gaseous precursors (CARB 2013). Fine particulate matter ($PM_{2.5}$) includes a subgroup of smaller particles that have an aerodynamic diameter of 2.5 micrometers or less. PM_{10} emissions in the treatable landscape are dominated by emissions from area sources, primarily fugitive dust from vehicle travel on unpaved and paved roads, farming operations, construction and demolition, and particles from residential fuel combustion.

Direct emissions of PM_{10} in California have increased slightly over the last 20 years, and are projected to increase very slightly through 2035. Emissions of $PM_{2.5}$ are dominated by several of the same sources as emissions of PM_{10}, but are more greatly influenced by combustion sources (CARB 2013).

Table 3.4-4 shows the attainment status for each criteria air pollutant with respect to the CAAQS and the NAAQS in each county that is part of the treatable landscape.

Table 3.4-4 Attainment Designations for Criteria Pollutants by County, Statewide

County	Ozone		Carbon Monoxide		NO_2		SO_2		PM_{10}		$PM_{2.5}$		Lead		Sulfates		Hydrogen Sulfide		Visibility Reducing Particles	
	CAAQS	NAAQS	CAAQS	NAAQS	CAAQS	NAAQS	CAAQS	NAAQS	CAAQS	NAAQS	CAAQS	NAAQS	CAAQS	NAAQS	CAAQS	NAAQS	CAAQS	NAAQS	CAAQS	NAAQS
Alameda	N	N	A	UA	A	UA	A	UA	N	U	N	N	A	UA	A	No Federal Standard	U	No Federal Standard	U	No Federal Standard
Alpine	U	AU	U	UA	A	UA	A	UA	N	U	A	UA	A	UA	A		U		U	
Amador	N	N	U	UA	A	UA	A	UA	U	U	U	UA	A	UA	A		U		U	
Butte	N	N	A	UA	A	UA	A	UA	N	U	N	UA	A	UA	A		U		U	
Calaveras	N	N	U	UA	A	UA	A	UA	N	U	U	UA	A	UA	A		U		U	
Colusa	A	AU	U	UA	A	UA	A	UA	N	U	A	UA	A	UA	A		U		U	
Contra Costa	N	N	A	UA	A	UA	A	UA	U	U	N	N	A	UA	A		U		U	
Del Norte	A	AU	U	UA	A	UA	A	UA	A	U	A	UA	A	UA	A		U		U	
El Dorado[1]	A/N	N/AU	U	UA	A	UA	A	UA	N	U	A/U	N/UA	A	UA	A		U		U	
Fresno	N	N	A	UA	A	UA	A	UA	N	A	N	N	A	UA	A		U		U	
Glenn	A	AU	U	UA	A	UA	A	UA	N	U	A	UA	A	UA	A		U		U	
Humboldt	A	AU	A	UA	A	UA	A	UA	N	U	A	UA	A	UA	A		A		U	
Imperial	N	N	A	UA	A	UA	A	UA	N	N	A	UA	A	UA	A		U		U	
Inyo[2]	N	AU	A	UA	A	UA	A	UA	N	A/N/U	A	UA	A	UA	A		A		U	
Kern[3]	N	N	A	UA	A	UA	A	UA	N	A/N/U	A/U	N/UA	A	UA	A		U		U	
Kings	N	N	U	UA	A	UA	A	UA	N	A	N	N	A	UA	A		U		U	
Lake	A	AU	A	UA	A	UA	A	UA	A	U	A	UA	A	UA	A		A		A	
Lassen	A	AU	U	UA	A	UA	A	UA	U	U	A	UA	A	UA	A		U		U	
Los Angeles[4]	N	N	A	UA	A	UA	A	UA	N	A/U	N	N/UA	A	N	A		U		U	
Madera	N	N	U	UA	A	UA	A	UA	N	A	N	N	A	UA	A		U		U	
Marin	N	N	A	UA	A	UA	A	UA	N	U	N	N	A	UA	A		U		U	
Mariposa	N	N	U	UA	A	UA	A	UA	U	U	U	UA	A	UA	A		U		U	
Mendocino	A	AU	U	UA	A	UA	A	UA	N	U	A	UA	A	UA	A		U		U	
Merced	N	N	A	UA	A	UA	A	UA	N	A	N	N	A	UA	A		U		U	
Modoc	A	AU	U	UA	A	UA	A	UA	U	U	A	UA	A	UA	A		U		U	
Mono	N	AU	A	UA	A	UA	A	UA	N	N	A	UA	A	UA	A		A		U	
Monterey	N	AU	A	UA	A	UA	A	UA	N	U	A	UA	A	UA	A		U		U	
Napa	N	N	A	UA	A	UA	A	UA	N	U	N	N	A	UA	A		U		U	

Table 3.4-4 Attainment Designations for Criteria Pollutants by County, Statewide

County	Ozone		Carbon Monoxide		NO_2		SO_2		PM_{10}		$PM_{2.5}$		Lead		Sulfates		Hydrogen Sulfide		Visibility Reducing Particles	
	CAAQS	NAAQS	CAAQS	NAAQS	CAAQS	NAAQS	CAAQS	NAAQS	CAAQS	NAAQS	CAAQS	NAAQS	CAAQS	NAAQS	CAAQS	NAAQS	CAAQS	NAAQS	CAAQS	NAAQS
Nevada	N	N	A	UA	A	UA	A	UA	N	U	U	UA	A	UA	A		U		U	
Orange	N	N	A	UA	A	UA	A	UA	N	A	N	N	A	UA	A		U		U	
Placer[5]	A/N	N/AU	A	UA	A	UA	A	UA	N	U	A/U	N/UA	A	UA	A		U		U	
Plumas	U	AU	A	UA	A	UA	A	UA	N	U	A/U	UA	A	UA	A		U		U	
Riverside[6]	N	N/AU	A	UA	A	UA	A	UA	N	A/N/U	A/N/U	N/UA	A	UA	A		U		U	
Sacramento	N	N	A	UA	A	UA	A	UA	N	A	A	N	A	UA	A		U		U	
San Benito	N	AU	U	UA	A	UA	A	UA	N	U	A	UA	A	UA	A		U		U	
San Bernardino[7]	N	N/AU	A	UA	A	UA	A	UA	N	N	A/U	UA	A	UA	A		U		U	
San Diego	N	N	A	UA	A	UA	A	UA	N	U	N	UA	A	UA	A		U		U	
San Francisco	N	N	A	UA	A	UA	A	UA	N	U	N	N	A	UA	A		U		U	
San Joaquin	N	N	A	UA	A	UA	A	UA	N	A	N	N	A	UA	A		U		U	
San Luis Obispo	N	N	A	UA	A	UA	A	UA	N	U	A	UA	A	UA	A	No Federal Standard	A	No Federal Standard	U	No Federal Standard
San Mateo	N	N	A	UA	A	UA	A	UA	N	U	N	N	A	UA	A		U		U	
Santa Barbara	N-T	AU	A	UA	A	UA	A	UA	N	U	U	UA	A	UA	A		A		U	
Santa Clara	N	N	A	UA	A	UA	A	UA	N	U	N	N	A	UA	A		U		U	
Santa Cruz	N	AU	U	UA	A	UA	A	UA	N	U	A	UA	A	UA	A		U		U	
Shasta	N	AU	U	UA	A	UA	A	UA	A	U	A	UA	A	UA	A		U		U	
Sierra	U	AU	U	UA	A	UA	A	UA	N	U	U	UA	A	UA	A		U		U	
Siskiyou	A	AU	U	UA	A	UA	A	UA	A	U	A	UA	A	UA	A		U		U	
Solano	N	N	A	UA	A	UA	A	UA	N	U	N	N	A	UA	A		U		U	
Sonoma[8]	A/N	N/AU	A	UA	A	UA	A	UA	A/N	U	A/N	N/UA	A	UA	A		U		U	
Stanislaus	N	N	A	UA	A	UA	A	UA	N	A	N	N	A	UA	A		U		U	
Sutter	N	AU	A	UA	A	UA	A	UA	N	U	A	UA	A	UA	A		U		U	
Tehama	N	AU	U	UA	A	UA	A	UA	N	U	U	UA	A	UA	A		U		U	
Trinity	A	AU	U	UA	A	UA	A	UA	A	U	A	UA	A	UA	A		U		U	

Table 3.4-4 Attainment Designations for Criteria Pollutants by County, Statewide

County	Ozone		Carbon Monoxide		NO_2		SO_2		PM_{10}		$PM_{2.5}$		Lead		Sulfates		Hydrogen Sulfide		Visibility Reducing Particles	
	CAAQS	NAAQS	CAAQS	NAAQS	CAAQS	NAAQS	CAAQS	NAAQS	CAAQS	NAAQS	CAAQS	NAAQS	CAAQS	NAAQS	CAAQS	NAAQS	CAAQS	NAAQS	CAAQS	NAAQS
Tulare	N	N	A	UA	A	UA	A	UA	N	A	N	N	A	UA	A	No Federal Standard	U	No Federal Standard	U	No Federal Standard
Tuolumne	N	N	A	UA	A	UA	A	UA	U	U	U	UA	A	UA	A		U		U	
Ventura	N	N	A	UA	A	UA	A	UA	N	U	A	UA	A	UA	A		U		U	
Yolo	N	N	A	UA	A	UA	A	UA	N	U	U	N	A	UA	A		U		U	
Yuba	N	AU	U	UA	A	UA	A	UA	N	U	A	UA	A	UA	A		U		U	

Notes: NO_2 = nitrogen dioxide; SO_2 = sulfur dioxide; PM_{10} = respirable particulate matter; $PM_{2.5}$ = fine particulate matter; CAAQS = California ambient air quality standards; NAAQS = national ambient air quality standards; A=Attainment, N=Nonattainment, N-T=Nonattainment/Transitional, U=Unclassified (CAAQS), UA=Unclassified/Attainment (NAAQS)

[1] The eastern portion of El Dorado County (Lake Tahoe Air Basin) is in attainment for the CAAQS and NAAQS for ozone, $PM_{2.5}$, and PM_{10}; however, the western portion (Mountain Counties Air Basin) is in nonattainment for ozone and unclassified for PM_{10}. A fraction of the County located in the Mountain Counties Air Basin is also in nonattainment for the $PM_{2.5}$ NAAQS.

[2] Owen's Valley in Inyo County is designated as nonattainment for the PM_{10} NAAQS, the Coso Junction portion of Inyo County is in attainment for the PM_{10} NAAQS, and the remainder of Inyo County is unclassified.

[3] The eastern portion of Kern County (Mojave Air Basin) is unclassified for the CAAQS for $PM_{2.5}$; however, the western portion (San Joaquin Valley Air Basin) is in nonattainment. The Mojave Air Basin portion is both classified as nonattainment and unclassified for the PM_{10} NAAQS and the San Joaquin Valley Air Basin is in attainment for the PM_{10} and $PM_{2.5}$ NAAQS.

[4] The northern portion of Los Angeles County (Mojave Air Basin) is unclassified and unclassified/attainment for the $PM_{2.5}$ CAAQS and NAAQS, respectively; however, the southern portion (South Coast Air Basin) is in nonattainment for both the CAAQS and NAAQS.

[5] The eastern portion of Placer County (Lake Tahoe Air Basin) is in attainment for the CAAQS and NAAQS for ozone; however, the western portion (Sacramento Valley Air Basin and Mountain Counties Air Basin) is in nonattainment for ozone. The far western portion (Sacramento Valley Air Basin) and far eastern portion (Lake Tahoe Air Basin) is in attainment the $PM_{2.5}$ CAAQS, and the middle portion (Mountain Counties Air Basin) is designated unclassified for the $PM_{2.5}$ CAAQS. The far western portion (Sacramento Valley Air Basin) is also in nonattainment for the $PM_{2.5}$ NAAQS.

[6] The western portion of Riverside County (South Coast Air Basin) is in nonattainment for the $PM_{2.5}$ CAAQS and NAAQS and the ozone NAAQS, the middle portion of Riverside County (Salton Sea Air Basin) is designated as unclassified for $PM_{2.5}$ for the CAAQS and nonattainment for the ozone NAAQS, and the eastern portion (Mojave Desert Air Basin) is designated as attainment for $PM_{2.5}$ for the CAAQS and the ozone NAAQS.

[7] The northeastern portion of San Bernardino is designated as unclassified for $PM_{2.5}$ for the CAAQS and the "County Portion of Federal Ozone AQMA" of San Bernardino is in attainment for the CAAQS $PM_{2.5}$.

[8] The northwest portion of Sonoma County (North Coast Air Basin) is in attainment for the CAAQS and NAAQs for ozone, $PM_{2.5}$, and PM_{10}; however, the southeast portion (San Francisco Bay Area Air Basin) is in nonattainment for these pollutants for the CAAQS and NAAQS.

Source: CARB 2018a

Ultrafine Particulate Matter

More recently, ultrafine particulate matter (UFP) has become a topic of greater concern. UFP refers to a subfraction of currently regulated $PM_{2.5}$ and PM_{10} size particles. UFP is most often defined as particles with an aerodynamic diameter of 0.1 microns or smaller. Although UPF consists of only a small fraction of total PM emissions, UFP supports a large surface area and is often heavily concentrated. Because of its small size, a given mass of UFP contains thousands to tens of thousands more particles. Moreover, also because of its size, UPF is highly penetrative to human tissues as compared to PM_{10} and $PM_{2.5}$. Observed human health effects in selected studies include lung function changes, airway inflammation, enhanced allergic responses, vascular thrombogenic effects, altered endothelial function, altered heart rate and heart rate variability, accelerated atherosclerosis, and increased markers of brain inflammation (Health Effects Institute 2013:3, 36, 39, 45, and 65). The predominant source of UFP is combustion by on-road vehicles, off-road vehicles, stationary sources, and vegetation burning (Health Effects Institute 2013:1, CARB 2006:3, Kleeman et al. 2007:1, and Black et al. 2017a).

Criteria Air Pollutant Emissions from Wildfires and Prescribed Burns

Wildfires and prescribed burns have occurred and currently continue to occur through the treatable landscape. Both produce smoke, which is composed of a complex mixture of CO_2, water vapor, CO, particulate matter, hydrocarbons and other organic chemicals, ROG, NO_X, and trace minerals. There are thousands of individual compounds present in smoke. Smoke composition can vary widely and depends on multiple factors, including how efficiently a fuel burns, the fuel type and moisture content, the fire temperature, wind conditions, and other weather-related influences. Different types of wood and vegetation are composed of varying amounts of cellulose, lignin, tannins and other polyphenols, oils, fats, resins, waxes, and starches, which produce different compounds that are released as smoke when burned (CARB and CDPH 2016).

The primary criteria air pollutant of concern from smoke is $PM_{2.5}$, a criteria air pollutant for which a NAAQS and CAAQS have been established. As compared to PM_{10}, $PM_{2.5}$ (including UFP) is transported farther from a burn site and can cause more severe, adverse health impacts because of its ability to penetrate more deeply into lung tissue. Emergency visits for respiratory symptoms increase in wildfire smoke–affected areas; specifically, patients are more likely to visit the emergency room for asthma, bronchitis, dyspnea, and symptoms of chronic obstructive pulmonary disease (Black et al. 2017a). Typically, wildfire smoke produces proportionately more $PM_{2.5}$ and UFP compared to PM_{10} (Black et al. 2017b).

The open burning of organic materials produces a higher mass of ROG, as compared to the combustion of fossil fuels. However, NO_X and SO_X emissions are comparatively lower (Black et al. 2017a). ROG emissions may oxidize with NO_X emissions from fire and other sources to contribute to spikes in ground-level ozone (NCAR 2008). Exposure to ozone may result in acute and chronic health impacts including coughing, pulmonary distress, lung inflammation, shortness of breath, and permanent lung impairment.

CO is another pollutant of concern generated by incomplete combustion of wood or other organic materials. Exposure to CO-containing smoke does not pose a significant hazard, except to some sensitive individuals and to individuals very close to the fire (e.g., firefighters). Individuals with cardiovascular disease may experience chest pain or cardiac arrhythmias from lower levels of CO exposure. CO exposure can cause headache, weakness, dizziness, confusion, nausea, disorientation, visual impairment, coma, and death, even in otherwise healthy individuals (CARB and CDPH 2016).

Although the same types of criteria air pollutants are generated by wildfires and prescribed burns, the characteristics of their smoke plumes can differ. Prescribed burns are controlled events that are carefully planned to reduce smoke-related impacts. Wildfires, however, burn under uncontrolled and unplanned circumstances. It is difficult to manage when wildfires burn, how much smoke is generated, where smoke travels, and their duration. Wildfire frequency is typically highest during summer months when fuels are driest and the likelihood of adverse weather conditions (i.e., high temperatures, low relative humidity, and sustained wind speeds) are present. Under these conditions, wildfires consume more vegetation on a per-acre basis than prescribed burns, resulting in more smoke emissions (Berger et al. 2018). Wildfires also have a long smoldering phase, because wildfire containment strategies focus on extinguishing the flame phase on the perimeter of the burned areas to protect life and property, while the smoldering phase within the burned area is left to burn out, sometimes for months after a fire is contained. The smoldering phase of wood burning is associated with higher output of particulate matter and can account for a large proportion of the total emissions from a wildfire event (Black et al. 2017a). Recent major wildfires have created hazardous air pollution conditions requiring health advisories and "spare the air" days far from the site of the fire. For instance, during the Camp Fire in Butte County, air quality became hazardous not only in Chico near the fire, but also more than one hundred miles away in more heavily populated communities, such as in Sacramento, Modesto, and San Francisco (Rowan 2018). Moreover, a Stanford University study found that children experienced greater health impacts, including asthma and cardiovascular events, when exposed to wildfire smoke than smoke generated by prescribed burns (Prunicki et al. 2019). Thus, wildfires are generally far more likely to result in adverse air quality and public health impacts than prescribed burns (Berger et al. 2018).

MONITORING STATION DATA AND ATTAINMENT DESIGNATIONS

Criteria air pollutant concentrations are measured at monitoring stations throughout the state. The data collected at these locations inform the attainment or nonattainment designation of counties and air basins. Vegetation treatment activities implemented under the CalVTP would occur within every air basin in the state and, as such, there would be a high degree of variation in how the emissions of treatments would affect the ambient concentrations of criteria air pollutants within an air basin. For the reasons stated above (e.g., topography, meteorology, emissions sources, location), ambient concentrations of criteria air pollutants differ between air basins.

TOXIC AIR CONTAMINANTS

According to the *California Almanac of Emissions and Air Quality* (CARB 2013), the majority of the estimated health risks from TACs can be attributed to relatively few compounds, the most prevalent being diesel PM. Diesel PM differs from other TACs in that it is not a single substance, but rather a complex mixture of hundreds of substances. Although diesel PM is emitted by diesel-fueled internal combustion engines, the composition of the emissions varies depending on engine type, operating conditions, fuel composition, lubricating oil, and whether the engine includes an emissions control system. Unlike the other TACs, no ambient monitoring data are available for diesel PM because no routine measurement method currently exists. However, CARB has made preliminary concentration estimates based on a particulate matter exposure method. This method uses CARB's emissions inventory's PM_{10} database, ambient PM_{10} monitoring data, and the results from several studies to estimate concentrations of diesel PM. In addition to diesel PM, the TACs for which data are available that pose the greatest existing ambient risk in California are benzene, 1,3-butadiene, acetaldehyde, carbon tetrachloride, hexavalent chromium, para-dichlorobenzene, formaldehyde, methylene chloride, and perchloroethylene. Diesel PM poses the greatest health risk among these 10 TACs mentioned.

Naturally Occurring Asbestos

Asbestos is the common name for a group of naturally occurring fibrous silicate minerals that can separate into thin but strong and durable fibers. NOA was identified as a TAC in 1986 by CARB. NOA is located in many parts of California, and is commonly associated with ultramafic rocks and serpentinite, according to a special publication published by the California Geological Survey (Churchill and Hill 2000). Ultramafic rocks form in high-temperature environments well below the surface of the earth. By the time they are exposed at the surface by geologic uplift and erosion, ultramafic rocks may be partially to completely altered into a type of metamorphic rock called serpentinite. Sometimes the metamorphic conditions are right for the formation of chrysotile asbestos or tremolite-actinolite asbestos in the bodies of these rocks, along their boundaries, or in the soil. Except for a few counties in the southeast portion of the state, most counties in California contain some amount of ultramafic rock. Some areas within the treatable landscape contain serpentinite or other ultramafic rock and soil that could potentially contain NOA.

Asbestos could be released from serpentinite or ultramafic rock if the rock is broken or crushed. Asbestos could also be released into the air due to vehicular traffic on unpaved roads on which asbestos-bearing rock has been used as gravel. Additionally, soil derived from asbestos-bearing rock could contain asbestos entrained into the air from new recreational uses added to route surfaces with exposed asbestos. At the point of release, asbestos fibers can become airborne, causing air quality and human health hazards. Natural weathering and erosion processes act on asbestos bearing rock and soil, increasing the likelihood for asbestos fibers to become airborne if disturbed (California Geological Survey 2002:22). The California Geological Survey has published guidance for geologists involved in conducting or reviewing NOA investigations. These guidelines describe general procedures for use by geologists to determine the presence, type, distribution, and amount of asbestos minerals at the site (California Geological Survey 2002).

Toxic Air Contaminants from Wildfire and Prescribed Burns

In addition to criteria air pollutants, which are discussed above, smoke from wildfires and prescribed burns also contains TACs such as aldehydes (including formaldehyde and acrolein) and organic compounds such as polycyclic aromatic hydrocarbons (PAHs) and benzene. Aldehydes are volatile organic compounds that are detectable by their distinctive odor. Formaldehyde and acrolein are the two most potent aldehydes found in smoke that cause eye and respiratory irritation and potentially exacerbate asthma. Chronic exposure to formaldehyde is associated with nasal cancer (NWCG 2018). PAHs and benzene are also carcinogenic, and long-term exposure could result in elevated cancer-risk.

Although there are many similarities between smoke produced from wildfires and prescribed burns, there are key differences that affect the types and quantities of TACs produced. As discussed under "Criteria Air Pollutants from Wildfire and Prescribed Burns," prescribed burns are controlled events, whereas wildfires burn under uncontrolled and unplanned circumstances. Prescribed burns are generally short in duration whereas wildfires may last for weeks or even months, potentially resulting in a longer exposure of receptors to TACs from smoke emissions. Most critically, wildfires have a much greater potential to burn built structures in addition to vegetation. Built structures contain plastics, chemically-treated wood, and other artificial materials which produce TACs when combusted. For example, chlorinated plastics (polyvinyl chloride) and those materials treated with flame retardants would create a wider array of chlorinated and other toxic compounds that could cause adverse health effects when inhaled (NWCG 2018). These toxic compounds are not typically present in smoke from prescribed burns.

TAC emissions may also be generated if vegetation treated with herbicides is burned. Herbicides have not been detected in prescribed burns occurring within months of their application (NWCG 2018). Studies conducted on herbicides (Bush et al. 1998, McMahon and Bush 1998) indicate that intense heat induced by flames quickly degrades most herbicides, whereas smoldering fires have the potential to volatize small quantities of certain herbicides over the duration of the smoldering phase. However, exposure analyses indicate that even under conditions of smoldering fires, no significant human health risks from herbicides where present. Naturally occurring chemical by-products of combustion (e.g., $PM_{2.5}$, CO, formaldehyde, acrolein) are a far greater risk to human health than combustion of herbicides (Bush et al. 1998).

EXISTING LEVELS OF EMISSIONS GENERATED BY WILDFIRES

As discussed in Section 1.1, "Purpose of CalVTP," fires are a natural component of California's ecosystems. However, wildfires can pose a threat to human communities. Wildfire events cause direct physical harm to humans, and damage to structures and natural resources, as well as contribute to global climate change and air quality degradation. During the second half of the 20th century, California's wildfires were less severe, burned fewer acres, and/or destroyed fewer structures by factors of two and three, respectively, when compared with modern fire statistics (CAL FIRE 2018a). Climate change is exacerbating wildfire conditions, and fire seasons have been extending further into the winter months since 2000. The catastrophic wildfires in October and December of 2017 serve as prime examples of the expanding fire season (CAL FIRE 2018b). Fifteen of the state's 20 most destructive wildfires have occurred since 2003 (CAL FIRE 2019).

To highlight the significance of emissions from burning in the United States, wildfire, agricultural burning, and prescribed burning for wildfire prevention made up 32 percent of the nation's annual fine particulate emissions according to the 2011 National Emissions Inventory (EPA 2014); science supporting new emission factors has increased that number to 48 percent (NWCG 2018:6). This category (burning) has grown in importance, considering its increased prevalence, when compared to other pollution sources.

Wildfire-generated air pollutant emissions are not considered by CARB to be anthropogenic sources and, as a result, are not included in CARB's statewide emissions inventory. Table 3.4-5 summarizes CARB's discrete estimation of PM_{10} and $PM_{2.5}$ emissions as well as total acres burned from wildfire between 2007 and 2017 (CARB 2019a). As shown in the table, the level of acres burned and particulate matter emitted from wildfires across the state vary year to year with a statewide average of 0.69 million acres burned and 261 and 221 thousand tons for PM_{10} and $PM_{2.5}$, respectively, during the 2007–2017 period. This does not account for the wildfires that occurred during 2018, which were the largest and most destructive on record. Thus, it is likely that particulate matter emissions from 2018 wildfires would exceed the numbers shown for 2008, which was the highest year in the past 10 years.

Table 3.4-5 Annual PM Emissions and Acres Burned from Wildfire, 2007–2017[1]

Year	PM_{10} (thousand tons per year)[1]	$PM_{2.5}$ (thousand tons per year)[2]	Acres Burned (million)
2007	219	186	1.04
2008	675	572	1.35
2009	101	86	0.43
2010	15	13	0.09
2011	43	36	0.20
2012	226	191	0.75
2013	277	235	0.56
2014	333	282	0.53
2015	320	272	0.79
2016	195	166	0.55
2017	467	397	1.34

Notes: PM_{10} = respirable particulate matter, $PM_{2.5}$ = fine particulate matter

[1] There are large uncertainties associated with mapped vegetation types, fuel loading, fuel moisture, burned area, modeled fuel consumption in flaming and smoldering phases, and emission factors. The emission estimates may have an uncertainty of between a factor of 2 to 3 (CARB 2019b). CARB has not yet released estimates for 2018.

[2] In this table, a ton represents 2,000 pounds rather than a metric ton, which totals 2,205 pounds or 1,000 kilograms.

Source: CARB 2019a

As shown in Table 3.4-5, the majority of particulate matter emissions from wildfires are composed of $PM_{2.5}$, which is of greater concern than PM_{10} due to its smaller aerodynamic diameter size and ability to penetrate deep into the lungs and even the circulatory system. The emissions estimates displayed in Table 3.4-5 do not account for emissions associated with the combustion of petroleum fuels during wildfire response (firefighting). Jet fuel is combusted to operate aircrafts and helicopters that transport equipment, water, fire retardant, and crews to wildfire locations. Depending on the terrain, diesel-powered wildland fire engines may be used. Additional emissions would occur from the operation of gasoline and diesel-fueled automobiles to transport firefighters locally, regionally, and statewide. These activities are discussed in greater detail in Section 3.9, "Energy."

EXISTING LEVELS OF EMISSIONS GENERATED BY VEGETATION TREATMENTS

As described in Chapter 1, "Introduction" and Section 2.3.1, "Past and Current Treatments," vegetation treatment currently occurs around the state under several other wildfire risk reduction programs implemented by various federal, state, and local agencies. In 2017–2018, CAL FIRE treated approximately 33,000 acres in California using the same treatment activities as proposed under the CalVTP. Criteria pollutant and precursor emissions are generated by existing treatment activities. Emissions are currently generated by mechanical equipment, hand tools, worker commute and haul trips, and from prescribed burning.

ODORS

Odors are generally regarded as an annoyance rather than a health hazard. However, manifestations of a person's reaction to foul odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache).

With respect to odors, the human nose is the sole sensing device. The ability to detect odors varies considerably among the population and overall is quite subjective. Some individuals can smell very minute quantities of specific substances; others may not have the same sensitivity but may have sensitivities to odors of other substances. In addition, people may have different reactions to the same odor; an odor that is offensive to one person may be perfectly acceptable to another (e.g., smells from fast food restaurants). It is important to also note that an unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. This is because of the phenomenon known as odor fatigue, in which a person can become desensitized to almost any odor and recognition only occurs with an alteration in the intensity. Odor sources of concern include wastewater treatment plants, sanitary landfills, composting facilities, recycling facilities, petroleum refineries, chemical manufacturing plants, painting operations, rendering plants, and food packaging plants. The odor associated with smoke generated by the burning of vegetative biomass on agricultural lands, forested areas, park and open space lands, and wildlands is also considered to be objectional.

SENSITIVE RECEPTORS

Sensitive receptors generally include those land uses where exposure to pollutants could result in health-related risks to sensitive individuals, such as children or the elderly. Residential dwellings, schools, hospitals, playgrounds, and similar facilities are of primary concern because of the presence of individuals particularly sensitive to pollutants and/or the potential for increased and prolonged exposure of individuals to pollutants.

Additionally, under the Smoke Management Program, smoke-sensitive areas are defined as populated areas and other areas where an air district determines that smoke and air pollutants can adversely affect public health. These areas include, but are not limited to, towns and villages, campgrounds, trails, populated recreational areas, hospitals, nursing homes, schools, roads, airports, public events, and shopping centers.

For the purposes of this PEIR, smoke-sensitive areas are considered sensitive receptors. Although the treatable landscape is generally in less populated, rural, or undeveloped areas, sensitive receptors are present throughout the treatable landscape.

3.4.3 Environmental Impacts and Mitigation Measures

METHODOLOGY

The air quality analysis focuses on the potential for treatment activities under the CalVTP to result in substantial emissions of air pollutants that would affect regional and/or localized air quality such that human health would be adversely affected. Significance determinations account for the influence of relevant SPRs, which are incorporated into treatment design.

- SPR AD-4 Public Notifications for Prescribed Burning: One to three days prior to the commencement of prescribed burning operations, the project proponent will: 1) post signs along the closest public roadway to the area describing the activity and timing, and requesting persons in the area to contact a designated representative of the project proponent (contact information will be provided with the notice) if they have questions or smoke concerns; 2) publish a public interest notification in a local newspapers or other widely distributed media source describing the activity, timing, and contact information; 3) send the local county supervisor a notification letter describing the activity, its necessity, timing, and measures being taken to protect the environment and prevent prescribed burn escape. This SPR applies only to prescribed burn treatment activities and all treatment types.

- **SPR AQ-1 Comply with Air Quality Regulations:** The project proponent will comply with the applicable air quality requirements of air districts within whose jurisdiction the project is located. This SPR applies only to prescribed burning treatment activities and all treatment types.
- **SPR AQ-2 Submit Smoke Management Plan:** The project proponent will submit a smoke management plan for all prescribed burns greater than 10 acres or estimated to produce more than 1 ton of particulate matter, in accordance with 17 CCR Section 80160(b). Burning will only be conducted in compliance with the burn authorization program of the applicable air district(s) having jurisdiction over the treatment area. Example of a smoke management plan is in Appendix PD-2. This SPR applies only to prescribed burning treatment activities and all treatment types.
- **SPR AQ-3 Create Burn Plan**: The project proponent will create a burn plan using the CAL FIRE burn plan template for all prescribed burns. The burn plan will include a fire behavior model output of First Order Fire Effects Model and BEHAVE or other fire behavior modeling simulation and that is performed by a qualified fire behavior technical specialist that predicts fire behavior, calculates consumption of fuels, tree mortality, predicted emissions, greenhouse gas emissions, and soil heating. The project proponent will minimize soil burn severity from broadcast burning to reduce the potential for runoff and soil erosion. The burn plan will be created with input from a qualified technician or certified State burn boss. This SPR applies only to prescribed burning treatment activities and all treatment types.
- **SPR AQ-4 Minimize Dust**: To minimize dust during treatment activities, the project proponent will implement the following measures:
  - Limit the speed of vehicles and equipment traveling on unpaved areas to 15 miles per hour to reduce fugitive dust emissions, in accordance with the California Air Resources Board (CARB) Fugitive Dust protocol.
  - If road use creates excessive dust, the project proponent will wet appurtenant, unpaved, dirt roads using water trucks or treat roads with a non-toxic chemical dust suppressant (e.g., emulsion polymers, organic material) during dry, dusty conditions. Any dust suppressant product used will be environmentally benign (i.e., non-toxic to plants and will not negatively impact water quality) and its use will not be prohibited by ARB, EPA, or the State Water Resources Control Board (SWRCB). The project proponent will not over-water exposed areas such that the water results in runoff. The type of dust suppression method will be selected by the project proponent based on soil, traffic, site-specific conditions, and air quality regulations.
  - Remove visible dust, silt, or mud tracked-out on to public paved roadways where sufficient water supplies and access to water is available. The project proponent will remove dust, silt, and mud from vehicles at the conclusion of each workday, or at a minimum of every 24 hours for continuous treatment activities, in accordance with Vehicle Code Section 23113.
  - Suspend ground-disturbing treatment activities, including land clearing and bulldozer lines, when there is visible dust transport (particulate pollution) outside the treatment boundary, if the particulate emissions may "cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or that endanger the comfort, repose, health, or safety of any of those persons or the public, or that cause, or have a natural tendency to cause, injury or damage to business or property," per Health and Safety Code Section 41700.

  This SPR applies to all treatment activities and treatment types.
- **SPR AQ-5 Avoid Naturally Occurring Asbestos:** The project proponent will avoid ground-disturbing treatment activities in areas identified as likely to contain naturally occurring asbestos (NOA) per maps and guidance published by the California Geological Survey, unless an Asbestos Dust Control Plan (17 CCR Section 93105) is prepared and approved by the air district(s) with jurisdiction over the treatment area. Any NOA-related guidance provided by the applicable air district will be followed. This SPR applies to all treatment activities and treatment types.

- **SPR AQ-6: Prescribed Burn Safety Procedures.** Prescribed burns planned and managed by non-CAL FIRE crews will follow all safety procedures required of CAL FIRE crew, including the implementation of an approved Incident Action Plan (IAP). The IAP will include the burn dates; burn hours; weather limitations; the specific burn prescription; a communications plan; a medical plan; a traffic plan; and special instructions such as minimizing smoke impacts to specific local roadways. The IAP will also assign responsibilities for coordination with the appropriate air district, such as conducting onsite briefings, posting notifications, weather monitoring during burning, and other burn related preparations. This SPR applies only to prescribed burning treatment activities and all treatment types.

Qualifying treatments implemented under the CalVTP could result in an incremental increase in emissions of criteria air pollutant and precursors. The potential for mobile-source emissions of criteria air pollutants and precursors to exceed, or contribute to exceedances of, the NAAQS and CAAQS is examined by comparing treatment-related emissions to mass emission thresholds recommended by air districts in California. Emissions were estimated for each treatment activity being conducted in tree, shrub, and grass fuel types in the treatable landscape. Treatment-generated emissions were estimated on a per-acre basis. Emissions generated by off-road equipment were estimated using emission factors from CARB's web-based OFFROAD2017 model (CARB 2017a). Emissions generated by on-road vehicle trips were estimated using emission factors from the Emission Factor 2017 model (EMFAC2017, Version 1.0.2) (CARB 2017b). Detailed calculations and assumptions are provided in Appendix AQ-1. The emissions intensity of treatment activities could vary widely according to multiple factors including, but not limited to, the amount of vegetation removed or treated per acre, the maturity of the vegetation, the number of workers and equipment needed for each treatment project, and the types of equipment available. For these reasons, all assumptions involved in the emissions calculations are included in Appendix AQ-1 and all emissions estimates are approximations.

Treatment-related TAC emissions are also discussed qualitatively based on the potential for projects to result in increased exposure of sensitive receptors (e.g., populated areas, residences, schools) to high concentrations of TACs. This discussion addresses the types of TAC-emitting activities that could occur such as diesel PM emitted by diesel-powered off-road equipment, NOA-containing fugitive dust emissions from ground disturbing activities, and TACs contained in smoke emissions from prescribed burning.

The potential for treatments implemented under the CalVTP to create objectionable odors affecting a substantial number of people is also discussed qualitatively with a focus on the types of odor sources, their intensity, smoke prevention measures, and the proximity of treatment activity to people.

THRESHOLDS OF SIGNIFICANCE

Thresholds of significance are based on Appendix G and Section 15065 of the State CEQA Guidelines, professional judgment, and CEQA case law. As stated in Appendix G, the significance criteria established by air districts, including quantitative thresholds, may be relied upon to make significance determinations. Multiple air districts in California have published CEQA guidance with recommended quantitative thresholds for determining whether emissions from individual projects would be considered significant in the context of CEQA (also called mass emissions thresholds). Mass emission thresholds are the emission increments that would result in a cumulatively considerable net increase of any criteria pollutant or precursor that would exceed, or contribute to, the nonattainment status with respect to the CAAQS and NAAQS. Given the extensive geographic scope of the CalVTP's treatable landscape, which is partially within every air district in California, the CAAQS and NAAQS thresholds are appropriate.

A treatment implemented under the proposed CalVTP would result in a significant regional and/or localized air quality impact such that human health would be adversely affected if emissions-generating treatment activity would:

- conflict with or obstruct implementation of the applicable air quality plan; specifically:
  - conflict with or obstruct implementation of CARB's State Implementation Plan, region-specific documents that demonstrate how each region can meet air quality standards;

- result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard; an increase would be cumulatively considerable if it would:
  - generate emissions of criteria air pollutants and precursors that would exceed or contribute to exceedances of the CAAQS or NAAQS;
- expose sensitive receptors to substantial pollutant concentrations; specifically:
  - result in an incremental increase in cancer risk greater than 10 in million and/or incremental increase in noncarcinogenic Hazard Index greater than 1.0; or
  - result in the exposure of people to NOA
- result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

According to the California Supreme Court, lead agencies, in preparing EIRs, must make "a reasonable effort to substantively connect a project's air quality impacts to likely *health consequences*." (*Sierra Club v. County of Fresno* (2018) 6 Cal.5th 502, 510 [italics added].) Stated another way, the lead agency must make "a reasonable effort to discuss relevant specifics regarding the connection between… the general health effects associated with a particular pollutant and the estimated amount of that pollutant the project will likely produce." (*Id*. at p. 521.) Where air quality effects are determined to be significant, "there must be a reasonable effort to put into a meaningful context the conclusion that the air quality impacts will be significant[,]" expressed in terms of "the nature and magnitude of the 'health and safety problems caused by the physical changes' resulting from the Project." (*Id*. at p. 522.)

The court recognized, however, that in some instances, making the desired connection may not be scientifically feasible. "[I]f it is not scientifically possible to do more than has already been done to connect air quality effects with potential human health impacts, the EIR itself must explain why, in a manner reasonably calculated to inform the public of the scope of what is and is not yet known about the Project's impacts." (*Id*. at p. 520.)

Under State CEQA Guidelines section 15065, subdivision (a)(4), the environmental effects of a project are significant where they "will cause substantial adverse effects on human beings, either directly or indirectly." (See also *California Building Industry Assn. v. Bay Area Air Quality Management Dist.* (2015) 62 Cal.4th 369, 799.) For purposes of this PEIR, "substantial adverse effects on human beings" means emitting criteria air pollutants or precursors that could result in in, or contribute to, an exceedance of the NAAQS or CAAQS in an air basin or at any location where people may be present; the exposure of people to a dose of TACs that results in an incremental increase in cancer risk greater than 10 in one million or a Hazard Index for acute or chronic risk greater than 1.0; exposure of people to airborne NOA; or exposing a substantial number of people to objectionable odors.

ISSUES NOT EVALUATED FURTHER

All issues identified in State CEQA Guidelines Appendix G and listed above under Thresholds of Significance are discussed below.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact AQ-1: Generate Emissions of Criteria Air Pollutants and Precursors during Treatment Activities that Would Exceed CAAQS or NAAQS and Conflict with Regional Air Quality Plans

Emissions of criteria air pollutants and precursors generated by mechanical and manual treatments, prescribed herbivory, herbicide application, and prescribed burns under the CalVTP would likely exceed air district–established mass emission thresholds and, therefore, result in, or contribute to, the nonattainment status with respect to the NAAQS and CAAQS in one or more air basins. In addition, treatment activity–related emissions could result in, or contribute to, localized exceedances of NAAQS and CAAQS for CO, PM_{10}, and $PM_{2.5}$ in areas where people reside and work, thereby also conflicting with the air quality planning efforts of regional air districts, including those that comprise the SIP. This could result in health complications experienced by receptors, which, if it occurred, would be a **potentially significant** impact.

Treatment activities implemented under the CalVTP would result in emissions of criteria air pollutants and precursors from several sources, including:

- exhaust generated by off-road equipment, machine-powered hand tools, and helicopters;
- exhaust from on-road vehicle trips associated with worker commutes and transport of equipment, as well as the hauling and processing of biomass;
- fugitive PM_{10} and $PM_{2.5}$ dust emissions generated by ground disturbance activities and vehicle travel on unpaved roads; and
- smoke generated by the combustion of vegetation during prescribed burns.

Mechanical treatments would be performed with heavy-duty off-road equipment such as wheeled tractors, crawler-type tractors, excavators, feller/bunchers, skidders, chippers, masticators or other specially designed tractors with attached implements designed to selectively cut, uproot, crush/compact, or chop target vegetation.

Manual treatments are typically conducted by one or two hand crews (i.e., 20–40 crew members) using four to eight chainsaws. Masticators and chippers may also be used at some manual treatment sites to assist with biomass disposition.

The vegetative debris produced by mechanical or manual treatments may be processed into several products: electricity, soil additives and amendments, engineered/composite wood, firewood, paper, densified wood, and potentially biofuels. This could result in additional haul truck trips to processing facilities, which would generate additional emissions of both exhaust and fugitive dust. Emissions would also be generated by equipment used to process the raw vegetative debris.

Prescribed herbivory may require intermittent use of an all-terrain vehicle or utility vehicle for herding livestock or transporting temporary fencing. On-road trucks would be used to haul livestock to and from sites where prescribed herbivory would be conducted.

Herbicide application may require all-terrain vehicles or tractors. However, few pieces of emission-generating equipment would be required, because herbicides would most frequently be applied by hand (manual application of herbicides).

Prior to implementing a prescribed burn, heavy-duty off-road equipment such as bulldozers, bulldozer transports, and masticators or track chippers may be used to create a fire containment (fuel break) perimeter. Fire engines and water trucks would be stationed on-site for safety. Hand tools to ignite the prescribed burn could include drip torches and Terra torches, which contain a blend of diesel fuel and gasoline. A helicopter with a helitorch may also be used when a large area needs to be burned or in an area with terrain that provides limited accessibility. Combustion of vegetation from prescribed burns would produce emissions of criteria air pollutants. The combustion of vegetation produces smoke, which is composed of a complex mixture of compounds, including criteria air pollutants and precursors.

Worker commute trips associated with all treatment activities would generate exhaust emissions of criteria air pollutants and precursors. If large crews are required, they would generally carpool to the site on a crew bus, which would also generate exhaust emissions. In addition, worker trips and truck trips on unpaved roads would result in fugitive PM_{10} and $PM_{2.5}$ dust emissions.

As discussed in Chapter 2, "Program Description," treatment activities would be selected based on several parameters including site-specific characteristics (e.g., types and maturity of vegetation, soil characteristics, terrain, proximity to sensitive areas, topography), weather conditions, treatment objectives, cost and available funding, and input from communities. Furthermore, the treatable landscape encompasses many different vegetation types, which can be grouped into three broad categories: tree, shrub, and grass. Given this wide variability over an expansive geographic area, there is no set of "typical" treatment characteristics that can be used to represent each type of treatment activity under the CalVTP. For instance, mechanical treatments conducted in a grass fuel type environment may use mowers, whereas mechanical treatments conducted in a tree fuel type environment may use feller/bunchers. Even the same treatment activity in the same fuel type could also vary. For instance, a mechanical treatment for a WUI fuel reduction treatment in a tree fuel type environment where biomass may be masticated and left in place may use chippers and masticators, whereas a mechanical treatment to establish a fuel break in a tree fuel type environment may use feller/bunchers, skidders, or cut-to-length systems to fell and remove select trees.

To provide a general sense of the scale of emissions that may be associated with treatment activities, the rates of emissions associated with each treatment activity (i.e., mechanical treatment, manual treatment, prescribed herbivory, herbicide application, and prescribed burning) in each fuel type (i.e., tree, shrub, and grass) are estimated on a per-acre basis using assumptions about the types and number of equipment that would be used by a treatment crew, as well as the number of workers per treatment crew. Treatment activities are subdivided by type because the types of equipment that could be used within each fuel type are distinct. These emission rates are summarized in Table 3.4-6. See Appendix AQ-1 for and detailed input parameters and assumptions. Exact emissions for treatment activities conducted under the CalVTP may differ from these hypothetical treatment scenarios because equipment, crew size, and area treated per day could vary widely. However, these scenarios are intended to provide a reasonable approximation of the emissions such activities would generate because they are based on past vegetation treatment projects conducted in California.

The emission rates presented in Table 3.8-3 do not include emissions generated by trucks hauling equipment or livestock to and from treatment sites at the beginning and end of each treatment because the emissions associated with the transport of equipment and livestock would vary considerably depending on the size of a treatment site, trip distance, and the number of crews working at each site. The emission rates presented in Table 3.4-6 also do not include emissions associated with any hauling or processing of biomass, which may occur as part of some manual and mechanical treatment activities as conditions warrant. As discussed in Section 2.5.2, "Description of Treatment Activities," the percentage of vegetation hauled to biomass facilities for energy generation is expected to increase over time. These emissions are not quantified due to the high level of uncertainty about what types of processing-related activities would occur and the distances feedstock would be hauled. Additionally, new biomass processing facilities that would require a discretionary decision from a lead agency would be subject to its own CEQA review.

The potential for treatment-related emissions of criteria air pollutants and precursors to contribute to regional air quality impacts and the potential for these emissions to result in high localized concentrations of criteria air pollutants are discussed separately below.

Table 3.4-6 Emissions of Criteria Air Pollutants and Precursors Associated with a Single Treatment Crew During a One-Acre Treatment

	Emissions per Acre Treated (lb/acre)			
	ROG	NO_X	PM_{10}	$PM_{2.5}$
Prescribed Burning				
Tree Fuel Type	2,186.6	166.0	1,421.3	1,421.3
Shrub Fuel Type	352.8	44.4	142.1	142.1
Grass Fuel Type	166.4	21.9	84.5	84.5
Mechanical Treatment				
Tree Fuel Type	3.0	5.3	0.3	0.2
Shrub Fuel Type	0.7	4.1	0.5	0.3
Grass Fuel Type	0.4	0.8	0.2	0.2
Manual Treatment				
Tree Fuel Type	43.8	4.3	0.8	0.2
Shrub Fuel Type	18.0	2.6	0.6	0.2
Grass Fuel Type	0.1	0.1	0.05	<0.1
Prescribed Herbivory				
Tree Fuel Type	0.4	0.9	0.1	0.1
Shrub Fuel Type	0.8	1.8	0.2	0.2
Grass Fuel Type	0.8	1.8	0.2	0.2
Herbicide Application				
Tree Fuel Type	0.5	1.6	0.2	0.1
Shrub Fuel Type	0.3	0.8	0.1	0.1
Grass Fuel Type	0.1	0.2	<0.1	<0.1

Notes: lb/acre = pounds per acre; ROG = reactive organic gases; PM_{10} = respirable particulate matter with an aerodynamic diameter of 10 microns or less; $PM_{2.5}$ = fine particulate matter with an aerodynamic diameter of 2.5 microns or less; NO_X = oxides of nitrogen;

Source: See Appendix AQ-1 for detailed calculations

Regional Air Quality

As described in Section 3.4-1, "Regulatory Setting," air districts recommend mass emission thresholds to determine whether a project would result in a cumulatively considerable net increase of any criteria pollutant or precursor that would exceed, or contribute to the nonattainment status with respect to the NAAQS and/or CAAQS, which represent concentration limits of criteria air pollutants needed to adequately protect human health.

As described in Chapter 2, "Program Description," the CalVTP would treat approximately 250,000 acres annually within the 20.3-million-acre treatable landscape. The relative distribution of treatment activities is reasonably expected to be 50 percent prescribed burning, 10 percent manual treatments, 20 percent mechanical treatments, 10 percent herbicide treatments, and 10 percent prescribed herbivory. However, it is not feasible to precisely describe the location, size, or timing of specific treatments during any particular year, or any single day, in this programmatic evaluation. Depending on the number of acres that would undergo treatment on the same day (or same year) within the same air basin, the levels of criteria air pollutants and precursors emitted by treatment activities could exceed the mass emissions thresholds recommended by local air districts. For instance, as shown in Table 3.4-6, one acre of prescribed burning would generate 166 pounds per day (lb/day) of NO_X. This level would exceed the applicable daily mass emissions thresholds established by every air district in California, which are shown in Table 3.4-2. As shown in

Table 3.4-6, mechanical treatment of tree-dominated fuels, manual treatment of tree-dominated fuels, and mechanical treatment of shrub-dominated fuels, would generate NO_X emissions at rates of 5.3 lb/acre, 4.3 lb/acre, and 4.1 lb/acre, respectively. If 20 acres underwent these types of treatment in a single day in the same air district the associated emissions would amount to approximately 106 lb/day, 86 lb/day, and 82 lb/day, respectively. These daily levels would exceed applicable daily mass emission threshold in most air districts. Also as shown in Table 3.4-6, prescribed herbivory in tree-, shrub-, and grass-dominated fuels would generate NO_X emissions at rates of 0.9 lb/acre, 1.8 lb/acre, and 1.8 lb/acre, respectively. If 100 acres underwent these types of treatment in a single day in the same air district the associated emissions would amount to approximately 90 lb/day, 180 lb/day, and 180 lb/day, respectively. These daily levels would exceed applicable daily mass emission threshold in many air districts. Moreover, combinations of different treatment activities taking place in the same air district at the same time could also result in exceedances of applicable daily mass emission thresholds. Some air districts recommend annual mass emission thresholds, expressed in tons per year, which could also be exceeded by treatment activity. Because treatment activities implemented under the CalVTP would generate levels of criteria air pollutants and precursors that exceed air district thresholds, these emissions could result in, or contribute to, exceedances of the NAAQS and CAAQS for ozone, PM_{10}, and $PM_{2.5}$, thereby also conflicting with the air quality planning efforts of regional air districts, including those that comprise the SIP.

<u>Localized Concentrations of Criteria Air Pollutants</u>

In addition to regional air quality concerns, emissions of some criteria air pollutants from treatment activities could result in localized concentrations of criteria air pollutants that exceed NAAQS and CAAQS and expose nearby receptors to associated adverse health effects. This discussion focuses on the formation of ground-level ozone from the oxidation of ROG and NO_x, fugitive PM_{10} and $PM_{2.5}$ dust emissions from travel on unpaved roads and ground disturbing activities, and smoke emissions from prescribed burning.

Ozone

As summarized in Table 3.4-3, "Sources and Health Effects of Criteria Air Pollutants," ground-level ozone is a secondary pollutant derived from the oxidation of ROG and NO_x in the presence of sunlight. Ozone is not a pollutant of localized concern. Portions of the treatable landscape are designated as non-attainment with respect to the NAAQS and CAAQS for ozone, as shown in Table 3.4-4. Therefore, treatment activity-related emissions of ROG and NO_x could exacerbate this existing adverse condition in these areas.

However, given the many factors (e.g., topography, meteorology, emissions sources) that contribute to the formation and dispersion of ozone, it is not scientifically possible to predict with a meaningful level of accuracy the number of days when ozone concentrations would exceed the NAAQS or CAAQS or the locations where exceedances would occur. Current models cannot determine the locations of, or the specific concentrations of, ozone from ROG or NO_x precursors because of the complex physical factors that contribute to the chemical reactions necessary to convert precursors to ground-level ozone (i.e., sun, temperature, wind, topography). Any meaningfully accurate prediction in site-specific ozone concentrations using currently available ozone models would require precursor emissions to be sufficiently substantial as to change the regional inventory of pollutants, which would not occur with a singular prescribed burn project. Therefore, such predictions for treatments conducted under the CalVTP would not be scientifically possible. Nonetheless, because precursor emission levels would likely exceed mass emissions thresholds established by local air districts, as discussed above, it is reasonably foreseeable that treatment activity–related emissions could contribute to an increase in the number of days when the NAAQS and CAAQS for ozone are exceeded in some portions of the air basins in which the ozone is formed.

As summarized in Table 3.4-3, human exposure to ozone may result in acute and chronic health effects including coughing, pulmonary distress, lung inflammation, shortness of breath, and permanent lung impairment. Mass emission thresholds are considered by air districts to be the levels that constitute a cumulatively considerable contribution to an exceedance of the CAAQS and NAAQS, which have been established to protect human health. Because emissions of ROG and NO_X generated by the CalVTP would exceed the mass emissions thresholds of local air districts, it is foreseeable that the aforementioned adverse health effects associated with ozone exposure could be exacerbated by treatment activity–related emissions of criteria air pollutants and precursors.

Fugitive PM_{10} and $PM_{2.5}$ Dust Emissions

Some parts of the treatable landscape can only be accessed by unpaved roads. Travel on unpaved surfaces generates fugitive PM_{10} and $PM_{2.5}$ dust emissions. Depending on the number of vehicle trips, the proximity of people, the silt content of soil, travel on unpaved roads could result in, or contribute to, an exceedance of the 24-hour CAAQS of 50 $\mu g/m^3$ for PM_{10}, the 24-hour NAAQS of 150 $\mu g/m^3$ for PM_{10}, and/or the 24-hour NAAQS of 35 $\mu g/m^3$ for $PM_{2.5}$ at nearby receptors. As summarized in Table 3.4-3, human exposure to fugitive dust emissions may cause acute and chronic health impacts including breathing and respiratory symptoms, premature death, and carcinogenesis. Several SPRs address fugitive dust and would be implemented to minimize fugitive dust emissions. SPR AQ-4, AQ-5, and AQ-6 would limit vehicle speeds on unpaved roads, require that vehicles be cleaned prior to leaving treatment sites to reduce the inadvertent transport of dust from unpaved areas onto paved roads, and require the suspension of ground disturbing activities when they result in visible dust transport outside the boundary of treatment areas. Furthermore, SPR AQ-4 requires treatment crews to wet unpaved roads if excessive dust is created during road use, using water trucks or non-toxic chemical dust suppressants. Implementation of these SPRs would minimize the contribution of treatment activities to localized concentrations of PM_{10} and $PM_{2.5}$. Nonetheless, if ambient background concentrations are high and multiple treatment crews generate new vehicle trips on the same unpaved roadway on the same day, resultant concentrations of PM_{10} and $PM_{2.5}$ from fugitive dust could exceed applicable NAAQS and CAAQS at roadside residences and other places where people are present and expose affected receptors to adverse health effects.

Smoke Emissions from Prescribed Burns

As discussed in Section 3.4.2, "Environmental Setting," the primary pollutant of localized concern from prescribed burning is $PM_{2.5}$, which includes UFP. Emissions of $PM_{2.5}$ generated by prescribed burns could result in, or contribute to, exceedances of the CAAQS and NAAQS for $PM_{2.5}$ where people are present. In terms of localized impacts, studies have shown that exposure of workers implementing prescribed burns to $PM_{2.5}$ can substantially exceed occupational exposure limits (OELs) established by the California Division of Occupational Safety and Health (Cal/OSHA) and the National Institute for Occupational Safety and Health (NWCG 2018). Inhalation of particulate matter can cause short-term breathing and adverse respiratory symptoms, aggravation of existing respiratory and/or cardiovascular conditions, premature death, exposure to carcinogens, and compromised immune function.

In addition to $PM_{2.5}$, smoke emissions contain CO, which at high concentrations can cause dizziness, nausea, and impaired mental function. CO levels are highest during the smoldering stages of a fire, and resultant concentrations are especially high in areas close to the fire. CO disperses rapidly with distance such that fire-generated CO will not adversely affect nearby receptors unless a large fire occurs and inversion conditions trap the CO in areas where people are present.

Localized exposure to smoke from prescribed burns, like other emissions, is dependent on proximity to the source. Those workers implementing the prescribed burn are at greatest risk for smoke exposure because they would be in or adjacent to active burn areas. CAL FIRE employs safety measures to protect fire personnel when implementing prescribed burns, including respirators and goggles that meet occupational safety and health standards. CAL FIRE also requires approval of an Incident Action Plan (IAP) that identifies medical personnel and procedures and requires all personal protective equipment to be worn during fire operations (see Appendix AQ-2 for a sample IAP). These safety measures would provide real-time monitoring of smoke conditions, reduce the potential for adverse smoke effects, and reduce inhalation hazards for fire personnel. Although these prescribed burning planning efforts are specific to CAL FIRE, each agency that plans and implements prescribed burns has its own set of agency-specific planning tools, planning and safety documents, public notification protocols, and best management practices to reduce risks related to safety, human health, and the environment. Moreover, SPR AQ-8 requires prescribed burns conducted by non-CAL FIRE crews to follow all CAL FIRE safety procedures, including an approved IAP, which would minimize worker exposure to smoke.

To protect the public from smoke emissions, emissions from prescribed burns are regularly controlled through reduction techniques, such as burning only when fuels have a prescribed moisture content, reducing fuels before ignition, and scheduling burns before new fuels appear. According to the National Wildfire Coordinating Group, if emission reduction techniques are optimally used, emissions from prescribed burns around the U.S. could potentially be reduced by 20–25 percent without interfering with land management objectives (NWCG 2018). Furthermore, several SPRs address prescribed burning and would be implemented to minimize smoke emissions and potential exposure of people. SPR AD-4 requires adequate public noticing and signage about prescribed burns including timing, contact information, and description of the activity. The public would be restricted from areas where active burns would take place. SPR AQ-2 requires burn managers to submit and obtain approval for their SMPs, which would identify the locations where people may be present and specify the smoke prescription to reduce their exposure to smoke. Additionally, SPR AQ-3 requires completion of a burn plan. Contents of a prescribed burn plan also include the date, location, and description of the area in detail, prescriptive weather requirements, fire behavior modeling, the ignition plan (including technique, time of day, and mop-up), a contingency plan, the smoke management plan (SMP), public notification plan, a go/no go checklist, and contact information for the burn boss and others in charge of the prescribed burn. Burn plans reduce the potential for public exposure to smoke by requiring the activity to be designed in a way that prioritizes public safety, and by identifying the specific conditions under which a safe prescribed burn can commence and proceed. Specific to prescribed burns implemented by CAL FIRE, one crew member is typically assigned to report weather conditions to the Incident Commander every 30 minutes to make sure the burn is staying within its prescription. If conditions deviate from the burn plan, crews transition from active burning activities to patrolling and/or extinguishing. In the event a prescribed burn extends beyond the perimeter of its planned area, on-site hand crews are deployed to control the escape.

However, despite adherence to an SMP, IAP, and other precautionary measures, meteorological conditions may change during some prescribed burns and the quantity of smoke generated and the direction and height of its dispersion may not occur as predicted. During these instances unanticipated people could be exposed to smoke. The concentrations of CO, PM_{10}, and $PM_{2.5}$ contained in the smoke could exceed, or contribute to, a localized exceedance of, the NAAQS and CAAQS for CO, PM_{10}, and $PM_{2.5}$ and expose receptors to adverse health effects such as breathing and adverse respiratory symptoms, aggravation of existing respiratory and/or cardiovascular conditions in the short-term, and in the long term, premature death, exposure to carcinogens, and compromised immune function. Such events could occur more frequently under the CalVTP simply because more prescribed burns would be performed each year, compared to existing conditions.

<u>Summary</u>

Emissions of criteria air pollutants and precursors associated with treatment activity performed by qualifying projects under the CalVTP would likely exceed air district–established mass emission thresholds and, therefore, result in, or contribute to, the nonattainment status with respect to the NAAQS and CAAQS in one or more air basins, thereby conflicting with the air quality planning efforts of regional air districts, including those that comprise the SIP. In addition, treatment activity–related emissions could result in, or contribute to, localized exceedances of NAAQS and CAAQS in areas where people reside and work. Such localized exceedances could result from fugitive PM_{10} and $PM_{2.5}$ dust emissions generated by travel by workers and haul trucks on unpaved roads and from prescribed burns that generate smoke containing CO, PM_{10}, and $PM_{2.5}$. Because of these possible adverse effects to air quality on both a regional level and local level and the resulting health effects that could be experienced by exposed receptors, this impact, if it occurred, would be **potentially significant**.

While implementation of the CalVTP would result in emissions of criteria air pollutants and precursors from on- and off-road equipment, vehicle travel, and prescribed burns that may exceed the mass emission thresholds of local air districts, it is also reasonable to expect that the treatment activities conducted under the CalVTP would result in some degree of long-term reduction in emissions of criteria air pollutants and precursors from wildfires by reducing the intensity of wildfires in treated landscapes, limiting wildfire spread, and slowing the progress of some fires to allow for more rapid containment. As described in Chapter 2, “Program Description,” a primary purpose of the CalVTP is to reduce wildfire risk in California. Emergency response for firefighting efforts requires mobilizing and deploying significant human and equipment resources from throughout the state, and in some cases nationally and internationally. Furthermore, when wildfires destroy structures, large volumes of debris are generated, which must be removed by haul trucks. This major surge in the use of on-road vehicles and off-road equipment during wildfire response results in an increase of emissions also unaccounted for by the air quality planning efforts of air districts. Wildfire itself, through the combustion of vegetative and non-vegetative fuels also results in increased and unforeseen emissions. As discussed in Section 3.4.2, "Environmental Setting," recent major wildfires have created hazardous air pollution conditions requiring health advisories and "spare the air" days far from the site of the fire. Thus, wildfires are generally far more likely to result in adverse air quality and public health impacts than prescribed burns. Given the unpredictability of wildfire, the variability in emission characteristics of wildfire fuels (i.e., grass-type, shrub-type, tree-type, built structures), and the possible variability in emissions from treatment activities under the CalVTP, evaluating the net effect of the CalVTP on emissions associated with wildfire and wildfire response is not possible, nor is it pertinent to determining the significance of the emissions from treatment activities under CEQA. This information is presented to explain the broader context for consideration of fire-related emissions in California, including both treatment emissions and wildfire emissions.

Mitigation Measures

Mitigation Measure AQ-1: Implement On-Road Vehicle and Off-Road Equipment Exhaust Emission Reduction Techniques

Where feasible, project proponents will implement emission reduction techniques to reduce exhaust emissions from off-road equipment. It is acknowledged that due to cost, availability, and the limits of current technology, there may be circumstances where implementation of certain emission reduction techniques will not feasible. The project proponent will document the emission reduction techniques that will be applied and will explain the reasons other techniques that could reduce emissions are infeasible.

Techniques for reducing emissions may include, but are not limited to, the following:

- Diesel-powered off-road equipment used in construction will meet EPA's Tier 4 emission standards as defined in 40 CFR 1039 and comply with the exhaust emission test procedures and provisions of 40 CFR Parts 1065 and 1068. Tier 3 models can be used if a Tier 4 version of the equipment type is not yet produced by manufacturers. This measure can also be achieved by using battery-electric off-road equipment as it becomes available. Prior to implementation of treatment activities, the project proponent will demonstrate the ability to supply the compliant equipment. A copy of each unit's certified tier specification or model year specification and operating permit (if applicable) will be available upon request at the time of mobilization of each unit of equipment.
- Use renewable diesel fuel in diesel-powered construction equipment. Renewable diesel fuel must meet the following criteria:
  - meet California's Low Carbon Fuel Standards and be certified by CARB Executive Officer;
  - be hydrogenation-derived (reaction with hydrogen at high temperatures) from 100 percent biomass material (i.e., non-petroleum sources), such as animal fats and vegetables;
  - contain no fatty acids or functionalized fatty acid esters; and
  - have a chemical structure that is identical to petroleum-based diesel and complies with American Society for Testing and Materials D975 requirements for diesel fuels to ensure compatibility with all existing diesel engines.
- Electric- and gasoline-powered equipment will be substituted for diesel-powered equipment.
- Workers will be encouraged to carpool to work sites, and/or use public transportation for their commutes.
- Off-road equipment, diesel trucks, and generators will be equipped with Best Available Control Technology for emission reductions of NO_X and PM.

<u>Significance after Mitigation</u>

Mitigation Measure AQ-1 would reduce the mass emissions of criteria air pollutants and precursors generated by use of on-road vehicles and off-road equipment during treatment activities. Given the potential infeasibility of implementing specific emission reduction techniques and the uncertainties associated with treatment activity location, size, and timing, the emission reductions from implementation of Mitigation Measure AQ-1 cannot be meaningfully quantified. Thus, depending on the number of acres that would undergo treatment on the same day (or same year) within the same air basin, the potential remains that levels of criteria air pollutants and precursors emitted by treatment activities could still exceed the mass emissions thresholds recommended by local air districts, thereby resulting in, or contributing to, exceedances of the NAAQS and CAAQS in air basins.

Mitigation Measure AQ-1 would not reduce to a less than significant level the potential for treatment-related vehicle travel on unpaved roads to result in, or contribute to, localized concentrations of PM_{10} and $PM_{2.5}$ that exceed applicable NAAQS and CAAQS.

While implementation of Mitigation Measure AQ-1 would reduce emissions and the resultant exposure to potential health effects, the amount of the reduction cannot be determined because of the variables described above; therefore, the potential remains that localized exceedances of the NAAQS and CAAQS for CO, PM_{10}, and $PM_{2.5}$ and associated adverse health effects to exposed people could occur and this impact would remain **potentially significant and unavoidable**.

Impact AQ-2: Expose People to Diesel Particulate Matter Emissions and Related Health Risk

Because of the short duration of treatment activities and because treatment activity would not take place near the same people for an extended period of time, diesel PM generated by treatment activities would not expose any person to an incremental increase in cancer risk greater than 10 in one million or a Hazard Index of 1.0 or greater. This impact would be **less than significant**.

Implementation of treatments under the CalVTP would result in exhaust emissions of diesel PM from off-road equipment and haul truck trips associated with treatment activities. Mechanical treatments of forested lands (tree fuel type) would generally involve the greatest number of large, heavy-duty off-road diesel equipment such as harvesters, forwarders, masticators and chippers in comparison to other treatment activities in other fuel types. Some diesel-powered equipment may also be used in manual treatments and herbicide application treatments, such as machine powered hand tools and applicators, and the preparation of prescribed burn areas may include bulldozing and chaining to loosen vegetation and for clearing vegetation to establish control lines. Diesel-powered on-road trucks would also be used to haul equipment and workers to and from treatment sites, and to haul livestock to sites where prescribed herbivory would be conducted.

As described in the Regulatory Setting (Section 3.4.1), diesel PM is a TAC. It is estimated that about 70 percent of total known cancer risk related to air toxics in California is attributable to diesel PM (CARB 2019c). The potential cancer risk from inhaling diesel PM is greater than the potential for all other diesel PM–related health impacts (i.e., noncancer chronic risk, short-term acute risk) and health impacts from other TACs (CARB 2003:K-1). Based on the emissions calculations summarized under Impact AQ-1 and presented in Appendix AQ-1, the level of diesel PM exhaust that would be emitted by a single crew performing mechanical treatment in tree-dominated fuel types would be approximately 1.4 lb/day and this level would be higher than for any other treatment activity in any other fuel type.

The dose to which receptors are exposed is the primary factor used to determine health risk (i.e., potential exposure to TAC emission levels that exceed applicable standards). Dose is a function of the concentration of a substance or substances in the environment and the duration of exposure to the substance. Dose is positively correlated with time, meaning that a longer exposure period would result in a higher exposure level for the maximally exposed individual (the hypothetical individual who receives the greatest possible projected dose in the area of highest TAC concertation levels over a specified period of time). Thus, the risks estimated for a maximally exposed individual are higher if a fixed exposure occurs over a longer period of time. According to the Office of Environmental Health Hazard Assessment, health risk assessments, which determine the exposure of people to TAC emissions, should be based on a 30- or 70-year exposure period, depending on whether the analysis is for a maximally exposed individual or population-wide impacts. However, such assessments should be limited to the period/duration of activities that generate TAC emissions (OEHHA 2015).

Treatment activities would progress across treatment sites such that diesel PM generated by treatment activities would not take place near any single sensitive receptor for an extended period. For example, mechanical treatment of forested lands by a single treatment crew progresses at a rate of approximately 5 acres per day (California Tahoe

Conservancy 2018:3-13). Thus, the diesel PM-emitting activities associated with treatment activities would not take place in the same approximate 5-acre area for more than one day. This means the period during which a single person could be exposed to diesel PM emissions from a treatment activity would be short relative to the 30- or 70-year exposure timeframe recommended for health risk assessments. In addition, diesel PM dissipates rapidly from the source, and exposure concentrations would decline with distance from these activities (Zhu et al. 2002:1032). Furthermore, SPR HAZ-1 requires that all diesel and gasoline-powered equipment be properly maintained to comply with all state and federal emissions requirements, which would prevent excessive emissions of diesel PM due to poorly functioning equipment. Also, SPR NOI-4 requires vegetation treatment activities and staging areas be located as far as possible from human receptors and SPR NOI-5 restricts equipment idling time.

Regarding treatment activities in forested areas, an emerging set of research of diesel PM generated by roadway traffic (i.e., on-road vehicles) indicates that vegetation removes particulates from the air. It does so through the direct absorption of gaseous pollutants through leaf stomata and by dissolving water soluble pollutants onto moist leaf surfaces (Islam et al. 2012:2, Zhang 2015:14). Evergreen trees are particularly effective because the leaves are not shed during the winter, when air quality is usually worst due to lower inversion heights (Islam et al. 2012:1). The research demonstrates that the presence of trees between vehicles and receptors further reduce potential exposure to diesel PM along roadways. Thus, treatment activities in the tree fuel type would experience the same mitigating effect on diesel PM emitted by equipment, because the remaining stands of trees provide the same buffering condition identified in the research. For the reasons stated above, it is expected that the cancer risk associated with diesel PM generated by treatment activities implemented under the CalVTP would be less than 10 in one million. Therefore, qualifying projects under the CalVTP would not result in the exposure of any individuals to an incremental increase in cancer risk greater than 10 in one million or a Hazard Index of 1.0. Impacts would be **less than significant**.

Moreover, implementation of Mitigation Measure AQ-1 would reduce the emissions of diesel PM generated by use of on-road vehicles and off-road equipment during treatment activities.

Mitigation Measures

No mitigation is required for this impact.

Impact AQ-3: Expose People to Fugitive Dust Emissions Containing Naturally Occurring Asbestos and Related Health Risk

Treatment activities implemented under the CalVTP could involve ground disturbing activities in areas where NOA is present. However, multiple SPRs would limit exposure of people to NOA-containing fugitive dust emissions generated by treatment activities implemented under the CalVTP. This impact would be **less than significant**.

As discussed in Section 3.4.2, "Environmental Setting," some areas within the treatable landscape contain serpentinite or other ultramafic rock and soil that could potentially contain NOA. These types of rock and soil contain thin veins of asbestos fibers that can become airborne when disturbed.

Treatment activities implemented under the CalVTP could involve ground disturbing activities such as vehicle travel on unpaved roads and use of tractors in areas where NOA is present, which may result in NOA becoming airborne. Treatment activities could also include prescribed burning in areas where NOA is present. The potential for fires in serpentine rock areas to release asbestos particles was investigated after the Chips Fire in August 2012, which burned over 75,000 acres in Plumas and Lassen National Forest Lands. Collected air samples indicated that no harmful levels of airborne asbestos particles were present in the smoke from this fire. The U.S. Forest Service (USFS) concluded that working or firefighting in the Chips Fire serpentine rock areas presented no asbestos exposure danger. USFS found that while there was no need for firefighters to wear high-efficiency particulate air respirators while performing duties in the area, it was worth considering reasonable safety precautions such as dust minimization measures (USFS 2013).

Multiple SPRs would limit exposure of people to fugitive dust emissions generated by treatment activities implemented under the CalVTP. SPR AQ-7 requires project proponents to avoid ground-disturbance in areas identified as likely to contain NOA as indicated on maps and guidance published by the California Geological Survey, unless an Asbestos Dust Control Plan (17 CCR Section 93105) is prepared and approved by the applicable local air district. SPR AQ-7 also requires treatment crews to follow any NOA-related guidance provided by the applicable local air district, reducing the risk of encountering NOA or generating airborne NOA emissions. Additionally, SPR AQ-4 requires treatment crews to wet unpaved roads using water trucks or treat roads with a non-toxic chemical dust suppressant (e.g., emulsion polymers, organic material) during dry, dusty conditions, which would reduce the risk of airborne NOA emissions. Implementation of SPRs AQ-4 and AQ-7 would minimize the potential for people to be exposed to NOA. As a result, this impact would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

Impact AQ-4: Expose People to Toxic Air Contaminants Emitted by Prescribed Burns and Related Health Risk

Prescribed burns conducted under the CalVTP could result in the short-term exposure of people to concentrations of TACs and associated levels of acute health risk with a Hazard Index greater than 1.0. This would be a **potentially significant** impact.

The primary air pollutant of concern from smoke generated by prescribed burning is $PM_{2.5}$. $PM_{2.5}$ is a criteria air pollutant, subject to the health-based NAAQS and CAAQS (exceedance of NAAQS and CAAQS for $PM_{2.5}$ is discussed in Impact AQ-1).

As discussed in Section 3.4.2, "Environmental Setting," smoke from prescribed burning generates small concentrations of TACs, such as aldehydes (including formaldehyde and acrolein), and organic compounds, such as PAHs and benzene. Smoke from prescribed burns also contains CO, which is identified as a TAC as well as a criteria pollutant. Although the concentrations of TACs within smoke generated by prescribed burns are much lower than concentrations of $PM_{2.5}$, TACs emitted by prescribed burning have the potential to expose people to adverse short- and long-term health effects (CARB and CDPH 2016). Risk factors published for these TACs indicate that they can expose receptors to short- and/or long-term health effects depending on the dose of exposure (CARB 2018b). The potential for receptors located near prescribed burn sites to be exposed to short- and long-term health effects are addressed below. Published research has studied worker (i.e., firefighter) exposure to TACs during burning; the results of these studies are used to inform the analysis of the effects of human exposure in general to TACs from prescribed burns.

Exposure to Short-Term Acute Health Effects

Exposure to the types of TACs found in smoke could result in acute short-term health impacts such as eye and respiratory irritation and exacerbated asthma symptoms. Studies evaluating exposure of firefighters to smoke from prescribed burns have compared measured exposure levels at or next to burn sites to the Permissible Exposure Limits (PEL) established by the U.S. Occupational Safety and Health Administration's (OSHA) and to more stringent OELs established by Cal/OSHA and the National Institute for Occupational Safety and Health. Although studies have not found the time-weighted average TAC exposure levels that would exceed OSHA's PELs, up to 14 percent of firefighters evaluated in the studies were exposed to short-term respiratory irritant levels above the more stringent OELs (NWCG 2018, Reinhardt et al. 2000). Studies also found that the level of acute health risk experienced by firefighters from short-term exposure to formaldehyde, acrolein, benzene, and CO exceeded a Hazard Index of 1.0 (NWCG 2018). The highest levels of exposure to TACs occurred when burn personnel were maintaining prescribed burns within designated containment lines and performing direct attack of spot fires that crossed containment lines. These events and the associated smoke exposures occur more frequently during stronger winds, which hamper fire management and can carry the convective plume of smoke into the breathing zone of firefighters (Reinhardt and Ottmar 2004).

As discussed under Impact AQ-1, prescribed burn smoke exposure, like other emissions, is dependent on proximity to the source. The studies describe above focused on exposure of firefighters, which are by necessity the nearest receptor to smoke during prescribed burning. The general population would be further from smoke than firefighters but may also be exposed. However, because smoke generally disperses over distance any nearby people would experience lower concentrations of TAC-containing smoke than fire personnel working within or adjacent to burn areas.

CAL FIRE and other agencies that plan and implement prescribed burns have agency-specific planning tools, planning and safety documents, public notification protocols, and best management practices to reduce safety risks and protect workers and the general population from excessive smoke exposure. CAL FIRE also requires approval of an Incident Action Plan (IAP) which, among other things, requires real-time monitoring of smoke conditions, reduces the potential for smoke exposure, and reduces inhalation hazards. SPR AQ-8 requires prescribed burns conducted by non-CAL FIRE crews to follow all CAL FIRE safety procedures, including developing and implementing an approved IAP. For safety reasons, the public would be restricted from areas where active burns would take place, which would also avoid and minimize smoke exposure. SPR AD-4 requires adequate public notice and signage about prescribed burns including timing, contact information, and description of the activity. This would alert the public to planned burns and give them adequate notice to take precautionary measures such as using respirators, closing windows, or temporarily vacating the area. Additionally, per SPR AQ-2 and as discussed in Section 3.4.1, "Regulatory Setting," burn managers must submit and obtain approval for each SMP, which would identify nearby locations where people spend time and specify the prescription to reduce smoke exposure. CAL FIRE typically assigns one crew member to report weather conditions to the Incident Commander every 30 minutes to make sure the burn is staying within its prescription. If conditions ever deviate from the burn plan, the burn is rescheduled, and crews transition from managing active burning activities to patrolling and/or extinguishing the burn. In the event a prescribed burn extends beyond the perimeter of its planned area, hand crews are onsite to control the escape.

The prescription in the burn plan, best management practices, safety protocols, and SPRs discussed above are intended to ensure that burns stay within their prescription and minimize the exposure of the public to smoke. However, despite adherence to an SMP, IAP, and other precautionary measures, there is no guarantee that smoke from every burn will behave as predicted and that people would not be exposed to TACs from smoke. Common reasons that prescribed burns have gone out of prescription are abnormal weather conditions, greater fuel loading than anticipated, and unexpected winds (Dether 2005). Furthermore, the CalVTP would increase the number of acres that are treated through prescribed burning annually over existing vegetation treatment regimes. Despite the best efforts to control burns, the increase in the number of prescribed burns performed each year could result in a greater number of instances when prescribed burns go out of prescription than under existing conditions. Therefore, prescribed burns implemented under the CalVTP would have the potential to expose people to a short-term dose of TAC concentrations that exceeds a Hazard Index greater than 1.0 for acute health risk.

Exposure to Long-Term Chronic Health Effects

Exposure to the types of TACs contained in smoke generated by prescribed burns could result in chronic long-term health risk, including elevated cancer-risk. The long-term public health impacts of prescribed burning are not well studied; however, a human health risk assessment conducted on wildland firefighters found that the levels of PAHs wildland firefighters were exposed to in smoke were not found to be the major contributors to their overall level of cancer risk (NWCG 2018). Short-term elevated exposures (i.e., over days to weeks) to carcinogens found in wildfire smoke were found to be small relative to total lifetime exposures to carcinogens in other, more common combustion sources (CARB and CDPH 2016).

As discussed in Impact AQ-2, the dose to which receptors are exposed is the primary factor used to determine health risk (i.e., potential exposure to TAC emission levels that exceed applicable standards). Dose is a function of concentration over time. Prescribed burns typically last 1 day and may occur up to 1 week in any given location and most do not go out of prescription and result in the movement of smoke plumes to areas where residences or other people are present. Thus, it is not anticipated that the dose resulting from the increase in the number of prescribed burns that would occur under the CalVTP would expose any people to a level of chronic, noncarcinogenic risk that exceeds a Hazard Index of 1.0 or to an incremental increase in cancer risk that exceeds 10 in one million.

Summary

In summary, the increase in prescribed burn activity under the CalVTP would not result in the long-term exposure of TAC-containing smoke to residences or other places where people spend time and, therefore, is not anticipated to expose any people to a level of chronic, noncarcinogenic risk that exceeds a Hazard Index of 1.0 or to an incremental increase in cancer risk that exceeds 10 in on million. However, despite adherence to all the safety measures in the

SMP and IAP, unpredictable changes in weather can occur during prescribed burns; if this occurred, it could result in the short-term exposure of residences and places where people spend time to concentrations of TACs and associated levels of acute health risk with a Hazard Index greater than 1.0. This would be a **potentially significant** impact.

As discussed in Section 3.4.2, "Environmental Setting," wildfires are a large source of TACs, and represent a greater public health concern than prescribed burns due to their uncontrolled nature and longer duration. Wildfires may last for weeks or even months, potentially resulting in a longer exposure of receptors to TACs from smoke emissions over a broad geography. Most critically, wildfires often burn structures in addition to vegetation, releasing a wider array of chlorinated and other toxic compounds not present in prescribed burns that could cause adverse health effects when inhaled (NWCG 2018). Given the unpredictability of wildfire, the variability in TAC emission characteristics of wildfire fuels (i.e., grass-type, shrub-type, tree-type, structures), and the possible variability in TAC emissions during prescribed burns under the CalVTP, evaluating the net effect of the CalVTP on TAC exposure associated with wildfire and wildfire response is not possible, nor is it pertinent to determining the significance of short-term exposure to TACs under CEQA. This information is presented to explain the broader context for consideration of fire-related emissions in California, within which treatment emissions would occur.

Mitigation Measures

The Board and CAL FIRE have incorporated all feasible measures to prevent and minimize smoke emissions as part of the precautionary measures required in Smoke Management Plans, pursuant to SPR AQ-2, and in Incident Action Plans and other burn safety procedures, pursuant to SPR AQ-6, for the unintended occurrence of when a prescribed burn may go out of prescription and adversely affect offsite receptors. Additionally, SPR AD-4 will alert the public to planned prescribed burns and give them adequate notice to take precautionary measures such as using respirators, closing windows, or temporarily vacating the area to reduce the potential for exposure; considering actions taken by the public to reduce exposure to smoke from prescribed burns are voluntary, there are no additional feasible methods to compel the public to reduce its exposure. Although all feasible precautions and notifications have been included in standard project requirements, the potential remains that short-term exposure to TACs from unpredictable weather changes could occur. Therefore, this impact would be **potentially significant and unavoidable**.

Impact AQ-5: Expose People to Objectionable Odors from Diesel Exhaust

While the use of diesel-powered equipment during treatment activities performed under the CalVTP could result in temporary emissions of odorous diesel exhaust, it is not anticipated that this the levels of diesel exhaust would be excessive, nor would it affect a substantial number of people. This would be a **less-than-significant** impact.

The occurrence and severity of odor impacts depends on numerous factors, including: the nature, frequency, and intensity of the source; wind speed and direction; and the proximity and sensitivity of exposed individuals. The CalVTP would not introduce any new operational sources of odors to the treatable landscape or any new locations where people spend time that could be exposed to existing odor sources. Diesel-powered equipment used for treatments implemented under the CalVTP could result in short-term odorous diesel exhaust emissions.

As discussed in Impact AQ-2, diesel exhaust emissions would be temporary, would not be generated at any one location for an extended period, and would dissipate rapidly from the source with an increase in distance. Additionally, treatment activities are generally in less populated, rural, or undeveloped areas, where human receptors are sparse. Furthermore, SPR HAZ-1 requires that all diesel and gasoline-powered equipment be properly maintained to comply with all state and federal emissions requirements, which would prevent the occurrence of higher emissions of diesel exhaust due to poorly functioning equipment. Also, SPR NOI-4 requires vegetation treatment activities and staging areas be located as far as possible from noise-sensitive receptors (e.g., residential land uses, schools, hospitals, places of worship) and SPR NOI-5 restricts equipment idling time. These SPRs would reduce exposure of receptors to diesel exhaust odors because they require diesel-powered equipment to be located away from receptors and also reduce the amount of time that engines would be idling and producing odorous emissions. Accordingly, treatment activities conducted under the CalVTP would not create objectionable odors affecting a substantial number or people. This impact would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

Impact AQ-6: Expose People to Objectionable Odors from Smoke During Prescribed Burning

Prescribed burns conducted under the CalVTP could result in the short-term exposure of a substantial number of people to odorous smoke. This would be a **potentially significant** impact.

Prescribed burns and pile burning conducted under the CalVTP could result in temporary odorous smoke emissions, which could be perceived as objectionable depending on the frequency and intensity of the resultant smoke, wind speed and direction, and the proximity and sensitivity of exposed individuals.

Per SPR AQ-2, and as discussed in Section 3.4.1, "Regulatory Setting," prescribed burning implemented under the CalVTP would be conducted in accordance with local air district regulations regarding open burning and in accordance with requirements of the California Smoke Management Program. SMPs are intended to reduce smoke impacts from prescribed burning and must include basic information such as the location, types, and amounts of material to be burned; expected duration of the fire; identification of responsible personnel; and identification of all smoke-sensitive areas. Larger burns require additional information such as meteorological conditions necessary for burning, projections of where the smoke is expected to travel (both day and night), contingency actions to be taken if smoke impacts occur or meteorological conditions deviate from those specified in the SMP, and monitoring. Additionally, treatments implemented under the CalVTP would generally be in less populated, rural, or undeveloped areas, where people are sparse. Furthermore, as discussed in Section 2.5.2, "Description of Treatment Activities," prescribed burns could be conducted at 10- to 15-year intervals to maintain low fuel hazard dependent on vegetation type, climate type, and soil type. Therefore, exposure of the same people in any given location to odorous smoke emissions would occur infrequently over a period of a few days to weeks, with the possibility of recurring every 10- to 15-years. As discussed in Impact AQ-4, when in prescription, prescribed burns would not expose receptors to smoke and associated odors.

However, despite adherence to an SMP, low likelihood of substantial numbers of people near prescribed burns, and infrequent occurrence of prescribed burns, there is no guarantee that smoke from every prescribed burn would behave as predicted and that a substantial number of people would not be exposed to smoke odors. Therefore, prescribed burns implemented under the CalVTP have the potential to expose a substantial number of people to odorous smoke emissions. Thus, this impact would be **potentially significant**.

As discussed in Section 3.4.2, "Environmental Setting," wildfires are a large source of smoke, and represent a greater odor source due to their uncontrolled nature and longer duration. Wildfires may last for weeks or even months, potentially resulting in a longer exposure of receptors to objectionable odors from smoke. Most critically, wildfires often burn structures in addition to vegetation, releasing a wider array of odorous emissions not present in prescribed burns that only combust vegetation. Given the unpredictability of wildfire, evaluating the net effect of the CalVTP on odors associated with wildfire is not possible, nor is it pertinent to determining the significance of short-term exposure to smoke-related odors under CEQA.

Mitigation Measures

The Board and CAL FIRE have incorporated all feasible measures to prevent and minimize smoke emissions as part of the precautionary measures the Board/CAL FIRE will require in Smoke Management Plans, pursuant to SPR AQ-2, and in Incident Action Plans and other burn safety procedures, pursuant to SPR AQ-6, for the unintended occurrence of when a prescribed burn may go out of prescription and adversely affect offsite receptors. Additionally, SPR AD-4 will alert the public to planned prescribed burns and give them adequate notice to take precautionary measures such as closing windows or temporarily vacating the area to reduce the potential for exposure to odors; considering actions taken by the public to reduce exposure to odors from prescribed burns are voluntary, there are no additional feasible methods to compel the public to reduce its exposure. Although all feasible precautions and notifications have been included in standard project requirements, the potential remains that short-term exposure to odorous smoke emissions from unpredictable weather changes could occur. Therefore, this impact would be **potentially significant and unavoidable**.

3.5 ARCHAEOLOGICAL, HISTORICAL, AND TRIBAL CULTURAL RESOURCES

This section evaluates the potential impacts related to implementation of the CalVTP on known and unknown cultural resources. Cultural resources include districts, sites, buildings, structures, or objects generally older than 50 years and considered to be important to a culture, subculture, or community for scientific, traditional, religious, or other reasons. They include pre-historic resources, historic-era resources, unique archaeological resources (as defined by Public Resources Code [PRC] Section 21083.2[g]), and "tribal cultural resources" (as defined by Assembly Bill [AB] 52, Statutes of 2014, in PRC Section 21074).

Archaeological resources are locations where human activity has altered the earth or left deposits of prehistoric or historic-era physical remains (e.g., stone tools, bottles, former roads, foundations). Historical (or architectural) resources include standing buildings (e.g., houses, barns, outbuildings, cabins) and intact structures (e.g., dams, bridges, roads, districts), or landscapes. A cultural landscape is defined as a geographic area (including both cultural and natural resources and the wildlife therein), associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values. Tribal cultural resources include site features, places, cultural landscapes, sacred places or objects that are of cultural value to a tribe and that meet the criteria described in PRC Section 21074.

Comments on the Notice of Preparation related to archaeological, historical, and tribal cultural resources included requests to consider cultural resources, Native American areas of special concern, and areas of high cultural sensitivity; partner with tribes to obtain information on traditional burn practices and vegetation management; outline tribal consultation; avoid impacts to State Owned Historic Resources; include conditions for conducting cultural resource surveys and completing PRC 5024 documentation; and outline actions for avoidance, preservation, or mitigation of tribal cultural resources (see Appendix A). These are addressed in Sections 3.5.1 through 3.5.3 below.

3.5.1 Environmental Setting

PREHISTORY

The prehistoric past of California is as diverse as the landscape itself, divided into regions, each having with its own pattern of material culture and chronology. The following represents a general base-line perspective of California prehistory which, inevitably, is subject to change as archaeological research continues its study of the material record (California State Parks 2013:41).

All six basic American Indian languages (Algic, Athapascan, Hokan, Penutian, Uto-Aztecan, and Yukian), representing discrete waves of human migration, are found within the state's boundaries. This phenomenon gives California a singular distinction as no other state contains all six, representing the earliest (Yukian) to the latest (Athapascan) movements of human populations out of Asia and across the Bering Strait. It is estimated that during Pre-Columbian times, approximately 20 percent of the nearly 500 languages spoken north of Mexico were articulated within the present-day boundary of the state (California State Parks 2013:41).

The earliest human migrations into California likely coincided with retreating glacial ice at the end of the Pleistocene epoch, approximately 10,000 to 15,000 years ago. The first populations were sparse, nomadic, and occupied a much different landscape than that of today. Shaped by a cooler and wetter climate, conifers grew in low foothills now covered in oaks, the coastline extended further into the Pacific Ocean, and the Mojave Desert contained numerous deep lakes that were created by glacial melt. The land supported now extinct species of bear, bison, horse, mammoth, saber-tooth tiger, sloth, and wolf. Early settlement patterns indicate that inland sites were located on shorelines of ancient lakes and marshes while those in coastal areas tended to occur along old stream channels and estuaries (California State Parks 2013:41).

As the Pleistocene epoch gradually warmed into our current climate, the Holocene epoch, a broad spectrum of environmental niches developed that contained relatively unique biotic and mineral resources. Prehistoric populations continued to move into the region, occupied the niches, and produced material cultures, or artifacts, that reflected distinct adaptations to individual environments. Because of California's environmental diversity, many regions offered an abundance of certain resources and a scarcity of others. Since there was very little cultivated agriculture (limited to the extreme southeastern portion of the region along the lower Colorado River), resource availability influenced local population size, settlement location, and temporary or permanent use, and favored trade and economic interdependence. Some nomadic behavior is presumed, possibly on an annual basis to take advantage of seasonal resources. In some favored locations, the natural bounty was adequate to sustain permanent settlement. Today, the prehistory of the state, ranging between 160 and 15,000 years ago, is largely understood by the material cultures that were created by the people who adapted to the physical environments they inhabited (California State Parks 2013:41-42).

ETHNOGRAPHY

One manner in which people can seek to understand aboriginal California Indian cultures is to look at the tribes inhabiting similar climatic and ecological zones; for this purpose, the setting of the treatable landscape is divided into northwest, northeast, central, and southern California. Generally speaking, technologies and materials used to manufacture tools, homes and storage containers show great similarity. Hunting, trapping and fishing technologies also are shared across tribal lines terrain, available water plants and animals affected the density of populations, settlement patterns as each tribe adjusted to its environment (NAHC 2018).

Northwest California

This region includes the Tolowa, Shasta, Karok, Yurok, Hupa, Whilikut, Chilula, Chimarike, and Wiyot tribes. The northern rainforest environment encouraged these tribes to establish their villages along the many rivers, lagoons, and coastal bays that dotted the landscape. While this territory was crisscrossed with thousands of trails, the most efficient form of transportation was the dugout canoe used to travel up and down rivers and cross the wider and deeper ones such as the Klamath. These tribes used the coast redwood trees for the manufacture of their boats and houses. Redwoods were felled by burning at the base and then split with elkhorn wedges. Redwood and sometimes cedar planks were used to construct rectangular gabled homes. Baskets in a variety of designs were manufactured in with the twined technique only. Many of these arts survived into the twentieth century and traditional skills have enjoyed a great renaissance in the past twenty years (NAHC 2018).

The elaborate ritual life of these tribes featured a World Renewal ceremony held each fall in the largest villages. The ceremony's purpose was to prevent future natural catastrophes such as earthquakes, floods or failure of acorn crop or a poor salmon run. This and other traditional rituals continue to be practiced, despite the grinding poverty that plagues many of these groups (NAHC 2018).

Northeast California

This region includes the Modoc, Achumawi, and Atsugewi tribes. The western portion of this territory was rich in acorn and salmon. Further to the east, the climate changes from mountainous to a high desert type of topography. Here food resources were grass seeds, tuber berries along with rabbit and deer. These tribes found tule to be a useful source of both food and a convenient material when laced together to form floor mats and structure covering. Volcanic mountains in the western portion of their territory supplied the valuable trade commodity obsidian.

Following contact, the Achumawi and Atsuguewi suffered a tremendous population decline due to vigilante violence and respiratory diseases. The Modocs' spectacular 1872 resistance to removal to the Oregon territory was the last heroic military defense of native sovereignty in 19th century California Indian History. Some surviving Northeast tribesmen received public land allotments around the turn of the century. The XL Rancheria was established for some of these Indians in 1938. Tragically the surviving Modocs were exiled to either Oregon or Oklahoma (NAHC 2018).

Central California

This vast territory includes: Bear River, Mattale, Lassick, Nogatl, Wintun, Yana, Yahi, Maidu, Wintun, Sinkyone, Wailaki, Kato, Yuki, Pomo, Lake Miwok, Wappo, Coast Miwok, Interior Miwok, Wappo, Coast Miwok, Interior Miwok, Monache, Yokuts, Costanoan, Esselen, Salinan, and Tubatulabal tribes. Vast differences exist between the coastal peoples, nearby mountain range territories, from those living in the vast central valleys and on the slopes of the Sierra Nevada. Nevertheless, all of these tribes enjoyed an abundance of acorn and salmon that could be readily obtained in the waterways north of Monterey Bay. Deer, elk, antelope, and rabbit were available elsewhere in vast quantities (NAHC 2018).

In this region basketry reached the height of greatest variety. Fortunately, basket making survived the years of suppression of native arts and culture to once again become one of the most important culturally defining element for Indians in this region. Common in this region was the semi-subterranean roundhouse where elaborate Kuksu dances were held in the past and continue to this day. These rituals assure the renewal of the world's natural foods both plant and animal. Despite differences between tribes, these rituals share similar purposes (NAHC 2018).

Southern California

Southern California presents a varied and somewhat unique region of the state. Beginning in the north, tribes found in this area are the Chumash, Alliklik, Kitanemuk, Serrano, Gabrielino, Luiseno, Cahuilla, and the Kumeyaay. The landmass and climate varied considerably from the windswept offshore Channel Islands that were principally inhabited by Chumash speaking peoples. Communication with their mainland neighbors was by large planked canoes powered by double paddle ores. These vessels were called "Tomols" and manufactured by a secretive guild of craftsmen. They could carry hundreds of pounds of trade goods and up to a dozen passengers. Shoreline communities enjoyed the rich animal and faunal life of ocean, bays, and wetlands environments. Interior tribes like the Serrano, Luiseno, Cahuilla, and Kumeyaay shared an environment rich in Sonoran life zone featuring vast quantities of rabbit, deer, acorn, seeds, and native grasses. At the higher elevations Desert Bighorn sheep were hunted (NAHC 2018).

Villages varied in size from poor desert communities with villages of as few as 100 people to the teaming Chumash villages with over a thousand inhabitants. Conical homes of arroweed, tule, or croton were common. Interior groups manufactured clay storage vessels sometimes decorated with paint. Baskets were everywhere manufactured with unique designs (NAHC 2018).

HISTORIC SETTING

The first documented European contact with California was during the 1542–1543 Spanish expedition of Juan Rodríguez Cabrillo up the coast from Mexico as far as Monterey. With no evidence of gold or silver to encourage conquest, and no competition, the Spanish had little interest in further exploration at that time. In 1579 Sir Francis Drake of England landed at the bay now named after him approximately thirty miles north of San Francisco. He stayed long enough to repair and restock his ships, claiming the land for England (California State Parks 2013:44).

By the late 1700s the Spanish Crown realized that its claim to land north of Mexico was not assured without colonization. As a result, the Franciscan Order was chosen to establish missions in Alta California. Twenty-one missions, built with Indian labor, were founded by the Franciscans south to north, from San Diego de Alcalá in 1769 to San Francisco Solano in Sonoma in 1821. In addition to a small military guard at each mission, there was usually a larger military post nearby, with four presidios, or fortified bases, established at San Diego (1769), Monterey (1770), San Francisco (1776), and Santa Barbara (1782). In 1822 Mexico achieved independence from Spain and the mission system was secularized. The territorial governors distributed mission lands to about 700 people, up to 50,000 acres per person. Some ranchos were even larger because requests were made in the name of multiple family members. Land ownership conferred great power within the region, at least until the Land Act of 1851 redefined who held rights to the ranchos, requiring proof of ownership (California State Parks 2013:44).

In early 1845 the American annexation of Texas caused Mexico to sever diplomatic relations with the United States, and war was declared in May 1846. The Bear Flag of the California Republic was raised over the plaza at Sonoma June 14, 1846, and within three weeks, American naval forces formally proclaimed American rule over the presidios and coastal towns. Gold was discovered at Coloma in 1848, sparking the gold rush that began the following year and accelerating statehood in 1850. Until the transcontinental railroad was completed in 1869, California remained relatively isolated, developing an economy and culture mostly independent of the national framework (California State Parks 2013:44-45).

On July 1, 1862, President Abraham Lincoln signed the Pacific Railroad Act of 1962, which authorized extensive land grants and issued government bonds to the Union Pacific Railroad and the Central Pacific Railroad to construct a transcontinental railroad. Construction of the railroad was completed on May 10, 1869, when the "Golden Spike" was hammered into place, connecting the two systems at Promontory, Utah. By 1883 California had additional interstate railroads servicing it and had an extensive system of intrastate railroads that greatly aided the development of agriculture, industry, and commerce, the growth of cities and towns, and trade with the other states and foreign countries (California State Parks 2013:45).

With increased population caused by the discovery of gold, the cattle and sheep industries rapidly grew in size, with cattle and sheep being driven into California from Texas and the southwest. In the 1850s the production of wheat began, and by 1889 California was the second largest producer of wheat. About that time, the production of fruits, nuts, and vegetables was increasing, and by 1905 that production exceeded the production of wheat as the major crops being grown in California. With the completion of the transcontinental railroad in 1869, the subsequent construction of extensive intrastate and interstate railroad systems, and the development of refrigerated rail cars, California was able to transport its agricultural products throughout the United States and to foreign countries. By 1948 California became the largest agricultural producing state, a distinction that it still holds today (California State Parks 2013:46).

In the early 1800s, logging and lumbering was occurring in the Sierra Nevada Mountains, but the quantity produced was small because the trees were cut by hand and the logs were converted into planks by the whipsawing method, in which a large two-handed saw was used by two sawyers. Ironically, James Marshall was building a sawmill that would be powered by water when gold was discovered in 1848. The subsequent gold rush increased the demand for lumber by both the miners and the residents of commercial towns like San Francisco, Sacramento, and Stockton. By the late 1800s, steam powered equipment like steam donkeys, logging locomotives, and steam-powered sawmills greatly increased the supply of lumber from California's forests. Demand for lumber was driven by the increasing agricultural production, increasing population, and the building booms that occurred in the early and mid-1900s (California State Parks 2013:47).

California's post-World War II population growth is seen most prominently in large suburban developments and new towns moving ever outward from older centers of population. Another arena that witnessed both wartime and post-war expansion in California is government and public agencies, and the industries they support. These include post offices, city halls, county administration buildings, courthouses, prisons, and countless office buildings. The post-war years, even up to the present day, witnessed a large influx of immigrants from a wide variety of other countries. These newcomers to California brought with them new religions and cultures that affected the resources they built and used. Often immigrant communities moved into neighborhoods constructed in the past by other cultural groups, thereby adding new layers of history through the stories and memories they brought to the resources (California State Parks 2013:48).

EXISITING VEGETATION TREATMENTS IN THE TREATABLE LANDSCAPE

Treatment activities currently occur within the treatable landscape and treatments involving soil disturbance sometimes result in disturbance, damage, or destruction of cultural resources. As described in Chapter 1, "Introduction" and Section 2.3.1, "Past and Current Treatments," vegetation treatment currently occurs around the state under several other wildfire risk reduction programs implemented by various federal, state, and local agencies. In 2017–2018, CAL FIRE treated approximately 33,000 acres in California using the same treatment activities as proposed under the CalVTP.

KNOWN RESOURCES

A comprehensive study to inventory archaeological, historical, or tribal cultural resources within the 20.3-million-acre treatable landscape was not feasible within the context of this PEIR due to the large geographic area. Also, for this reason, a records search for known archaeological or historical resources and surveys was not conducted for this analysis. The following are general cultural resource types that may be present in the treatable landscape.

Historical Resources

Historical resources may include one or more of the following features.

Buildings: A building is a structure created to shelter any form of human activity (e.g., house, barn, church, and hotel).

Structure: A structure is constructed for purposes other than human shelter, it is often an engineering project or large in scale (e.g., bridges, dams, lighthouses, water towers, radio telescopes).

Linear Resource: Linear resources are mostly long, narrow constructions, generally consisting of any device constructed to transport water (e.g., flumes, pipes, canals, dams, and tunnels), corridors designed to facilitate the transportation of people or information (e.g., roads, trails, railroad grades, and telegraph/telephone lines), and barriers constructed to separate adjoining areas (e.g., stone fences, walls, and fences).

Mine: This includes excavations and associated structures and tailings built into the earth to extract natural resources.

Cemetery: These are locations of human interment and include any single or multiple burials.

Foundation: These are structural footings to support a building or structure.

Refuse Deposit: These are discrete areas that contain artifact concentrations of glass, ceramic, metal, bone, or other material reflecting the purposeful discard of those materials (e.g., privies, dumps, trash scatters).

Prehistoric Archaeological Resources

Different types of archaeological resources that may be present include the following features.

Village Site: Village sites are locations of continuous and concentrated habitation that typically have a large, well-developed midden deposit containing abundant artifactual evidence. They may also contain burials, rock art, bedrock milling stations, or other features.

Burial Site: A burial site or cemetery is a location where intentional human interments are found in large numbers and close concentration. These locations typically lack evidence of other prehistoric activities.

Milling Site: This is a boulder or group of boulders or bedrock outcrops that contain at least one modified surface (mortar, slick, or metate) caused by the processing of food or other natural resources.

Lithic Workshop: A lithic workshop is a distribution of stone flakes and tool fragments reflecting purposeful modification of parent stone through percussion and/or pressure detachment.

Ceramic Scatter: A ceramic scatter consists of fragments of ceramic vessels and artifacts distributed over generally open, flat ground.

Shell Middens: Shell middens are locations with large amounts of marine shell that extend to an appreciable depth below ground surface. They are normally found in coastal contexts but have been found in the interior.

Rock Art: Rock art consists of designs or design elements on rock surfaces created by surface applications (pictographs) or by etching (petroglyphs).

Rock Shelters: These are natural caves or crevices in rock outcrops in which human use has left artifactual remains.

Tribal Cultural Resources

Different types of tribal cultural resources that may be present include the following features. The definition of tribal cultural resources in the CEQA (PRC Section 21074) requires that the site, features, places, cultural landscapes, sacred places, and objects of cultural value are either included in or eligible to the California Register of Historical Resources, included in a local register of historical resources, or determined by the lead agency to be significant based on criteria for resources eligible to the California Register. They may include:

Resource Collection Location: This is a location where Native Americans have historically gone, and are known or believed to go today, to collect resources in accordance with traditional cultural rules of practice.

Spiritual Location: This is a location where Native American religious practitioners have historically gone, and are known or believed to go today, to perform ceremonial activities in accordance with traditional cultural rules of practice.

Traditional Location: This is a location associated with the traditional beliefs of a Native American group about its origins, its cultural history, or the nature of the world.

Cemetery: A cemetery is a location that has been selected for human burial or interment.

Tribal Consultation

The Board sent letters on February 9, 2019 notifying 12 Native American tribes that preparation of the PEIR has begun, as required by PRC Section 21080.3.1. These tribes had submitted requests to the Board to be notified of projects. The specific details of the consultations are confidential pursuant to California law; however, a summary of events related to communication between the tribes and the Board is provided below in Table 3.5-1.

Table 3.5-1 Tribal Consultation

Native American Tribe and Contact	Date of Initial Response	Follow-up Response	Comment
Soboba Band of Luiseno Indians Joseph Ontiveros	No Response	N/A	
Morongo Band of Mission Indians Raymond Huaute	No Response	N/A	
Mishewal Wappo Tribe of Alexander Valley Vincent Salsedo	No Response	N/A	
San Manuel Band of Mission Indians Daniel McCarthy	March 1, 2019	March 21, 2019	The Tribe requests consultation and review of environmental documents.
Elk Valley Rancheria Dale Miller	No Response	N/A	
Rincon Band of Luiseno Indians Vince Whipple	February 20, 2019	March 21, 2019	The Tribe requests consultation to learn more about the project and would like to be included in archaeological surveys.
Wilton Rancheria Steven Huchason	No Response	N/A	
Mechoopda Indian Tribe of Chico Rancheria Dennis Ramirez	No Response	N/A	
Pechanga Tribe, Temecula Band of Luiseno Indians Anna Hoover	February 25, 2019	March 21, 2019	The Tribe requests consultation to provide specific, confidential information on the locations of TCRs.
Wiyot Tribe Thomas Torma	No Response	N/A	
United Auburn Indian Community Gene Whitehouse	March 22, 2019	March 25, 2019	The Tribe requests consultation and review of cultural and environmental documents.
Pit River Tribe Natalie Forrest-Perez			

Source: Data compiled by Ascent Environmental in 2019

3.5.2 Regulatory Setting

FEDERAL

Section 106 of the National Historic Preservation Act

Federal protection of resources is legislated by (a) the National Historic Preservation Act (NHPA) of 1966 as amended by 16 U.S. Code 470, (b) the Archaeological Resource Protection Act of 1979, and (c) the Advisory Council on Historical Preservation. These laws and organizations maintain processes for determination of the effects on historical properties eligible for listing in the National Register of Historic Places (NRHP). Compliance with these federal requirements would only be relevant, if a federal agency permit or approval were needed to implement a project, such as a Clean Water Act Section 404 permit.

Section 106 of the NHPA and accompanying regulations (36 Code of Federal Regulations [CFR] Part 800) constitute the main federal regulatory framework guiding cultural resources investigations and require consideration of effects on properties that are listed in, or may be eligible for listing in the NRHP. The NRHP is the nation's master inventory of known historical resources.

The formal criteria (36 CFR 60.4) for determining NRHP eligibility are as follows:

1. The property is at least 50 years old (however, properties under 50 years of age that are of exceptional importance or are contributors to an historic district can also be included in the NRHP);
2. It retains integrity of location, design, setting, materials, workmanship, feeling, and associations; and
3. It possesses at least one of the following characteristics:

   Criterion A Association with events that have made a significant contribution to the broad patterns of history (events).

   Criterion B Association with the lives of persons significant in the past (persons).

   Criterion C Distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or possesses high artistic values, or represents a significant, distinguishable entity whose components may lack individual distinction (architecture).

   Criterion D Has yielded, or may be likely to yield, information important to prehistory or history (information potential).

The National Register Bulletin also provides guidance in the evaluation of archaeological site significance. Effects of a project on properties listed in the NRHP must be evaluated under CEQA.

STATE

California Register of Historical Resources

All properties in California that are listed in or formally determined eligible for listing in the NRHP are eligible for the CRHR. The CRHR is a listing of State of California resources that are significant within the context of California's history. The CRHR is a statewide program of similar scope and with similar criteria for inclusion as those used for the NRHP. In addition, properties designated under municipal or county ordinances are also eligible for listing in the CRHR.

An historical resource must be significant at the local, State, or national level under one or more of the criteria defined in the California Code of Regulations Title 15, Chapter 11.5, Section 4850, to be included in the CRHR. The CRHR criteria are similar to the NRHP criteria and are tied to CEQA because any resource that meets the criteria below is considered a significant historical resource under CEQA. As noted above, all resources listed in or formally determined eligible for the NRHP are automatically listed in the CRHR.

The CRHR uses four evaluation criteria:

1. Is associated with events or patterns of events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States.
2. Is associated with the lives of persons important to local, California, or national history.
3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master, or possesses high artistic values.
4. Has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California or the nation.

Similar to the NRHP, a resource must meet one of the above criteria and retain integrity. The CRHR uses the same seven aspects of integrity as the NRHP.

California Environmental Quality Act

CEQA requires public agencies to consider the effects of their actions on "historical resources," "unique archaeological resources," and "tribal cultural resources."

Historical Resources

"Historical resource" is a term with a defined statutory meaning (PRC Section 21084.1; determining significant impacts to historical and archaeological resources is described in the State CEQA Guidelines, Sections 15064.5[a] and [b]). Under State CEQA Guidelines Section 15064.5(a), historical resources include the following:

1. A resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the California Register of Historical Resources (PRC Section 5024.1).
2. A resource included in a local register of historical resources, as defined in Section 5020.1(k) of the Public Resources Code or identified as significant in an historical resource survey meeting the requirements of Section 5024.1(g) of the Public Resources Code, will be presumed to be historically or culturally significant. Public agencies must treat any such resource as significant unless the preponderance of evidence demonstrates that it is not historically or culturally significant.
3. Any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California may be considered to be an historical resource, provided the lead agency's determination is supported by substantial evidence in light of the whole record. Generally, a resource will be considered by the lead agency to be historically significant if the resource meets the criteria for listing in the California Register of Historical Resources (PRC Section 5024.1).
4. The fact that a resource is not listed in or determined to be eligible for listing in the California Register of Historical Resources, not included in a local register of historical resources (pursuant to Section 5020.1(k) of the Public Resources Code), or identified in an historical resources survey (meeting the criteria in Section 5024.1(g) of the Public Resources Code) does not preclude a lead agency from determining that the resource may be an historical resource as defined in PRC Section 5020.1(j) or 5024.1.

Under PRC Section 21084.1 and State CEQA Guidelines Section 15064.5(b), a substantial adverse change in the significance of an historical resource is a significant environmental effect. State CEQA Guidelines Section 15126.4(b) includes the following considerations for mitigation related to significant effects on historical resources.

1. Where maintenance, repair, stabilization, rehabilitation, restoration, preservation, conservation or reconstruction of the historical resource will be conducted in a manner consistent with the Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings (1995), Weeks and Grimmer, the project's impact on the historical resource shall generally be considered mitigated below a level of significance and thus is not significant.

2. In some circumstances, documentation of an historical resource, by way of historic narrative, photographs or architectural drawings, as mitigation for the effects of demolition of the resource will not mitigate the effects to a point where clearly no significant effect on the environment would occur.
3. Public agencies should, whenever feasible, seek to avoid damaging effects on any historical resource of an archaeological nature. The following factors shall be considered and discussed in an EIR for a project involving such an archaeological site:
   A. Preservation in place is the preferred manner of mitigating impacts to archaeological sites. Preservation in place maintains the relationship between artifacts and the archaeological context. Preservation may also avoid conflict with religious or cultural values of groups associated with the site.
   B. Preservation in place may be accomplished by, but is not limited to, the following:
      1. Planning construction to avoid archaeological sites;
      2. Incorporation of sites within parks, greenspace, or other open space;
      3. Covering the archaeological sites with a layer of chemically stable soil before building tennis courts, parking lots, or similar facilities on the site.
      4. Deeding the site into a permanent conservation easement.
   C. When data recovery through excavation is the only feasible mitigation, a data recovery plan, which makes provisions for adequately recovering the scientifically consequential information from and about the historical resource, shall be prepared and adopted prior to any excavation being undertaken. Such studies shall be deposited with the California Historical Resources Regional Information Center. Archaeological sites known to contain human remains shall be treated in accordance with the provisions of Section 7050.5 Health and Safety Code. If an artifact must be removed during project excavation or testing, curation may be an appropriate mitigation.
   D. Data recovery shall not be required for an historical resource if the lead agency determines that testing or studies already completed have adequately recovered the scientifically consequential information from and about the archaeological or historical resource, provided that the determination is documented in the EIR and that the studies are deposited with the California Historical Resources Regional Information Center.

<u>Unique Archaeological Resources</u>

CEQA also requires lead agencies to consider whether projects will impact unique archaeological resources. PRC Section 21083.2(g) states that unique archaeological resource means an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

1. Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.
2. Has a special and particular quality such as being the oldest of its type or the best available example of its type.
3. Is directly associated with a scientifically recognized important prehistoric or historic event or person.

As discussed in Sections 21083.2(a) and (h), non-unique archaeological resources not meeting any of these criteria do not require further protection.

Section 21083.2(b) states that if it can be demonstrated that a project will cause damage to a unique archaeological resource, the lead agency may require reasonable efforts be made to preserve the resources in place or left in an undisturbed state. Examples of that treatment, in no order of preference, may include, but are not limited to, any of the following:

1. Planning construction to avoid archaeological sites.

2. Deeding archaeological sites into permanent conservation easements.
3. Capping or covering archaeological sites with a layer of soil before building on the sites.
4. Planning parks, greenspace, or other open space to incorporate archaeological sites.

Subdivision (d) further states that excavation as mitigation shall be restricted to those parts of the unique archaeological resource that would be damaged or destroyed by the project.

Tribal Cultural Resources

CEQA also requires lead agencies to consider whether projects will impact tribal cultural resources (TCRs). PRC Section 21074 states the following:

a. "Tribal cultural resources" are either of the following:
   1. Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either of the following:
      A. Included or determined to be eligible for inclusion in the California Register of Historical Resources.
      B. Included in a local register of historical resources as defined in Section 5020.1(k).
   2. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in Section 5024.1(c). In applying the criteria set forth in Section 5024.1(c) for the purposes of this paragraph, the lead agency shall consider the significance of the resource to a California Native American tribe.
b. A cultural landscape that meets the criteria of Section 21084.1(a) is a tribal cultural resource to the extent that the landscape is geographically defined in terms of the size and scope of the landscape.
c. An historical resource described in Section 21084.1, a unique archaeological resource as defined in Section 21083.2(g), or a "nonunique archaeological resource" as defined in Section 21083.2(h) may also be a tribal cultural resource if it conforms with the criteria of Section 21084.1(a).

PRC Section 21084.2 states that a substantial adverse change in the significance of a tribal cultural resource is a significant environmental effect.

California Native American Historical, Cultural, and Sacred Sites Act

The California Native American Historical, Cultural, and Sacred Sites Act applies to both State and private lands. The Act requires that upon discovery of human remains, construction or excavation activity cease and the County coroner be notified. If the remains are of a Native American, the coroner must notify NAHC, which notifies and has the authority to designate the most likely descendant (MLD) of the deceased. The Act stipulates the procedures the descendants may follow for treating or disposing of the remains and associated grave goods.

Health and Safety Code, Sections 7050.5 and 7052

Section 7050.5 of the Health and Safety Code requires that construction or excavation be stopped in the vicinity of discovered human remains until the coroner can determine whether the remains are those of a Native American. If determined to be Native American, the coroner must contact the NAHC. Section 7052 states that the disturbance of Native American cemeteries is a felony.

Public Resources Code, Section 5097

PRC Section 5097 specifies the procedures to be followed in the event of the unexpected discovery of human remains on nonfederal land. The disposition of Native American burial falls within the jurisdiction of the NAHC. Section 5097.5 of the Code states the following:

> No person shall knowingly and willfully excavate upon, or remove, destroy, injure, or deface any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, or any other archaeological, paleontological or historical

> feature, situated on public lands, except with the express permission of the public agency having jurisdiction over such lands. Violation of this section is a misdemeanor.

Public Resources Code, Section 21080

AB 52, signed by the California Governor in September of 2014, established a new class of resources under CEQA: "tribal cultural resources," defined in PRC 21074. Pursuant to PRC Sections 21080.3.1, 21080.3.2, and 21082.3, lead agencies undertaking CEQA review must, upon written request of a California Native American tribe, begin consultation before the release of an environmental impact report, negative declaration, or mitigated negative declaration. PRC Section 21080.3.2 states:

> Within 14 days of determining that a project application is complete, or to undertake a project, the lead agency must provide formal notification, in writing, to the tribes that have requested notification of proposed projects in the lead agency's jurisdiction. If it wishes to engage in consultation on the project, the tribe must respond to the lead agency within 30 days of receipt of the formal notification. The lead agency must begin the consultation process with the tribes that have requested consultation within 30 days of receiving the request for consultation. Consultation concludes when either: 1) the parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource, or 2) a party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached.

If the lead agency determines that a project may cause a substantial adverse change to a tribal cultural resource, and measures are not otherwise identified in the consultation process, provisions under PRC Section 21084.3(b) describe mitigation measures that may avoid or minimize the significant adverse impacts.

LOCAL

When state agencies, including CAL FIRE, are conducting governmental activities under the authority of state law or the State Constitution, in this case, treatments implemented under the proposed CalVTP, they are exempt from local government plans, policies, and ordinances (unless a constitutional provision or statute directs otherwise). Nonetheless, CAL FIRE voluntarily seeks to operate consistently with local governance to the extent feasible. Given its statewide extent and the possible number of local and regional responsible agencies, this PEIR does not identify potentially applicable local government plans, policies, and ordinances. Types of local regulations relevant to archaeological, historical, and tribal cultural resources may include general plan policies and ordinances protective of these resources. This PEIR assumes that any vegetation treatments proposed by local or regional agencies under the CalVTP would be consistent with local plans, policies, and ordinances to the extent the projects are subject to them, as required by SPR AD-3.

3.5.3 Impact Analysis and Mitigation Measures

ANALYSIS METHODOLOGY

The analysis is informed by the provisions and requirements of federal, state, and local laws and regulations that apply to cultural resources.

Section 21083.2 of the State CEQA Guidelines defines "unique archaeological resource" as an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets one or more of the following CRHR-related criteria: 1) that it contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information; 2) that it as a special and particular quality, such as being the oldest of its type or the best available example of its type; or 3) that it is directly associated with a scientifically recognized important prehistoric or historic event or person. An impact on a "nonunique resource" is not a significant environmental impact under CEQA (State CEQA Guidelines Section 15064.5[c][4]). If an archaeological resource qualifies as a resource under CRHR criteria, then the resource is treated as a unique archaeological resource for the purposes of CEQA.

PRC Section 21074 defines tribal cultural resources as "sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American Tribe" that are listed or determined eligible for CRHR listing, listed in a local register of historical resources, or otherwise determined by the lead agency, in its discretion and supported by substantial evidence, to be a tribal cultural resource based on CRHR criteria.

The analysis of environmental impacts on cultural resources focuses on the potential for substantial adverse effects to historical resources, unique archaeological resources, tribal cultural resources, and human remains. Significance determinations account for the influence of relevant SPRs, which are incorporated into treatment design and listed below.

- **SPR AD-3 Consistency with Local Plans, Policies, and Ordinances**: The project proponent will design and implement the treatment in a manner that is consistent with applicable local plans (e.g., general plans), policies, and ordinances to the extent the project is subject to them. This SPR applies to all treatment activities and treatment types.

Cultural resource SPRs and mitigation measures require that qualified individuals implement components of the measures. The requirements listed below will be met to be considered qualified and may be performed by individuals of various titles (including supervised designees) as long as they are qualified.

Qualified Archaeologist: To be qualified, an archaeologist would hold a Prehistoric Archeology, Historic Archeology, Conservation, Cultural Anthropology, or Curation degree from an accredited university and meet the Secretary of Interior's Qualifications Standards (36 CFR Part 61). The project proponent will review the resume and approve the qualifications of the archaeologists.

Archaeologically Trained Resource Professional: To be qualified, an archaeologically trained resource professional would hold a valid Archaeological Training Certificate issued by CAL FIRE and the Board or equivalent state or local agency training or certification.

- **SPR CUL-1 Conduct Record Search:** For treatments led by CAL FIRE, an archaeological and historical resource record search will be conducted per the "Archaeological Review Procedures for CAL FIRE Projects" (CAL FIRE current edition dated 2010). For treatments led by a project proponent other than CAL FIRE, an archaeological and historical resource record search will be conducted per the "Archaeological Review Procedures for CAL FIRE Projects" or equivalent state or local agency procedures. Instead of conducting a new search, the project proponent may use recent record searches containing the treatment area requested by a landowner or other public agency in accordance with the Archaeological Review Procedures for CAL FIRE Projects or equivalent agency guidance. This SPR applies to all treatment activities and treatment types.
- **SPR CUL-2 Contact Geographically Affiliated Native American Tribes:** The project proponent will obtain the latest Native American Heritage Commission (NAHC) provided Native Americans Contact List, which may be obtained from the CAL FIRE website, as appropriate. Using the appropriate Native Americans Contact List, the project proponent will notify the California Native American Tribes in the counties where the treatment activity is located. The notification will contain the following:
  - A written description of the treatment location and boundaries.
  - Brief narrative of the treatment objectives.
  - A description of the activities used (e.g., prescribed burning, mastication) and associated acreages.
  - A map of the treatment area at a sufficient scale to indicate the spatial extent of activities.
  - A request for information regarding potential impacts to cultural resources from the proposed treatment.
  - A detailed description of the depth of excavation, if ground disturbance is expected.

  In addition, the project proponent will contact the NAHC for a review of their Sacred Lands File. This SPR applies to all treatment activities and treatment types.

- **SPR-CUL-3 Pre-field Research:** The project proponent will conduct research prior to implementing treatments as part of the cultural resource investigation. The purpose of this research is to properly inform survey design, based on the types of resources likely to be encountered within the treatment area, and to be prepared to interpret, record, and evaluate these findings within the context of local history and prehistory. The qualified archaeologist or archaeologically trained resource professional will review records, study maps, read pertinent ethnographic, archaeological, and historical literature specific to the area being studied, and conduct other tasks to maximize the effectiveness of the survey. This SPR applies to all treatment activities and treatment types.
- **SPR CUL-4 Archaeological Surveys:** The project proponent will coordinate with an archaeologically trained resource professional or qualified archaeologist to conduct a site-specific survey of the treatment area. The survey methodology (e.g., pedestrian survey, subsurface investigation) depends on whether the area has a low, moderate, or high sensitivity for resources, which is based on whether the records search, pre-field research, and/or Native American consultation identifies archaeological, historical, or tribal cultural resources near or within the treatment area. A survey report will be completed for every cultural resource survey completed. The specific requirements will comply with the current edition of "Archaeological Review Procedures for CAL FIRE Projects" or equivalent state or local agency procedures, as applicable. This SPR applies to all treatment activities and treatment types.
- **SPR CUL-5 Treatment of Archaeological Resources:** If cultural resources are identified within a treatment, including tribal cultural resources, and cannot be avoided, a qualified archaeologist will notify the culturally affiliated tribe(s) based on information provided by NAHC and assess, whether an archaeological find qualifies as a unique archaeological resource, an historical resource, or in coordination with said tribe(s), as a tribal cultural resource. The project proponent, in consultation with culturally affiliated tribe(s), will develop effective protection measures for important tribal cultural resources located within treatment areas. These measures may include adjusting the treatment location or design to entirely avoid cultural resource locations or changing treatment activities so that damaging effects to cultural resources will not occur. These protection measures will be written in clear, enforceable language, and will be included in the survey report in accordance with the "Archaeological Review Procedures for CAL FIRE Projects" or equivalent state or local agency procedures. If the resource is a tribal cultural resource, the project proponent will provide the tribe(s) the opportunity to submit comments and participate in consultation to resolve issues of concern. This SPR applies to all treatment activities and treatment types.
- **SPR CUL-6 Avoid Built Historical Resources:** If the records search identifies built historical resources, as defined in Section 15064.5 of the State CEQA Guidelines, the project proponent will avoid these resources. Within a buffer of 100 feet of the built historical resource, there will be no prescribed burning or mechanical treatment activities Buffers less than 100 feet for built historical resources will only be used after consultation with and receipt of written approval from a qualified archaeologist. If the records search does not identify known historical resources in the treatment area, but structures (i.e., buildings, bridges, roadways) over 50 years old that have not been evaluated for historic significance are present in the treatment area, they will similarly be avoided. This SPR applies to all treatment activities and treatment types.
- **SPR CUL-7 Cultural Resource Training:** The project proponent will train all crew members and contractors implementing treatment activities on the protection of sensitive archaeological, historical, or tribal cultural resources. Workers will be trained to halt work if archaeological resources are encountered on a treatment site and the treatment method consists of physical disturbance of land surfaces (e.g., soil disturbance). This SPR applies to all treatment activities and treatment types.

THRESHOLDS OF SIGNIFICANCE

Thresholds of significance are based on PRC Sections 21083.2, 21084.1, and 21084.2, State CEQA Guidelines Section 15064.5(b) and (c)(4), and Appendix G of the State CEQA Guidelines. A treatment implemented under the proposed CalVTP would result in a significant impact on cultural resources if it would:

- cause a substantial adverse change in the significance of a historical resource as pursuant to Section 15064.5 of the State CEQA Guidelines;

- cause a substantial adverse change in the significance of a unique archaeological resource pursuant to Section 15064.5 of the State CEQA Guidelines;
- cause a substantial adverse change in the significance of a tribal cultural resource, defined in PRC Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe; or
- disturb any human remains, including those interred outside of dedicated cemeteries.

ISSUES NOT EVALUATED FURTHER

All potential archaeological, historical, and tribal cultural resources issues identified in the thresholds of significance are evaluated below.

IMPACT ANALYSIS

Impact CUL-1: Cause a Substantial Adverse Change in the Significance of Built Historical Resources

Vegetation treatment under the CalVTP could occur on lands that contain built historical resources. Implementation of SPRs CUL-1, CUL-6, and CUL-7, would avoid any substantial adverse change to any built historical resources. This impact would be **less than significant**.

Historical (or architectural) resources include standing buildings (e.g., houses, barns, cabins) and intact structures (e.g., dams, bridges). Because of the large geographic extent of the treatable landscape, conducting a records search for built historical resources is not feasible within the context of this PEIR. However, due to the large area of land and the variety of landowners and land uses within the treatable landscape, it is assumed that historical resources are present.

Under the proposed CalVTP, CAL FIRE and other project proponents would implement vegetation treatment activities including prescribed burning, mechanical treatments, manual treatments, prescribed herbivory, and herbicide application, as described in Chapter 2, “Program Description.” Treatment design would integrate SPRs identified above. SPR CUL-1 requires a sufficiently recent records search for historical resources. SPR CUL-6 requires the avoidance of known built historical resources and the avoidance of built-environment structures that have not yet been evaluated for historical significance. SPR CUL-7 requires that workers be trained regarding protection of historical resources. Conducting record searches and avoiding known historical resources will avoid or minimize the risk of disturbance, damage, or destruction of historical resources by identifying, then avoiding and protecting the resources from damage that could be caused by treatment activities. Conducting worker awareness training will avoid or minimize the risk of disturbance, damage, or destruction of historical resources by training workers on how to identify and avoid known resources that could be otherwise inadvertently be damaged by treatment activities. Implementation of these SPRs would avoid damage or destruction that could result in a substantial adverse change in the significance of a built historic resource. Therefore, this impact would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

Impact CUL-2: Cause a Substantial Adverse Change in the Significance of Unique Archaeological Resources or Subsurface Historical Resources

Vegetation treatment under the CalVTP could occur on lands that contain resources that may qualify as unique archaeological resources or subsurface historical resources. The CalVTP primarily involves treatment activities that either require no soil disturbance or very shallow soil disturbance; however, it is possible that unique archaeological or subsurface historical resources would be disturbed during treatment activities. SPRs CUL-1 through CUL-5 and SPR CUL-7 require a records search, pre-field research, an archaeological survey, coordination with Native American groups, worker training to recognize sensitive cultural resources, and avoiding or protecting known resources. Despite implementation of these SPRs, unknown unique archaeological resources or subsurface historical resources could be inadvertently damaged during treatment activities. This would be a **potentially significant** impact**.**

Because of the large geographic extent of the treatable landscape, conducting a records search for archaeological and subsurface historical resources is not feasible within the context of this PEIR. However, archaeological and subsurface historical resources have been identified throughout the treatable landscape. Therefore, this analysis assumes that archaeological and subsurface historical resources may be present within the treatable landscape. These resources may include village sites, milling sites, lithic scatters, rock art, building foundations, and refuse deposits.

Under the CalVTP, CAL FIRE and other project proponents would implement vegetation treatment activities as described in Chapter 2, "Program Description." Most treatment activities would not require soil disturbance (i.e., manual treatments, prescribed herbivory, prescribed burning, herbicide application) because activities would be limited to the use of hand crews, livestock, low intensity burning, or herbicides to kill or remove the above-ground portions of vegetation in the treatment area. However, some activities (e.g., mechanical treatments) could result in churning up the surface of the ground during treatment as vegetation is removed.

Treatment design would integrate the SPRs identified above. SPR CUL-1 requires a recent records search for archaeological and subsurface historical resources. SPR CUL-2 requires coordination with geographically associated Native American tribe(s), which would identify locations of any known unique archaeological or subsurface historical resources and areas where there is a high likelihood of finding these types of resources and require avoidance of these resources. SPR CUL-3 requires pre-field research to become familiar with the area and potential resources, SPR CUL-4 requires an archaeological survey of the treatment area to identify archaeological resources and SPR CUL-5 requires working with the geographically affiliated tribe(s) to avoid and protect any resources identified. Conducting record searches, contacting Native American groups, conducting cultural resource surveys, and avoiding known unique archaeological and subsurface historical resources would avoid or minimize the risk of disturbance, damage, or destruction of these resources by identifying, avoiding, or protecting these sensitive subsurface resources from damage that could be caused by treatment activities.

Although known resources would be avoided through implementation of SPRs, ground disturbance during treatments could encounter unknown archaeological sites and materials or subsurface historical resources, which may result in inadvertent damage to or destruction of these resources.

SPR CUL-7 requires worker awareness training and that treatment activities be halted if archaeological materials are discovered. Conducting worker awareness training will avoid or minimize the risk of disturbance, damage, or destruction of subsurface resources by training workers on how to identify resources that could be otherwise inadvertently be damaged by treatment activities and halting work in the event of any discoveries. Despite implementation of SPRs, unknown unique archaeological resources or subsurface historical resources could be discovered during ground-disturbing activities and be inadvertently damaged or destroyed, if they are present in the treatment areas and affected. If this occurred, it could cause a substantial adverse change in the significance of unique archaeological resources or subsurface historical resources, which would be a **potentially significant** impact.

Mitigation Measures

Mitigation Measure CUL-2: Protect Inadvertent Discoveries of Unique Archaeological Resources or Subsurface Historical Resources

If any prehistoric or historic-era subsurface archaeological features or deposits, including locally darkened soil ("midden"), that could conceal cultural deposits, are discovered during ground-disturbing activities, all ground-disturbing activity within 100 feet of the resources will be halted and a qualified archaeologist or archaeologically trained resource professional will assess the significance of the find. The qualified archaeologist will work with the project proponent to develop a primary records report that will comply with the current "Archaeological Review Procedures for CAL FIRE Projects" or equivalent state or local agency procedures, if applicable. If the archaeologist determines that further information is needed to evaluate significance, a data recovery plan will be prepared. If the find is determined to be significant by the qualified archaeologist (i.e., because the find constitutes a unique archaeological resource, subsurface historical resource, or tribal cultural resource), the archaeologist will work with the project proponent to develop appropriate procedures to protect the integrity of the resource. Procedures could include preservation in place (which is the preferred manner of mitigating impacts to archaeological sites), archival research, subsurface testing, or recovery of scientifically consequential information from and about the resource. Any find will be recorded standard DPR Primary Record forms (Form DPR 523) will be submitted to the appropriate regional information center.

Significance after Mitigation

Implementation of Mitigation Measure CUL-2 would reduce impacts to unknown unique archaeological or subsurface historical resources because it would protect in place, recover information, record, or otherwise treat the discovered resource appropriately. However, given the large geographic extent of the treatable landscape, the wide variety in resource types and significance, the potential extent of damage during inadvertent excavation, it is uncertain whether this measure would avoid a substantial adverse change in the significance of a unique archaeological or subsurface historical resource. Although SPRs would require every reasonable effort to identify and protect resources, there could be some rare instances where inadvertent damage of unknown resources may be extensive, and a substantial adverse change may not be fully mitigated. Although these are anticipated to be unusual exceptions, in these cases, impacts to undiscovered unique archaeological or subsurface historical resources would be **significant and unavoidable**.

Impact CUL-3: Cause a Substantial Adverse Change in the Significance of a Tribal Cultural Resource

The Board sent letters to 12 Native American tribes on February 9, 2019, notifying each that the PEIR was being prepared under CEQA, as required by PRC 21080.3.1. Four tribes requested initiation of tribal consultation. Tribal consultation is ongoing, but not yet complete and could result in the identification of tribal cultural resources as described under PRC Section 21074. Tribal cultural resources may be identified within the treatable landscape during consultation and could be affected by treatments implemented under the proposed CalVTP. This would be a **potentially significant** impact.

The Board sent letters on February 9, 2019, notifying 12 Native American tribes that preparation of the PEIR has begun, as required by PRC Section 21080.3.1. Four of those tribes, the San Manuel Band of Mission Indians, Rincon Band of Luiseno Indians, Pechanga Tribe, Temecula Band of Luiseno Indians, and United Auburn Indian Community, requested the initiation of tribal consultation (Table 3.5-1). The SPRs for the CalVTP were provided to these four tribes, and two of the tribes offered input on the SPRs. No further input was received from the remaining tribes and consultation with those tribes is considered complete.

Treatment design would integrate the SPRs to avoid cultural resources to the extent possible. SPR CUL-2 requires consultation with geographically affiliated tribes, SPR CUL-3 requires a survey of the treatment area for archaeological and tribal cultural resources, SPR CUL-5 requires consulting with the geographically affiliated tribes to avoid or protect any identified resources, and SPR CUL-7 requires worker awareness training and that treatment activities be halted if archaeological materials are discovered.

No tribal cultural resources have been identified within the treatable landscape; however, tribal consultation pursuant to PRC Section 21080.3.1 has not yet been completed. Therefore, tribal cultural resources may be identified within the treatable landscape during consultation and could be affected by treatments implemented under the proposed CalVTP. This would be a **potentially significant** impact.

Mitigation Measures

Mitigation Measure CUL-3: Complete Tribal Consultation (PRC Section 21080.3.1) and Avoid Potential Effects on Tribal Cultural Resources

The Board of Forestry and Fire Protection will complete tribal consultation pursuant to PRC Section 21080.3.1.

If no tribal cultural resource is identified during consultation, no further mitigation is required.

If the project proponent determines that a treatment may cause a substantial adverse change to a tribal cultural resource, and measures to protect the resource are not otherwise identified in the consultation process, provisions under PRC Section 21084.3(b) describe mitigation measures that may avoid or minimize the significant adverse impacts. Examples include:

1. Avoidance and preservation of the resources in place, including, but not limited to, designing the treatment to avoid the resources and protect the cultural and natural context.
2. Treating the resource with culturally appropriate dignity taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:
   A. Protecting the cultural character and integrity of the resource
   B. Protecting the traditional use of the resource
   C. Protecting the confidentiality of the resource.

<u>Significance after Mitigation</u>

Implementation of Mitigation Measure CUL-3 would reduce impacts to tribal cultural resources because it would require completion of tribal consultation and identification of measures to protect identified resources, if any. The Board anticipates that through implementation of SPRs, mitigation measures, and completion of the tribal consultation process, all impacts to tribal cultural resources would be reduced to a less-than-significant level. However, given that tribal consultation is ongoing, the large geographic extent of the treatable landscape, and the wide variety in resource types and significance, it cannot be known at this time whether measures developed during consultation would adequately avoid a substantial adverse change in the significance of a tribal cultural resource or would be feasible for project proponents to implement. Therefore, recognizing that tribal consultation has yet to conclude, this PEIR identifies impacts to tribal cultural resources as **potentially significant and unavoidable**.

Impact CUL-4: Disturb Human Remains

Prehistoric or historic-era marked or un-marked human interments are present throughout California, including the treatable landscape. Ground-disturbing vegetation treatment activities could uncover previously unknown human remains. Compliance with California Health and Safety Code Sections 7050.5 and 7052 and PRC Section 5097 would avoid disturbance. This impact would be **less than significant**.

The potential to uncover Native American human remains exists in locations throughout California and there is a possibility that unmarked, previously unknown Native American or other graves, including those interred outside formal cemeteries, could be present within the treatable landscape. As described above, most treatment activities would not require soil disturbance because activities would be limited to the use of hand crews, livestock, low intensity burning, or herbicides to kill or remove the above-ground portions of vegetation in the treatment area. However, mechanical treatments could result in churning up the surface of the ground during treatment as vegetation is removed. Because of the shallow depth of any ground disturbance relative to the anticipated depth of buried human remains, treatment activities under the CalVTP have low potential to uncover previously unknown remains. Nevertheless, if near the ground surface, there is a possibility that unmarked, previously unknown Native American or other graves could be present within the treatable landscape and could be uncovered during treatment activities.

California law protects Native American human burials, skeletal remains, and items associated with Native American burials from vandalism and inadvertent destruction. The procedures for the treatment of Native American human remains are contained in California Health and Safety Code Sections 7050.5 and 7052 and PRC Section 5097. These statutes require that, if human remains are discovered, potentially damaging ground-disturbing activities in the area of the remains will be halted immediately, and the county coroner and will be notified immediately. If the remains are determined by the coroner to be Native American, NAHC will be notified within 24 hours and the guidelines of the NAHC will be adhered to in the treatment and disposition of the remains. Following the coroner's findings, the archaeologist, the NAHC-designated Most Likely Descendant (MLD), and the landowner will determine the ultimate treatment and disposition of the remains and take appropriate steps to ensure that additional human interments, if present, are not disturbed. If the NAHC is unable to identify the MLD, the MLD fails to make a recommendation, or the landowner rejects the MLD's recommendation and mediation by NAHC fails to provide acceptable measures, the landowner will rebury the Native American remains and associated grave goods with appropriate dignity on the property in an area not subject to further disturbance in accordance with State CEQA Guidelines Section 15064.5(e)(2). The responsibilities for acting upon notification of a discovery of Native American human remains are identified in PRC Section 5097.94.

Compliance with California Health and Safety Code Sections 7050.5 and 7052 and PRC Section 5097, requires avoiding or minimizing disturbance of human remains, and appropriately treating any remains that are discovered. In compliance with California law, this impact would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

3.6 BIOLOGICAL RESOURCES

This section describes the biological resources that are known or have the potential to occur in the treatable landscape. Biological resources include common vegetation and wildlife, sensitive plant communities, special-status plant and animal species, and biologically important lands. Regulatory requirements that pertain to biological resources are summarized. The analysis describes potential impacts from implementation of the proposed CalVTP and identifies mitigation measures for those impacts determined to be significant.

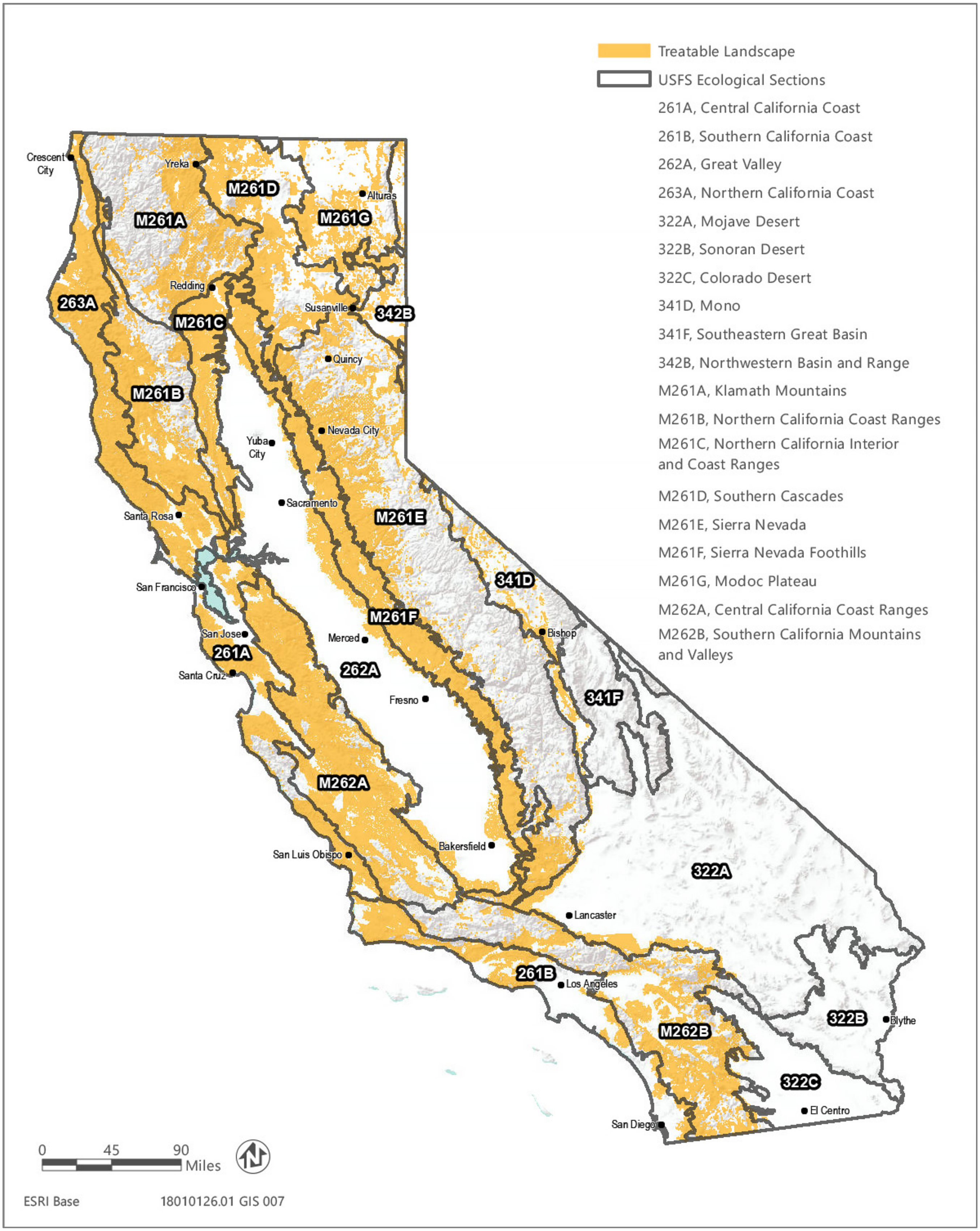
Comments on the Notice of Preparation (included in Appendix A) related to biological resources requested that the PEIR consider the following: use of multiple data sources to determine potential biological resources in treatment areas including conducting protocol-level surveys; potential impacts of vegetation treatment within chaparral; potential for vegetation treatments to increase invasive plant species and measures to control spread; and potential effects on sensitive vegetation and wildlife from vegetation removal, prescribed burns, and prescribed herbivory.

3.6.1 Environmental Setting

TREATABLE LANDSCAPE AND ECOREGIONAL APPROACH

The treatable landscape, which encompasses the area within which the proposed CalVTP would be implemented, covers much of California and includes numerous habitats, sensitive natural communities, and special-status plant and animal species. The biological resources setting description and environmental analysis are geographically organized into ecological regions or "ecoregions." Generally, an ecoregion is a geographic area with similar or recurring patterns of physical and biological characteristics that may include geology, soils, geomorphology, hydrology, climate, vegetation types, animal species composition, biodiversity, and land use history. The objectives of organizing this analysis by ecoregions are to: (1) describe the range of key biological resources that could be affected by program implementation; (2) identify the sensitive resources that potentially occur within or near a treatment area based on vegetation communities, special-status species, and sensitive habitats described for that same ecoregion; (3) provide a relevant geographic scale for analyzing cumulative impacts on biological resources; and (4) provide increased efficiency during project-specific review of later treatment activities for determining whether affected resources and impacts of proposed treatments under the CalVTP were considered within the scope of the PEIR.

Several ecoregion classification systems have been established by various agencies and organizations locally, nationally, and internationally. Classifications were developed for different purposes and each has its own benefits and limitations. After evaluation of several classification systems, the U.S. Forest Service (USFS) National Hierarchical Framework of Ecological Units (Framework) at the ecological section level was selected for use in the CalVTP PEIR for the reasons listed below. Figure 3.6-1 displays the USFS ecological sections (also referred to as "ecoregions" in this PEIR) and the treatable landscape. The treatable landscape is present in some portion of every ecoregion in California, with the exception of the Sonoran Desert Section.



Source: Data downloaded from CAL FIRE in 2018

Figure 3.6-1 Ecoregions and Treatable Landscape

- The Framework contains multiple hierarchical levels of organization, providing flexibility as to the scale of application. Organizing ecosystems within a hierarchical framework provides a means of describing resources at an appropriate scale, while allowing for the ability to examine conditions at coarser or finer levels, if needed. Because of the broad (statewide) distribution of potential treatment areas, combined with unique regional and vegetation-specific issues requiring evaluation in the CalVTP, multiple hierarchical levels may be useful. In the USFS National Hierarchical Framework of Ecological Units, the largest ecological units are domains, which are groups of related climates that are differentiated based on precipitation and temperature. Divisions represent a further refinement of the climates within domains and are differentiated based on precipitation levels and patterns as well as temperature. Divisions are subdivided into provinces, which are differentiated based on vegetation or other natural land covers. Sections are subdivisions of provinces, delineated primarily by physical and biological components such as climate, physical geography, soils, and potential natural communities. Sections are further subdivided into smaller units. Sections are the primary ecological unit used to describing biological resources in the CalVTP. In this document, ecological sections, or sections, are also referred to generally as "ecoregions."
- At the ecological section level, the Framework provides a higher resolution and number of ecological units in California than the other classification systems considered. Eighteen of 19 sections delineated in California contain at least some treatable landscape (except the Sonoran Desert Section). Using ecoregions is inherently a coarse-level approach to characterizing resource conditions and potential impacts across the treatable landscape; therefore, a classification with more subareas (i.e., greater degree of refinement) allows for the efficient presentation of more detailed information in the CalVTP PEIR setting (i.e., baseline conditions) and provides more specificity in analyzing impacts in key ecoregions within the treatable landscape.
- The Framework has been used in other statewide natural resource plans and environmental documents, such as the Statewide Wildlife Action Plan (SWAP) (CDFW 2015a) and the California Forest Carbon Plan (Forest Climate Action Team 2018). These plans provide the most current resource descriptions and data and use of the same classification system provides efficiency and consistency for the CalVTP PEIR.
- Vegetation types and descriptions in the Framework follow A Manual of California Vegetation (Sawyer et al. 2009), which is the current standard for vegetation classification in California and is consistent with the National Vegetation Classification System.
- California Wildlife Habitat Relationships (CWHR) System species range maps used the Framework; therefore, the mapped California ranges for many special-status species correspond well with USFS ecological unit boundaries.
- The Framework includes well-documented and useful descriptions that offer strong evidence supporting the system's organization (McNab et al. 2007)

Importantly, while the ecoregion organization in this PEIR provides a comprehensive approach to the program-level environmental impact analysis and would guide project-specific biological resource evaluations, it does not replace the need for project-specific environmental review when sensitive resources could likely be present. During project-level planning and evaluation, a combination of data sources and survey efforts would be used to verify the specific biological resources known or with potential to occur in a specific treatment area. Additional biological analysis for a Project-Specific Analysis (PSA) may include field assessments, confirmation of biological resources that could be affected, protocol or other pre-construction surveys for special-status species, and the implementation of SPRs and mitigation measures during individual treatment activities (refer to Appendix PD-3, "Project-Specific Analysis").

METHODS

The environmental setting for biological resources describes the common and sensitive resources that potentially occur in the treatable landscape. While several of these resources are appropriately summarized for the entire treatable landscape (refer to "Overview of Biological Resources Described at the Treatable Landscape Level" below), most of the resources are summarized at the ecoregion level (refer to "Overview of Ecoregion Description Content" below). The information on biological resources was gathered through review of existing data sources and is presented as a general summary of resources that may occur in the treatable landscape. During the PSA, additional data sources would be used to determine locally present, sensitive biological resources with potential to occur in a project area, including reconnaissance surveys. The following primary sources of information were used:

- Vegetation and habitat types: Information on the major vegetation and habitat types within the treatable landscape was determined from maps and associated data from CAL FIRE's Fire and Resource Assessment Program (FRAP). Supplemental information was provided by the Manual of California Vegetation Online (CNPS 2019) and CWHR System habitat type descriptions (CWHR 2019).
- Sensitive biological resources: Information on sensitive biological resources, including special-status species and sensitive natural communities, within the treatable landscape of each ecoregion was compiled from the following:
  - The California Natural Diversity Database (CNDDB) and its GIS application were used to identify reported occurrences of special-status species and sensitive natural communities. The CNDDB is a statewide database managed by the California Department of Fish and Wildlife (CDFW) that is continually updated with the reported location and condition of the State's rare and declining species. Although the CNDDB is the most current and reliable tool available for tracking occurrences of special-status species statewide, it contains only those records that previously have been reported to CDFW.
  - CWHR range maps and habitat types were used to supplement CNDDB data to determine the potential to occur for special-status amphibian, reptile, bird, and mammal species within the treatable landscape. The CWHR types are described in terms of vegetation and are grouped according to vegetative dominance or distinguishing characteristics to which wildlife are thought to respond (Mayer and Laudenslayer 1988). The CWHR System was developed to identify and classify existing vegetation types important to wildlife in California and it is, therefore, appropriate as a tool for analyzing potential species occupancy and use of proposed treatment areas.
  - U.S. Fish and Wildlife Service (USFWS) critical habitat GIS data were used to identify designated critical habitat. USFWS official lists of federal candidate, proposed, threatened, and endangered species and USFWS range lists were used to help determine the potential for special-status species occurrence. Official lists from all applicable USFWS offices were accessed using the USFWS Information for Planning and Conservation (IPaC) website.
  - Other sources of information were sought to determine the ranges, habitat, and potential for special-status species to occur in the treatable landscape, such as the SWAP (CDFW 2015a) and others described below, under "Special-Status Species."
  - USFWS National Wetland Inventory (NWI) GIS datasets and the National Hydrography Dataset (NHD) were used to identify wetland and aquatic habitats within the treatable landscape.
- Conservation lands, special management areas, and other biologically important lands:
  - For purposes of identifying potential wildlife movement corridors at a statewide scale, regional landscape linkages and habitat connectivity areas were identified and mapped within the treatable landscape using CDFW's Terrestrial Connectivity dataset (CDFW 2018a). The Terrestrial Connectivity dataset is one of the four key components of CDFW's Areas of Conservation Emphasis (ACE) suite of terrestrial conservation data, along with Terrestrial Biodiversity, Significant Habitats, and Climate Resilience. The ACE Terrestrial Connectivity dataset provides a single snapshot of connectivity information across the state. The dataset summarizes information on terrestrial connectivity by ACE hexagon, including the presence of mapped habitat corridors or linkages; the juxtaposition to large, contiguous, natural areas; and a relative intactness (ecological condition) score. Mapped corridors or linkages incorporated into the Terrestrial Connectivity dataset include California Essential Habitat Connectivity Areas and Natural Landscape Blocks (Spencer et al. 2010), and several other regional and statewide corridor/linkage-mapping products.

    The Terrestrial Connectivity dataset was developed to support conservation planning efforts by allowing users to spatially evaluate the relative contribution of an area to terrestrial connectivity based on the results of statewide, regional, and other connectivity analyses. Each ACE hexagon is assigned a connectivity rank from 1 to 5, which indicates the degree to which the hexagon is part of a large, contiguous natural area or a mapped linkage or corridor. A rank of 5 indicates that the area is within the core of a natural landscape block or linkage and has high landscape intactness. A rank of 1 indicates that the area has low landscape intactness and is not part of a natural landscape block or linkage (CDFW 2018a).

- Habitat conservation plans (HCPs) and natural community conservation plans (NCCPs) adopted or in progress for areas within the treatable landscape were identified using CDFW's Conservation Plan Boundaries GIS data (CDFW 2017).
- Locations, ownership, and acreages of other protected open space and conservation lands in the treatable landscape were obtained from the California Protected Areas Database (CPAD 2018).
- BIOS is a system that enables the management and visualization of biogeographic data collected by CDFW and partner organizations. Partner organizations that provide data layers to BIOS include the U.S. Geological Survey, U.S. Bureau of Land Management, USFWS, California Coastal Conservancy, California Geological Survey, and USFS. BIOS facilitates the sharing of data within the BIOS community through integrating GIS, relational database management, and ESRI's ArcGIS Server technology to create a statewide, integrated information management tool that can be used on any computer with access to the Internet (http://www.dfg.ca.gov/biogeodata/bios/). BIOS was used to access data layers including Essential Habitat Connectivity areas, lakes and streams, state refuges, state parks, California Protected Areas, lands under conservation easements, and CDFW-owned and operated lands.

OVERVIEW OF BIOLOGICAL RESOURCES DESCRIBED AT THE TREATABLE LANDSCAPE LEVEL

The topics in this section are summarized for the entire treatable landscape. Topics are described at this level, which is coarser than the ecoregion level, because they are either relevant to the entire state or cross multiple ecoregion boundaries. More refined identification, characterization, and analysis of these topics would be completed during the PSA.

Fire Regime

This section provides a general discussion about fire regime for different vegetation types throughout the state. This topic is generally not discussed further in the ecoregion descriptions; however, additional information about fire regimes for the CWHR types within the treatable landscape is provided in Appendix BIO-1.

Fire characteristics, or fire regime, can be described based on seven attributes that are generally considered important to ecosystem function. These attributes are comprised of the temporal attributes of seasonality and fire return interval, the spatial attributes of fire size and spatial complexity, the magnitude attributes of fireline intensity and fire severity, and fire type (Van Wagtendonk et al. 2018). The *Manual of California Vegetation* (Sawyer et al. 2009: Appendix 2, Table A2) provides a list of the fire regime attributes of the vegetation alliances described in California.

Many of California's ecosystems are fire-adapted; however, semi-arid forests and grasslands are often not experiencing fire as frequently as needed to maintain their ecological structure and function. Other ecosystems, such as coastal sage scrub and chaparral, are experiencing fires too frequently, resulting in changes to their ecology (CDFW 2015a). The fire return interval and fire response for chaparral and coastal scrub alliances, as reported in the *Manual of California Vegetation* (Sawyer et al. 2009) is provided in Table 3.6-1. Studies found 34 percent of coastal sage scrub sites were converted to nonnative annual grasslands between 1930 and 2009 and that annual grass encroachment was positively correlated with frequent fire and air pollution (Talluto and Suding 2008).

Forest vegetation types are generally adapted to relatively frequent, moderate to low intensity fires that burn understory fuels and not mature trees. In addition, there is growing recognition that forests adapted to moderate and low intensity fires also experienced a small proportion of high-severity fire, providing opportunities for early-seral habitat development and the production of large pieces of deadwood resources that are important to many wildlife species (Fontaine and Kennedy 2012, Marlon et al. 2012).

Relative to forest vegetation types, southern chaparral vegetation types are adapted to less frequent, higher intensity crown fires that kill most of the above-ground biomass. While the above-ground parts of the dominant plants are killed during these fires, these species quickly regenerate from sprouts and a viable seed bank and return to their pre-fire composition as long as fires are not so hot as to sterilize the soil and destroy the seed bank and root crown systems, or too frequent to allow shrubs to mature. Natural fire return intervals for individual chaparral types across the state are variable, ranging from around 30 years in northern chaparral types to 100 years or more in coastal southern chaparral types (Van de Water and Safford 2011). Fire return intervals in coastal scrub habitats are likewise widely variable but are generally short to medium, ranging from 1 to 5 years for the shortest and up to 50 to 100 years (Table 3.6-1). The longest fire return interval for a coastal scrub type is 50 to 200 years for California buckwheat scrub in desert regions.

Fires have increased substantially in southern California coastal areas, and in places this has led to a conversion of native chaparral and coastal scrub vegetation to annual grassland cover dominated by nonnative species (Underwood et al. 2018). Some chaparral species resprout from root crowns and also regenerate from seed (facultative seeders) and some are obligate seeders (regenerate only from seed). Facultative seeders are more resilient to fire than obligate seeders, which can be eliminated from an area if fire return intervals are too short (Underwood et al. 2018). For example, Bigberry manzanita chaparral is an obligate seeder with a medium fire return interval that ranges from 20 to over 100 years.

Table 3.6-1 Fire Return Interval

CWHR Classification/MCV Alliance	Fire Response	Fire Return Interval
Chamise-redshank Chaparral		
Chamise chaparral	facultative seeder	medium (10-100+ years)
Chamise - white sage chaparral*	facultative seeder	medium (30-60 years)
Chamise - black sage chaparral	facultative seeder	medium (30-60 years)
Redshank chaparral	facultative seeder	medium (10-100+ years)
Eastwood manzanita chaparral	facultative seeder	medium (10-100+ years)
Bigberry manzanita chaparral	obligate seeder	medium (20-100+ years)
Hoary leaf ceanothus chaparral	obligate seeder	medium (10-100 years)
Wedge leaf ceanothus chaparral/Buck brush chaparral	obligate seeder	medium (20-100 years)
Cup leaf ceanothus chaparral*	obligate seeder	medium (10-100 years)
Mission manzanita chaparral*	facultative seeder	medium (30-100+ years)
Coastal scrub		
Dune mat*	—	—
California sagebrush scrub	facultative seeder	medium (20-100+ years)
California sagebrush - California buckwheat scrub	facultative seeder	medium (20-50+ years)
California sagebrush - black sage scrub	facultative seeder	medium (15-70+ years)
Quailbush scrub	obligate seeder	long (35-100 years)
Coyote brush scrub	facultative seeder	medium (15-50+ years)
Broom patch[N]	facultative seeder	—
Sea rocket sands	—	—
Sand dune sedge swath*	—	—
Blue blossom chaparral	obligate seeder	medium (20-50 years)
Giant coreopsis scrub*	facultative seeder	—
Hazelnut scrub*	facultative seeder	short (1-5 years)
Bush monkeyflower scrub*	facultative seeder	medium (20-50 years)

Table 3.6-1 Fire Return Interval

CWHR Classification/MCV Alliance	Fire Response	Fire Return Interval
Live-forever - lichen/moss sparse herbaceous rock outcrop	—	—
California brittle bush - Ashy buckwheat scrub*	obligate sprouter	medium (15-70 years)
Brittle bush scrub	facultative seeder	medium
Narrowleaf goldenbush - bladderpod scrub	obligate seeder	—
Palmer's goldenbush scrub*	—	—
California yerba santa scrub	facultative seeder	short (>10-50 years)
California buckwheat scrub	facultative seeder	south/central coast: medium (15-30+ years); desert: long (50-200 years)
California buckwheat - white sage scrub*	facultative seeder	medium (15-70+ years)
Wright's buckwheat - Heerman's buckwheat - Utah butterfly-bush scrub*	—	—
California coffee berry scrub	facultative seeder	—
Coastal silk tassel scrub*	—	—
California match weed patch*	—	—
Sawtooth golden bush scrub*	obligate sprouter	medium (20-100 years)
Goldenaster patch*	—	—
Menzies's golden bush scrub*	—	medium to long
Salt rush swales*	—	—
Bush penstemon scrub*	—	medium (20-100 years)
Scale broom scrub*	obligate sprouter	—
Deer weed scrub	obligate seeder	short (5-50 years)
Silver bush lupine scrub	obligate seeder	short (5-50 years)
Yellow bush lupine scrub	facultative seeder	long
Silver dune lupine - mock heather scrub*	—	long
California desert-thorn scrub*	obligate sprouter	—
Bush mallow scrub	facultative seeder	medium (20-50+ years)
Laurel sumac scrub	facultative seeder	short to medium (10-60 years)
Ice plant mats[N]	—	—
Wax myrtle scrub*	obligate sprouter	long
Coast prickly pear scrub*	facultative seeder	medium (10-50 years)
Coastal sage and Island scrub oak chaparral*	obligate sprouter	medium to long (50-100+ years)
Lemonade berry scrub*	obligate sprouter	medium (15-70+ years)
Coastal bramble*	obligate sprouter	medium (20-100 years) (drought years)
White sage scrub*	facultative seeder	medium (15-70+ years)
Purple sage scrub	facultative seeder	medium (15-70+ years)
Black sage scrub	facultative seeder	medium (15-90+ years)
Coast range stonecrop draperies	—	—
Bushy spikemoss mats*	obligate sprouter	—
Jojoba scrub*	—	—
Bush seepweed scrub*	—	—
Poison oak scrub	facultative seeder	short to medium

Table 3.6-1 Fire Return Interval

CWHR Classification/MCV Alliance	Fire Response	Fire Return Interval
Mixed Chaparral		
Baker manzanita stand*	—	—
Hoary, common, and Stanford manzanita chaparral*	obligate seeder	—
Brittle leaf - woolly leaf manzanita chaparral*	facultative seeder	medium (30-100+ years)
Eastwood manzanita chaparral	See above under Chamise-redshank chaparral	
Bigberry manzanita chaparral	See above under Chamise-redshank chaparral	
Hooker's manzanita chaparral*	—	—
Hoover's manzanita chaparral*	obligate seeder	medium (50-100+ years)
Mount Tamalpais manzanita chaparral*	obligate seeder	medium (50-100+ years)
Monterey manzanita chaparral*	—	—
Morro manzanita chaparral*	obligate seeder	medium (50-100+ years)
Ione manzanita chaparral*	obligate seeder	medium (30-100+ years)
Glossy leaf manzanita chaparral*	obligate seeder	medium (30-100+ years)
Pajaro manzanita chaparral*	obligate seeder	medium (30-100+ years)
Sandmat manzanita chaparral*	—	—
Pointleaf manzanita - pink-bract manzanita chaparral*	obligate seeder	medium (20-50+ years)
Burton Mesa chaparral*	—	—
Silverleaf manzanita chaparral*	—	—
Whiteleaf manzanita chaparral	obligate seeder	medium (20-70+ years)
Hoary leaf ceanothus chaparral	See above under Chamise-redshank chaparral	
Wedge leaf ceanothus chaparral, Buck brush chaparral	See above under Chamise-redshank chaparral	
Cup leaf ceanothus chaparral*	See above under Chamise-redshank chaparral	
Deer brush chaparral	facultative seeder	medium (10-50+ years)
Chaparral whitethorn chaparral	facultative seeder (south of Tulare County); obligate seeder (north of Tulare County)	medium (25-65 years)
Bigpod ceanothus chaparral	obligate seeder	medium (25-55 years)
Hairy leaf - woolly leaf ceanothus chaparral*	obligate seeder	medium (25-100 years)
Wart leaf ceanothus chaparral*	obligate seeder	medium (20-100 years)
Wart stemmed ceanothus chaparral*	—	—
Birch leaf mountain mahogany chaparral	facultative seeder	medium (40-80 years)
Golden chinquapin thickets*	obligate sprouter	short
Bush poppy scrub	—	medium (20-100 years)
California yerba santa scrub	facultative seeder	short (>10-50 years)
Thick leaf yerba santa scrub*	—	—
California coffee berry scrub	See above under coastal scrub	
Ocean spray brush*	obligate sprouter	medium
Deer weed scrub	See above under coastal scrub	
Silver bush lupine scrub	See above under coastal scrub	
Bush mallow scrub	See above under coastal scrub	
Laurel sumac scrub	See above under coastal scrub	
Shrub tanoak chaparral*	obligate sprouter	medium (20-80 years)

Table 3.6-1 Fire Return Interval

CWHR Classification/MCV Alliance	Fire Response	Fire Return Interval
Holly leaf cherry - toyon - greenbark ceanothus chaparral	obligate sprouter	medium to long
Choke cherry thickets*	—	—
Scrub oak chaparral	obligate sprouter	medium (30-100+ years)
Scrub oak - chamise chaparral	obligate sprouter	medium (20-100 years)
Canyon live oak chaparral	obligate sprouter	medium (30-100+ years)
Muller oak chaparral	obligate sprouter	medium (30-100+ years)
Coastal sage and Island scrub oak chaparral*	See above under coastal scrub	
Leather oak chaparral	facultative seeder	medium (30-100+ years)
Tucker oak chaparral	—	medium (30-100+ years)
Palmer oak chaparral*	obligate sprouter	long
Interior live oak chaparral	obligate sprouter	medium (30-100+ years)
Sugarbush chaparral	facultative seeder	—
Oak gooseberry thicket*	—	—
Poison oak scrub	See above under coastal scrub	
Canyon sunflower scrub*	facultative seeder	—
Montane Chaparral		
Mount Tamalpais manzanita chaparral	See above under mixed chaparral	
Green leaf manzanita chaparral	facultative seeder	medium (20-50 years)
Whiteleaf manzanita chaparral	See above under mixed chaparral	
Mountain whitethorn chaparral	facultative seeder	medium (20-50+ years)
Deer brush chaparral	See above under mixed chaparral	
Tobacco brush or snow bush chaparral	facultative seeder	medium (40-75 years)
Birch leaf mountain mahogany chaparral	See above under mixed chaparral	
Bush chinquapin chaparral	obligate sprouter	medium (5-50 years)
Bitter cherry thicket	—	—
Choke cherry thicket	—	—
Brewer oak scrub	facultative seeder	medium (25-50+ years)
Sadler oak or deer oak brush field	obligate sprouter	medium (25-75+ years)
Huckleberry oak chaparral	obligate sprouter	medium (25-75+ years)

*These are designated sensitive natural communities with a state rarity rank of S1 (critically imperiled), S2 (imperiled), or S3 (vulnerable).

[N] These alliances are dominated by nonnative vegetation.

Definitions (Parker et al. 2015):

Facultative seeders: shrubs that survive wildfire and sprout new shoots after the fire. These types of plants also have persistent soil seed banks that fire stimulates, and they recruit new individuals from seedlings that successfully establish in the postfire environment.

Obligate sprouter: shrubs that can survive wildfire and sprout new shoots after the fire. Generally, no seedlings are recruited in the postfire environment.

Obligate seeders: shrubs or trees that are killed by wildfire and persist in the habitat because they have persistent soil seed banks that fire stimulates. Obligate seeders recruit new individuals after wildfire from the seed bank and establish new populations in the postfire environment.

Source: Sawyer et al. 2009, CNPS 2019; Compiled by Ascent Environmental in 2019

Prior to European settlement, conifer forests in the Sierra Nevada were reportedly open, park-like stands of large pine and fir trees with a grassy understory. Frequent low-intensity fires rejuvenated grasslands and consumed dead woody debris and leaf litter from the forest floor and high-intensity crown fires that consumed mature individuals were infrequent. During the 20th century, policies of fire exclusion were implemented throughout the region, reducing fire frequency and allowing the recruitment of large numbers of trees that would have been removed as saplings under a regime of frequent fire. As a result, many forest stands have become denser, and have higher loads of surface fuels. This change in stand structure has increased fire hazards because more intense fires, which may spread through the canopy and cause substantial tree mortality, are now much more likely.

Some plant species, such as closed-cone cypress and pine species and some chaparral species, need hot fires to regenerate (CDFW 2015a, Sawyer et al. 2009). Closed-cone pine-cypress vegetation types, including Baker cypress stand, Mendocino pygmy cypress woodland, Piute cypress woodland, and Bishop pine-Monterey pine forest, are adapted to low complexity, high intensity, high to very high severity fires with a medium fire return interval. Fire return intervals generally need to be longer than 15 years to allow a new cone crop to develop but short enough to ensure viable seed crops are present. In general, fire kills most closed-cone cypress and pine species but ensures seed dissemination and germination. Seeds fall on bare mineral soil and seedlings establish dense thickets (CNPS 2019). Additional information on the fire ecology of CWHR types found in the treatable landscape is provided in Appendix BIO-1.

Although many wildlife species in California evolved with fire, large high-intensity wildfires, such as the ones recorded in 2017 and 2018, are considered a threat to some already threatened or endangered species due to direct mortality and habitat loss (USFWS 2018, Chiono et al. 2017). Fuel management has been suggested as a method to decrease the risk of wildfire on these already vulnerable species (USFWS 2018, Chiono et al. 2017). However, current fire risk reduction and suppression activities also have variable effects on wildlife, depending on the specific management actions and environment in which the actions occur. For example, an analysis of multiple areas across the U.S. found that overall bird and mammal diversity and abundance remained neutral or increased with moderate levels of forest thinning for fire fuel management, although biodiversity decreased in some areas in the short-term (Verschuyl et al. 2011).

Other than direct residential development, one of the more important changes in shrubland ecosystems has been the anthropogenic alteration of the natural fire regime. Despite a long-standing policy of fire suppression, the primary impact to these ecosystems has been a dramatic acceleration of human-caused fire occurrence. Because of the increase in anthropogenic ignitions associated with human population centers, more fires now occur in the wildland-urban interface than in the backcountry. Too-frequent fire may promote the invasion of nonnative plant species by providing canopy openings, reducing cover of competing vegetation, and creating favorable soil conditions, such as newly exposed soil surfaces and increased nutrient availability. Invasive plants may change fire behavior and fire regimes, often by increasing fuel bed flammability, which increases fire frequency. These changes may also impact habitat loss and small mammal populations. Cheatgrass serves as a classic example of an invasive plant that has significantly altered the fire ecology in the Western United States and Canada; it is a winter annual that grows rapidly during late winter and early spring and provides a continuous fuel bed of light, flashy fuel once cured in early summer.

The restoration of native, fire-adapted plant communities is a critical need across portions of the western United States (Agee and Skinner 2005). In California, prescribed burning and some mechanical and manual fuel treatments are currently occurring on lands within the SRA at a smaller scale than that proposed by the CalVTP (refer to Chapter 2, "Project Description"). Fuel treatments have been shown to reduce wildfire severity (Stephens et al. 2009), although fuel reduction projects within forested settings appear to be more effective in reducing burn severity as compared to some southern California chaparral ecosystems. This objective recognizes that appropriately designed vegetation treatments can mimic the disturbance processes that historically controlled plant community composition and structure. In addition, restoring native, fire-adapted ecosystems can increase ecosystem resiliency to wildfire, drought, and potentially climate change.

Invasive Species

For purposes of this PEIR, as discussed with and agreed upon by CDFW, invasive species means those plant species identified as invasive by the California Invasive Plant Council (Cal-IPC) or defined as noxious weeds under California law by the CDFA. Cal-IPC categorizes plants as invasive based on assessment of ecological impacts conducted with transparent, science-based criteria and expert review. It focuses on invasive plant species that can have substantial ecological impacts in California wildlands and represents the best available knowledge of invasive plant experts in California (Cal-IPC 2019). There are currently over 300 plant species in the Cal-IPC inventory, approximately 200 of which are rated as invasive and approximately 100 of which are on a watch list of species at high risk of becoming invasive in the future. The CDFA has approximately 90 plant species on its noxious weed list. Many of these species are also rated invasive by Cal-IPC.

Infestations of invasive plants generally originate in areas where soil and vegetation have been disturbed; the removal of native vegetation provides an opportunity for propagules of introduced species to establish, grow, and reproduce and eventually spread throughout the disturbed area and possibly into adjacent undisturbed vegetation.

Human activities have facilitated the expansion of thousands of plant species beyond their native ranges; a small fraction of these, generally around 10 percent of introduced species, spread and persist into native ecosystems and have serious impacts on their introduced environment (Williamson and Fitter 1996). While invasive plant species represent only about 3 percent of the species growing in California's wildlands, they cover a greater proportion of the landscape than noninvasive plants (Cal-IPC 2019). As described by Cal-IPC, invasive plants are species that are not native to, but can spread into California wildland ecosystems, and have the ability to displace or hybridize with native species, alter biological communities, or alter ecosystem processes. These impacts can include alteration of hydrological patterns, fire cycles, and soil chemistry; reduction of nutrient, water, and light availability; and reduced biodiversity (Coblentz 1990, Vitousek et al. 1996, Cal-IPC 2006). The impacts of invasive plant species can decrease wildlife habitat values and reduce the quality of rangeland forage for livestock. Infestations of invasive plants generally originate in areas where soil and vegetation have been disturbed; the removal of native vegetation provides an opportunity for propagules of introduced species to establish, grow, and reproduce. Prescribed-fire and mechanical treatments can each increase the abundance of invasive plant species, and this increase is generally greatest with combined mechanical and prescribed-fire treatments (Stephens et al. 2012).

Wildlife Movement Corridors

A wildlife movement corridor is generally a topographical/landscape feature or movement zone that connects two or more natural habitat areas. Wildlife corridors link areas of suitable wildlife habitat that are separated by variation in vegetation, rugged terrain, human disturbance and habitat fragmentation, or other biophysical factors. Movement corridors may provide favorable locations for wildlife to travel between different habitat areas, such as foraging sites, breeding sites, cover areas, and preferred summer and winter range locations. They may also function as dispersal corridors allowing animals to move between various locations within their range. Therefore, wildlife movement and migration corridors are considered an important ecological resource by CDFW and other agencies and are protected by many local governments in California.

Ecological movement corridors have been addressed in several conservation biology and landscape planning applications. As landscapes become increasingly fragmented, organisms that occupy remaining patches of suitable habitat may experience a reduction in habitat quality and area, and become at risk to processes that affect small or isolated populations. These processes may include changes in microclimates, limits to daily or seasonal movements, inbreeding depression, and random demographic or environmental catastrophes. These factors can result in increased mortality or local extinction of populations. Protecting and managing ecological corridors that link core areas of habitat, and facilitate movement or dispersal among habitat patches, has been widely proposed to reduce the adverse effects of habitat fragmentation. By maintaining or increasing connectivity among habitat patches or distinct regions, corridors may play an important role in maintaining population persistence and genetic diversity, facilitating recolonization of sites where populations have gone extinct, or allowing for traditional seasonal movements within a population's overall range.

Because of the statewide geographic scope of this PEIR, potential wildlife movement corridors within the treatable landscape were preliminarily identified at a regional scale using CDFW's statewide Terrestrial Connectivity dataset. As described previously under "Methods," the Terrestrial Connectivity dataset characterizes spatially the relative contribution of an area to terrestrial connectivity based on the results of statewide, regional, and other connectivity analyses. Each ACE hexagon is assigned a connectivity rank from 1 to 5, which indicates the degree to which the hexagon is part of a large, contiguous natural area or a mapped linkage or corridor. A rank of 5 indicates that the area is within the core of a natural landscape block or linkage and has high landscape intactness. A rank of 1 indicates that the area has low landscape intactness and is not part of a natural landscape block or linkage (CDFW 2018a).

Appendix BIO-2 provides a map showing connectivity rankings for lands in the treatable landscape for each ecoregion, and a table that summarizes the acreages of each ranking within the ecoregions.

In addition to large blocks of open space and corridors formally mapped in CDFW's Terrestrial Connectivity dataset and other studies, many habitat features provide wildlife dispersal and other movement opportunities at more local or site-specific scales. For example, depending on their landscape position and habitat quality, riparian areas in all ecoregions can function as important movement corridors for amphibians, reptiles, birds, mammals, and fish by providing connectivity between other areas of natural habitat and between populations. Additionally, relatively small open space lands (e.g., County and regional parks) can function as part of a regional corridor or "stepping stones" for species whose movements are less sensitive to the presence of human disturbance and major roads or other impediments to movement, such as birds.

Wildlife Nursery Sites

Nursery sites are locations where fish and wildlife concentrate for hatching and/or raising young, such as nesting rookeries for birds, spawning areas for native fish, fawning areas for deer, and maternal roosts for bats. In this PEIR, nursery sites are considered for native wildlife that are not defined as special-status species; special-status species are considered separately. The treatable landscape could contain a variety of wildlife nursery sites. For example, herons and egrets will nest communally in rookies that may contain a few to hundreds of pairs of birds. Based on a statewide heron rookery inventory conducted in the early 1980s, CDFW identified important geographic areas for breeding great egret (*Ardea alba*) and snowy egret (*Egretta thula*) within the Great Valley and Northern California Coast Sections. Great blue heron (*Ardea herodias*) rookeries were found statewide and cattle egret (*Bubulcus ibis*) rookeries were primarily found in southern California (CDFG 1982). Many of the state's major river systems provide important spawning habitat for native fish. For example, Chinook salmon (*Oncorhynchus tshawytscha*) runs are supported mainly by the Klamath River basin, which contains the Klamath and Trinity Rivers and their tributaries and the Central Valley, including the Sacramento and San Joaquin River basins (CDFW 2013). These basins occur within the Northern California Coast, Klamath, and Southern Cascades Sections, and the Great Valley, North, and Central California Coast Ranges, Northern California Interior Coast Ranges, Modoc Plateau, Southern Cascades, Sierra Nevada Foothills, and Sierra Nevada Sections, respectively. Fawning areas also have the potential to occur throughout the treatable landscape. For example, mule deer in California occur in chaparral and woodland habitats such as mixed chaparral, chamise-redshank chaparral, coastal scrub, coastal oak woodlands, blue oak woodlands, blue oak-gray pine woodlands, montane hardwood, montane hardwood-conifer, and valley oak woodlands, and could use these areas for fawning habitat. Riparian habitats, including montane and valley foothill riparian, are also used for fawning (Sommer et al. 2007). Bat maternity roost sites occur state-wide and could be found throughout the treatable landscape. Roost sites depend on the bat species, but may include specialized roosting habitat, such as caves or tree foliage, or a bat species may use multiple different habitat types for maternity roosts. Other roosting habitat includes buildings, bridges, and other built structures, cliffs including rock crevices and cracks, rip-rap, and tree hollows. Some bat species will also use different types of roost habitat in different geographic regions within their range. Native nursery sites are not mapped on a regional scale and would need to be evaluated at a project-specific level.

Environmentally Sensitive Habitat Areas

The Coastal Act defines environmentally sensitive [habitat] areas (ESHAs) as: "Any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could easily be disturbed or degraded by human activities and developments." Therefore, to designate an ESHA, the following three elements must be evaluated:

- presence of species or habitats that are rare,
- presence of species or habitats that are valuable, and
- sensitivity of species or habitat to human disturbance or degradation.

Rare habitats in the context of designating ESHAs consist of habitats in the following categories: 1) natural communities with a state or global rarity ranking of S1 or G1 (critically imperiled), S2 or G2 (imperiled), or S3 or G3 (vulnerable to extirpation or extinction) and 2) habitat areas that support rare or special-status plant or animal species. Rare or special-status species consist of those with a state or global rarity ranking of S1 or G1 (critically imperiled), S2 or G2 (imperiled), or S3 or G3 (vulnerable to extirpation or extinction); species listed as endangered, threatened, or candidates under federal Endangered Species Act (ESA) or California Endangered Species Act (CESA); plants designated as rare under the Native Plant Protection Act; California Fully Protected Species, California Species of Special Concern, any species for which there is compelling evidence of rarity and, pursuant to CEQA Guidelines Section 15380(d), and plants/animals listed as locally important species under a Local Coastal Program (LCP). Plant species with a California Rare Plant Rank of 1 (plants presumed extinct in California, or rare, threatened, or endangered in California and elsewhere), 2 (plants that are rare, threatened, or endangered in California but more common elsewhere) (California Coastal Commission 2019). Examples of ESHAs include coastal sage scrub, maritime chaparral, coastal bluff habitats, coastal dune habitats, wetlands as defined under the Coastal Act, riparian habitats, eucalyptus trees supporting overwintering monarch butterflies, and tree stands supporting nesting raptors.

Habitat areas may be especially valuable because of their “special nature,” such as being an unusually pristine example of a habitat type, containing an unusual mix of species, supporting species at the edge of their range, or containing species with extreme variation or populations with unique genetic characteristics. Habitats or species may also be considered valuable because of their special “role in the ecosystem” because they provide habitat for endangered species, protect water quality, provide essential corridors linking one sensitive habitat to another, or provide critical ecological linkages, such as the provision of pollinators or crucial trophic connections. Wetlands are defined under the Coastal Act as “lands within the coastal zone which may be covered periodically or permanently with shallow water and include saltwater marshes, freshwater marshes, open or closed brackish marshes, swamps, mudflats, and fens.” Under this definition, a feature need only exhibit one of the three wetland parameters (i.e., wetland vegetation, hydric soils, wetland hydrology) used by U.S. Army Corps of Engineers (USACE) to define a wetland under the Clean Water Act (CWA).

The California Coastal Commission considers that species and habitats meeting the definitions of rare or especially valuable, as described in the preceding paragraphs, are vulnerable to human disturbance or degradation because of historic losses and adverse effects of urbanization in coastal California. The Coastal Act restricts development in ESHAs to only those uses dependent on the resource (e.g., hiking, educational signs and kiosks, research, and restoration), requires protection of ESHAs against any significant disruption of habitat values, and requires that development adjacent to ESHAs be designed to avoid degradation of the ESHAs and be compatible with continuance of habitat and recreation areas. Development setbacks are required and vary depending on the resource and type and intensity of disturbance but are commonly between 100 and 500 feet.

LCPs set the guidelines for development and resource protection within a portion of the coastal zone contained in a city or county, in compliance with the Coastal Act. An LCP consists of a coastal land use plan and implementing regulations, adopted by a city council or a county board of supervisors and certified by the Coastal Commission. With a certified LCP, the local agency receives coastal development permit authority delegated by the Coastal Commission. Each of the 76 coastal counties and cities develop its own LCPs and many of them divide their coastal jurisdictions into smaller segments so there are currently over 125 individual LCPs. Where no LCP has been adopted, the Coastal Commission retains direct permitting authority over development in the coastal zone. Where an LCP has been adopted, the Commission retains appellate authority over local permitting decisions.

OVERVIEW OF ECOREGION DESCRIPTION CONTENT

The environmental setting for biological resources describes the common and sensitive resources that potentially occur in the treatable landscape, within each ecoregion. These resources are characterized at the ecoregion level (Figure 3.6-1). The ecoregion descriptions present primary or characteristic common and sensitive biological resources that are known or have the potential to occur within the treatable landscape.

The following biological resources are described for each ecoregion (to the extent each is present within an ecoregion):

- Vegetation and habitat types:

- Sensitive biological resources; including:
  - special-status species;
  - critical habitat; and
  - sensitive natural communities and habitats, including:
    - sensitive natural communities;
    - wetlands and waters of the United States and State; and
    - other sensitive habitats (i.e., riparian habitats, oak woodlands, and chaparral and coastal sage scrub);
- Conservation lands, special management areas, and other biologically important lands, including:
  - areas subject to habitat conservation plans, natural community conservation plans, and other conservation plans; and
  - protected open space lands.

The following introduces the types of resources described for each ecoregion in the treatable landscape and summarizes the methods and data sources used to identify these resources.

Vegetation and Habitat Types

A vegetation community, or vegetation type, is an assemblage of plants that coexist in a similar environment (USNVC 2017). California contains some of the highest diversity of vegetation types of any area of comparable size in North America due to its complex combinations of geology, climate, natural disturbance regimes, topography, and high plant species diversity (Sawyer et al. 2009). California supports over 100 forest and woodland vegetation types, over 200 chaparral and scrub types, and over 150 herbaceous vegetation types (CDFW 2015a). Vegetation types are defined by structure, growth form, and species composition. Growth form (e.g., tree, shrub, or herb) is a broad-scale vegetation grouping that reflects climate, substrate, and disturbance regime of the environment. At finer scales, vegetation is grouped based on plant species that co-occur in a given area and interact with each other and their environment (USNVC 2017). At all scales, vegetation types can be described by repeating patterns of form, structure, and species composition and relationships to their environment. CDFW uses the terms natural communities and vegetation communities interchangeably (VegCAMP 2018).

Habitat generally refers to the environmental setting, or place, in which a plant or animal lives, including the abiotic (physical) and biotic factors that characterize that environment. Habitat is often characterized by a dominant plant form or physical characteristic and vegetation is often the best representation of habitat (VegCAMP 2018).

CAL FIRE’s FRAP vegetation layer was used to identify the habitat/vegetation types within the treatable landscape of each ecoregion. The FRAP vegetation layer is developed from various data sets representing the best available land cover data for the state. Data from these various sources are then converted to CWHR habitat types and merged into a single statewide vegetation layer. The FRAP vegetation layer is the most comprehensive data set of vegetation mapping available for the state.

CDFW’s Vegetation Classification and Mapping Program (VegCAMP) developed and maintains a standardized statewide classification system in compliance with National Vegetation Classification (NVC) standards as described in the *Survey of California Vegetation Classification and Mapping Standards* (VegCAMP 2018). The classification for California was first published as the *Manual of California Vegetation* in 1995, updated in the second edition of the manual (Sawyer et al. 2009), and is now most easily accessed in *Manual of California Vegetation Online* (CNPS 2019). CDFW is continually updating the classification based on new projects, so much information is also in project-specific classification and mapping reports. As the creator of VegCAMP, CDFW is in the process of mapping vegetation across the state according to the statewide classification standard. To date, however, only five of the state’s 19 ecoregions are more than 50 percent mapped by VegCAMP. FRAP incorporates VegCAMP data where available and includes the best available land cover data from other sources where VegCAMP is not available.

A major source of cover data for the FRAP vegetation layer is the *Classification and Assessment with Landsat of Visible Ecological Groupings* (CALVEG). This is a vegetation classification and mapping system developed for the state of California by the Pacific Southwest Region of the U.S. Forest Service. A statewide CALVEG map was originally produced in 1979 and large areas have been updated over time; however, the focus of the CALVEG mapping effort is forests and rangelands and it does not cover the entire state (Center for Geographical Studies 2015). CALVEG vegetation types generally correspond to the alliance level of NVC and there are currently 213 vegetation types classified in CALVEG, but CALVEG types were mapped from satellite imagery at a coarse scale with very little ground verification. The coarse scale of the mapping effort makes it ineffective for identifying sensitive natural communities that are only distinguishable at finer floristic levels (Center for Geographical Studies 2015).

Approximately 29 percent of the FRAP vegetation data was mapped by VegCAMP using the *Manual of California Vegetation* (MCV) classification standard and approximately 57 percent was derived from CALVEG. The remaining approximately 14 percent was derived primarily from federal sources used to identify urban areas (NLCD), Agriculture (NASS), and LANDFIRE to fill in desert lands that had not been mapped by any California efforts.

While FRAP is an amalgamation of the best available vegetation cover data, when FRAP merges VegCAMP and CALVEG data into their vegetation layer, it is converted to CWHR types and the higher resolution of the source data is lost. For example, there are currently 213 vegetation types in the CALVEG data and over 450 vegetation types identified so far in the *Manual of California Vegetation Online* (CNPS 2019), but there are only 59 CWHR types. Therefore, the best available data at the local scale will need to be reviewed during the project specific analysis to help identify sensitive vegetation and habitat types that are typically defined at a finer scale than is available in the FRAP vegetation layer.

According to the state classification system, a stand of vegetation that contains trees that are evenly distributed and conspicuous throughout, and with generally 10 percent or greater tree canopy cover is classified as a forest or woodland. A stand of vegetation where woody shrubs or subshrubs are conspicuous throughout, shrub cover is at least 10 percent, and tree canopy cover is generally less than 10 percent, is classified as a shrubland. Stands of vegetation dominated by herbaceous plants (i.e., grasses and forbs) and having less than 10 percent cover of subshrubs, shrub, and trees (Sawyer et al. 2009) is classified as herbaceous vegetation. In general, the sources of the FRAP vegetation data conform to these standards for distinguishing forests and woodlands, shrublands, and herbaceous vegetation.

Thirty-seven of the 59 CWHR types occur in the treatable landscape, consisting of 25 woodland and forest habitats, 10 scrub and chaparral habitats, and two grassland (or herbaceous) habitats. Some CWHR types were excluded from the potential vegetation types that could be treated under this program because their wildfire risks are negligible (e.g., wet meadow, estuarine, riverine, and emergent wetland). However, broadcast burns may be implemented in wetland habitats that were not identified in the FRAP vegetation layer and therefore excluded from the treatable landscape. Agricultural land is excluded from the SRA, so agricultural vegetation types (e.g., cropland, orchards, vineyards) are also excluded from this program. Other CWHR types excluded from the treatment program include desert wash, desert riparian, and palm oasis. Appendix BIO-1 provides a list of all the CWHR types mapped within the statewide treatable landscape and an ecological description of each type. The *Manual of California Vegetation Online* (CNPS 2019) classification conversion tool was used to develop a list of MCV alliances that are associated with each CWHR type in each ecoregion, and these are presented in table format in the ecoregion descriptions later in this section.

Sensitive Biological Resources

Sensitive biological resources addressed in this PEIR include those that are afforded special protection or consideration through CEQA, the California Fish and Game Code (including but not limited to the CESA), ESA, CWA, Porter-Cologne Water Quality Control Act (Porter-Cologne Act), and local or regional policies.

Special-Status Species

Plants and animals may be special-status species due to declining populations, vulnerability to habitat change, or restricted distributions. Special-status species include those species legally protected under the CESA, the ESA, or other regulations, as well as species considered sufficiently rare by the scientific community to qualify for such listing. In this document, special-status species are defined as the following.

- Species listed or proposed for listing as threatened or endangered under ESA (50 CFR 17.12 for listed plants, 50 CFR 17.11 for listed animals, and various notices in the Federal Register for proposed species) or candidates for possible future listing as threatened or endangered under ESA (75 CFR 69222);
- Species listed or candidates for listing by the State of California as threatened or endangered under CESA (14 Cal. Code Regs., Section 670.5);
- Animals fully protected under the California Fish and Game Code (FGC) (Section 3511 for birds, Section 4700 for mammals, Section 5050 for reptiles and amphibians, and Section 5515 for fish);
- Plants listed as rare under the California Native Plant Protection Act (FGC Section 1900 et seq.);
- Plants considered by CDFW to be “rare, threatened or endangered in California” (California Rare Plant Ranks of 1A, presumed extinct in California and either rare or extinct elsewhere; 1B, considered rare or endangered in California and elsewhere; 2A, presumed extinct in California but common elsewhere; and 2B, considered rare or endangered in California but more common elsewhere). Note, that while these rankings do not afford the same type of legal protection as ESA or CESA, the uniqueness of these species requires special consideration under Section 15380 of the CEQA Guidelines;
- Animals identified by CDFW as species of special concern;
- Species considered locally significant, that is, a species that is not rare from a statewide perspective but is rare or uncommon in a local context such as within a county or region (CEQA Section 15125 (c)) or is so designated in local or regional plans, policies, or ordinances (CEQA Guidelines, Appendix G); or
- Species that otherwise meets the definition of rare or endangered under CEQA Section 15380.

Three sets of special-status species tables are provided in Appendix BIO-3 for plants, fish, and wildlife (other than fish). These tables list special-status species that are known to occur or have the potential to occur within the treatable landscape for each ecoregion[1]. Additional habitat information is provided in the table for each plant and wildlife (other than fish) species.

For special-status plant species, known occurrences from CNDDB were used to identify species known to occur within the treatable landscape for each ecoregion. Habitat associations for special-status plants were compiled from CNDDB and California Native Plant Society (CNPS) habitat descriptions and bloom periods were derived from CNPS data. California has the greatest number of native plant taxa in the United States at approximately 6,500 species, subspecies, and varieties; and nearly one third of these are endemic, meaning they occur in California and nowhere else in the world (CDFW 2015a). Over 200 of these plant taxa are designated as rare, threatened, or endangered and over 2,000 more are of conservation concern (CDFW 2015a). Nearly all of the plant taxa designated as rare, threatened, or endangered in the state are known or have potential to inhabit some portion of the treatable landscape.

For special-status fish species, known occurrences from CNDDB and species ranges from the PISCES Database website (Santos et al. 2014) and BIOS were used to identify species known or with potential to occur within the treatable landscape for each ecoregion (Appendix BIO-3, Table 19). The fish species tables were cross-checked with CDFW’s Special Animals List (CDFW 2018b) and the SWAP for completeness (CDFW 2015a).

[1] Given the large geographic area of the treatable landscape and anticipated use of this PEIR over the long-term, Appendix BIO-3 cannot identify every special-status species potentially affected by later CalVTP treatment activities. After certification of this PEIR, species status may change, taxonomic classification or scientific nomenclature may change, and new species may be designated as special status. If a proposed later treatment project would impact a species that meets the definition of special status in this PEIR but is not listed in Appendix BIO-3, the project could qualify for a “within the scope” finding if the potential impacts on the species’ life history group are adequately considered in the PEIR, pursuant to State CEQA Guidelines sections 15152 and 15168, and any applicable mitigation is imposed, as explained in the Project Specific Analysis Instructions (see Appendix PD-3).

For special-status invertebrate, amphibian, reptile, bird, and mammal species, known occurrences from CNDDB and species ranges from CWHR, Xerces Society (Xerces Society et al. 2019), and USFWS were used to identify species known or with potential to occur within the treatable landscape for each ecoregion. Species, or sub-species for taxa recognized at this level, with ranges that intersect the treatable landscape and species with known CNDDB occurrences within the treatable landscape, were included in the species tables. If spatial data for species or sub-species ranges were not available, a qualified ecologist used best available science to determine species potential to occur within the treatable landscape and associated CWHR types. If spatial data were available for species or sub-species range, these data were overlaid with CAL FIRE's FRAP vegetation maps (refer to "Vegetation and Habitat Types" above) to identify the CWHR types that occur within the treatable landscape and are associated with each special-status species (as described in CWHR 2019 or other species accounts). These types are disclosed in the species tables in Appendix BIO-3. Although the treatable landscape excludes areas mapped as CWHR aquatic types (i.e., riverine, lacustrine, estuarine, marine, or water) or herbaceous wetland types (i.e., wet meadow, fresh emergent wetland, and saline wetland), wildlife species known to require aquatic habitat are noted in the tables. For example, most amphibians require aquatic habitat for breeding and therefore they would have the potential to occur within the appropriate CWHR types in the treatable landscape if aquatic breeding habitat is nearby. The wildlife species tables were cross-checked with CDFW's Special Animals List (CDFW 2018b) and the SWAP for completeness (CDFW 2015a).

Critical Habitat

Critical habitat is a USFWS-designated geographic area that is essential for the conservation of a threatened or endangered species that may require special management and protection. Critical habitat may include an area that is not currently occupied by the species, but that will be needed for its recovery. A critical habitat designation only affects activities performed by Federal agencies or that involve a Federal permit, license, or funding, and that are likely to destroy or adversely modify the area of critical habitat. CAL FIRE, as a state agency, is not required to consult with USFWS for actions within critical habitat. The descriptions below provide a complete list of the plant and animal species that have designated critical habitat within each section for informational purposes. Appendix BIO-4 provides a list and acreage of critical habitat within the treatable landscape of each ecoregion.

Sensitive Natural Communities and Habitats

Sensitive habitats include those that are of special concern to resource agencies or are afforded specific consideration through CEQA, Section 1602 of the California Fish and Game Code, Section 404 of the CWA, and the state's Porter-Cologne Act. Sensitive natural habitat may be of special concern to agencies and conservation organizations for a variety of reasons, including their locally or regionally declining status, or because they provide important habitat to common and special-status species. Sensitive natural communities are those native plant communities defined by CDFW as having limited distribution statewide or within a county or region and that are often vulnerable to environmental effects of projects (CDFW 2018c). In addition to habitats officially identified by CDFW as sensitive natural communities or meeting the definition of waters of the United States, other sensitive habitats include riparian habitats, oak woodlands, chaparral, and coastal sage scrub. Appendix BIO-1 lists and provides a description of all the riparian, oak woodland, chaparral, and coastal sage scrub CWHR types mapped within the statewide treatable landscape. The paragraphs that follow provide an overview discussion of sensitive natural communities and sensitive habitat types, why they are sensitive, and their condition and value at a statewide scale. Specific information about sensitive habitat types in each ecoregion and a list of MCV alliances associated with each of these types in each ecoregion is provided in the respective ecoregional section descriptions.

Sensitive Natural Communities

CDFW maintains a list of plant communities that are native to California. Sensitive natural communities are ranked by CDFW from S1 to S3, where S1 is critically imperiled, S2 is imperiled, and S3 is vulnerable. CDFW's natural-community rarity rankings follow the 2009 NatureServe Conservation Status Assessments: Methodology for Assigning Ranks (Faber-Langendoen et al. 2012), in which all alliances are listed with a global (G) and state (S) rank, where G1 is critically imperiled, G2 is imperiled, G3 is vulnerable, G4 is apparently secure, and G5 is secure. These communities may or may not contain special-status species or their habitat. Known occurrences of sensitive natural communities are included in the CNDDB; however, no new occurrences have been added to the CNDDB since the mid-1990s when funding was cut for this portion of the CNDDB program. Additionally, the sensitive natural communities included in the CNDDB are based on the Holland 1986 classification and are not consistent with the state's current vegetation mapping and classification standards. The legacy sensitive natural community data from CNDDB is currently being validated and moved to BIOS. Sensitive natural communities are currently being mapped as part of the VegCAMP statewide vegetation mapping program and are being added to BIOS as mapping is completed and verified. VegCAMP data, the BIOS website, and local or regional vegetation maps would need to be reviewed during project specific analyses to help identify potentially occurring sensitive natural communities. The *Manual of California Vegetation Online* (CNPS 2019) was used to develop a list of sensitive natural communities that may occur within each CWHR type in each ecoregion and these are identified in the ecoregional section descriptions.

Wetlands and Other Waters of the United States and Waters of the State

Waters of the United States include navigable waters of the United States; interstate waters; all other waters where the use, degradation, or destruction of the waters could affect interstate or foreign commerce; tributaries to any of these waters; and wetlands that meet any of these criteria or that are adjacent to any of these waters or their tributaries. Wetlands are defined as those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. To qualify for federal protection, wetlands must occur in hydrologic locations subject to federal jurisdiction and meet three wetland delineation criteria: hydrophytic vegetation, hydric soil types, and wetland hydrology. Many surface waters and wetlands in California meet the criteria for waters of the United States, including intermittent streams and seasonal lakes and wetlands.

Waters of the state are defined as any surface water or groundwater, including saline waters, within the boundaries of the state. This includes all waters of the United States, but also areas not regulated under the federal Clean Water Act. The State Water Resources Control Board (California Water Boards 2019) defines an area as a wetland as follows:

An area is wetland if, under normal circumstances, (1) the area has continuous or recurrent saturation of the upper substrate caused by groundwater or shallow surface water or both; (2) the duration of such saturation is sufficient to cause anaerobic conditions in the upper substrate; and (3) the area's vegetation is dominated by hydrophytes the area lacks vegetation.

Wetlands provide numerous ecosystem functions including flood water storage, groundwater recharge, shoreline stabilization, water filtration, and support of native biological diversity (Technical Advisory Team 2012). It has been estimated that nearly 150 species of birds and more than 200 species of fish in in the United States depend on wetlands for their survival and over 30 percent of plants and 50 percent of animals listed as threatened or endangered under the federal Endangered Species Act depend on wetland habitats (Technical Advisory Team 2012). The CWHR lists a total of 366 amphibians, reptiles, birds, and mammals in California that depend on aquatic habitats for their survival, including 34 species that are listed as threatened or endangered under ESA or CESA.

Areas mapped in the FRAP vegetation data as aquatic habitats (i.e., riverine, lacustrine, estuarine, or marine) or herbaceous wetlands (i.e., wet meadow, fresh emergent wetland, and saline wetland) were eliminated from the treatable landscape; however, many aquatic and herbaceous wetland habitats, including seasonal streams and wetlands, are too small to be included in the FRAP data. For example, vernal pools occur in many areas mapped as annual grasslands and are not accounted for in the FRAP vegetation data. There are 11 vegetation alliances described in the MCV that qualify as wetlands and are categorized and mapped as annual grassland in the FRAP vegetation data. Other wetlands, such as seeps, fens, and marshes may be hidden beneath a woodland or forest canopy making them undetectable from aerial or satellite imagery.

The National Wetland Inventory and the National Hydrography Dataset Wetland were used to help identify aquatic habitats within the treatable landscape for this PEIR; however, project-specific analysis would be required to identify wetlands and other waters that are typically defined at a finer scale than is available in the FRAP vegetation layer. Aquatic habitats and their acreage within the treatable landscape of each ecoregion, according to the NWI, is provided in Table 3.6-2.

Table 3.6-2 Wetland Types within the Treatable Landscape by Ecoregion

Ecoregion	Wetland Type								Total
	Estuarine and Marine Deepwater	Estuarine and Marine Wetland	Freshwater Emergent Wetland	Freshwater Forested and Shrub Wetland	Freshwater Pond	Lake	Riverine	Other Freshwater Wetland	
Central California Coast	20	115	3,210	9,999	859	417	12,316	18	**22,954**
Southern California Coast	3	49	865	7,885	360	486	9,073	—	**18,721**
Great Valley	—	1	33,201	2,627	1,230	589	5,787	<1	**43,435**
Northern California Coast	131	517	5,806	13,594	917	197	22,100	—	**43,262**
Mojave Desert	—	—	1,153	745	224	1,858	2,279	—	**6,259**
Colorado Desert	—	—	<1	<1	25	23	252	—	**300**
Mono	—	—	7,079	2,105	170	387	1,825	—	**11,566**
Southeastern Great Basin	—	—	—	—	—	—	<1	—	**<1**
Northwestern Basin and Range	—	—	12,034	38,201	809	141	1,379	—	**52,564**
Klamath Mountains	—	—	2,660	5,928	283	91	16,502	—	**25,646**
Northern California Coast Ranges	—	—	1,187	1,698	566	305	14,393	—	**18,149**
Northern California Interior and Coast Ranges	—	—	2,393	1,144	630	33	10,764	—	**14,964**
Southern Cascades	—	—	12,458	9,696	381	226	7,541	—	**30,302**
Sierra Nevada	—	—	16,271	9,699	1,426	647	17,567	<1	**45,610**
Sierra Nevada Foothills	—	—	6,008	5,479	2,540	876	21,344	—	**36,247**
Modoc Plateau	—	—	17,784	1,647	310	289	3,322	—	**23,352**
Central California Coast Ranges	—	—	2,644	6,242	1,124	624	18,033	4	**28,667**
Southern California Mountains and Valleys	—	—	3,232	8,406	626	1,590	14,596	—	**28,450**
TOTAL	**154**	**682**	**127,985**	**125,095**	**12,480**	**8,775**	**179,073**	**22**	**454,266**

Source: Compiled by Ascent Environmental in 2019 from the USFWS National Wetlands Inventory

Riparian Habitats

Riparian habitats are found on the banks, floodplains, and terraces of rivers and streams where flooding occurs periodically or where groundwater is near to the surface. Riparian habitat may be associated with lakes and other water bodies, as well, and are transitional areas between wetlands and uplands. Riparian habitats located near rivers, streams, and lakes are subject to regulation under Section 1602 of the California Fish and Game Code, even if they are not included on CDFW's list of special-status natural communities, and riparian habitats often support high wildlife species diversity and abundance relative to surrounding habitats. Riparian woodland and scrub habitats provide important nesting habitat for numerous neotropical migrant bird species during the breeding season, as well as stopover habitat during spring and fall migration. Riparian vegetation stabilizes banks against erosion, provides shade to keep water temperatures down during summer months, provides cover for fish and amphibians, supports insects that feed fish, filters stormwater, and provides large woody debris input that provides vital habitat for salmonids and other aquatic species. Many species of amphibians, reptiles, birds, and mammals use riparian habitats for nesting, foraging, roosting, or basking, and riparian areas can also serve as important wildlife movement corridors providing connectivity between other areas of natural habitat and between populations. The CWHR identifies a total of 545 amphibians, reptiles, birds, and mammals in California that utilize riparian habitats, including 67 species that are listed as threatened or endangered under ESA or CESA. Riparian habitat areas may qualify as waters of the United States if they occur within the ordinary high-water mark of waters of the United States or if they meet the three parameters of wetland vegetation, hydric soils, and wetland hydrology and are located in areas subject to federal jurisdiction. Two riparian habitat types are mapped in the treatable landscape: valley and foothill riparian and montane riparian; however, these are generic categories that comprise numerous vegetation alliances, many of which are designated as sensitive natural communities based on their rarity rank (e.g. California sycamore woodlands, Fremont cottonwood forest, black cottonwood forest, red willow thickets, shining willow groves).

Riparian habitats face many threats including agriculture and urbanization, climate change, stream alteration (e.g., damming, channelization, diversion), wildfire, grazing, drought, and invasive plants. It is estimated that conversion to agriculture during the 19th and 20th centuries reduced the amount of native riparian vegetation in the Central Valley by 90 to 95 percent from pre-European settlement (Orr and Merrill 2018). Flow regulation and creation of levees have reduced river dynamics necessary to the maintenance of native riparian vegetation on most major rivers in the state (Orr and Merrill 2018) and it is estimated that land conversion and hydrological modifications have eliminated over 95 percent of the historic riparian habitat statewide (Riparian Habitat Joint Venture 2004). Much or the remaining riparian habitat in the state is seriously degraded. Increased fuel loads, aridification, and invasive species such as giant reed (*Arundo donax*) have turned many riparian habitats into dispersal corridors that conduct fire across the landscape (Orr and Merrill 20108).

Oak Woodlands

The importance of protecting oak woodlands is recognized through the passage of the Oak Woodlands Conservation Act and Public Resources Code Section 21083.4, which addresses how county lead agencies must address impacts to oak woodlands in environmental documents. Generally, a plant community is defined in the Public Resources Code as a forest land or woodland, rather than a grassland or shrubland, if there is at least 10 percent tree canopy cover (Public Resources Code Section 12220[g]). Oak woodlands have at least 10 percent tree cover and the tree layer is dominated by one or more species of oak. Oak woodlands provide important habitat to numerous common and special-status wildlife species supporting some 5,000 species of insects, over half of the state's 662 species of terrestrial vertebrates, and several thousand plant taxa (CDFW 2015a, McCreary 2009). As such, oak woodland communities are considered sensitive habitats by wildlife resource agencies, including USFWS and CDFW; and many California counties have ordinances protecting oak woodlands.

There is a great deal of concern about oak and other hardwood communities in California (Harris and Kocher 2002) because the rapid rate of urban and agricultural development in California's foothills is fragmenting and altering these communities. Studies suggest that oak and other hardwood habitats are at risk throughout California (California Oak Foundation 2006, Saving and Greenwood 2002, Giusti and Merenlender 2002, Light and Pedroni 2002). The California Oak Foundation (2006) found that 20 percent of California's oak woodlands were at risk of loss from urbanization by 2040, with the Central Valley and Sierra Foothills facing the most immediate threats. Eighty percent of the anticipated oak woodland losses would be in the Central Valley. In addition, there has been concern for many years that some species of oak (blue oak, valley oak, coast live oak, and Engelmann oak) appear not to be regenerating in portions of the state, primarily the foothills of the Sierra, Coast, and Transverse ranges, at rates sufficient to maintain existing population densities and stand structure (McCreary 2009). There are many theories regarding the cause of poor regeneration of these oaks, including expansion of nonnative annual grasses, livestock grazing, and changing fire frequencies (McCreary 2009). There is little evidence, however, to support the theory that fire suppression has led to reduced regeneration in oak woodlands, since studies have shown that recently-burned stands had no greater density of oak seedlings than stands that had not burned in 25 or more years, and that prescribed burning in blue oak woodlands did not affect seedling recruitment (McCreary 2009). Oak woodlands are sensitive habitats because they face intensive development pressures, appear not to be regenerating, are at risk from Sudden Oak Death Syndrome, and because of the high habitat value they provide to native wildlife.

Chaparral and Coastal Sage Scrub

Chaparral and coastal sage scrub are sensitive habitat types, because of the large-scale loss of these vegetation types from development and type conversion. Senate Bill 1260, Statutes of 2018, mandates that CAL FIRE's "prescribed burning, mastication, herbicide application, mechanical thinning, or other vegetative treatments" can only be carried out if they will not result in "type conversion" away from existing chaparral and coastal sage scrub vegetation types. For purposes of this PEIR, type conversion of chaparral and coastal sage scrub habitats means a change from a vegetation type dominated by native shrub species that are characteristic of chaparral and coastal sage scrub vegetation alliances to a vegetation type characterized predominantly by weedy herbaceous cover or annual grasslands. This definition is consistent with those provided in Syphard et al. (2019), Underwood et al. (2018), and Halsey (2008). Short fire-return intervals can lead to type conversion by prohibiting shrub regeneration (Underwood et al. 2018). Chaparral and coastal sage scrub vegetation provide essential habitat and other ecosystem functions in portions of California that are not suited to support grassland or forest and woodland vegetation due to geology, climate, topography, or other factors.

Large-scale conversion of native shrub communities to nonnative annual grasslands is likely the result of several interacting factors including fire, grazing by domestic livestock, fragmentation, competition (from invasive plants), and nitrogen deposition (from air pollution) (Cox et al. 2014, Underwood et al. 2018). Widespread conversion of chaparral and coastal sage scrub to agricultural uses occurred in the late 19th to 20th century and urbanization in the latter half of the 20th century resulted in large-scale and rapid conversion coastal sage scrub and chaparral. It is estimated that 60 to 90 percent of historic coastal sage scrub habitat has been lost and much of what remains is heavily invaded by nonnative grasses (Cox et al. 2014). The role of nitrogen in causing conversion of sage scrub to herbaceous cover has been hypothesized and studied for more than a decade and research results suggest that a combination of nitrogen deposition, drought, and frequent fire have all contributed to this change (Talluto & Suding, 2008). Nitrogen deposition has consequences for chaparral communities including species composition shifts and soil acidification (Underwood et al. 2018). Nitrogen deposition has been linked to an increase in the establishment of nonnative annual grasses and forbs in both chaparral and coastal sage scrub habitats (Cox et al. 2014, Underwood et al. 2018).

Chaparral is a type of shrubland vegetation dominated by drought-tolerant, deep-rooted shrubs with sclerophyllous (i.e., stiff, firm, hard), waxy, evergreen leaves such as manzanita (*Arctostaphylos* spp.), ceanothus (*Ceanothus* spp.), chamise (*Adenostoma fasciculatum*), redshank (*Adenostoma sparsifolium*), or scrub oak species (e.g., *Quercus berberdifolia*, *Q. dumosa*). There are three chaparral CWHR types mapped in the treatable landscape: chamise-redshank chaparral, mixed chaparral, and montane chaparral; however, these three types can include many different vegetation alliances, including alliances that are designated as sensitive natural communities based on their statewide rarity or inclusion of narrow endemic and special-status plant species. Some coastal chaparral alliances are dominated by a single, locally endemic species of manzanita or ceanothus (Underwood et al. 2018, Sawyer et al. 2009). Chaparral habitats are high in plant species diversity although they often appear to be shrub monocultures. Woody shrubs generally comprise approximately 20 percent of the chaparral flora, while herbaceous annuals and perennial comprise approximately 35 percent and 40 percent of the flora, respectively (Underwood et al. 2018).

Coastal sage scrub is also a shrubland vegetation type, but it is typically dominated by lower-growing, shallow-rooted, aromatic shrubs with soft, flexible branches, and soft, deciduous leaves that drop off in response to drought. Characteristic dominant shrubs in coastal sage scrub include California sagebrush (*Artemisia californica*), white sage (*Salvia apiana*), black sage (*Salvia mellifera*), purple sage (*Salvia leucophylla*), and buckwheat (*Eriogonum* spp.). CWHR includes a single, broad category, called coastal scrub, that captures the myriad of vegetation types referred to collectively as coastal sage scrub. This category includes numerous alliances that are designated as sensitive natural communities based on their statewide rarity. It is estimated that up to 92 percent of the historical coastal sage scrub habitat in the state has already been lost (CDFW 2015a, Pollack 2001) and coastal sage scrub is considered one of the most threatened vegetation types in North America (Cox et al. 2014).

Chaparral and coastal sage scrub are diverse habitats that support numerous native plant and wildlife species. Of 712 regularly occurring mammals, birds, amphibians, and reptiles inventoried in CWHR, 388 occur at some point in their life cycle in chaparral or coastal sage scrub habitats; and 374 of these (114 mammals, 172 birds, 30 amphibians, and 58 reptiles) are native and 141 of these are special-status species with 70 of them being officially listed under ESA or CESA (Underwood et al. 2018). The mixed chaparral type supports over 150 terrestrial animal species (CDFW 2015a). California chaparral supports nearly 400 vertebrate species and an unknown number of invertebrates, as well as a high proportion of endemic and special-status plant species (Underwood et al. 2018). Although the number of invertebrates is unknown, there is high diversity of hymenopterans (wasps, bees, ants), lepidopterans (butterflies and moths), and coleopterans (beetles) and especially high diversity of arthropods (Underwood et al. 2018). These shrubland ecosystems support a high degree of endemism in both plant and wildlife species because of unique biotic and abiotic factors including varied topography, geology, and climatic conditions (Underwood et al. 2018). Montane chaparral supports a wide variety of wildlife, including numerous small mammals, birds, and reptiles, provides seasonal forage for herbivores when grasses are not in abundance, and also provides important habitat for deer for critical summer range foraging, escape cover, and fawning habitat (CWHR 2019). Many bird species eat seeds and fruits produced in chaparral, or insects associated with the shrublands, take cover from predators and weather in shrubs, as well as utilize shrubs as singing, roosting, and nesting sites (CWHR 2019). Shrubs are important habitat elements in otherwise open environments to provide shade during hot weather and shelter from wind rain. Populations of small vertebrates usually decline sharply or are eliminated when chaparral is converted to grassland (CWHR 2019, Quinn 1983). Rodents appear to be particularly sensitive to modification of chaparral habitats (Quinn 1983). Chaparral also provides valuable ecosystem services including flood and erosion control, sediment retention, biomass sequestration, and biodiversity (Underwood et al. 2018).

Conservation Lands, Special Management Areas, and Other Biologically Important Lands

The treatable landscape includes several areas covered under adopted HCPs or NCCPs, and numerous open space lands protected and managed for natural resource values such as State Parks, CDFW Wildlife Areas and Ecological Reserves, County parks, and other open space and habitat preserves. Additionally, environmentally sensitive areas within the coastal zone, local and regional wildlife movement corridors, and wildlife nursery sites are important features of California's biodiversity and ecosystem function and are analyzed in this PEIR.

Habitat Conservation Plan, Natural Community Conservation Plan, and other Conservation Plan Areas

Nearly 100 HCPs and NCCPs (or joint HCPs/NCCPs) have been adopted or are being planned for areas within the treatable landscape across 15 ecoregions. HCPs and NCCPs provide the basis for issuance of long-term species "take" permits under Section 10 of ESA and the California Natural Community Conservation Planning Act (NCCPA), respectively. Section 3.6.2, "Regulatory Setting," describes the regulatory framework and requirements for HCPs and NCCPs in greater detail. The purpose of developing an HCP or NCCP is to facilitate a permittee or project applicant in obtaining an incidental take permit from the USFWS and/or an NCCPA permit from CDFW, and to develop a long-term conservation plan to protect and contribute to the conservation of covered species and natural communities in a plan area while allowing for covered activities that are compatible with other local policies and regulations.

Protected Open Space Lands

The treatable landscape contains numerous lands that are owned in fee and protected for open space purposes by public agencies or non-profit organizations. Examples of these lands that are important for sensitive and common biological resources and contribute to regional habitat connectivity include:

- State Parks and regional parks,
- CDFW Wildlife Areas and Ecological Reserves,
- large and small urban parks that are managed primarily as open space,
- land trust preserves, and
- special district open space lands and other types of open space.

ECOREGIONS

Central California Coast Section

The Central California Coast Section (261A) encompasses 3,377,765 acres and consists of mountains, hills, valleys, and plains in the outer southern Coast Ranges of California, alluvial river valleys, coastal dunes and terraces, bluffs, and cliffs along the rugged coastline. Small mountain ranges run parallel to the coastline, including the Santa Cruz and Santa Lucia mountains and elevations range from sea level to 2,400 feet. Summer daytime temperatures are often modified by morning fog and sea breezes. This ecoregion contains 1,321,334 acres of treatable landscape, which represents approximately 39 percent of the total landscape within the ecoregion. Within the treatable landscape exist modeled treatment areas for the following treatment types: WUI fuel reduction (1,015,242 acres), fuel break (204,364 acres), and ecological restoration (258,292 acres). The treatable landscape covers much of this ecoregion surrounding the urban centers, agriculture areas, and federal lands. The treatable landscape in this ecoregion is displayed in Figure 3.6-2.

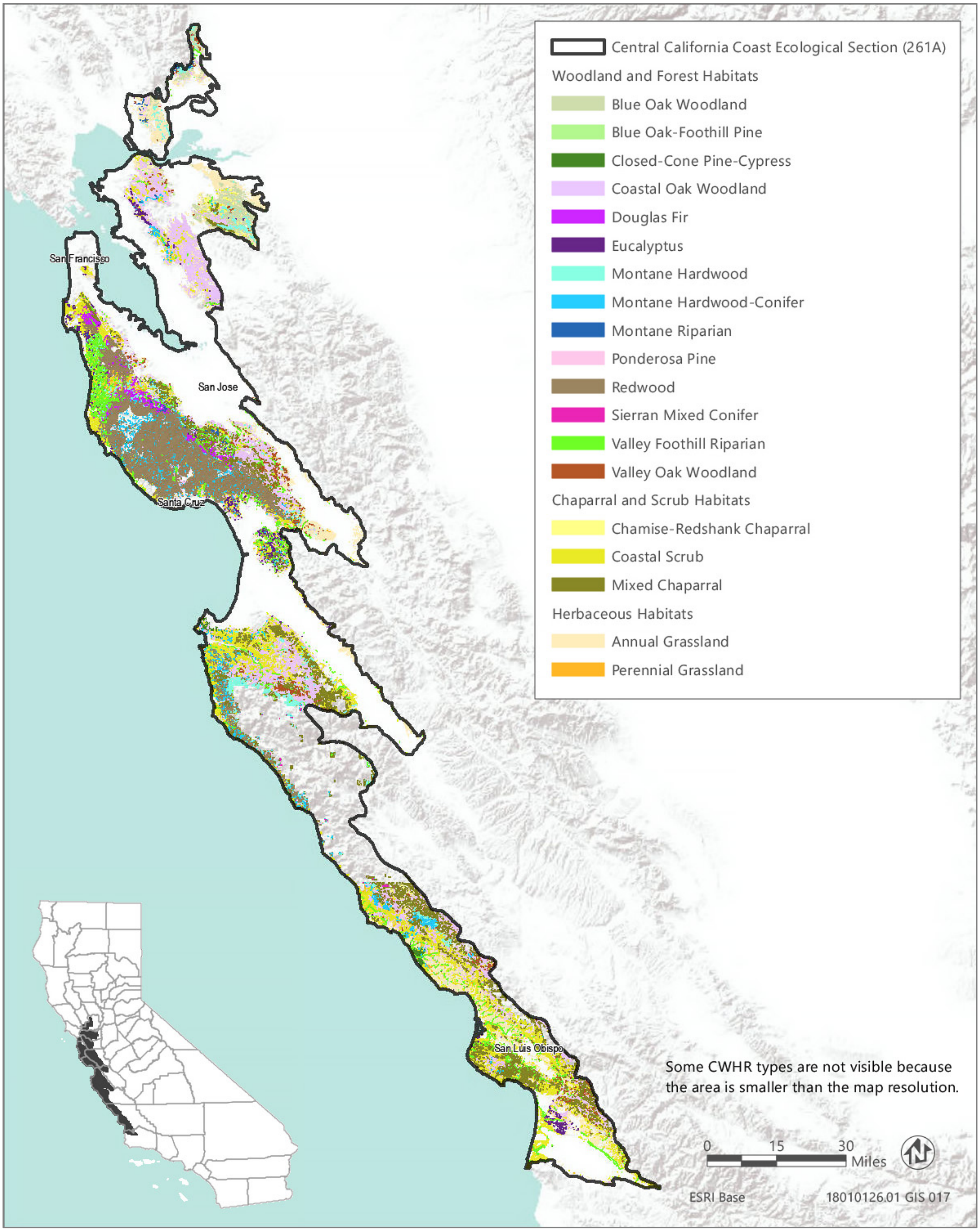
Vegetation and Habitat Types

The combined acreage of woodland and forest habitat types is approximately 684,332 acres, or 52 percent, of the treatable landscape and the combined acreage of chaparral and scrub habitat types is approximately 264,145 acres, or 20 percent, of the treatable landscape. Herbaceous habitat types (annual and perennial grasslands) comprise approximately 369,858 acres, or nearly 28 percent of the treatable landscape. Annual grassland is the most common habitat type in the treatable landscape of this ecoregion followed by coastal oak woodland.

While annual grassland makes up the largest amount of the land cover, this CWHR type represents a diversity of vegetation types ranging from those dominated by invasive plants, such as cheatgrass – Medusahead grassland and yellow star-thistle fields, to those characterized by native wildflowers, such as popcorn flower fields, squirreltail patches, and California poppy – lupine fields. Annual grasslands may also include uncommon vegetation assemblages, such as tarplant patches and Monolopia – leafy-stemmed tickseed fields. Vernal pools may also be present in areas mapped as annual or perennial grasslands in this ecoregion. There are 16 unique vegetation alliances mapped and described within areas classified as annual grassland within this ecoregion. Five unique vegetation alliances have been mapped and described within areas mapped as coastal oak woodlands in this ecoregion, three of which are designated sensitive natural communities.

Coastal habitats include coastal scrub and maritime chaparral. Coastal scrub and grasslands also extend inland along river valleys, like the lower Salinas Valley, where the moist maritime climate reaches through gaps in the coastal ranges. Within this ecoregion, there are 29 vegetation alliances identified within the coastal scrub CWHR type and 33 vegetation alliances identified within the CWHR chaparral habitat types.

Table 3.6-3 provides the acreage of each CWHR habitat type within the treatable landscape of this ecoregion and the associated MCV vegetation alliances that may occur within each CWHR type in this ecoregion. Alliances that are designated as sensitive natural communities and those that are dominated by nonnative vegetation are indicated in Table 3.6-3. Sensitive natural communities are discussed in more detail below. The distribution of CWHR types within this ecoregion is shown in Figure 3.6-2.



Source: Data received from CAL FIRE in 2018

Figure 3.6-2 CWHR Types - Central California Coast Ecological Section (261A)

Table 3.6-3 Vegetation and Habitat Types within the Treatable Landscape for the Central California Coast Ecological Section

CWHR Classification	Acres	MCV Alliances	
Woodland and Forest Habitats			
Blue Oak Woodland	39,127	▶ Blue oak woodland	▶ Interior live oak woodland
Blue Oak-Foothill Pine	5,341	▶ Blue oak woodland	▶ Foothill pine woodland
Closed-Cone Pine-Cypress	18,213	▶ Santa Cruz cypress grove* ▶ Monterey pygmy cypress stand* ▶ Monterey cypress stand*	▶ Sargent cypress woodland* ▶ Knobcone pine forest ▶ Bishop pine – Monterey pine forest
Coastal Oak Woodland	352,837	▶ Madrone forest* ▶ Coast live oak woodland ▶ Mixed oak forest	▶ Shreve oak forest* ▶ California bay forest*
Douglas Fir	28,397	▶ Bigleaf maple forest* ▶ Douglas fir forest	▶ Douglas fir - tanoak forest*
Eucalyptus	9,866	▶ Eucalyptus - tree of heaven - black locust groves	
Montane Hardwood	19,764	▶ Santa Lucia fir grove* ▶ Bigleaf maple forest* ▶ California buckeye grove* ▶ Red alder forest ▶ Tanoak forest*	▶ Coulter pine woodland ▶ Mixed oak forest ▶ Canyon live oak forest ▶ Interior live oak woodland
Montane Hardwood-Conifer	78,837	▶ Santa Lucia fir grove* ▶ Bigleaf maple forest*	▶ Red alder forest ▶ Coulter pine woodland
Montane Riparian	592	▶ White alder grove ▶ Torrent sedge patch* ▶ Hinds's walnut and related stand*	▶ Fremont cottonwood forest* ▶ Black cottonwood forest* ▶ Sandbar willow thicket
Ponderosa Pine	1,126	▶ Ponderosa pine forest	
Redwood	111,975	▶ Western azalea patch*	▶ Redwood forest*
Sierran Mixed Conifer	145	▶ Incense cedar forest*	
Valley Foothill Riparian	15,722	▶ Box-elder forest* ▶ Torrent sedge patch* ▶ California sycamore woodland* ▶ Fremont cottonwood forest* ▶ Black cottonwood forest*	▶ Himalayan blackberry - rattlebox - edible fig riparian scrub[N] ▶ Sandbar willow thicket ▶ Red willow thicket* ▶ Shining willow groves* ▶ Pepper tree or Myoporum grove[N]
Valley Oak Woodland	5,390	▶ Valley oak woodland*	
Chaparral and Scrub Habitats			
Chamise-Redshank Chaparral	45,229	▶ Chamise chaparral ▶ Chamise - black sage chaparral	▶ Eastwood manzanita chaparral ▶ Wedge leaf ceanothus chaparral/Buck brush chaparral

Table 3.6-3 Vegetation and Habitat Types within the Treatable Landscape for the Central California Coast Ecological Section

CWHR Classification	Acres	MCV Alliances	
Coastal Scrub	154,826	▸ Dune mat* ▸ California sagebrush scrub ▸ California sagebrush - California buckwheat scrub ▸ California sagebrush - black sage scrub ▸ Quailbush scrub ▸ Coyote brush scrub ▸ Broom patch[N] ▸ Sea rocket sands ▸ Sand dune sedge swath* ▸ Blue blossom chaparral ▸ Giant coreopsis scrub* ▸ Hazelnut scrub* ▸ Bush monkeyflower scrub* ▸ Live-forever - lichen/moss sparse herbaceous rock outcop	▸ Narrowleaf goldenbush - bladderpod scrub ▸ California buckwheat scrub ▸ California coffee berry scrub ▸ California match weed patch* ▸ Salt rush swale* ▸ Deer weed scrub ▸ Silver bush lupine scrub ▸ Yellow bush lupine scrub ▸ Silver dune lupine - mock heather scrub* ▸ Ice plant mats[N] ▸ Wax myrtle scrub* ▸ Purple sage scrub ▸ Black sage scrub ▸ Coast range stonecrop draperies ▸ Poison oak scrub
Mixed Chaparral	64,090	▸ Hoary, common, and Stanford manzanita chaparral* ▸ Brittle leaf - woolly leaf manzanita chaparral* ▸ Eastwood manzanita chaparral ▸ Hooker's manzanita chaparral* ▸ Hoover's manzanita chaparral* ▸ Monterey manzanita chaparral* ▸ Morro manzanita chaparral* ▸ Glossy leaf manzanita chaparral* ▸ Pajaro manzanita chaparral* ▸ Sandmat manzanita chaparral* ▸ Silverleaf manzanita chaparral* ▸ Wedge leaf ceanothus chaparral, Buck brush chaparral ▸ Deer brush chaparral	▸ Hairy leaf - woolly leaf ceanothus chaparral* ▸ Wart leaf ceanothus chaparral* ▸ Birch leaf mountain mahogany chaparral ▸ Golden chinquapin thickets* ▸ California coffee berry scrub ▸ Ocean spray brush* ▸ Deer weed scrub ▸ Silver bush lupine scrub ▸ Holly leaf cherry - toyon - greenbark ceanothus chaparral ▸ Scrub oak chaparral ▸ Scrub oak - chamise chaparral ▸ Leather oak chaparral ▸ Interior live oak chaparral ▸ Poison oak scrub
Herbaceous Habitats			
Annual Grassland	367,603	▸ Fiddleneck - phacelia field ▸ Wild oat grassland[N] ▸ Upland mustard and other ruderal forbs[N] ▸ Annual brome grassland[N] ▸ Red brome or mediterranean grass grassland[N] ▸ Cheatgrass - medusahead grassland[N] ▸ Yellow star-thistle field[N] ▸ Tar plant field*	▸ Annual dogtail grassland[N] ▸ Squirreltail patch ▸ California poppy - lupine field ▸ California goldfields - dwarf plantain - small fescue flower fields ▸ Perennial rye grass field[N] ▸ Spanish clover field ▸ Monolopia - leafy-stemmed tickseed field*

Table 3.6-3 Vegetation and Habitat Types within the Treatable Landscape for the Central California Coast Ecological Section

CWHR Classification	Acres	MCV Alliances	
			▶ Popcorn flower field
Perennial Grassland	2,255	▶ Bent grass - tall fescue meadow ▶ Water foxtail meadow* ▶ European beach grass sward[N] ▶ Upland mustard and other ruderal forbs[N] ▶ California brome - blue wildrye prairie* ▶ Pacific reed grass meadow* ▶ Poison hemlock or fennel patch[N] ▶ Pampas grass patch[N] ▶ California oat grass prairie* ▶ Tufted hair grass meadow ▶ Squirreltail patch	▶ Idaho fescue grassland* ▶ Gum plant patch* ▶ Common velvet grass - sweet vernal grass meadow[N] ▶ Ashy ryegrass - creeping ryegrass turf* ▶ Sea lyme grass patch* ▶ Deer grass bed* ▶ Needle grass - melic grass grassland ▶ Fountain grass sward[N] ▶ Harding grass - reed canary grass sward[N] ▶ Curly blue grass grassland*
Total	1,321,335		

*These are designated sensitive natural communities with a state rarity rank of S1 (critically imperiled), S2 (imperiled), or S3 (vulnerable).

[N] These alliances are dominated by nonnative vegetation.

Source: CWHR 2019, CNPS 2019, compiled by Ascent Environmental in 2019

Sensitive Biological Resources

Special-Status Species

More than 100 special-status wildlife taxa and 240 plant taxa are known or have the potential to occur within the treatable landscape of the Central California Coast Section. These include 54 wildlife taxa and 60 plant taxa that are officially listed as rare, threatened, or endangered, candidates for listing, or fully protected. Many of the special-status plants are narrow endemics associated with the maritime chaparral or coastal scrub habitats of the ecoregion or with dunes, sandstone, or serpentine substrates. A list of all the special-status plant species known or with potential to occur within the treatable landscape of the Central California Coast Section, along with their listing status and detailed habitat descriptions, is provided in Appendix BIO-3, Table 1a. A list of special-status wildlife (other than fish) species known or with potential to occur in the treatable landscape of this ecoregion, along with the CWHR types they are associated with, is provided in Appendix BIO-3, Table 1b. Special-status fish known or with potential to occur within the treatable landscape of this ecoregion are identified in Appendix BIO-3, Table 19.

Critical Habitat

Critical habitat has been designated within the treatable landscape of this ecoregion for eight plant taxa and 13 wildlife taxa. Appendix BIO-4 lists and provides the acreage of critical habitat designated within the treatable landscape of this ecoregion for these species. The treatable landscape includes critical habitat for Santa Cruz tarplant (*Holocarpha macradenia*), California red-legged frog (*Rana draytonii*), marbled murrelet (*Brachyramphus marmoratus*), and bay checkerspot butterfly (*Euphydryas editha bayensis*).

Sensitive Natural Communities and Habitats

Sensitive Natural Communities

A total of 45 sensitive natural communities have been identified in the Central California Coast Ecological Section and may be present within the treatable landscape. This includes 14 MCV alliances in the maritime chaparral of this ecoregion, including hoary, common, and Stanford manzanita chaparral, Hooker's manzanita chaparral, Monterey manzanita chaparral, Morro manzanita chaparral, Pajaro manzanita chaparral, and wart leaf ceanothus chaparral.

Maritime chaparral is discussed in more detail under "Other Sensitive Habitats." Madrone forest, Shreve oak forest, California bay forest, bigleaf maple forest, tanoak forest, and California buckeye groves, may be present in areas mapped as oak woodlands in this ecoregion. Other notable sensitive natural communities in this ecoregion include Santa Cruz cypress grove, Monterey pygmy cypress stand, Santa Lucia fir grove, Monterey cypress stand, redwood forest, western azalea patches, and wax myrtle scrub. A complete list of the sensitive natural communities that are associated with each CWHR type in the treatable landscape of this section is provided in Table 3.6-3.

Wetlands and Waters of the United States and State

Wetland habitats known to occur within the treatable landscape of the Central California Coast Section include estuarine and marine deepwater, estuarine and marine wetland, freshwater emergent wetland, freshwater forested and shrub wetland, freshwater pond, lake, riverine, and other freshwater wetlands (Table 3.6-2,). In addition, vernal pools, salt rush swales, water foxtail meadows and Pacific reedgrass meadows may be included in areas mapped as annual or perennial grasslands. Major waterways include the Pajaro, Salinas, Carmel, and Santa Maria rivers and Pescadero Creek. Elkhorn Slough and Morro Bay are the region's two largest estuaries, with other significant wetlands found at the Pajaro, Salinas, Carmel, and Santa Maria river mouths, Devereux Slough, and Goleta Slough, and Pescadero Marsh (Page and Shuford 2000 in CDFW 2015a).

Other Sensitive Habitats

Riparian habitats mapped within the treatable landscape in this ecoregion consist of 592 acres of montane riparian and 15,722 acres of valley and foothill riparian. There are 10 MCV alliances that may occur within the valley foothill riparian habitat type within this ecoregion and six MCV alliances with potential to occur in the montane riparian habitat type. Eight of these riparian vegetation types are designated sensitive natural communities, including Hind's walnut and related stands, box-elder forest, California sycamore woodland, and Fremont cottonwood forest. All riparian habitats are considered sensitive and those located near rivers, streams, and lakes are protected under California Fish and Game Code. Major stands of riparian habitat are associated with the largest rivers and streams of the ecoregion; however, riparian vegetation may be present along smaller intermittent streams, and smaller stands may not have been captured in the source land cover data used to create the FRAP vegetation layer. The majority of the ecoregion's large river-valley floodplain and riparian forests have been replaced by agriculture (CDFW 2015a).

Oak woodland habitats in the treatable landscape of the Central California Coast Section consist of approximately 352,837 acres of coastal oak woodland, 39,127 acres of blue oak woodland, 5,341 acres of blue oak – foothill pine woodland, and 15,722 acres of valley oak woodland. In addition, there are approximately 19,764 acres of montane hardwood that may include mixed oak forest, canyon live oak forest, and interior live oak woodland. Valley oak woodland is a designated sensitive natural community, as is Shreve oak forest, which may be present in areas mapped as coastal oak woodland. While oak woodlands face intense development pressure statewide, in this ecoregion, oak woodlands are at low risk of development (only 3 percent projected loss from development) (California Oak Foundation 2006). According to the 2015 SWAP, oak woodland habitats in this ecoregion support more than 200 species of plants, 300 vertebrates, and 5,000 invertebrates are associated with these oak woodlands.

Maritime chaparral, characterized by manzanita and California lilac (*Ceanothus* spp.) species adapted to the foggy coastal climate, once dominated sandy hills along Monterey Bay, Nipomo Mesa, Burton Mesa, and Morro Bay. Maritime chaparral is now one of the region's most threatened vegetation types, with its extent severely reduced by development. Central maritime chaparral occurs in nutrient-poor soils (e.g., weathered sandstone and shale outcrops) on windward slopes and coastal lowlands along the northern and central coast from Mendocino County to Santa Barbara County (Holland 1986, Sawyer et al. 2009). Areas classified as mixed chaparral within the treatable landscape of this ecoregion (64,090 acres) may be composed of maritime chaparral types. This is a sensitive habitat type that is characterized by one or more species of manzanita or ceanothus, including many that are special-status species and narrow endemics (Sawyer et al. 2009). As noted previously, 14 designated sensitive natural communities have been identified in the maritime chaparral of this ecological section.

Conservation Lands, Special Management Areas, and Other Biologically Important Lands

Habitat Conservation Plan, Natural Community Conservation Plan, and Other Conservation Plan Areas

The treatable landscape in the Central California Coast Section includes plan areas for the East Contra Costa County HCP/NCCP and the San Bruno Mountain HCP, which have been adopted and are being implemented. An additional four HCPs and two HCP/NCCPs are currently being planned in the treatable landscape. Table 3.6-4 summarizes the conservation plans adopted or in progress within the treatable landscape.

Table 3.6-4 Conservation Plans Adopted or In Progress in the Treatable Landscape—Central California Coast Section

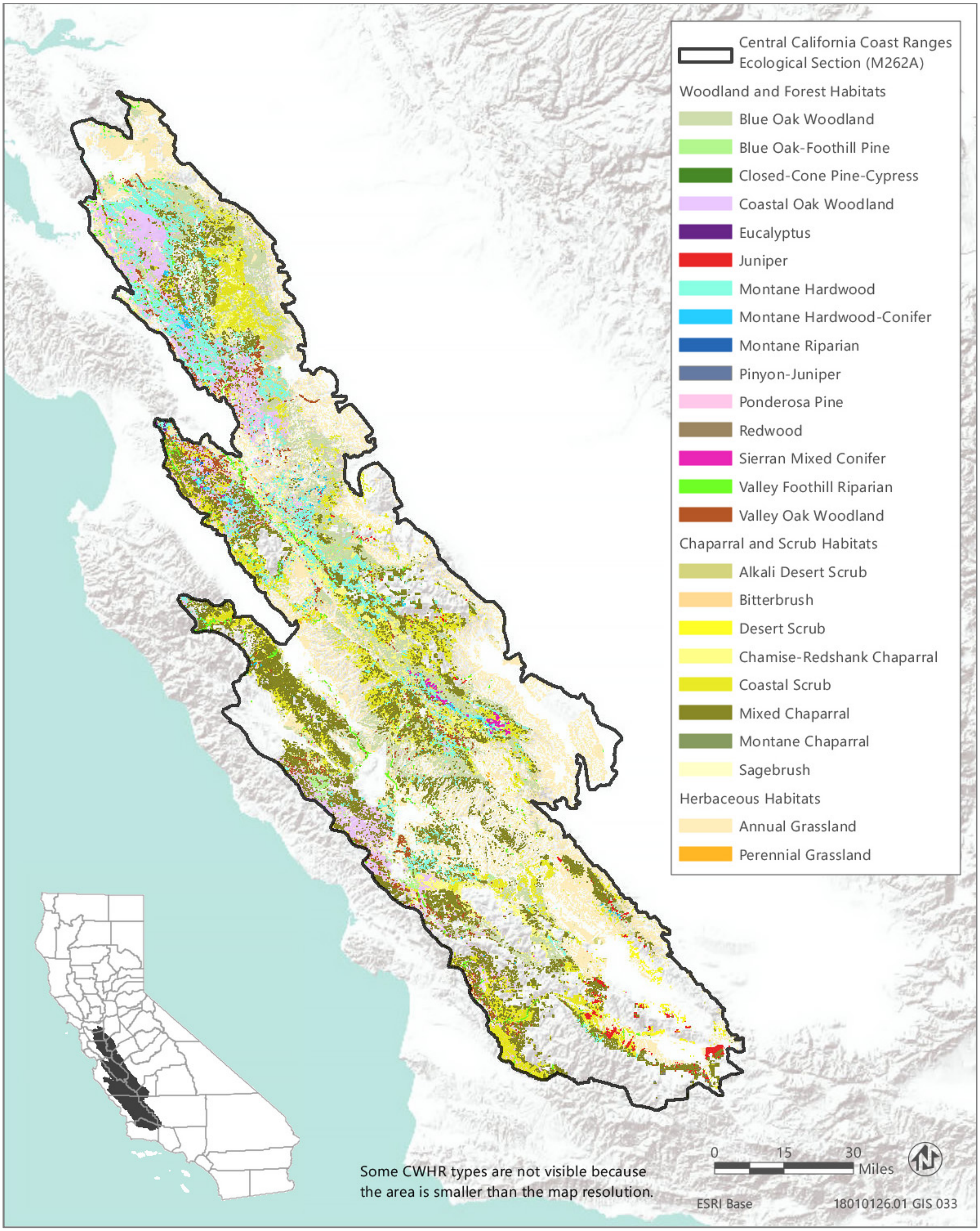
Conservation Plan	Plan Type	Stage	Plan Area Within the Treatable Landscape (Acres)
Los Osos	HCP	Planning	2,069
San Bruno Mountain	HCP	Implementation	3,868
Santa Barbara Multi-Species	HCP	Planning	5,039
Santa Cruz Sandhills	HCP	Planning	8,323
Solano Multi-Species	HCP	Planning	51,176
Bay/Delta Conservation Plan	HCP/NCCP	Planning	3,606
East Contra Costa County	HCP/NCCP	Implementation	73,397
Santa Clara Valley	HCP/NCCP	Planning	124,932
		Total	**272,410**

Protected Open Space Lands

The treatable landscape in the Central California Coast Section contains 691 protected open space units that are recognized in the California Protected Areas Database (CPAD). These lands cover 355,139 acres, which represent 27 percent of the treatable landscape in the ecoregion. Some of the major land owners include State Parks, San Francisco Public Utilities Commission (SFPUC), East Bay Regional Park District (EBRPD), Midpeninsula Regional Open Space District, CDFW, and Peninsula Open Space Trust. Examples of some of the prominent open space units in the Central California Coast Section include Mount Diablo State Park, Henry Cowell Redwoods State Park, Wilder Ranch State Park, The Forest of Nisene Marks State Park, La Honda Creek Open Space Preserve, Elkhorn Slough Ecological Reserve, San Luis Obispo Wildlife Area, and San Francisco Watershed Lands.

Central California Coast Ranges Section

The Central California Coast Ranges Section (M262A) encompasses 6,141,171 acres and is the interior part of the southern Coast Ranges of California, south of the Carquinez Strait. It extends south to the Transverse Ranges. Elevations range from 500 to 3,500 feet. It is inland from the coast far enough that the climate is modified only slightly by marine influence. This ecoregion contains 1,985,255 acres of treatable landscape, which represents approximately 32 percent of the total landscape within the ecoregion. Within the treatable landscape exist modeled treatment areas for the following treatment types: WUI fuel reduction (508,486 acres), fuel break (453,108 acres), and ecological restoration (1,199,875 acres). The treatable landscape in this ecoregion consists of treatment areas on many of the slopes and ridgelines of the north-south running mountain ranges, with fewer treatment areas located in the valley depressions and is displayed in Figure 3.6-3.



Source: Data received from CAL FIRE in 2018

Figure 3.6-3 CWHR Types - Central California Coast Ranges Ecological Section (M262A)

Vegetation and Habitat Types

The predominant habitat types in the treatable landscape of the Central California Coast Ranges Section are annual grassland and blue oak woodland, which comprise approximately 32 percent and 23 percent of the treatable landscape, respectively. Chaparral habitats (chamise-redshank chaparral and mixed chaparral) make up approximately 15 percent of the treatable landscape area. Other common habitat types are coastal oak woodland and coastal scrub, which comprise approximately 12 and 7 percent of the treatable landscape, respectively. Annual grasslands in this ecoregion represent a diversity of vegetation types ranging from those dominated by invasive plants, such as barbed goatgrass patches and yellow star-thistle fields, to those characterized by native wildflowers, such as fiddleneck – Phacelia fields and California goldfields-dwarf plantain-small fescue flower fields. Annual grasslands may also include uncommon vegetation assemblages, such as goldenaster patches and Monolopia – leafy-stemmed tickseed fields. Vernal pools may also be present in areas mapped as annual or perennial grasslands in this ecoregion. Within the Central California Coast Ranges ecoregion, 18 unique vegetation alliances have been described and mapped within areas classified as annual grassland in the CWHR system.

Chaparral and scrub habitats are likewise very diverse. In Central California Coast Ranges ecoregion, there are 24 vegetation alliances that may occur within coastal scrub habitat, 24 alliances that may occur within mixed chaparral, nine within alkali desert scrub, and seven within chamise – redshank chaparral habitat. Many of these are designated as sensitive natural communities because of their rarity based on range and distribution and threat level.

Table 3.6-5 provides the acreage of each CWHR habitat type within the treatable landscape of this ecoregion and the associated MCV vegetation alliances that may occur within each CWHR type in this ecoregion. Alliances that are designated as sensitive natural communities and those that are dominated by nonnative vegetation are indicated in Table 3.6-5. Sensitive natural communities are discussed in more detail below. The distribution of CWHR types within this ecoregion is shown in Figure 3.6-3.

Table 3.6-5 Vegetation and Habitat Types within the Treatable Landscape for the Central California Coast Ranges Ecoregion

CWHR Classification	Acres	MCV Alliances	
Woodland and Forest Habitats			
Blue Oak Woodland	461,022	▸ Blue oak woodland	▸ Interior live oak woodland
Blue Oak-Foothill Pine	71,881	▸ Blue oak woodland	▸ Foothill pine woodland
Closed-Cone Pine-Cypress	892	▸ Sargent cypress woodland*	▸ Knobcone pine forest
Coastal Oak Woodland	240,716	▸ Madrone forest* ▸ Coast live oak woodland	▸ Mixed oak forest ▸ California bay forest*
Eucalyptus	543	▸ Eucalyptus groves[N]	
Juniper	12,754	▸ California juniper woodland	
Montane Hardwood	68,739	▸ California buckeye groves* ▸ Mixed oak forest ▸ Canyon live oak forest	▸ California black oak forest ▸ Interior live oak woodland
Montane Hardwood-Conifer	2,382	▸ Santa Lucia fir groves* ▸ Coulter pine woodland	▸ Bigcone Douglas fir forest*
Montane Riparian	26	▸ White alder groves ▸ Torrent sedge patches* ▸ Fremont cottonwood forest*	▸ Black cottonwood forest* ▸ Sandbar willow thickets
Pinyon-Juniper	219	▸ Singleleaf pinyon – Utah juniper woodlands	
Ponderosa Pine	31	▸ Ponderosa pine forest	
Redwood	65	▸ Redwood forest*	

Table 3.6-5 Vegetation and Habitat Types within the Treatable Landscape for the Central California Coast Ranges Ecoregion

CWHR Classification	Acres	MCV Alliances	
Sierran Mixed Conifer	1,738	▶ Incense cedar forest*	▶ Mixed conifer forest
Valley Foothill Riparian	6,468	▶ Wild tarragon patches ▶ Torrent sedge patches* ▶ California sycamore woodlands* ▶ Fremont cottonwood forest* ▶ Black cottonwood forest* ▶ California rose briar patches* ▶ Himalayan blackberry – rattlebox – edible fig riparian scrub[N]	▶ Brewer willow thickets* ▶ Sandbar willow thickets ▶ Red willow thickets* ▶ Shining willow groves* ▶ Pepper tree or Myoporum groves[N]
Valley Oak Woodland	12,171	▶ Valley oak woodland*	
Chaparral and Scrub Habitats			
Alkali Desert Scrub	7,836	▶ Iodine bush scrub* ▶ Fourwing saltbush scrub ▶ Shadscale scrub ▶ Quailbush scrub ▶ Allscale scrub	▶ Spinescale scrub ▶ Winterfat scrubland* ▶ Alkali sacaton – scratchgrass – alkali cordgrass alkaline wet meadow* ▶ Bush seepweed scrub*
Bitterbrush	4	▶ Bitterbrush scrub	
Chamise-Redshank Chaparral	143,057	▶ Chamise chaparral ▶ Chamise – white sage chaparral* ▶ Chamise – black sage chaparral ▶ Redshank chaparral	▶ Eastwood manzanita chaparral ▶ Bigberry manzanita chaparral ▶ Wedge leaf (or buck brush) ceanothus chaparral
Coastal Scrub	146,864	▶ California sagebrush scrub ▶ California sagebrush – California buckwheat scrub ▶ California sagebrush – black sage scrub ▶ Quailbush scrub ▶ Coyote brush scrub ▶ Blue blossom chaparral ▶ Bush monkeyflower scrub* ▶ Live-forever – lichen/moss sparse herbaceous rock outcrop ▶ Narrowleaf goldenbush – bladderpod scrub ▶ California buckwheat scrub ▶ Wright's buckwheat patches*	▶ Wright's buckwheat – Heermann's buckwheat – Utah butterfly-bush scrub* ▶ California coffee berry scrub ▶ California match weed patches* ▶ Goldenaster patches* ▶ Scale broom scrub* ▶ Deer weed scrub ▶ Silver bush lupine scrub ▶ Bush mallow scrub ▶ Purple sage scrub ▶ Black sage scrub ▶ Coast Range stonecrop draperies ▶ Bushy spikemoss mats* ▶ Bush seepweed scrub*
Desert Scrub	2,383	▶ Cheesebush – sweetbush scrub ▶ Narrowleaf goldenbush – bladderpod scrub	▶ Heerman's buckwheat patches* ▶ Wright's buckwheat – Heerman's buckwheat – Utah butterfly-bush scrub*

Table 3.6-5 Vegetation and Habitat Types within the Treatable Landscape for the Central California Coast Ranges Ecoregion

CWHR Classification	Acres	MCV Alliances	
Mixed Chaparral	163,843	▶ Brittle leaf – woolly leaf manzanita chaparral* ▶ Eastwood manzanita chaparral ▶ Bigberry manzanita chaparral ▶ Hoover's manzanita chaparral* ▶ Wedge leaf (or buck brush) ceanothus chaparral ▶ Deer brush chaparral ▶ Chaparral whitethorn chaparral ▶ Hairy leaf – woolly leaf ceanothus chaparral* ▶ Wart leaf ceanothus chaparral* ▶ Birch leaf mountain mahogany chaparral	▶ Bush poppy scrub ▶ California coffee berry scrub ▶ Ocean spray brush* ▶ Deer weed scrub ▶ Silver bush lupine scrub ▶ Bush mallow scrub ▶ Holly leaf cherry chaparral * ▶ Holly leaf cherry – toyon – greenbark ceanothus chaparral ▶ Scrub oak chaparral ▶ Scrub oak – chamise chaparral ▶ Leather oak chaparral ▶ Tucker oak chaparral ▶ Interior live oak chaparral ▶ Oak gooseberry thickets*
Montane Chaparral	65	▶ Deer brush chaparral	▶ Birch leaf mountain mahogany chaparral
Sagebrush	2	▶ Big sagebrush	▶ Rubber rabbitbrush scrub
Herbaceous Habitats			
Annual Grassland	641,005	▶ Barbed goatgrass patches[N] ▶ Fiddleneck – Phacelia fields ▶ Wild oats grasslands[N] ▶ Upland mustards and other ruderal forbs[N] ▶ Annual brome grasslands[N] ▶ Red brome or Mediterranean grass grasslands[N] ▶ Cheatgrass-Medusahead grasslands[N] ▶ Yellow star-thistle fields[N] ▶ Annual dogtail grasslands[N]	▶ Squirreltail patches ▶ California poppy-lupine fields ▶ Goldenaster patches* ▶ Holocarpha (*Heermanii, virgata*) fields ▶ California goldfields-dwarf plantain-small fescue flower fields ▶ Perennial rye grass fields[N] ▶ Monolopia - leafy-stemmed tickseed fields* ▶ Popcorn flower fields ▶ White-tip clover swales*
Perennial Grassland	549	▶ Upland mustards and other ruderal forbs[N] ▶ Sand-aster and perennial buckwheat fields ▶ Pampas grass patches[N] ▶ Squirreltail patches ▶ Ashy ryegrass – creeping ryegrass turfs* ▶ Creeping ryegrass turfs*	▶ Perennial rye grass fields[N] ▶ Torrey's melic grass patches* ▶ Deer grass beds* ▶ Nodding needle grass grassland* ▶ Foothill needle grass grassland* ▶ Purple needle grass grassland* ▶ Needle grass – melic grass grassland ▶ Harding grass – reed canary grass swards[N] ▶ Curly blue grass grassland*
Total	1,985,255		

*These are designated sensitive natural communities with a state rarity rank of S1 (critically imperiled), S2 (imperiled), or S3 (vulnerable).

[N] These alliances are dominated by nonnative vegetation.

Source: CWHR 2019, CNPS 2019, Compiled by Ascent Environmental in 2019

Sensitive Biological Resources

Special-Status Species

More than 90 special-status wildlife taxa and 121 plant taxa are known or have the potential to occur within the treatable landscape of the Central California Coast Ranges Section. Eighteen of the special-status plant taxa and 49 of the wildlife taxa are state or federally listed as rare, threatened, or endangered, candidates for listing, or fully protected. One of the plant species, Camatta Canyon amole (*Chlorogalum pupureum* var. *reductum*), is known from only two occurrences on the northeast side of the La Panza Range in San Luis Obispo County and nowhere else in the world. A portion of one of these occurrences and all of the other occurrence, along with 1,730 acres of the species' designated critical habitat, is within the treatable landscape. A list of all the special-status plant species known or with potential to occur within the treatable landscape of the Central California Coast Ranges, along with their listing status and detailed habitat descriptions, is provided in Appendix BIO-3, Table 2a.

A list of special-status wildlife (other than fish) species known or with potential to occur in the treatable landscape of this ecoregion, along with the CWHR types they are associated with, is provided in Appendix BIO-3, Table 2b. Special-status fish known or with potential to occur within the ecoregion are identified in Appendix BIO-3, Table 19.

Critical Habitat

Critical habitat has been designated within the treatable landscape of Central California Coast Ranges Section for two plant species and nine wildlife species. The treatable landscape includes critical habitat for Camatta Canyon amole, Contra Costa goldfields (*Lasthenia conjugens*), longhorn fairy shrimp (*Branchinecta longiantenna*), California red-legged frog, California tiger salamander (*Ambystoma californiense*), and Alameda striped racer (*Masticophis lateralis euryxanthus*). Appendix BIO-4 provides the acreage of critical habitat designated within the treatable landscape of this ecoregion for these species.

Sensitive Natural Communities and Habitats

Sensitive Natural Communities

There are 38 sensitive natural communities that have potential to occur within the treatable landscape of the Central California Coast Ranges Section. The sensitive natural communities associated with each CWHR type in this ecoregion are identified in Table 3.6-5. Notable examples for this ecoregion include Santa Lucia fir groves, Sargent cypress woodland, Brewer willow thickets, Heerman's buckwheat patches, brittle leaf – woolly leaf manzanita chaparral, Hoover's manzanita chaparral, and wart leaf ceanothus chaparral.

Wetlands and Other Waters of the United States and Waters of the State

Wetland habitats known to occur within the treatable landscape of the Central California Coast Ranges Section include freshwater emergent wetland, freshwater forested and shrub wetland, freshwater pond, lake, and riverine wetlands totaling over 28,000 acres. The acreage of each general wetland type mapped in the treatable landscape by NWI is provided in Table 3.6-2. In addition, white-tip clover swales, creeping ryegrass turfs, and vernal pools are wetlands that may be included in areas mapped as annual or perennial grasslands. Alkali sacaton – scratchgrass – alkali cordgrass alkaline wet meadow, bush seepweed scrub, and iodine bush scrub are wetland types that may be included in areas mapped as alkali desert scrub. Major waterways include Salinas River, San Benito River, San Antonio River, Arroyo Seco, Coyote Creek, Clear Creek, Sawmill Creek, and Upper White Creek.

Other Sensitive Habitats

CWHR riparian habitat types identified within the treatable landscape of the Central California Coast Ranges Section consist of approximately 6,468 acres of valley foothill riparian habitat and 26 acres of montane riparian habitat. There are 12 MCV alliances that may occur within the valley foothill riparian habitat type within this ecoregion and five MCV alliances with potential to occur in the montane riparian habitat type. Many of these, such as Torrent sedge patches, California rose briar patches, California sycamore woodlands, Fremont cottonwood forest, black cottonwood forest, red willow thickets, and shining willow groves are designated sensitive natural communities, but all riparian habitats are considered sensitive, and those located near rivers, streams, and lakes are protected under California Fish and Game Code. Prominent stands of riparian habitat are associated with the major waterways of the ecoregion including the Salinas River, San Benito River, San Antonio River, Arroyo Seco, Coyote Creek, Clear Creek, Sawmill Creek, and Upper White Creek; however, stands of riparian vegetation may occur along any intermittent or perennial stream, and many may not have been captured in the source land cover data used to create the FRAP vegetation layer.

Oak woodland habitats in the treatable landscape of the Central California Coast Ranges Section consist of approximately 461,022 acres of blue oak woodland, 71,881 acres of blue oak – foothill pine woodland, 240,716 acres of coastal oak woodland, and 12,171 acres of valley oak woodland. In addition, there are approximately 68,739 acres of montane hardwood that may include mixed oak forest, canyon live oak forest, California black oak forest, and interior live oak woodland. The only one of these oak woodland types that is a designated sensitive natural community is valley oak woodland; however, other sensitive natural communities, including madrone forest, California bay forest, and California buckeye groves, may be present in areas mapped as oak woodlands. According to the 2015 SWAP, oak woodland habitats in this ecoregion support more than 200 species of plants, 300 vertebrates, and 5,000 invertebrates are associated with these oak woodlands. In this ecoregion, oak woodlands are at low risk of development (only 3 percent projected loss from development) (California Oak Foundation 2006).

Chaparral and coastal scrub habitats in the treatable landscape of the Central California Coast Ranges Section consist of approximately 143,057 acres of chamise – redshank chaparral, 163,843 acres of mixed chaparral, 65 acres of montane chaparral, and 146,864 acres of coastal scrub. Designated sensitive natural communities that may be present within these habitat areas include chamise – white sage chaparral, bush monkeyflower scrub, California match weed patches, scale broom scrub, Hoover's manzanita chaparral, holly-leaf cherry chaparral, ocean spray scrub, and oak gooseberry thickets. The south and central coast regions, including the Central California Coast Ranges ecoregion, support large contiguous patches of chaparral with high wildlife species endemism compared to the rest of the state, especially among mammals and reptiles (Underwood et al. 2018). There is also a high degree of plant species endemism within chaparral and coastal scrub habitats in this ecoregion.

Conservation Lands, Special Management Areas, and Other Biologically Important Lands

Habitat Conservation Plan, Natural Community Conservation Plan, and other Conservation Plan Areas

The treatable landscape in the Central California Coast Ranges Section includes plan areas for the San Joaquin County HCP and East Contra Costa County HCP/NCCP, which have been adopted and are being implemented. Additionally, one HCP and two HCP/NCCPs are currently being planned in the treatable landscape. Table 3.6-6 summarizes the conservation plans adopted or in progress, including the acreages of plan areas within the treatable landscape.

Table 3.6-6 Conservation Plans Adopted or In Progress in the Treatable Landscape—Central California Coast Ranges Section

Conservation Plan	Plan Type	Stage	Plan Area Within the Treatable Landscape (Acres)
Kern County Valley Floor	HCP	Planning	12,475
San Joaquin County	HCP	Implementation	33,171
East Contra Costa County	HCP/NCCP	Implementation	23,404
Northeastern San Luis Obispo County	HCP/NCCP	Planning	176,849
Santa Clara Valley	HCP/NCCP	Planning	248,036
		Total	**493,935**

Protected Open Space Lands

The treatable landscape in the Central California Coast Ranges Section contains 132 protected open space units that are recognized in CPAD. These lands cover 182,207 acres, which represent 9 percent of the treatable landscape in the ecoregion. Some of the major land owners include State Parks, CDFW, SFPUC, EBRPD, Contra Costa Water District, Monterey County, Santa Clara County, and the University of California. Examples of some of the prominent open space units in the Central California Coast Ranges Section include Henry W. Coe State Park, Pacheco State Park, Carrizo Plains Ecological Reserve, Los Vaqueros Watershed, San Francisco Watershed Lands, Ohlone Regional Wilderness, and Sunol Regional Wilderness.

Colorado Desert Section

The Colorado Desert Section (322C) encompasses 2,929,221 acres and consists of alluvial plains, slopes, basins, and dunes. Elevations range from the current level of the Salton Sea, about 230 feet below sea level, to 1,000 feet. This hot and dry ecoregion contains 25,179 acres of treatable landscape, which represents less than 1 percent of the total landscape within the ecoregion. Within the treatable landscape exist modeled treatment areas for the following treatment types: WUI fuel reduction (8,256 acres), fuel break (16,193 acres), and ecological restoration (3,857 acres). The treatable landscape of this ecoregion is limited to a few higher-elevation areas north of Palm Springs and west of the Salton Sea. The treatable landscape in this ecoregion is displayed in Figure 3.6-4.

Vegetation and Habitat Types

Desert scrub is the predominant habitat type in the treatable landscape of the Colorado Desert Section, comprising 84 percent of the habitat cover. The remaining habitat consists primarily of coastal scrub habitat (12 percent) and small amounts of alkali desert scrub, desert succulent shrub, and annual grassland habitat types. There is a minimal amount (approximately 10 acres) of chaparral and sagebrush habitats, and 1 acre or less each of juniper, pinyon-juniper, montane hardwood, and montane riparian habitat. The distribution of CWHR types within the treatable landscape of this ecoregion is shown in Figure 3.6-4 and the acreage of each type is provided in Table 3.6-7.

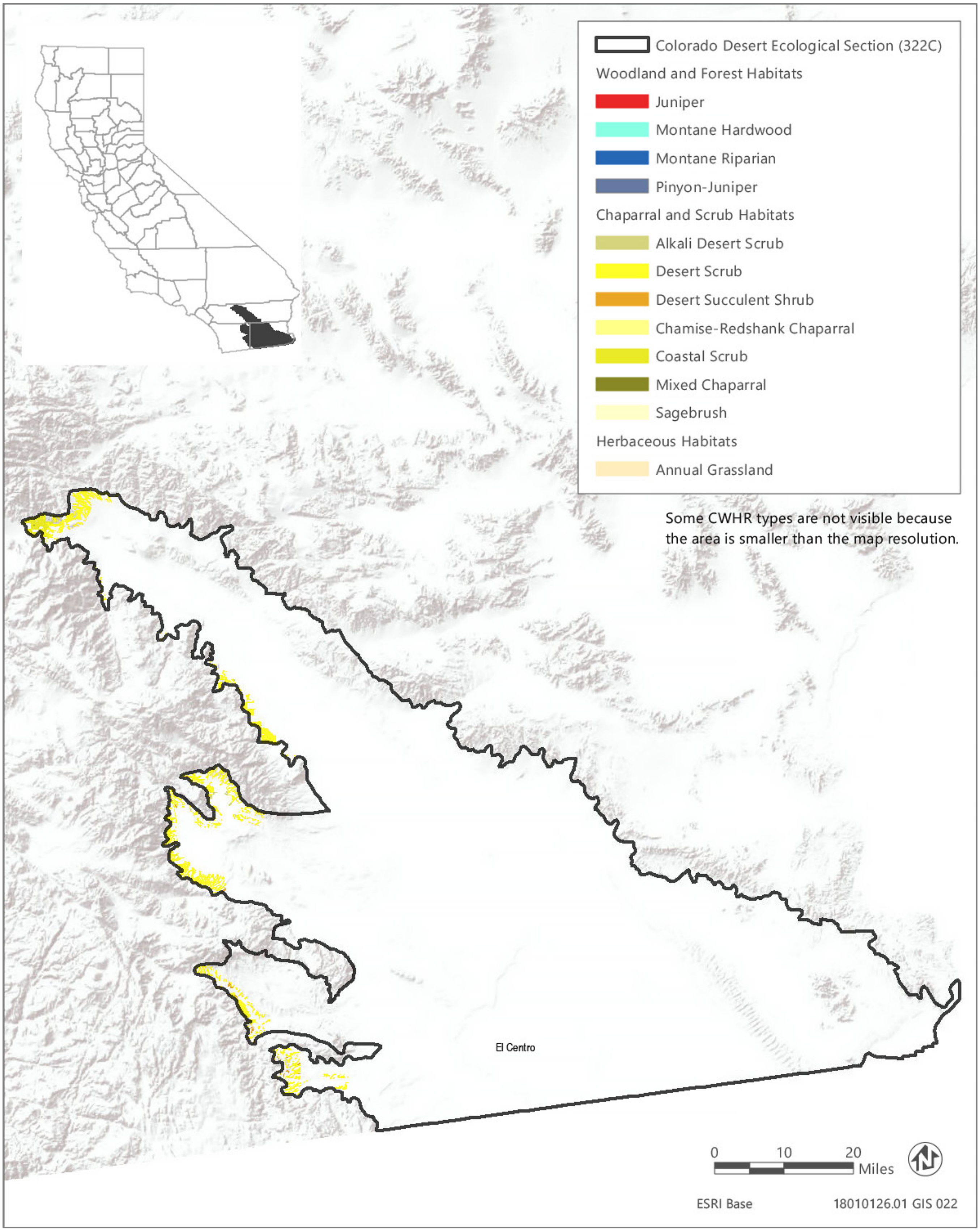
Sensitive Biological Resources

Special-Status Species

There are at least 65 special-status wildlife taxa and 40 plant taxa with potential to occur within the treatable landscape of the Colorado Desert Section including three plant taxa and 36 animal taxa that are state or federally listed as rare, threatened, or endangered. Many of these species are associated with desert wash or desert scrub habitats. A notable example unique to this ecoregion is Casey’s June beetle (*Dinacoma caseyi*), which is known from a less than 800-acre area in southern Palm Springs and nowhere else in the world. A list of all the special-status plant species known or with potential to occur within the treatable landscape of the Colorado Desert Section, along with their listing status and detailed habitat descriptions, is provided in Appendix BIO-3, Table 3a. A list of special-status wildlife (other than fish) species known or with potential to occur in the treatable landscape of this ecoregion, along with the CWHR types they are associated with, is provided in Appendix BIO-3, Table 3b. Special-status fish known or with potential to occur in the ecoregion are identified in Appendix BIO-3, Table 19.

Critical Habitat

Critical habitat has been designated within the treatable landscape of this ecoregion for two wildlife taxa, Casey’s June beetle and peninsular bighorn sheep (*Ovis canadensis nelson*) and one plant, Coachella Valley milk-vetch (*Astragalus lentiginosus* var. *coachellae*). Appendix BIO-4 lists and provides the acreage of critical habitat designated within the treatable landscape of this ecoregion for these species.



Source: Data received from CAL FIRE in 2018

Figure 3.6-4 CWHR Types - Colorado Desert Ecological Section (322C)

Table 3.6-7 Vegetation and Habitat Types within the Treatable Landscape for the Colorado Desert Ecological Section

CWHR Classification	Acres	MCV Alliances	
Woodland and Forest Habitats			
Juniper	1	▶ Utah juniper woodland*	
Montane Hardwood	<1	▶ Coulter pine woodland ▶ Interior live oak woodland	▶ Canyon live oak forest
Montane Riparian	<1	▶ Fremont cottonwood forest*	▶ Sandbar willow thicket
Pinyon-Juniper	<1	▶ Singleleaf pinyon – Utah juniper woodlands	
Chaparral and Scrub Habitats			
Alkali Desert Scrub	475	▶ Iodine bush scrub* ▶ Fourwind saltbush scrub ▶ Desert holly scrub ▶ Quailbush scrub	▶ Allscale scrub ▶ Alkali sacaton - scratchgrass - alkali cordgrass alkaline wet meadow* ▶ Bush seepweed scrub*
Chamise-Redshank Chaparral	4	▶ Cup leaf ceanothus chaparral*	
Coastal Scrub	3,131	▶ Quailbush scrub ▶ Deer weed scrub	▶ Brittle bush scrub ▶ Bush seepweed scrub*
Desert Scrub	21,049	▶ Desert agave scrub* ▶ Iodine bush scrub* ▶ White bursage scrub ▶ Desert needlegrass grassland* ▶ Cheesebush - sweetbush scrub ▶ Fourwind saltbush scrub ▶ Desert holly scrub ▶ Quailbush scrub ▶ Allscale scrub ▶ Crucifixion thorn stand* ▶ Rigid spineflower - hairy desert sunflower ▶ Mojave-Sonoran desert dunes* ▶ Acton's and Virgin River brittlebush - net-veined goldeneye scrub*	▶ Brittle bush scrub ▶ California buckwheat - Parish's goldeneye scrub Creosote bush scrub ▶ Creosote bush - white bursage scrub Creosote bush - brittle bush scrub ▶ Big galleta shrub-steppe* ▶ Desert almond - Mexican bladdersage scrub ▶ Catclaw acacia - desert lavender - chuparosa scrub ▶ Alkali sacaton - scratchgrass - alkali cordgrass alkaline wet meadow* ▶ Bush seepweed scrub*
Desert Succulent Shrub	284	▶ Desert agave scrub* ▶ Elephant tree stands*	▶ Teddy bear cholla patches* ▶ Mojave yucca scrub
Mixed Chaparral	2	▶ Cup leaf ceanothus chaparral*	▶ Deer weed scrub
Sagebrush	4	▶ Big sagebrush	
Herbaceous Habitats			
Annual Grassland	229	▶ Red brome or mediterranean grass grassland[N]	
Total	25,179		

*These are designated sensitive natural communities with a state rarity rank of S1 (critically imperiled), S2 (imperiled), or S3 (vulnerable).

[N] These alliances are dominated by nonnative vegetation.

Source: CWHR 2019, CNPS 2019, Compiled by Ascent Environmental in 2019

Sensitive Natural Communities and Habitats

Sensitive Natural Communities

There are 17 sensitive natural communities that may occur within the treatable landscape of the Colorado Desert Section. The sensitive natural communities associated with each CWHR type in this ecoregion are identified in Table 3.6-7. They include iodine bush scrub, bush seepweed scrub, desert agave scrub, crucifixion thorn stand, Elephant tree stands, and teddy bear cholla patches.

Wetlands and Other Waters of the United States and Waters of the State

A total of only 300 acres of wetland habitats have been mapped by NWI within the treatable landscape of the Colorado Desert Section. These consist primarily of riverine wetlands with a small amount (48 acres) of freshwater ponds and lakes and less than 1 acres each of freshwater emergent wetland and freshwater forested and shrub wetland. It is likely there is greater acreage than what has been previously mapped of each of these types. The acreage of each general wetland type mapped in the treatable landscape by NWI is provided in Table 3.6-2. In addition, bush seepweed scrub, iodine bush scrub, and alkali sacaton - scratchgrass - alkali cordgrass alkaline wet meadow are wetland sensitive natural communities that may be present within areas mapped as alkali desert scrub, coastal scrub, or desert scrub.

Other Sensitive Habitats

Oak woodland stands may be present in areas mapped as montane hardwood, but this represents very minimal acreage within the ecoregion. Less than 1 acre of riparian habitat has been mapped within the treatable landscape. While more riparian habitat is likely present, it is not likely to be abundant within the treatable landscape. Chaparral cover is also minimal in this ecoregion with only a total of 6 acres mapped in the treatable landscape.

Conservation Lands, Special Management Areas, and Other Biologically Important Lands

Habitat Conservation Plan, Natural Community Conservation Plan, and other Conservation Plan Areas

The treatable landscape in the Colorado Desert Section includes the plan area for the Coachella Valley Multiple Species Habitat Conservation Plan, which has been adopted and is being implemented. Two additional HCP/NCCPs are currently being planned in the treatable landscape. Table 3.6-8 summarizes the conservation plans adopted or in progress, including the acreages of plan areas within the treatable landscape.

Table 3.6-8 Conservation Plans Adopted or In Progress in the Treatable Landscape—Colorado Desert Section

Conservation Plan	Plan Type	Stage	Plan Area Within the Treatable Landscape (Acres)
Coachella Valley Multiple Species Habitat Conservation Plan	HCP/NCCP	Implementation	16,406
Desert Renewable Energy Conservation Plan	HCP/NCCP	Planning	19,761
San Diego East County Multiple Species Conservation Plan	HCP/NCCP	Planning	19,407
		Total	**55,575**

Protected Open Space Lands

The treatable landscape in the Colorado Desert Section contains 20 protected open space units that are recognized in CPAD. These lands cover 12,794 acres, which represent 51 percent of the treatable landscape in the ecoregion. Some of the major land owners include State Parks, CDFW, Anza-Borrego Foundation, Coachella Valley Mountains Conservancy, California State Lands Commission (CSLC), Riverside County Regional Park and Open Space District, Borrego Water District, San Diego County, University of California, and Friends of the Desert Mountains. Examples of some of the prominent open space units in the Colorado Desert Section include Anza-Borrego Desert State Park, Peninsular Ranges Ecological Reserve, Santa Rosa and San Jacinto Mountains National Monument, Agua Caliente Regional Park, and Borrego Salton Seaway.

Great Valley Section

The Great Valley Section (262A) encompasses 13,094,068 acres and contains the alluvial plains of the Sacramento and San Joaquin Valleys. Summers are hot and dry and winters are mild. Elevations range from sea level to 800 feet. This ecoregion contains 605,440 acres of treatable landscape, which represents approximately 5 percent of the total landscape within the ecoregion. Within the treatable landscape exist modeled treatment areas for the following treatment types: WUI fuel reduction (432,249 acres), fuel break (182,840 acres), and ecological restoration (40,853 acres). The treatable landscape within this ecoregion is limited to the outer edges of the ecoregion and contains valley edges at the base of the Sierra Nevada and Interior Coast Range foothills. The treatable landscape in this ecoregion is displayed in Figure 3.6-5.

Vegetation and Habitat Types

The predominant habitat type in the treatable landscape of this ecoregion is annual grassland, which makes up approximately 82 percent of the habitat cover. The next most abundant type is blue oak woodland, which makes up only about 7 percent of the land cover, followed closely by alkali desert scrub at about 6 percent cover. The annual grassland habitat type in this ecoregion represents a diversity of vegetation types including several that are dominated by nonnative and invasive plants, such as wild oat grassland, annual brome grassland, and knapweed and purple-flowered star-thistle field. Several vegetation types identified as annual grasslands may be characterized by native wildflowers, such as California poppy – lupine fields and popcorn flower fields. Annual grasslands in this ecoregion may also include uncommon vegetation assemblages, such as goldenaster patches and Monolopia – leafy-stemmed tickseed fields. Within the Great Valley ecological section, 25 unique vegetation alliances have been described and mapped within areas classified as annual grassland in the CWHR system. The distribution of CWHR types within the treatable landscape of this ecoregion is shown in Figure 3.6-5 and the acreage of each type is provided in Table 3.6-9.

Sensitive Biological Resources

Special-Status Species

There are at least 94 special-status wildlife taxa and 68 plant taxa known or with potential to occur in the treatable landscape of the Great Valley Section, including 23 plant taxa and 49 animal taxa that are state or federally listed as rare, threatened, or endangered or fully protected. Many of these species are associated with the vernal pool habitats of the region. A list of all the special-status plant species known or with potential to occur within the treatable landscape of the Great Valley Section, along with their listing status and detailed habitat descriptions, is provided in Appendix BIO-3, Table 4a. A list of special-status wildlife (other than fish) species known or with potential to occur in the treatable landscape of this ecoregion, along with the CWHR types they are associated with, is provided in Appendix BIO-3, Table 4b. Special-status fish known or with potential to occur in the ecoregion are identified in Appendix BIO-3, Table 19.

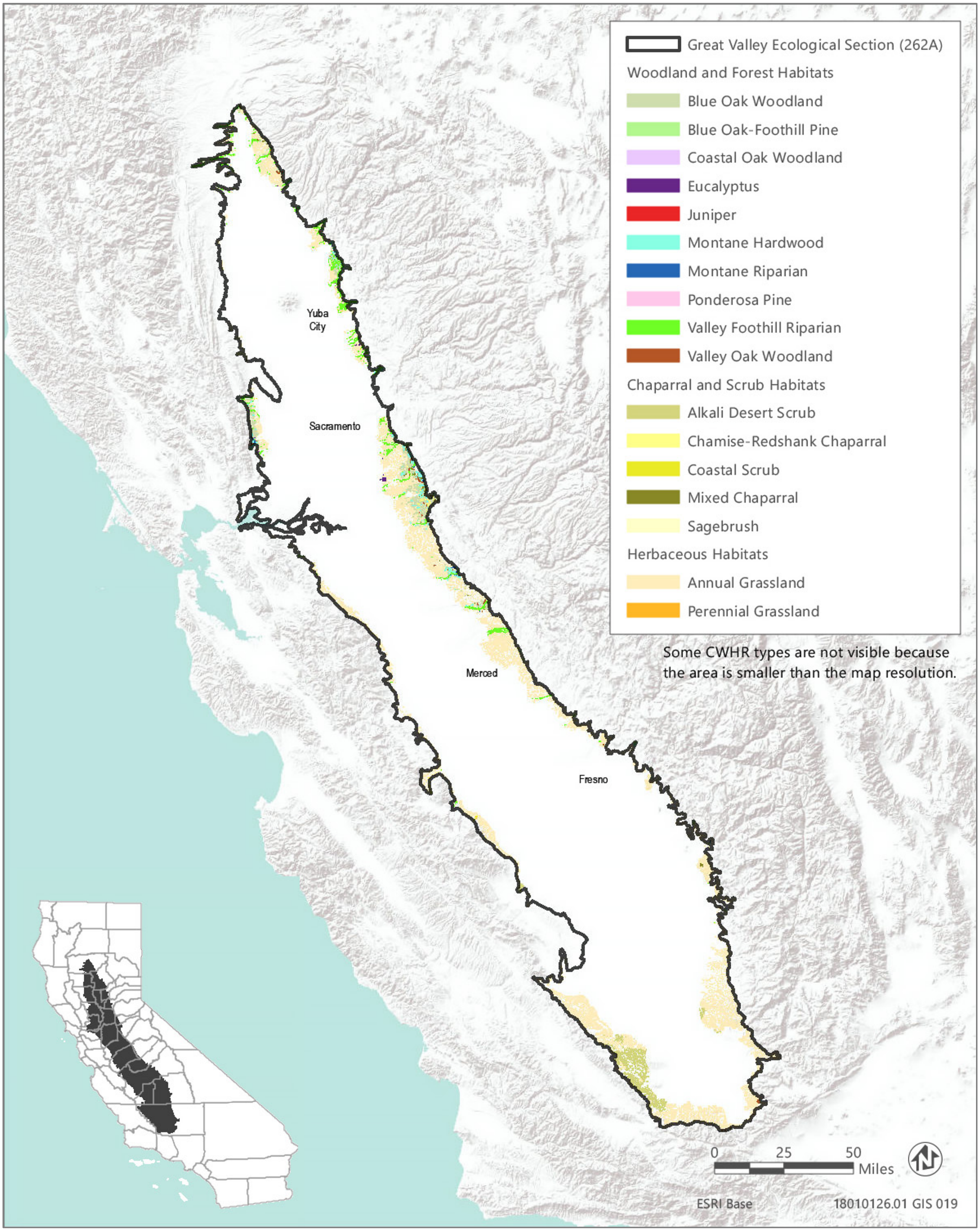
Critical Habitat

Critical habitat has been designated within the treatable landscape of this ecoregion for eight wildlife taxa and 10 plant taxa. Most of these species are associated with vernal pool habitats, including California tiger salamander, vernal pool fairy shrimp (*Branchinecta lynchi*), vernal pool tadpole shrimp (*Lepidurus packardi*), Colusa grass (*Neostpafia colusana*), San Joaquin Orcutt grass (*Orcuttia inaequalis*), and Sacramento Orcutt grass (*Orcuttia viscida*). Appendix BIO-4 lists and provides the acreage of critical habitat designated within the treatable landscape of this ecoregion for these species.

Sensitive Natural Communities and Habitats

Sensitive Natural Communities

There are 38 sensitive natural communities that may occur within the treatable landscape of the Great Valley Section. The sensitive natural communities associated with each CWHR type in this ecoregion are identified in Table 3.6-9. Many of these are vernal pool communities that may be interspersed within annual grasslands. Other examples of sensitive natural communities in this ecoregion include goldenaster patches, tar plant field, Indian rice grass grassland, California brome – blue wildrye prairie, and gum plant patch.



Source: Data received from CAL FIRE in 2018

Figure 3.6-5 CWHR Types - Great Valley Ecological Section (262A)

Table 3.6-9 Vegetation and Habitat Types within the Treatable Landscape for the Great Valley Ecological Section

CWHR Classification	Acres	MCV Alliances	
Woodland and Forest Habitats			
Blue Oak Woodland	40,722	▸ Blue oak woodland	▸ Interior live oak woodland
Blue Oak-Foothill Pine	2,607	▸ Foothill pine woodland	▸ Blue oak woodland
Coastal Oak Woodland	37	▸ Coast live oak woodland	▸ California bay forest*
Eucalyptus	700	▸ Eucalyptus - tree of heaven - black locust groves[N]	
Juniper	<1	▸ None[1]	
Montane Hardwood	7,001	▸ California buckeye grove*	▸ Interior live oak woodland
Montane Riparian	465	▸ White alder grove ▸ Red osier thicket* ▸ Oregon ash grove* ▸ Sandbar willow thicket	▸ Hinds's walnut and related stand* ▸ Fremont cottonwood forest* ▸ Wild grape shrubland*
Ponderosa Pine	1	▸ None[1]	
Valley Foothill Riparian	10,471	▸ Box-elder forest* ▸ Button willow thicket* ▸ Red osier thicket* ▸ California sycamore woodland* ▸ Fremont cottonwood forest* ▸ California rose briar patch*	▸ Himalayan blackberry - rattlebox - edible fig riparian scrub[N] ▸ Sandbar willow thicket ▸ Red willow thicket* ▸ Shining willow groves* ▸ Pepper tree or Myoporum grove[N] ▸ Wild grape shrubland*
Valley Oak Woodland	768	▸ Valley oak woodland*	
Chaparral and Scrub Habitats			
Alkali Desert Scrub	38,843	▸ Iodine bush scrub* ▸ Fourwind saltbush scrub ▸ Shadscale scrub ▸ Quailbush scrub ▸ Allscale scrub	▸ Spinescale scrub ▸ Winterfat scrubland* ▸ Alkali sacaton - scratchgrass - alkali cordgrass alkaline wet meadow* ▸ Bush seepweed scrub*
Chamise-Redshank Chaparral	2,163	▸ None[1]	
Coastal Scrub	600	▸ Quailbush scrub ▸ Coyote brush scrub ▸ Broom patch[N] ▸ Narrowleaf goldenbush - bladderpod scrub ▸ Ice plant mats[N] ▸ Bush seepweed scrub*	▸ California buckwheat scrub ▸ California match weed patch* ▸ Goldenaster patch* ▸ Deer weed scrub ▸ Silver bush lupine scrub
Mixed Chaparral	4,150	▸ Hoary, common, and Stanford manzanita chaparral* ▸ Silver bush lupine scrub	▸ Deer weed scrub

Table 3.6-9 Vegetation and Habitat Types within the Treatable Landscape for the Great Valley Ecological Section

CWHR Classification	Acres	MCV Alliances	
Sagebrush	30	▶ Big sagebrush	
Herbaceous Habitats			
Annual Grassland	496,870	▶ Western ragweed meadow ▶ Fiddleneck - phacelia field ▶ Wild oat grassland[N] ▶ Upland mustard and other ruderal forbs[N] ▶ Annual brome grassland[N] ▶ Red brome or mediterranean grass grassland[N] ▶ Cheatgrass - medusahead grassland[N] ▶ Yellow star-thistle field[N] ▶ Knapweed and purple-flowered star-thistle field[N] ▶ Tar plant field* ▶ Alkali weed - salt grass playas and sinks* ▶ Perennial rye grass field[N] ▶ Spanish clover field ▶ Monolopia - leafy-stemmed tickseed field* ▶ Water blinks - annual checkerbloom vernal pool*	▶ California button-celery patch* ▶ California poppy - lupine field ▶ Goldenaster patch* ▶ California goldfields - dwarf plantain - small fescue flower fields ▶ Fremont's goldfields - salt grass alkaline vernal pool* ▶ Fremont's goldfields - Downingia vernal pools* ▶ Smooth goldfields vernal pool bottom* ▶ Fremont's tidy-tips - blow wives vernal pool* ▶ Popcorn flower field ▶ White-tip clover swales*
Perennial Grassland	13	▶ Indian rice grass grassland* ▶ Bent grass - tall fescue meadow ▶ Upland mustard and other ruderal forbs[N] ▶ California brome - blue wildrye prairie* ▶ Knapweed and purple-flowered star-thistle field[N] ▶ Poison hemlock or fennel patch[N] ▶ Sand-aster and perennial buckwheat field ▶ Pampas grass patch[N]	▶ Tufted hair grass meadow ▶ Gum plant patch* ▶ Ashy ryegrass - creeping ryegrass turf* ▶ Needle grass - melic grass grassland ▶ Fountain grass sward[N] ▶ Harding grass - reed canary grass sward[N] ▶ Curly blue grass grassland*
Total	**605,441**		

*These are designated sensitive natural communities with a state rarity rank of S1 (critically imperiled), S2 (imperiled), or S3 (vulnerable).

[N] These alliances are dominated by nonnative vegetation.

[1] There are no MCV alliances recognized for this CWHR type in this ecoregion.

Source: CWHR 2019, CNPS 2019, Compiled by Ascent Environmental in 2019

Wetlands and Other Waters of the United States and Waters of the State

NWI has mapped over 43,000 acres of wetlands in the treatable landscape of the Great Valley Section. The majority, over 33,000 acres, is freshwater emergent wetland. Other wetlands mapped in the NWI are riverine, lake, freshwater pond, freshwater forested and shrub wetland, and just 1 acre of estuarine and marine wetland. The acreage of each general wetland type mapped in the treatable landscape by NWI is provided in Table 3.6-2. Vernal pools are also prevalent in areas mapped as annual grasslands in this ecoregion and may include water blinks - annual checkerbloom vernal pools, California button-celery patches, Fremont's goldfields - salt grass alkaline vernal pools, and Fremont's goldfields - Downingia vernal pools, among other vernal pool types.

Other Sensitive Habitats

There are 10,471 acres of valley foothill riparian habitat mapped in this ecoregion. Sensitive natural communities that may be included in this acreage are box elder forest, button willow thicket, red osier thicket, California sycamore woodland, Fremont cottonwood forest, California rose briar patch, red willow thicket, and shining willow groves.

Oak woodlands found in the treatable landscape of the Great Valley Section consist of blue oak woodland, blue oak-foothill pine woodland, valley oak woodland, and a small amount (37 acres) of coastal oak woodland. There are also about 7,000 acres of montane hardwood that likely contain interior live oak woodland stands. Oak woodlands in this ecoregion face the greatest threat from urbanization of anywhere in the state (California Oak Foundation 2006).

There is minimal chaparral habitat in the treatable landscape of this ecoregion, consisting of a little over 2,000 acres of chamise-redshank chaparral and a little over 4,000 acres of mixed chaparral. Sensitive chaparral natural communities that may occur in this ecoregion are hoary, common, and Stanford manzanita chaparral.

Conservation Lands, Special Management Areas, and Other Biologically Important Lands

Habitat Conservation Plan, Natural Community Conservation Plan, and other Conservation Plan Areas

The treatable landscape in the Great Valley Section includes plan areas for the Metropolitan Bakersfield HCP, San Joaquin County HCP, and East Contra Costa County HCP/NCCP, which have been adopted and are being implemented. Additionally, five HCPs and seven HCP/NCCPs are currently being planned in the treatable landscape. Table 3.6-10 summarizes the conservation plans adopted or in progress, including the acreages of plan areas within the treatable landscape.

Table 3.6-10 Conservation Plans Adopted or In Progress in the Treatable Landscape—Great Valley Section

Conservation Plan	Plan Type	Stage	Plan Area Within the Treatable Landscape (Acres)
Calaveras County	HCP	Planning	75,323
East Fresno	HCP	Planning	15,013
Kern County Valley Floor	HCP	Planning	119,249
Metropolitan Bakersfield	HCP	Implementation	24,081
San Joaquin County	HCP	Implementation	70,077
Solano Multi-Species	HCP	Planning	13,807
South Sacramento	HCP	Planning	61,552
Bakersfield Regional Habitat Conservation Plan	HCP/NCCP	Planning	59,234
Bay/Delta Conservation Plan	HCP/NCCP	Planning	2,153
Butte Regional Conservation Plan	HCP/NCCP	Planning	80,861
East Contra Costa County	HCP/NCCP	Implementation	2,194
Northeastern San Luis Obispo County	HCP/NCCP	Planning	524
Placer County Conservation Plan Phase I	HCP/NCCP	Planning	18,987
Yolo Natural Heritage Program	HCP/NCCP	Planning	31,633
Yuba-Sutter	HCP/NCCP	Planning	9,745
		Total	584,433

Protected Open Space Lands

The treatable landscape in the Great Valley Section contains 110 protected open space units that are recognized in CPAD. These lands cover 34,901 acres, which represent 6 percent of the treatable landscape in the ecoregion. Some of the major land owners include The Wildlands Conservancy, The Nature Conservancy, CDFW, National Audubon Society, East Bay Municipal Utility District, Central Valley Flood Protection Board, Sacramento County, and State Parks. Examples of some of the prominent open space units in the Great Valley Section include Wind Wolves Preserve, Bobcat Ranch, Oroville Wildlife Area, Thomes Creek Ecological Reserve, Cosumnes River Parkway, and Grizzly Island Wildlife Area.

Klamath Mountains Section (M261A)

The Klamath Mountains Section encompasses 5,576,544 acres and includes the hills, valleys, and plains between the Southern Cascades Mountains and the Coast Range mountains. Elevations range from 1,500 to 8,000 feet. This ecoregion contains 1,267,874 acres of treatable landscape, which represents approximately 23 percent of the total landscape within the ecoregion. Within the treatable landscape exist modeled treatment areas for the following treatment types: WUI fuel reduction (404,249 acres), fuel break (150,122 acres), and ecological restoration (843,735 acres). The treatable landscape covers much of this eastern half of the ecoregion to the north and west of Redding. The treatable landscape in this ecoregion is displayed in Figure 3.6-6.

Vegetation and Habitat Types

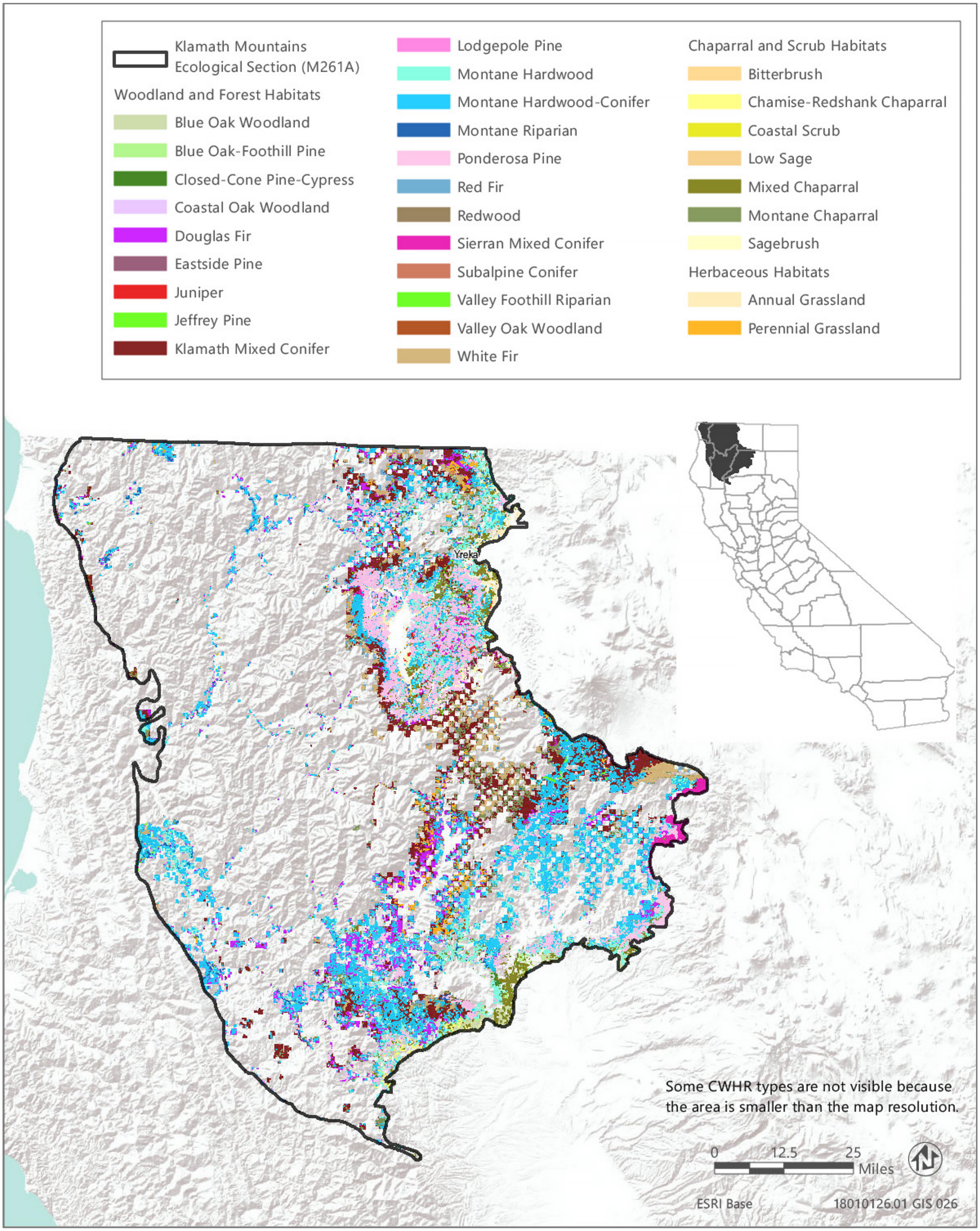
The predominant habitat types in the treatable landscape of the Klamath Mountains Section are Douglas fir and Klamath mixed conifer, which comprise approximately 25 percent and 23 percent of the treatable landscape, respectively. Montane hardwood and montane hardwood-conifer habitats combined make up approximately 23 percent of the treatable landscape area. Other common habitat types are ponderosa pine, mixed chaparral, and annual grassland, which comprise approximately 6, 6, and 5 percent of the treatable landscape, respectively. This ecoregion supports diverse habitat types and the remaining 12 percent of the treatable landscape area is comprised of 22 other habitat types. Douglas fir in this ecoregion represents eight vegetation alliances, and five of these are designated as sensitive natural communities. Klamath mixed conifer in this ecoregion represents five vegetation alliances, and all of them are designated as sensitive natural communities.

Table 3.6-11 provides the acreage of each CWHR habitat type within the treatable landscape of this ecoregion and the associated MCV vegetation alliances that may occur within each CWHR type in this ecoregion. Alliances that are designated as sensitive natural communities and those that are dominated by nonnative vegetation are indicated in Table 3.6-11. Sensitive natural communities are discussed in more detail below. The distribution of CWHR types within this ecoregion is shown in Figure 3.6-6.

Sensitive Biological Resources

Special-Status Species

There are 91 special-status wildlife taxa and 135 plant taxa with potential to occur within the treatable landscape of the Klamath Mountains Section including seven plant taxa and 33 animal taxa that are state or federally listed as rare, threatened, or endangered. The Klamath Mountains ecoregion contains a wide diversity of plant species, including habitat specialists and species known only to occur locally. Over 45 special-status plant species in this ecoregion are associated with serpentine soils and over 17 species are associated with bogs and fens. Three salamander species, Shasta salamander (*Hydromantes shastae*), Scott Bar salamander (*Plethodon asupak*), and Siskiyou Mountains salamander (*Plethodon stormi*), are endemic to this ecoregion. A complete list of all the special-status plant species known or with potential to occur within the treatable landscape of the Klamath Mountains Section, along with their listing status and detailed habitat descriptions, is provided in Appendix BIO-3, Table 5a and a list. A list of special-status wildlife (other than fish) species known or expected to occur in the treatable landscape of this ecoregion, along with the CWHR types they are associated with, is provided in Appendix BIO-3, Table 5b. Special-status fish with potential to occur within the ecoregion are identified in Appendix BIO-3, Table 19.



Source: Data received from CAL FIRE in 2018

Figure 3.6-6 CWHR Types - Klamath Mountains Ecological Section (M261A)

Table 3.6-11 Vegetation and Habitat Types within the Treatable Landscape for the Klamath Mountains Ecological Section

CWHR Classification	Acres	MCV Alliances	
Woodland and Forest Habitats			
Blue Oak Woodland	14,732	▶ Blue oak woodland	▶ Interior live oak woodland
Blue Oak-Foothill Pine	24,335	▶ Foothill pine woodland	▶ Blue oak woodland
Closed-Cone Pine-Cypress	2,357	▶ Baker cypress stand* ▶ McNab cypress woodland* ▶ Knobcone pine forest	▶ Beach pine forest* ▶ Bishop pine - Monterey pine forest*
Coastal Oak Woodland	275	▶ Madrone forest*	▶ California bay forest*
Douglas Fir	318,537	▶ White fir - Douglas fir forest ▶ Bigleaf maple forest* ▶ Port Orford cedar forest* ▶ Ponderosa pine - Douglas fir forest	▶ Douglas fir forest ▶ Douglas fir - incense cedar forest* ▶ Douglas fir - tanoak forest* ▶ Western hemlock forest*
Eastside Pine	3,092	▶ Jeffrey pine forest	▶ Ponderosa pine forest
Jeffrey Pine	6,587	▶ Jeffrey pine forest	
Juniper	13,695	▶ Western juniper woodland	
Klamath Mixed Conifer	294,869	▶ Pacific silver fir forest* ▶ Subalpine fir forest*	▶ Alaska yellow-cedar stand* ▶ Brewer spruce forest* ▶ Engelmann spruce forest*
Lodgepole Pine	7	▶ Lodgepole pine forest	
Montane Hardwood	138,850	▶ Bigleaf maple forest* ▶ California buckeye grove* ▶ Red alder forest ▶ Tanoak forest*	▶ Canyon live oak forest ▶ Oregon white oak woodland* ▶ Interior live oak woodland
Montane Hardwood-Conifer	155,132	▶ Bigleaf maple forest* ▶ Red alder forest	
Montane Riparian	3,881	▶ Rocky Mountain maple thicket* ▶ Mountain alder thicket* ▶ White alder grove ▶ Sitka alder thicket* ▶ Resin birch thicket* ▶ Water birch thicket* ▶ Torrent sedge patch*	▶ Fremont cottonwood forest* ▶ Black cottonwood forest* ▶ Sandbar willow thicket ▶ Jepson willow thicket* ▶ Wild grape shrubland*
Ponderosa Pine	71,302	▶ Ponderosa pine forest	▶ Ponderosa pine - Douglas fir forest
Red Fir	6,482	▶ Red fir forest	▶ Red fir - white fir forest
Redwood	200	▶ Western azalea patch*	▶ Redwood forest*
Sierran Mixed Conifer	12,093	▶ Incense cedar forest* ▶ Mixed oak forest ▶ Ponderosa pine - Douglas fir forest	▶ Douglas fir - incense cedar forest* ▶ Giant sequoia forest*
Subalpine Conifer	273	▶ Engelmann spruce forest*	▶ Western white pine forest

Table 3.6-11 Vegetation and Habitat Types within the Treatable Landscape for the Klamath Mountains Ecological Section

CWHR Classification	Acres	MCV Alliances	
		▶ Whitebark pine forest ▶ Foxtail pine woodland*	▶ Mountain hemlock forest
Valley Foothill Riparian	428	▶ Torrent sedge patch* ▶ Button willow thicket* ▶ Fremont cottonwood forest* ▶ Black cottonwood forest*	▶ Himalayan blackberry - rattlebox - edible fig riparian scrub[N] ▶ Sandbar willow thicket ▶ Wild grape shrubland*
Valley Oak Woodland	89	▶ Valley oak woodland*	
White Fir	27,296	▶ White fir forest ▶ White fir - sugar pine forest	▶ White fir - Douglas fir forest ▶ Red fir - white fir forest
Chaparral and Scrub Habitats			
Bitterbrush	187	▶ Bitter brush scrub*	
Chamise-Redshank Chaparral	5,501	▶ Chamise chaparral	▶ Wedge leaf ceanothus chaparral/Buck brush chaparral
Coastal Scrub	4	▶ California yerba santa scrub	▶ Coast range stonecrop draperies
Low Sage	19	▶ Little sagebrush scrub	
Mixed Chaparral	69,662	▶ Hoary, common, and Stanford manzanita chaparral* ▶ Whiteleaf manzanita chaparral ▶ Wedge leaf ceanothus chaparral, Buck brush chaparral ▶ Deer brush chaparral ▶ Birch leaf mountain mahogany chaparral	▶ Bush poppy scrub ▶ California yerba santa scrub ▶ Ocean spray brush* ▶ Shrub tanoak chaparral* ▶ Scrub oak chaparral
Montane Chaparral	27,793	▶ Green leaf manzanita chaparral ▶ Whiteleaf manzanita chaparral ▶ Mountain whitethorn chaparral ▶ Deer brush chaparral ▶ Tobacco brush or snow bush chaparral ▶ Birch leaf mountain mahogany chaparral	▶ Bush chinquapin chaparral* ▶ Bitter cherry thicket ▶ Brewer oak scrub ▶ Sadler oak or deer oak brush field* ▶ Huckleberry oak chaparral
Sagebrush	1,934	▶ Little sagebrush scrub ▶ Big sagebrush ▶ Curl leaf mountain mahogany scrub	▶ Rubber rabbitbrush scrub ▶ Bitter brush scrub*
Herbaceous Habitats			
Annual Grassland	61,398	▶ Wild oat grassland ▶ Annual brome grassland[N] ▶ Red brome or mediterranean grass grassland[N] ▶ Cheatgrass - medusahead grassland[N]	▶ Yellow star-thistle field[N] ▶ Knapweed and purple-flowered star-thistle field[N] ▶ Annual dogtail grassland[N]

Table 3.6-11 Vegetation and Habitat Types within the Treatable Landscape for the Klamath Mountains Ecological Section

CWHR Classification	Acres	MCV Alliances	
Perennial Grassland	6,863	▸ Water foxtail meadow* ▸ Small-fruited sedge meadow* ▸ Knapweed and purple-flowered star-thistle field[N] ▸ California oat grass prairie* ▸ Tufted hair grass meadow	▸ Idaho fescue grassland* ▸ Ashy ryegrass - creeping ryegrass turf* ▸ Needle grass - melic grass grassland ▸ Kentucky blue grass turf[N] ▸ Curly blue grass grassland*
Total	1,267,873		

*These are designated sensitive natural communities with a state rarity rank of S1 (critically imperiled), S2 (imperiled), or S3 (vulnerable).

[N] These alliances are dominated by nonnative vegetation.

Source: CWHR 2019, CNPS 2019, Compiled by Ascent Environmental in 2019

Critical Habitat

Critical habitat has been designated within the treatable landscape of this ecoregion for only two wildlife taxa, northern spotted owl (*Strix occidentalis caurina*) and marbled murrelet (*Brachyramphus marmoratus*). Appendix BIO-4 provides the acreage of critical habitat designated within the treatable landscape of this ecoregion for each species.

Sensitive Natural Communities and Habitats

Sensitive Natural Communities

There are 56 sensitive natural communities that may occur within the treatable landscape of the Klamath Mountains Section. The sensitive natural communities associated with each CWHR type in this ecoregion are identified in Table 3.6-11. They include Pacific silver fir forest, subalpine fir forest, Alaska yellow-cedar stand, Brewer spruce forest, Engelmann spruce forest, and Sadler oak or deer oak brush field.

Wetlands and Other Waters of the United States and Waters of the State

Wetland habitats known to occur within the treatable landscape of the Klamath Mountain Section include freshwater emergent wetland, freshwater forested and shrub wetland, freshwater pond, lake, and riverine wetlands. The acreage of each general wetland type mapped in the treatable landscape by NWI is provided in Table 3.6-2. In addition, torrent sedge patch, water foxtail meadow, and small-fruited sedge meadow are wetland sensitive natural communities that may be present within areas mapped as montane riparian, valley foothill riparian, or perennial grassland. Major waterways include the Klamath River, Trinity River, Salmon River, Rogue River, and Scott River.

Other Sensitive Habitats

There are 4,309 acres of montane riparian and valley foothill riparian habitat mapped in this ecoregion. Sensitive natural communities that may be included in this acreage are Rocky Mountain maple thicket, mountain alder thicket, Sitka alder thicket, resin birch thicket, water birch thicket, torrent sedge patch, Fremont cottonwood forest, black cottonwood forest, Jepson willow thicket, wild grape shrubland, and button willow thicket.

Oak woodlands found in the treatable landscape of the Klamath Mountains Section consist of blue oak woodland, blue oak-foothill pine woodland, and a small amount of coastal oak woodland and valley oak woodland. There are also about 138,850 acres of montane hardwood that likely contain canyon live oak forest, Oregon white oak woodland, and interior live oak woodland stands.

Chaparral habitats in the treatable landscape of the Klamath Mountains Section consist of approximately 69,662 acres of mixed chaparral, 27,793 acres of montane chaparral, and 5,501 acres of chamise – redshank chaparral. Designated sensitive chaparral natural communities that may be present within these habitat areas include bush chinquapin chaparral, Sadler oak or deer oak brush field, hoary, common, and Sanford manzanita chaparral, shrub tanoak chaparral, and ocean spray scrub.

<u>Conservation Lands, Special Management Areas, and Other Biologically Important Lands</u>

Habitat Conservation Plan, Natural Community Conservation Plan, and other Conservation Plan Areas
No conservation plans have been adopted for lands within the treatable landscape in the Klamath Mountains Section.

Protected Open Space Lands
The treatable landscape in the Klamath Mountains Section contains 37 protected open space units that are recognized in CPAD. These lands cover 11,921 acres, which represent 0.9 percent of the treatable landscape in the ecoregion. Some of the major land owners include State Parks, CDFW, The Nature Conservancy, CSLC, City of Yreka, CAL FIRE, and Trinity County. Examples of some of the prominent open space units in the Klamath Mountains Section include Castle Crags State Park, McCloud River Preserve, Del Norte Coast Redwoods State Park, Jedediah Smith Redwoods State Park, Greenhorn Park, Ellen Pickett State Forest, Cantara-Ney Springs Wildlife Area, and China Point Ecological Reserve.

Modoc Plateau Section
The Modoc Plateau Section (M261G) encompasses 3,538,741 acres and contains northwesterly trending block ranges and basins commonly interspersed with volcanic formations such as cinder cones or lava flows. Elevations range from 3,000 to 9,900 feet. This ecoregion contains 746,035 acres of treatable landscape, which represents approximately 21 percent of the total landscape within the ecoregion. Within the treatable landscape exist modeled treatment areas for the following treatment types: WUI fuel reduction (61,005 acres), fuel break (89,469 acres), and ecological restoration (676,564 acres). The treatable landscape primarily consists of mountains, ridges, and valleys within the southern half of this ecoregion. The treatable landscape in this ecoregion is displayed in Figure 3.6-7.

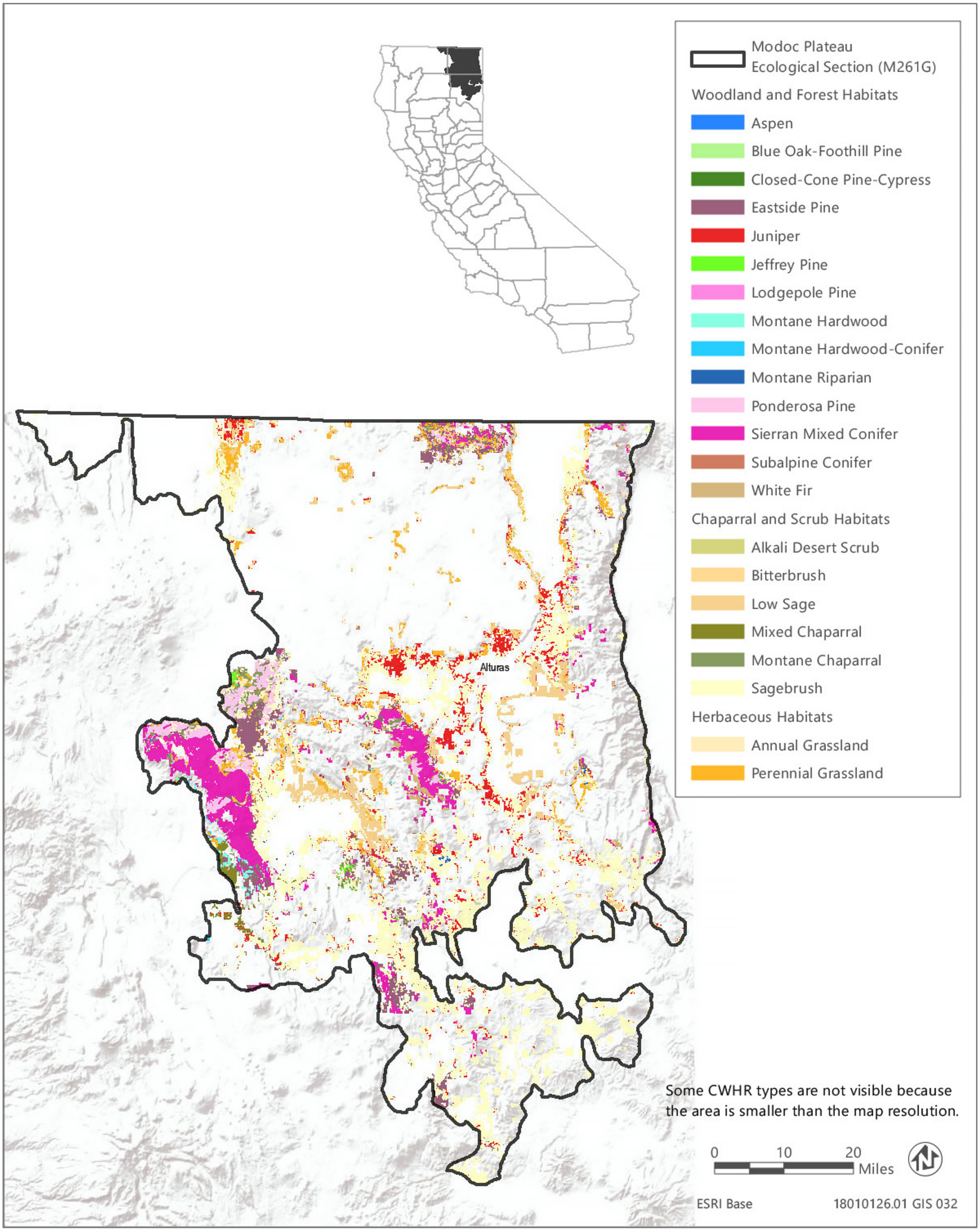
<u>Vegetation and Habitat Types</u>

Chaparral and scrub habitats make up the majority of habitat types in the Modoc Plateau Section, comprising approximately 53 percent of the cover in the treatable landscape. There are 14 MCV alliances associated with the chaparral and scrub habitats of this ecoregion. Sagebrush is the predominant scrub type and makes up 36 percent of the vegetative cover of the treatable landscape. Woodland and forest habitats make up approximately 40 percent of the land cover with eastside pine being the predominant forest type. Annual and perennial grasslands make up approximately 6 percent of the treatable landscape. This is one of the few ecoregions where perennial grassland is more abundant than annual grassland. These grasslands support a diversity of native and nonnative vegetation alliances. The distribution of CWHR types within the treatable landscape of this ecoregion is shown in Figure 3.6-7 and the acreage of each type, as well as associated MCV alliances, is provided in Table 3.6-12.

<u>Sensitive Biological Resources</u>

Special-Status Species
There are 57 special-status wildlife taxa and 67 plant taxa known or with potential to occur in the treatable landscape of the Modoc Plateau Section, including two plant taxa and 27 animal taxa that are state or federally listed as rare, threatened, or endangered or fully protected. A list of all the special-status plant species known or with potential to occur within the treatable landscape of the Great Valley Section, along with their listing status and detailed habitat descriptions, is provided in Appendix BIO-3, Table 6a. A list of special-status wildlife (other than fish) species known or with potential to occur in the treatable landscape of this ecoregion, along with the CWHR types they are associated with, is provided in Appendix BIO-3, Table 6b. Special-status fish known or with potential to occur in the ecoregion are identified in Appendix BIO-3, Table 19.

Critical Habitat
Designated critical habitat within the treatable landscape of the Modoc Plateau exists for only two species, shortnose sucker (*Chasmistes brevirostris*) and Lost River sucker (*Deltistes luxatus*). Appendix BIO-4 lists and provides the acreage of critical habitat designated within the treatable landscape of this ecoregion for these species.



Source: Data received from CAL FIRE in 2018

Figure 3.6-7 CWHR Types - Modoc Plateau Ecological Section (M261G)

Table 3.6-12 Vegetation and Habitat Types within the Treatable Landscape for the Modoc Plateau Ecological Section

CWHR Classification	Acres	MCV Alliances	
Woodland and Forest Habitats			
Aspen	380	▶ Aspen groves*	
Blue Oak-Foothill Pine	22	▶ Foothill pine woodland	
Closed-Cone Pine-Cypress	8	▶ Baker cypress stand*	▶ Knobcone pine forest
Eastside Pine	126,499	▶ Jeffrey pine forest ▶ Ponderosa pine forest	▶ Washoe pine woodland*
Jeffrey Pine	1,827	▶ Jeffrey pine forest	
Lodgepole Pine	387	▶ Lodgepole pine forest	
Montane Hardwood	3,356	▶ Oregon white oak woodland*	
Montane Hardwood-Conifer	654	▶ None[1]	▶
Montane Riparian	756	▶ Resin birch thickets* ▶ Water birch thickets* ▶ Black cottonwood forest* ▶ Western Labrador-tea thickets* ▶ Interior rose thickets*	▶ Bebb's willow thickets* ▶ Sandbar willow thickets ▶ Geyer willow thickets* ▶ Lemmon's willow thickets*
Ponderosa Pine	34,674	▶ Ponderosa pine forest	▶ Washoe pine woodland*
Sierran Mixed Conifer	77,609	▶ Incense cedar forest*	▶ Mixed oak forest
Subalpine Conifer	30	▶ Whitebark pine forest	▶ Western white pine forest
White Fir	3,312	▶ White fir forest	▶ White fir - sugar pine forest
Chaparral and Scrub Habitats			
Alkali Desert Scrub	286	▶ Greasewood scrub	▶ Alkali sacaton - scratchgrass - alkali cordgrass alkaline wet meadow*
Bitterbrush	3,119	▶ Bitter brush scrub*	
Low Sage	76,105	▶ Little sagebrush scrub	▶ Lahontan sagebrush scrub
Mixed Chaparral	4,296	▶ Deer brush chaparral	▶ Choke cherry thickets*
Montane Chaparral	20,570	▶ Green leaf manzanita chaparral ▶ Deer brush chaparral ▶ Tobacco brush or snow bush chaparral	▶ Choke cherry thickets* ▶ Brewer oak scrub
Sagebrush	225,203	▶ Little sagebrush scrub ▶ Lahontan sagebrush scrub ▶ Silver sagebrush scrub* ▶ Big sagebrush	▶ Mountain big sagebrush Curl leaf mountain mahogany scrub ▶ Rubber rabbitbrush scrub ▶ Bitter brush scrub*
Herbaceous Habitats			
Annual Grassland	11,346	▶ Wild oats grassland[N] ▶ Annual brome grassland[N] ▶ Red brome or mediterranean grass grassland[N] ▶ Cheatgrass - medusahead grassland ▶ Knapweed and purple-flowered star-thistle field[N]	▶ Needle spike rush stands* ▶ Fremont's goldfields - Downingia vernal pools* ▶ Spanish clover field

Table 3.6-12 Vegetation and Habitat Types within the Treatable Landscape for the Modoc Plateau Ecological Section

CWHR Classification	Acres	MCV Alliances	
Perennial Grassland	28,017	▸ Crested wheatgrass rangeland[N] ▸ Bent grass - tall fescue meadows ▸ Water foxtail meadow* ▸ Small-fruited sedge meadow* ▸ Knapweed and purple-flowered star-thistle field[N] ▸ Tufted hair grass meadows	▸ Idaho fescue grassland* ▸ Ashy ryegrass - creeping ryegrass turf* ▸ Mat muhly meadow ▸ Harding grass - reed canary grass sward[N] ▸ Kentucky blue grass turf[N] ▸ Curly blue grass grassland* ▸ Bluebunch wheat grass grassland*
Total	618,456		

*These are designated sensitive natural communities with a state rarity rank of S1 (critically imperiled), S2 (imperiled), or S3 (vulnerable).

[N] These alliances are dominated by nonnative vegetation.

[1] There are no MCV alliances recognized for this CWHR type in this ecoregion.

Source: CWHR 2019, CNPS 2019, Compiled by Ascent Environmental in 2019

Sensitive Natural Communities and Habitats

Sensitive Natural Communities

There are 48 sensitive natural communities that may occur within the treatable landscape of the Modoc Plateau Section. The sensitive natural communities associated with each CWHR type in this ecoregion are identified in Table 3.6-12. Examples of sensitive natural communities in this ecoregion include aspen groves, silver sagebrush scrub, Washoe pine woodland, bitterbrush scrub, Idaho fescue grassland, and bluebunch wheat grass grassland.

Wetlands and Other Waters of the United States and Waters of the State

Wetlands mapped in the treatable landscape of the Modoc Plateau consist of over 23,000 acres of freshwater emergent wetland, freshwater forested and shrub wetland, freshwater pond, lake, and riverine habitats. Freshwater emergent wetland is the most abundant wetland type with over 17,700 acres inventoried in the NWI. The acreage of each general wetland type mapped in the treatable landscape by NWI is provided in Table 3.6-2. Additional wetland types that may be present within other CWHR types in the treatable landscape include silver sagebrush scrub, tufted hair grass meadows, water foxtail meadows, needle spike rush stands, and Fremont's goldfields - Downingia vernal pools.

Other Sensitive Habitats

CWHR riparian habitat types identified within the treatable landscape of the Modoc Plateau Section consist of approximately 756 acres of montane riparian habitat. There are nine MCV alliances that may occur in the montane riparian habitat type. All but one of these are designated sensitive natural communities. Examples include resin birch thickets, western Labrador-tea thickets, interior rose thickets, and Bebb's willow thickets. All riparian habitats are considered sensitive and those located near rivers, streams, and lakes are protected under California Fish and Game Code.

Oak woodlands within the treatable landscape of this ecoregion are limited with only 22 acres of blue oak-foothill pine and 3,356 acres of montane hardwood that likely supports Oregon white oak woodland, a designated sensitive natural community.

Chaparral habitats in the treatable landscape consist of approximately 4,300 acres of mixed chaparral and over 20,500 acres of montane chaparral. Mixed chaparral alliances found in this ecoregion consist of deer brush chaparral and choke cherry thickets, and montane chaparral alliances include green leaf manzanita chaparral, tobacco brush or snow bush chaparral, and Brewer oak scrub. Choke cherry thickets are a designated sensitive natural community. The green leaf manzanita chaparral, tobacco brush or snow bush chaparral community types are successional following fire with the dominant shrub species (e.g., green leaf manzanita and tobacco brush) sprouting prolifically from their root crowns after fire. In addition, tobacco brush and green leaf manzanita develop seed banks that remain dormant in the soil until stimulated to germinate following fire. The combination of sprouting and seedling recruitment following fire rapidly replenishes the shrub layer of these communities, and crown fires that remove the tree canopy from forest and woodland types in this ecoregion can result in post-fire dominance of chaparral shrubs. If fires recur too frequently, conifer regeneration can be eliminated resulting in permanent conversion to chaparral. The return interval is 40 to 75 years for tobacco brush or snow bush chaparral and 20 to 50 years for green leaf manzanita chaparral (Sawyer et al. 2009).

Conservation Lands, Special Management Areas, and Other Biologically Important Lands

Habitat Conservation Plan, Natural Community Conservation Plan, and other Conservation Plan Areas

No conservation plans have been adopted for lands within the treatable landscape in the Modoc Plateau Section.

Protected Open Space Lands

The treatable landscape in the Modoc Plateau Section contains 18 protected open space units that are recognized in CPAD. These lands cover 12,530 acres, which represent 2 percent of the treatable landscape in the ecoregion. The land owners are CSLSC, CDFW, Lassen County, Modoc County, and University of California. Examples of some of the prominent open space units in the Modoc Plateau Section include Fitzhugh Creek Wildlife Area, Ash Creek Wildlife Area, Silver Creek Wildlife Area, Surprise Valley Wildlife Area, Great Basin Springs, and Eagle Lake Field Station.

Mojave Desert Section

The Mojave Desert Section (322A) encompasses 16,527,027 acres and consists of widely separated short ranges in desert plains and contains isolated mountains, plateaus, playas, basins, and dunes. Elevations in this hot and dry ecoregion range from 300 feet below sea level to 11,000 feet. This ecoregion contains 307,905 acres of treatable landscape, which represents approximately 2 percent of the total landscape within the ecoregion. Within the treatable landscape exist modeled treatment areas for the following treatment types: WUI fuel reduction (206,080 acres), fuel break (109,085 acres), and ecological restoration (29,825 acres). The treatable landscape within this ecoregion is limited to small swaths along the base of the southern end of the Sierra Nevada and the north-northeastern side of the Transverse Ranges. The treatable landscape in this ecoregion is displayed in Figure 3.6-8.

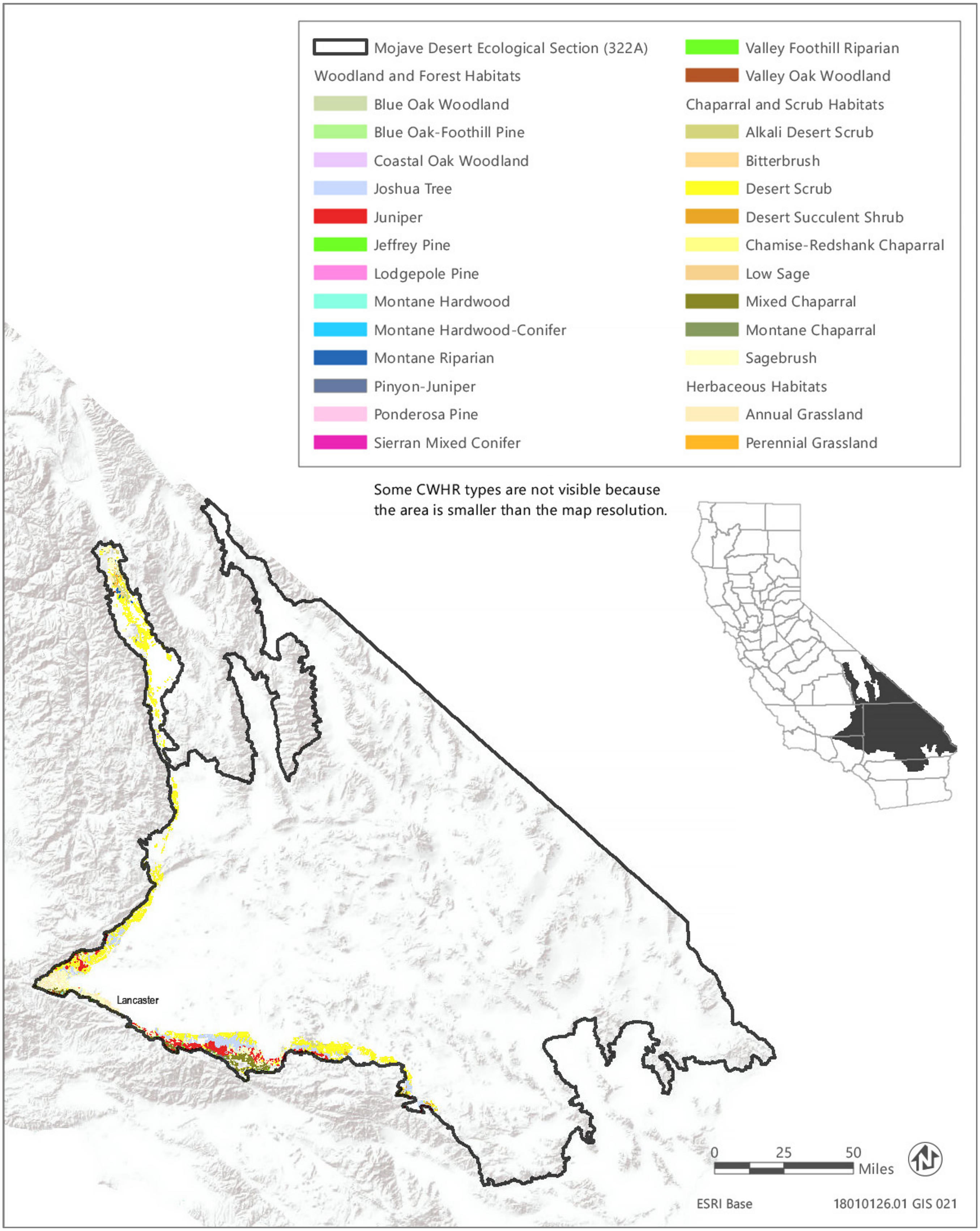
Vegetation and Habitat Types

Desert scrub is the predominant habitat type, comprising approximately 41 percent of the treatable landscape of the Mojave Desert Section. Other chaparral and scrub habitats make up about 21 percent of the treatable landscape, while woodland and forest habitats and herbaceous habitats comprise approximately 29 percent and 9 percent, respectively. The desert scrub habitat is very diverse, representing as many as 36 unique vegetation alliances. The distribution of CWHR types within the treatable landscape of this ecoregion is shown in Figure 3.6-8 and the acreage of each type, as well as associated MCV alliances, is provided in Table 3.6-13.

Sensitive Biological Resources

Special-Status Species

There are 94 special-status wildlife taxa and 56 plant taxa known or with potential to occur in the treatable landscape of the Mojave Desert Section, including seven plant taxa and 37 animal taxa that are state or federally listed as rare, threatened, or endangered or fully protected. A list of all the special-status plant species known or with potential to occur within the treatable landscape of the Great Valley Section, along with their listing status and detailed habitat descriptions, is provided in Appendix BIO-3, Table 7a. A list of special-status wildlife (other than fish) species known or with potential to occur in the treatable landscape of this ecoregion, along with the CWHR types they are associated with, is provided in Appendix BIO-3, Table 7b. Special-status fish known or with potential to occur in the ecoregion are identified in Appendix BIO-3, Table 19.



Source: Data received from CAL FIRE in 2018

Figure 3.6-8 CWHR Types - Mojave Desert Ecological Section (322A)

Table 3.6-13 Vegetation and Habitat Types within the Treatable Landscape for the Mojave Desert Ecological Section

CWHR Classification	Acres	MCV Alliances	
Woodland and Forest Habitats			
Blue Oak Woodland	421	▶ Blue oak woodland	
Blue Oak-Foothill Pine	196	▶ Foothill pine woodland	
Coastal Oak Woodland	15	▶ California bay forest*	
Jeffrey Pine	17	▶ Jeffrey pine forest	
Joshua Tree	45,888	▶ Joshua tree woodland*	
Juniper	40,553	▶ Needleleaf rabbitbrush scrub ▶ California juniper woodland ▶ Utah juniper woodland*	▶ Two-needle pinyon stands* ▶ Singleleaf pinyon - Utah juniper woodlands
Lodgepole Pine	3	▶ Lodgepole pine forest	
Montane Hardwood	573	▶ Bigcone Douglas fir forest*	▶ Canyon live oak forest
Montane Hardwood-Conifer	6	▶ Bigcone Douglas fir forest*	
Montane Riparian	343	▶ Water birch thicket* ▶ Fremont cottonwood forest*	▶ Sandbar willow thicket ▶ Wild grape shrubland*
Pinyon-Juniper	1,307	▶ Utah juniper woodland*	▶ Singleleaf pinyon - Utah juniper woodlands
Ponderosa Pine	1	▶ Ponderosa pine forest	
Sierran Mixed Conifer	2	▶ Mixed conifer forest	
Valley Foothill Riparian	204	▶ Fremont cottonwood forest* ▶ Himalayan blackberry - rattlebox - edible fig riparian scrub[N] ▶ Sandbar willow thicket	▶ Red willow thicket* ▶ Wild grape shrubland*
Valley Oak Woodland	325	▶ Valley Oak Woodland*	
Chaparral and Scrub Habitats			
Alkali Desert Scrub	15,437	▶ Iodine bush scrub* ▶ Fourwind saltbush scrub ▶ Shadscale scrub ▶ Desert holly scrub ▶ Quailbush scrub ▶ Parry's saltbush scrub* ▶ Allscale scrub	▶ Spinescale scrub ▶ Winterfat scrubland* ▶ Greasewood scrub ▶ Alkali sacaton - scratchgrass - alkali cordgrass alkaline wet meadow* ▶ Bush seepweed scrub*
Bitterbrush	2,996	▶ Bitter brush scrub*	
Chamise-Redshank Chaparral	1	▶ Chamise chaparral	
Desert Scrub	127,346	▶ Desert needlegrass grassland* ▶ Iodine bush scrub* ▶ White bursage scrub ▶ Cheesebush - sweetbush scrub ▶ Fremont's chaffbush - woolly sage scrub* ▶ Fourwind saltbush scrub ▶ Shadscale scrub ▶ Desert holly scrub ▶ Quailbush scrub ▶ Parry's saltbush scrub* ▶ Allscale scrub	▶ Nevada joint fir - Anderson's boxthorn - spiny hop sage scrub ▶ Narrowleaf goldenbush - bladderpod scrub ▶ California buckwheat - Parish's goldeneye scrub ▶ Wright's buckwheat - Heerman's buckwheat - Utah butterfly-bush scrub* ▶ Apache plume scrub* ▶ Snakeweed scrub* ▶ Winterfat scrubland*

Table 3.6-13 Vegetation and Habitat Types within the Treatable Landscape for the Mojave Desert Ecological Section

CWHR Classification	Acres	MCV Alliances	
		▶ Spinescale scrub ▶ Saguaro - foothill palo verde - velvet mesquite desert scrub* ▶ Crucifixion thorn stand* ▶ Rigid spineflower - hairy desert sunflower ▶ Mojave-Sonoran desert dunes* ▶ Greasewood scrub ▶ Catclaw acacia - desert lavender - chuparosa scrub ▶ Alkali sacaton - scratchgrass - alkali cordgrass alkaline wet meadow*	▶ Creosote bush scrub ▶ Creosote bush - white bursage scrub ▶ Creosote bush - brittle bush scrub ▶ Spiny menodora scrub* ▶ James' galleta shrub-steppe* ▶ Big galleta shrub-steppe* ▶ Desert almond - Mexican bladdersage scrub ▶ Bush seepweed scrub* ▶ Acton's and Virgin River brittlebush - net-veined goldeneye scrub* ▶ Brittle bush scrub
Desert Succulent Shrub	1,400	▶ Saguaro - foothill palo verde - velvet mesquite desert scrub* ▶ Teddy bear cholla patch*	▶ Nolina scrub* ▶ Mojave yucca scrub
Low Sage	1	▶ Black sagebrush scrub*	
Mixed Chaparral	24,068	▶ Muller oak chaparral	
Montane Chaparral	17	▶ Green leaf manzanita chaparral	▶ Deer brush chaparral
Sagebrush	19,468	▶ Black sagebrush scrub* ▶ Big sagebrush ▶ Black brush scrub ▶ Death Valley joint fir scrub*	▶ Mormon tea scrub ▶ Rubber rabbitbrush scrub ▶ Stansbury cliff rose scrub* ▶ Bitter brush scrub*
Herbaceous Habitats			
Annual Grassland	26,952	▶ Fiddleneck - phacelia field ▶ Tournefort's mustard and other ruderal desert forb patch[N] ▶ California poppy - lupine field ▶ Monolopia - leafy-stemmed tickseed field	▶ California goldfields - dwarf plantain - small fescue flower fields Red brome or mediterranean grass grassland[N]
Perennial Grassland	367	▶ Indian rice grass grassland* ▶ Desert needlegrass grassland* ▶ Tournefort's mustard and other ruderal desert forb patch[N] ▶ Sand-aster and perennial buckwheat field	▶ Ashy ryegrass - creeping ryegrass turf*Deer grass bed* ▶ Needle grass - melic grass grassland ▶ Curly blue grass grassland*
Total	307,907		

*These are designated sensitive natural communities with a state rarity rank of S1 (critically imperiled), S2 (imperiled), or S3 (vulnerable).

[N] These alliances are dominated by nonnative vegetation.

Source: CWHR 2019, CNPS 2019, Compiled by Ascent Environmental in 2019

Critical Habitat

Designated critical habitat within the treatable landscape of the Mojave Desert exists for seven species. Appendix BIO-3 lists and provides the acreage of critical habitat designated within the treatable landscape of this ecoregion for these species. Examples include arroyo toad, California condor, Cushenbury milk-vetch (*Astragalus albens*), and Cushenbury buckwheat (*Eriogonum ovalifolium* var. *vineum*). Appendix BIO-4 lists and provides the acreage of critical habitat designated within the treatable landscape of this ecoregion for these species.

Sensitive Natural Communities and Habitats

Sensitive Natural Communities

There are 35 sensitive natural communities that may occur within the treatable landscape of the Mojave Desert Section. The sensitive natural communities associated with each CWHR type in this ecoregion are identified in Table 3.6-13. Examples of sensitive natural communities in this ecoregion include Bigcone Douglas fir forest, Joshua tree woodland, Utah juniper woodland, crucifixion thorn stand, Wright's buckwheat - Heerman's buckwheat - Utah butterfly-bush scrub, desert needlegrass grassland, and Death Valley joint fir scrub.

Wetlands and Other Waters of the United States and Waters of the State

Wetlands mapped in the treatable landscape of the Mojave Desert consist of just over 6,000 acres of freshwater emergent wetland, freshwater forested and shrub wetland, freshwater pond, lake, and riverine habitats (Table 3.6-2). Additional wetland types that may be present within other CWHR types in the treatable landscape include alkali sacaton - scratchgrass - alkali cordgrass alkaline wet meadows, water foxtail meadows, iodine bush scrub, and bush seepweed scrub.

Other Sensitive Habitats

CWHR riparian habitat types identified within the treatable landscape of the Mojave Desert Section consist of approximately 343 acres of montane riparian habitat and 204 acres of valley and foothill riparian habitat. There are four MCV alliances that may occur in the montane riparian habitat type and five that may occur in the valley and foothill riparian habitat. Four of riparian alliances are designated sensitive natural communities. Examples include water birch thicket, Fremont cottonwood forest, and red willow thicket. All riparian habitats are considered sensitive and those located near rivers, streams, and lakes are protected under California Fish and Game Code.

Approximately 420 acres of blue oak woodland and 200 acres of valley oak woodland habitat have been mapped within the treatable landscape of this ecoregion and canyon live oak forest may be present in the 573 acres of montane hardwood.

Just over 24,000 acres of mixed chaparral and 17 acres of montane chaparral have been mapped in the treatable landscape of this ecoregion. Muller oak chaparral, green leaf manzanita chaparral, and deer brush chaparral are the most likely vegetation alliances within the chaparral habitat types. Muller oak (*Quercus Cornelius-mulleri*), green leaf manzanita (*Arctostaphylos patula*), and deer brush (*Ceanothus integerrimus*) all sprout prolifically from root crowns following fire and also establish from seed. Muller oak chaparral is adapted to episodic fires of variable intensity and severity with a fire return interval of 30 to 100 years (Sawyer et al. 2009). Deer brush and green leaf manzanita also reestablish readily from seed after fires. The return interval is 10 to 50 years for deer brush chaparral and 20 to 50 years for green leaf manzanita chaparral (Sawyer et al. 2009).

Conservation Lands, Special Management Areas, and Other Biologically Important Lands

Habitat Conservation Plan, Natural Community Conservation Plan, and other Conservation Plan Areas

The treatable landscape in the Mojave Desert Section includes plan areas for the West Mojave Plan (HCP), Desert Renewable Energy Conservation Plan (HCP/NCCP), and Town of Apple Valley Multi-Species HCP/NCCP, which are currently being planned in the treatable landscape. Table 3.6-14 summarizes the acreages of the plan areas within the treatable landscape.

Table 3.6-14 Conservation Plans Adopted or In Progress in the Treatable Landscape—Mojave Desert Section

Conservation Plan	Plan Type	Stage	Plan Area Within the Treatable Landscape (Acres)
West Mojave Plan	HCP	Planning	362,660
Desert Renewable Energy Conservation Plan	HCP/NCCP	Planning	427,563
Town of Apple Valley Multi-Species	HCP/NCCP	Planning	0.2
		Total	**790,233**

Protected Open Space Lands

The treatable landscape in the Mojave Desert Section contains 46 protected open space units that are recognized in CPAD. These lands cover 44,646 acres, which represent 14 percent of the treatable landscape in the ecoregion. Some of the major land owners include City of Los Angeles Department of Water and Power (LADWP), The Wildlands Conservancy, State Parks, CSLC, CDFW, County of Los Angeles, Mountains Recreation and Conservation Authority, and Arroyos and Foothills Conservancy. Examples of some of the prominent open space units in the Mojave Desert Section include Pioneertown Mountains Preserve, Red Rock Canyon State Park, Antelope Valley California Poppy Reserve, Blalock Wildlife Sanctuary, King Clone Ecological Reserve, Cartago Wildlife Area, and Black Mesa Significant Ecological Area.

Mono Section

The Mono Section (341D) encompasses 1,973,879 acres and consists of block ranges separated by desert basins and alluvial fans, just east of the Sierra Nevada. Elevations in this ecoregion range from 4,000 feet to over 14,000 feet. This ecoregion contains 188,748 acres of treatable landscape, which represents approximately 10 percent of the total landscape within the ecoregion. Within the treatable landscape exist modeled treatment areas for the following treatment types: WUI fuel reduction (75,966 acres), fuel break (33,022 acres), and ecological restoration (99,980 acres). The treatable landscape is dispersed across much of the ecoregion and includes areas surrounding cities and communities along Highway 395. The treatable landscape in this ecoregion is displayed in Figure 3.6-9.

Vegetation and Habitat Types

The predominant CWHR type in the treatable landscape of the Mono Section is sagebrush, which makes up about 49 percent of the land cover. There are 13 MCV alliances that may be found within areas mapped as sagebrush. Six other scrub habitat types are also present, comprising almost 35 percent of the treatable landscape. The desert scrub and alkali desert scrub types are also highly diverse with 16 associated MCV alliances recognized in this ecoregion. Woodland and forest habitats make up just 17,721 acres, or almost 10 percent of the treatable landscape and annual and perennial grasslands 12,330 acres, or about 6 percent. Annual grassland here is mostly composed of one vegetation alliance – cheatgrass-medusahead grassland with cheatgrass being dominant (*Bromus tectorum*). Eight MCV alliances have been mapped and described in the perennial grasslands in this ecoregion, however, and these include both nonnative and native types. The distribution of CWHR types within the treatable landscape of this ecoregion is shown in Figure 3.6-9 and the acreage of each type, as well as associated MCV alliances, is provided in Table 3.6-15.

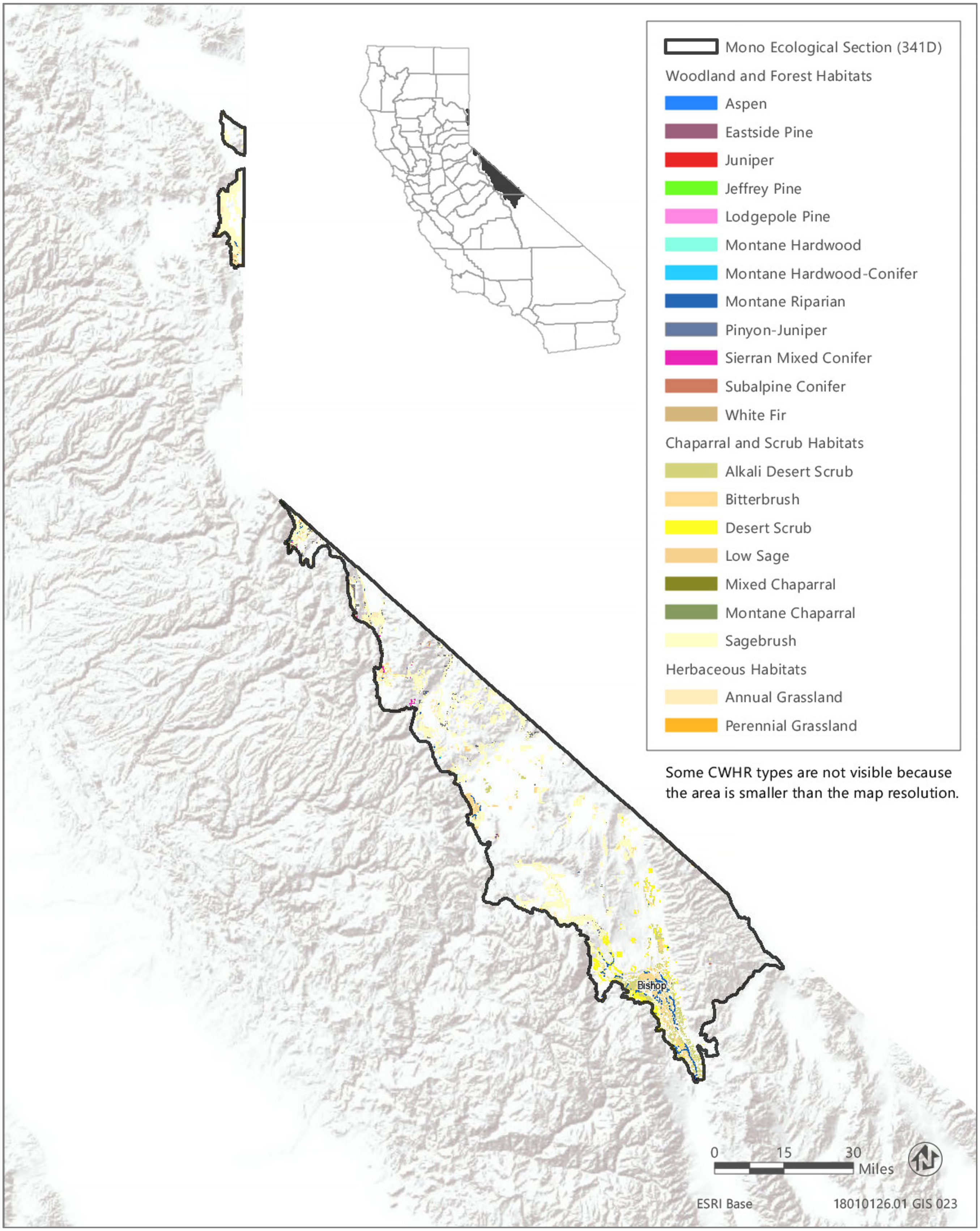
Sensitive Biological Resources

Special-Status Species

There are 84 special-status wildlife taxa and 70 plant taxa known or with potential to occur in the treatable landscape of the Mono Section, including four plant taxa and 25 animal taxa that are state or federally listed as rare, threatened, or endangered or fully protected. A list of all the special-status plant species known or with potential to occur within the treatable landscape of the Mono Section, along with their listing status and detailed habitat descriptions, is provided in Appendix BIO-3, Table 8a. A list of special-status wildlife (other than fish) species known or with potential to occur in the treatable landscape of this ecoregion, along with the CWHR types they are associated with, is provided in Appendix BIO-3, Table 8b. Special-status fish known or with potential to occur in the ecoregion are identified in Appendix BIO-3, Table 19.

Critical Habitat

Designated critical habitat is present within the treatable landscape of the Mono Section for five species: yellow-billed cuckoo (*Coccyzus americanus*), Owens tui chub (*Gila bicolor* ssp. *snyderi*), Sierra Nevada bighorn sheep (*Ovis canadensis sierra*), Fish slough milk-vetch (*Astragalus lentiginosus* var. *piscinensis*), and Webber's ivesia (*Ivesia webberi*). Appendix BIO-4 lists and provides the acreage of critical habitat designated within the treatable landscape of this ecoregion for these species.



Source: Data received from CAL FIRE in 2018

Figure 3.6-9 CWHR Types - Mono Ecological Section (341D)

Table 3.6-15 Vegetation and Habitat Types within the Treatable Landscape for the Mono Ecological Section

CWHR Classification	Acres	MCV Alliances	
Woodland and Forest Habitats			
Aspen	838	▸ Aspen groves*	
Eastside Pine	2,383	▸ Jeffrey pine forest	▸ Ponderosa pine forest
Jeffrey Pine	118	▸ Jeffrey pine forest	
Juniper	40	▸ Needleleaf rabbitbrush scrub ▸ Mountain juniper woodland	▸ Utah juniper woodland* ▸ Singleleaf pinyon - Utah juniper woodlands
Lodgepole Pine	62	▸ Lodgepole pine forest	
Montane Hardwood	92	▸ California black oak forest	▸ Interior live oak woodland
Montane Hardwood-Conifer	106	▸ None[1]	
Montane Riparian	3,413	▸ Rocky Mountain maple thickets* ▸ Water birch thicket* ▸ Fremont cottonwood forest* ▸ Black cottonwood forest*	▸ Interior rose thicket* ▸ Sandbar willow thicket ▸ Geyer willow thickets* ▸ Yellow willow thickets*
Pinyon-Juniper	10,366	▸ Utah juniper woodland* ▸ Singleleaf pinyon - Utah juniper woodlands	▸ Ponderosa pine forest
Sierran Mixed Conifer	164	▸ Mixed conifer forest	
Subalpine Conifer	60	▸ Whitebark pine forest ▸ Limber pine woodland* ▸ Bristlecone pine woodland*	▸ Western white pine forest ▸ Mountain hemlock forest
White Fir	79	▸ White fir forest	
Chaparral and Scrub Habitats			
Alkali Desert Scrub	21,419	▸ Iodine bush scrub* ▸ Shadscale scrub ▸ Quailbush scrub ▸ Parry's saltbush scrub*	▸ Winterfat scrubland* ▸ Greasewood scrub ▸ Alkali sacaton - scratchgrass - alkali cordgrass alkaline wet meadow* ▸ Bush seepweed scrub*
Bitterbrush	27,987	▸ Bitter brush scrub*	
Desert Scrub	13,314	▸ Iodine bush scrub* ▸ White bursage scrub ▸ Shadscale scrub ▸ Quailbush scrub ▸ Parry's saltbush scrub* ▸ Rigid spineflower - hairy desert sunflower ▸ Mojave-Sonoran desert dunes* ▸ Acton's and Virgin River brittlebush - net-veined goldeneye scrub* ▸ Nevada joint fir - Anderson's boxthorn - spiny hop sage scrub	▸ California buckwheat - Parish's goldeneye scrub ▸ Wright's buckwheat - Heerman's buckwheat - Utah butterfly-bush scrub* ▸ Winterfat scrubland* ▸ Spiny menodora scrub* ▸ James' galleta shrub-steppe* ▸ Greasewood scrub ▸ Alkali sacaton - scratchgrass - alkali cordgrass alkaline wet meadow* ▸ Bush seepweed scrub*
Low Sage	1,710	▸ Little sagebrush scrub	▸ Black sagebrush scrub*
Mixed Chaparral	3	▸ Deer brush chaparral	
Montane Chaparral	891	▸ Mountain whitethorn chaparral	▸ Tobacco brush or snow bush chaparral

Table 3.6-15 Vegetation and Habitat Types within the Treatable Landscape for the Mono Ecological Section

CWHR Classification	Acres	MCV Alliances	
Sagebrush	93,464	Little sagebrush scrub Silver sagebrush scrub* Black sagebrush scrub* Rothrock's sagebrush* Big sagebrush Mountain big sagebrush Small leaf mountain mahogany scrub*	Curl leaf mountain mahogany scrub Black brush scrub Mormon tea scrub Rubber rabbitbrush scrub Parry's rabbitbrush scrub* Bitter brush scrub*
Herbaceous Habitats			
Annual Grassland	12,117	Cheatgrass - medusahead grassland[N]	
Perennial Grassland	213	Crested wheatgrass rangeland[N] Purple three-awn meadow* Poison hemlock or fennel patch[N] Tufted hair grass meadow	Ashy ryegrass - creeping ryegrass turf* Kentucky blue grass turf[N] Curly blue grass grassland* Bluebunch wheat grass grassland*
Total	188,839		

*These are designated sensitive natural communities with a state rarity rank of S1 (critically imperiled), S2 (imperiled), or S3 (vulnerable).

[N] These alliances are dominated by nonnative vegetation.

[1] There are no MCV alliances recognized for this CWHR type in this ecoregion.

Source: CWHR 2019, CNPS 2019, Compiled by Ascent Environmental in 2019

Sensitive Natural Communities and Habitats

Sensitive Natural Communities

There are 29 sensitive natural communities that may occur within the treatable landscape of the Mono Section. The sensitive natural communities associated with each CWHR type in this ecoregion are identified in Table 3.6-15. Examples of sensitive natural communities in this ecoregion include aspen groves, limber pine woodland, bristlecone pine woodland, Utah juniper woodland, winterfat scrubland, James' galleta shrub-steppe, black sagebrush shrub, Rothrock's sagebrush, small leaf mountain mahogany scrub, and purple three-awn meadow.

Wetlands and Other Waters of the United States and Waters of the State

Over 11,500 acres of freshwater emergent wetland, freshwater forested and shrub wetland, freshwater pond, lake, and riverine habitats have been mapped within the treatable landscape of the Mono Section (Table 3.6-2). Additional wetland types that may be present within other CWHR types in the treatable landscape include alkali sacaton - scratchgrass - alkali cordgrass alkaline wet meadows, silver sagebrush scrub, iodine bush scrub, and bush seepweed scrub.

Other Sensitive Habitats

There are just over 3,400 acres of montane riparian habitat mapped in the treatable landscape of this ecoregion. There are eight MCV alliances that may occur in the montane riparian habitat type and all but one of these are designated sensitive natural communities, including Rocky Mountain maple thickets, water birch thicket, Geyer willow thickets, and yellow willow thickets.

A minor amount of black oak forest and interior live oak woodland may be present within the 92 acres of montane hardwood mapped in the treatable landscape of this ecoregion. Unlike many oak woodlands in the state, black oak forest is not seriously threatened by development and has not sustained substantial losses. There are no chaparral or coastal sage scrub habitats present.

<u>Conservation Lands, Special Management Areas, and Other Biologically Important Lands</u>

Habitat Conservation Plan, Natural Community Conservation Plan, and other Conservation Plan Areas

No conservation plans have been adopted for lands within the treatable landscape in the Mono Section.

Protected Open Space Lands

The treatable landscape in the Mono Section contains 35 protected open space units that are recognized in CPAD. These lands cover 99,925 acres, which represent 53 percent of the treatable landscape in the ecoregion. Some of the major land owners include LADWP, CDFW, CSLC, State Parks, and Mono County. Examples of some of the prominent open space units in the Mono Section include Hallelujah Junction Wildlife Area, Slinkard/Little Antelope Wildlife Area, Mono Lake Tufa State Reserve, Bodie State Historic Park, and East Walker River Wildlife Area.

Northern California Coast Section

The Northern California Coast Section (263A) encompasses 4,240,135 acres and encompasses parallel mountain ranges, hills, and valleys in the northern California Coast Ranges and small parts of the Klamath mountains, as well as alluvial river valleys, coastal dunes and terraces, bluffs, and cliffs along the rugged coastline. This ecoregion extends from the Oregon-California border south to the San Francisco Bay. Summer daytime temperatures are often modified by fog and sea breezes. Elevations range from sea level to 3,000 feet. This ecoregion contains 2,395,236 acres of treatable landscape, which represents approximately 56 percent of the total landscape within the ecoregion. Within the treatable landscape exist modeled treatment areas for the following treatment types: WUI fuel reduction (1,315,341 acres), fuel break (229,665 acres), and ecological restoration (1,017,802 acres). The treatable landscape is dispersed across much of the ecoregion and is displayed in Figure 3.6-10.

Vegetation and Habitat Types

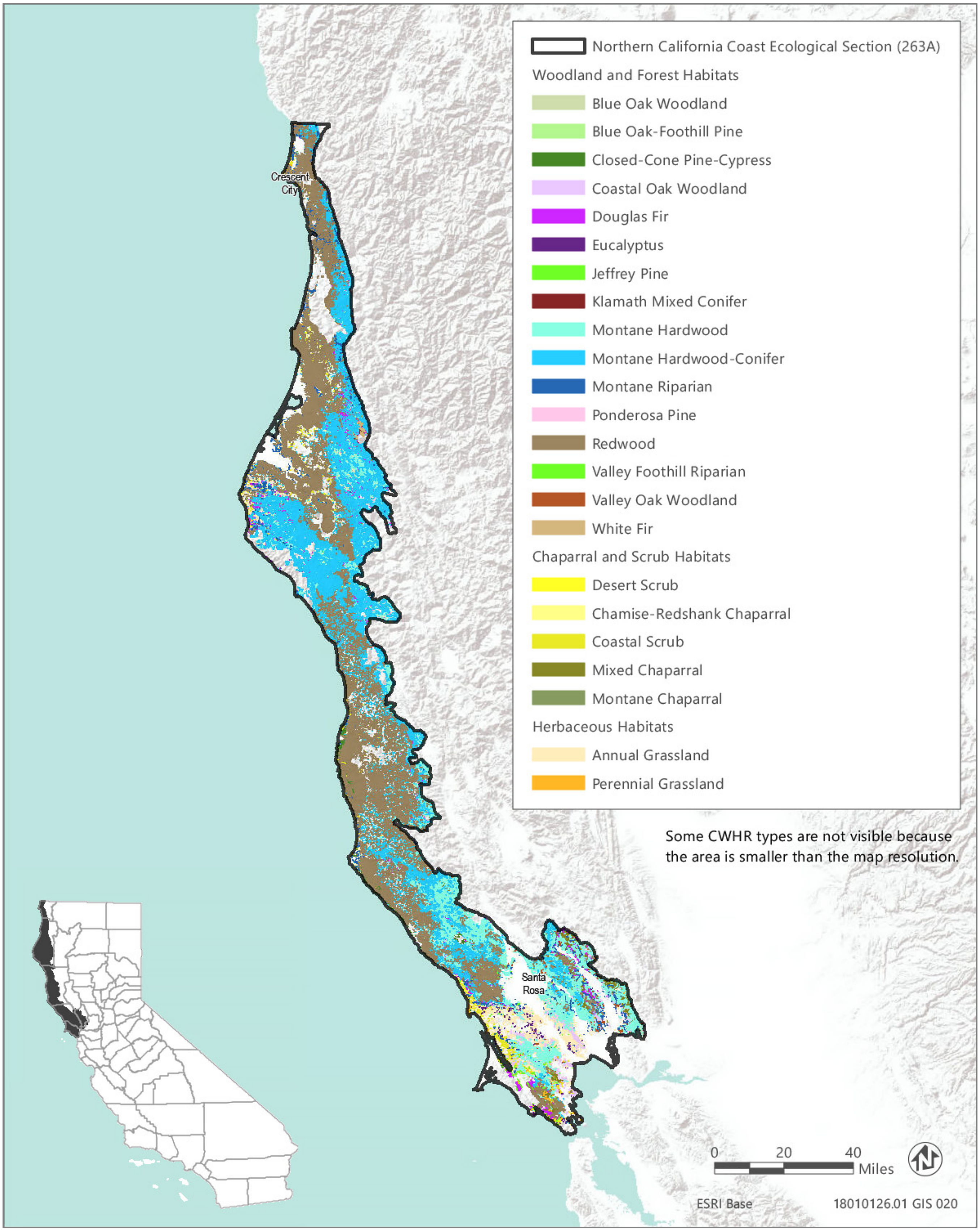
The predominant habitat types in the treatable landscape of the Northern California Coast Section are montane hardwood-conifer and redwood, which comprise approximately 21 percent and 20 percent of the treatable landscape, respectively. Douglas fir makes up approximately 18 percent of the treatable landscape area. Other common habitat types are montane hardwood and annual grassland, which comprise approximately 16 and 13 percent of the treatable landscape, respectively. This ecoregion also supports several unique and diverse habitat types. For example, redwood habitat in this ecoregion represents four vegetation alliances, and all of these are designated as sensitive natural communities. Fourteen of the 23 habitat types within the treatable landscape of this ecoregion have potential to include at least one sensitive natural community.

Table 3.6-16 provides the acreage of each CWHR habitat type within the treatable landscape of this ecoregion and the associated MCV alliances that may occur within each CWHR type in this ecoregion. Klamath mixed conifer, white fir, and desert scrub are mapped within this ecoregion; however, none of the corresponding MCV vegetation alliances have been previously identified in this ecoregion. Incense cedar forest, a vegetation alliance that is also designated a sensitive community, is not included in any CWHR type mapped within this ecoregion and is not shown in Table 3.6-16; however, it is known to occur in this ecoregion. Alliances that are designated as sensitive natural communities and those that are dominated by nonnative vegetation are indicated in Table 3.6-16. Sensitive natural communities are discussed in more detail below. The distribution of CWHR types within this ecoregion is shown in Figure 3.6-10.

Sensitive Biological Resources

Special-Status Species

More than 83 special-status wildlife taxa and 269 plant taxa are known or have the potential to occur within the treatable landscape of the Northern California Coast Section, including 45 plant taxa and 47 animal taxa that are state or federally listed as rare, threatened, or endangered. One of these plant species, Tiburon mariposa lily (*Calochortus tiburonensis*) is known from only one occurrence at Ring Mountain Preserve on the Tiburon Peninsula and nowhere else in the world. Over 65 special-status plant species in this ecoregion are sometimes associated with serpentine soils and 26 plant species in this ecoregion are sometimes associated with bogs and fens. A list of all the special-status plant species known or with potential to occur within the treatable landscape of the Northern California Coast Section, along with their listing status and detailed habitat descriptions, is provided in Appendix BIO-3, Table 9a. A list of special-status wildlife (other than fish) species known or with potential to occur in the treatable landscape of this ecoregion, along with the CWHR types they are associated with, is provided in Appendix BIO-3, Table 9b. Special-status fish known or with potential to occur within the treatable landscape of this ecoregion are identified in Appendix BIO-3, Table 19.



Source: Data received from CAL FIRE in 2018

Figure 3.6-10 CWHR Types - Northern California Coast Ecological Section (263A)

Table 3.6-16 Vegetation and Habitat Types within the Treatable Landscape for the Northern California Coast Ecological Section

CWHR Classification	Acres	MCV Alliances	
Woodland and Forest Habitats			
Blue Oak Woodland	4,245	▶ Blue oak woodland	▶ Interior live oak woodland
Blue Oak-Foothill Pine	1,049	▶ Foothill pine woodland	▶ Blue oak woodland
Closed-Cone Pine-Cypress	35,165	▶ McNab cypress woodland* ▶ Mendoncino pygmy cypress woodland* ▶ Sargent cypress woodland*	▶ Knobcone pine forest ▶ Beach pine forest* ▶ Bishop pine - Monterey pine forest*
Coastal Oak Woodland	79,781	▶ Madrone forest* ▶ Coast live oak woodland	▶ Mixed oak forest ▶ California bay forest*
Douglas Fir	430,231	▶ Bigleaf maple forest* ▶ Port Orford cedar forest* ▶ Ponderosa pine - Douglas fir forest	▶ Douglas fir forest ▶ Douglas fir - tanoak forest* ▶ Western hemlock forest*
Eucalyptus	1,830	▶ Eucalyptus - tree of heaven - black locust groves[N]	
Jeffrey Pine	482	▶ Jeffrey pine forest	
Klamath Mixed Conifer	1,384	▶ None[1]	
Montane Hardwood	394,942	▶ Bigleaf maple forest* ▶ California buckeye grove* ▶ Red alder forest ▶ Tanoak forest*	▶ Mixed oak forest ▶ Canyon live oak forest ▶ Oregon white oak woodland* ▶ Interior live oak woodland
Montane Hardwood-Conifer	495,403	▶ Bigleaf maple forest*	▶ Red alder forest
Montane Riparian	41,397	▶ White alder grove ▶ Torrent sedge patch* ▶ Oregon ash grove* ▶ Hinds's walnut and related stand* ▶ Fremont cottonwood forest*	▶ Black cottonwood forest* ▶ Western Labrador-tea thicket* ▶ Sandbar willow thicket ▶ Wild grape shrubland*
Ponderosa Pine	320	▶ Ponderosa pine forest	▶ Ponderosa pine - Douglas fir forest
Redwood	470,976	▶ Grand fir forest* ▶ Sitka spruce forest*	▶ Western azalea patch* ▶ Redwood forest*
Valley Foothill Riparian	756	▶ Box-elder forest* ▶ Torrent sedge patch* ▶ Fremont cottonwood forest* ▶ Black cottonwood forest* ▶ Himalayan blackberry - rattlebox - edible fig riparian scrub[N]	▶ Brewer willow thicket* ▶ Sandbar willow thicket ▶ Red willow thicket* ▶ Shining willow groves* ▶ Wild grape shrubland*
Valley Oak Woodland	947	▶ Valley oak woodland*	
White Fir	866	▶ None[1]	
Chaparral and Scrub Habitats			
Chamise-Redshank Chaparral	12,079	▶ Chamise chaparral ▶ Eastwood manzanita chaparral	▶ Wedge leaf ceanothus chaparral/Buck brush chaparral
Coastal Scrub	55,792	▶ Dune mat* ▶ California sagebrush scrub ▶ Coyote brush scrub ▶ Broom patch[N] ▶ Sea rocket sands	▶ Goldenaster patch* ▶ Salt rush swale* ▶ Deer weed scrub ▶ Silver bush lupine scrub ▶ Yellow bush lupine scrub

Table 3.6-16 Vegetation and Habitat Types within the Treatable Landscape for the Northern California Coast Ecological Section

CWHR Classification	Acres	MCV Alliances	
		▶ Sand dune sedge swath* ▶ Blue blossom chaparral ▶ Hazelnut scrub* ▶ Live-forever - lichen/moss sparse herbaceous rock outcop ▶ California coffee berry scrub ▶ Coastal silk tassel scrub*	▶ Silver dune lupine - mock heather scrub* ▶ Ice plant mats[N] ▶ Wax myrtle scrub* ▶ Coastal bramble* ▶ Coast range stonecrop draperies ▶ Poison oak scrub
Desert Scrub	4	▶ None[1]	
Mixed Chaparral	38,938	▶ Baker manzanita stand* ▶ Hoary, common, and Stanford manzanita chaparral* ▶ Eastwood manzanita chaparral ▶ Mount Tamalpais manzanita chaparral* ▶ Glossy leaf manzanita chaparral* ▶ Wedge leaf ceanothus chaparral, Buck brush chaparral ▶ Deer brush chaparral	▶ Hairy leaf - woolly leaf ceanothus chaparral* ▶ Golden chinquapin thickets* ▶ California coffee berry scrub ▶ Ocean spray brush* ▶ Deer weed scrub ▶ Silver bush lupine scrub ▶ Scrub oak chaparral ▶ Leather oak chaparral ▶ Interior live oak chaparral ▶ Poison oak scrub
Montane Chaparral	9,245	▶ Mount Tamalpais manzanita chaparral*	▶ Deer brush chaparral
Herbaceous Habitats			
Annual Grassland	316,561	▶ Wild oat grassland[N] ▶ Upland mustard and other ruderal forbs[N] ▶ Annual brome grassland[N] ▶ Red brome or mediterranean grass grassland[N] ▶ Cheatgrass - medusahead grassland[N] ▶ Yellow star-thistle field[N] ▶ Annual dogtail grassland[N] ▶ Squirreltail patch	▶ California poppy - lupine field ▶ Goldenaster patch* ▶ California goldfields - dwarf plantain - small fescue flower fields ▶ Perennial rye grass field[N] ▶ White-tip clover swales*
Perennial Grassland	2,841	▶ Bent grass - tall fescue meadow ▶ Water foxtail meadow* ▶ European beach grass sward[N] ▶ Upland mustard and other ruderal forbs[N] ▶ California brome - blue wildrye prairie* ▶ Pacific reed grass meadow* ▶ Poison hemlock or fennel patch[N] ▶ Sand-aster and perennial buckwheat field ▶ Pampas grass patch[N]	▶ California oat grass prairie* ▶ Tufted hair grass meadow ▶ Squirreltail patch ▶ Idaho fescue grassland* ▶ Red fescue grassland* ▶ Gum plant patch* ▶ Common velvet grass - sweet vernal grass meadow[N] ▶ Ashy ryegrass - creeping ryegrass turf* ▶ Sea lyme grass patch* ▶ Needle grass - melic grass grassland ▶ Harding grass - reed canary grass sward[N]
Total	2,395,234		

*These are designated sensitive natural communities with a state rarity rank of S1 (critically imperiled), S2 (imperiled), or S3 (vulnerable).

[N] These alliances are dominated by nonnative vegetation.

[1] There are no MCV alliances recognized for this CWHR type in this ecoregion.

Source: CWHR 2019, CNPS 2019, Compiled by Ascent Environmental in 2019

Critical Habitat

Critical habitat has been designated within the treatable landscape of this ecoregion for four plant taxa and eight wildlife taxa. Appendix BIO-4 lists and provides the acreage of critical habitat designated within the treatable landscape of this ecoregion for these species. Examples include northern spotted owl (*Strix occidentalis caurina*), marbled murrelet (*Brachyramphus marmoratus*), California red-legged frog (*Rana draytonii*), and Contra Costa goldfields (*Lasthenia conjugens*).

Sensitive Natural Communities and Habitats

Sensitive Natural Communities

There are over 49 sensitive natural communities that may occur within the treatable landscape of the Northern California Coast Section. The sensitive natural communities associated with each CWHR type in this ecoregion are identified in Table 3.6-16. They include Mendocino pygmy cypress forest, Sargent cypress woodland, beach pine forest, bishop pine – Monterey pine forest, grand fir forest, Sitka spruce forest, redwood forest, tanoak forest, hazelnut scrub, coastal silk tassel scrub, California oat grass prairie, Pacific reed grass meadow, and red fescue grassland.

Wetlands and Other Waters of the United States and Waters of the State

Wetland habitats known to occur within the treatable landscape of the Central California Coast Section include estuarine and marine deepwater, estuarine and marine wetland, freshwater emergent wetland, freshwater forested and shrub wetland, freshwater pond, lake, and riverine (Table 3.6-2). In addition, vernal pools, white-tip clover swales, water foxtail meadows and Pacific reed grass meadows may be included in areas mapped as annual or perennial grasslands. Major waterways include the Mattole, Klamath, Eel, Mad, Trinity, Van Duzen, Ten Mile, Navarro, and Russian rivers. Humboldt and Arcata Bay support several sloughs and other significant wetlands include Inglenook Fen and Laguna de Santa Rosa.

Other Sensitive Habitats

CWHR riparian habitat types identified within the treatable landscape of the Northern California Coast Section consist of approximately 41,397 acres of montane riparian and 756 acres of valley and foothill riparian habitats. There are 14 MCV alliances that may occur in the montane and valley and foothills riparian habitat types. Eleven of these are designated sensitive natural communities. Examples include Oregon ash grove, western Labrador-tea thickets, box-elder forests, Brewer willow thicket, and shining willow groves. All riparian habitats are considered sensitive and those located near rivers, streams, and lakes are protected under California Fish and Game Code.

Approximately 79,781 acres of coastal oak woodland, 4,245 acres of blue oak woodland, and 947 acres of valley oak woodland habitat have been mapped within the treatable landscape of this ecoregion. In addition, 1,049 acres of blue oak-foothill pine and 394,942 acres of montane hardwood habitat within the treatable landscape of this ecoregion support several additional oak alliances, including Oregon white oak woodland, a designated sensitive natural community.

Chaparral and coastal sage scrub habitats in the treatable landscape consist of approximately 55,792 acres of coastal scrub, 38,938 acres of mixed chaparral, 12,079 acres of chamise-redshank chaparral, and 9,245 acres of montane chaparral. Twenty-two MCV alliances have been mapped and described within areas classified as coastal scrub in this ecoregion, including eight alliances designated as sensitive natural communities. Seventeen MCV alliances have been mapped and described within areas classified as mixed chaparral in this ecoregion, including seven alliances designated as sensitive natural communities. Montane chaparral alliances consist of Mount Tamalpais manzanita chaparral, a designated sensitive community, and deer brush chaparral. Chamise-redshank chaparral consists of chamise chaparral, Eastwood manzanita chaparral, and wedge leaf ceanothus chaparral/buck brush chaparral.

The 470,976 acres of redwood forest habitat within the treatable landscape of this ecoregion support old-growth redwood forest, a designated sensitive natural community. Old-growth redwood forests are a relict vegetation type with roughly five percent of its range remaining (Save the Redwoods League 2019) that support a wide variety of plant and animal species closely associated with this vegetation type.

Conservation Lands, Special Management Areas, and Other Biologically Important Lands

Habitat Conservation Plan, Natural Community Conservation Plan, and other Conservation Plan Areas

The treatable landscape in the Northern California Coast Section includes plan areas for the Green Diamond HCP and Humboldt Redwoods (formerly Pacific Lumber) Company HCP, which have been adopted and are being implemented. Additionally, one HCP and one HCP/NCCP are currently being planned in the treatable landscape. Table 3.6-17 summarizes the conservation plans adopted or in progress, including the acreages of plan areas within the treatable landscape.

Table 3.6-17 Conservation Plans Adopted or In Progress in the Treatable Landscape—Northern California Coast Section

Conservation Plan	Plan Type	Stage	Plan Area Within the Treatable Landscape (Acres)
Green Diamond	HCP	Implementation	487,027
Humboldt Redwoods (formerly Pacific Lumber) Company	HCP	Implementation	202,280
Solano Multi-Species	HCP	Planning	16,917
Mendocino Redwood Company	HCP/NCCP	Planning	156,706
		Total	**862,930**

Protected Open Space Lands

The treatable landscape in the Northern California Coast Section contains 440 protected open space units that are recognized in CPAD. These lands cover 271,895 acres, which represent 11 percent of the treatable landscape in the ecoregion. Some of the major land owners include State Parks, CAL FIRE, The Conservation Fund, CDFW, Marin County Open Space District, and Sonoma Land Trust. Examples of some of the prominent open space units in the Northern California Coast Section include Humboldt Redwoods State Park, Mount Tamalpais State Park, Samuel P. Taylor State Park, Lake Earl Wildlife Area, Mottole River Ecological Reserve, Petaluma Marsh Wildlife Area, and Lucas Valley Open Space Preserve.

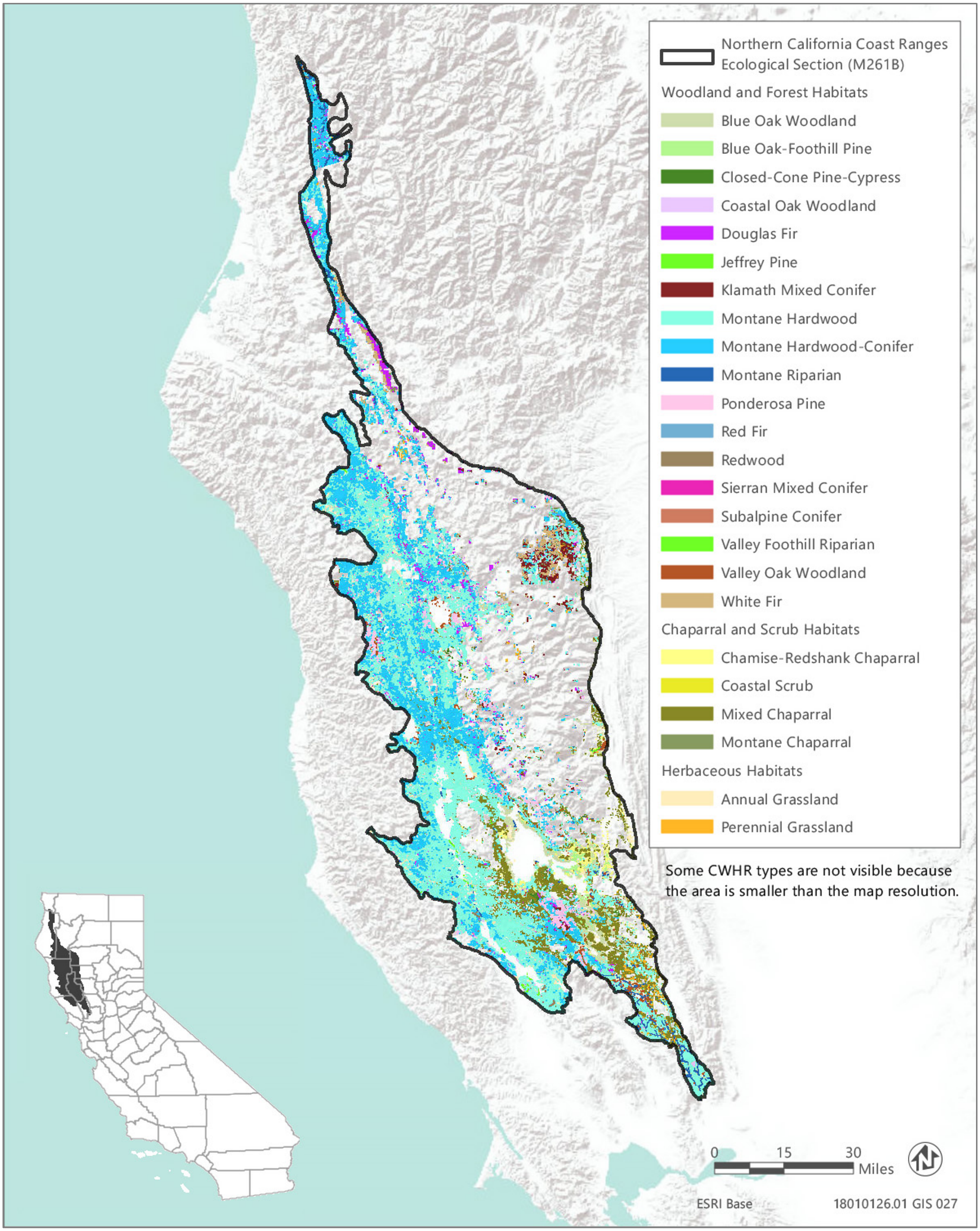
Northern California Coast Ranges Section

The Northern California Coast Ranges Section (M261B) encompasses 3,836,186 acres and includes mountains, hills, and valleys in the interior part of the northern California Coast Ranges mountains, north of the Carquinez Straight. Elevations range from 1,000 to 7,500 feet. This ecoregion contains 1,529,503 acres of treatable landscape, which represents approximately 40 percent of the total landscape within the ecoregion. Within the treatable landscape exist modeled treatment areas for the following treatment types: WUI fuel reduction (719,591 acres), fuel break (206,294 acres), and ecological restoration (754,399 acres). The treatable landscape within this ecoregion consists of treatment areas on many of the western and southern slopes and ridgelines of the north-south running ranges and is displayed in Figure 3.6-11.

Vegetation and Habitat Types

The predominant habitat types in the treatable landscape of the North California Coast Ranges Section are montane hardwood and Douglas fir, which comprise approximately 35 percent and 16 percent of the treatable landscape, respectively. Annual grassland and montane hardwood-conifer habitats combined make up approximately 12 percent and 11 percent, respectively, of the treatable landscape area. Four chaparral habitats make up approximately 12 percent of the treatable landscape area. Combined, montane hardwood and Douglas fir in this ecoregion represent 14 vegetation alliances, and half of these are designated as sensitive natural communities. Vernal pools may also be present in areas mapped as annual or perennial grasslands in this ecoregion.

Table 3.6-18 provides the acreage of each CWHR habitat type within the treatable landscape of this ecoregion and the associated MCV vegetation alliances that may occur within each CWHR type in this ecoregion. Alliances that are designated as sensitive natural communities and those that are dominated by nonnative vegetation are indicated in Table 3.6-18. Sensitive natural communities are discussed in more detail below. The distribution of CWHR types within this ecoregion is shown in Figure 3.6-11.



Source: Data received from CAL FIRE in 2018

Figure 3.6-11 CWHR Types - Northern California Coast Ranges Ecological Section (M261B)

Table 3.6-18 Vegetation and Habitat Types within the Treatable Landscape for the Northern California Coast Ranges Ecological Section

CWHR Classification	Acres	MCV Alliances	
Woodland and Forest Habitats			
Blue Oak Woodland	70,372	▶ Blue oak woodland	▶ Interior live oak woodland
Blue Oak-Foothill Pine	42,203	▶ Foothill pine woodland	▶ Blue oak woodland
Closed-Cone Pine-Cypress	9,715	▶ McNab cypress woodland* ▶ Sargent cypress woodland*	▶ Knobcone pine forest
Coastal Oak Woodland	26,913	▶ Madrone forest* ▶ Coast live oak woodland	▶ Mixed oak forest ▶ California bay forest*
Douglas Fir	249,160	▶ White fir - Douglas fir forest ▶ Bigleaf maple forest* ▶ Ponderosa pine - Douglas fir forest	▶ Douglas fir forest ▶ Douglas fir - incense cedar forest* ▶ Douglas fir - tanoak forest* ▶ Western hemlock forest*
Jeffrey Pine	223	▶ Jeffrey pine forest	
Klamath Mixed Conifer	27,056	▶ None[1]	
Montane Hardwood	536,562	▶ Bigleaf maple forest* ▶ California buckeye grove* ▶ Tanoak forest* ▶ Mixed oak forest	▶ Canyon live oak forest ▶ Oregon white oak woodland* ▶ Interior live oak woodland
Montane Hardwood-Conifer	161,685	▶ Bigleaf maple forest*	
Montane Riparian	5,610	▶ Mountain alder thicket* ▶ White alder grove ▶ Sitka alder thicket* ▶ Torrent sedge patch* ▶ Oregon ash grove*	▶ Hinds's walnut and related stand* ▶ Fremont cottonwood forest* ▶ Black cottonwood forest* ▶ Sandbar willow thicket ▶ Wild grape shrubland*
Ponderosa Pine	16,650	▶ Ponderosa pine forest	▶ Ponderosa pine - Douglas fir forest
Red Fir	1,207	▶ Red fir forest	▶ Red fir - white fir forest
Redwood	1,348	▶ Redwood forest*	
Sierran Mixed Conifer	2	▶ Incense cedar forest* ▶ Mixed oak forest	▶ Ponderosa pine - Douglas fir forest ▶ Douglas fir - incense cedar forest*
Subalpine Conifer	28	▶ Foxtail pine woodland*	▶ Mountain hemlock forest
Valley Foothill Riparian	646	▶ Box-elder forest* ▶ Torrent sedge patch* ▶ Button willow thicket* ▶ Fremont cottonwood forest* ▶ Black cottonwood forest*	▶ Himalayan blackberry - rattlebox - edible fig riparian scrub[N] ▶ Brewer willow thicket* ▶ Sandbar willow thicket ▶ Wild grape shrubland*
Valley Oak Woodland	3,822	▶ Valley oak woodland*	
White Fir	7,328	▶ White fir forest ▶ White fir - sugar pine forest	▶ White fir - Douglas fir forest ▶ Red fir - white fir forest
Chaparral and Scrub Habitats			
Chamise-Redshank Chaparral	39,933	▶ Chamise chaparral ▶ Eastwood manzanita chaparral	▶ Wedge leaf ceanothus chaparral/Buck brush chaparral

Table 3.6-18 Vegetation and Habitat Types within the Treatable Landscape for the Northern California Coast Ranges Ecological Section

CWHR Classification	Acres	MCV Alliances	
Coastal Scrub	225	▸ Coyote brush scrub ▸ Blue blossom chaparral ▸ Live-forever - lichen/moss sparse herbaceous rock outcop ▸ California coffee berry scrub	▸ Goldenaster patch* ▸ Deer weed scrub ▸ Silver bush lupine scrub ▸ Coast range stonecrop draperies
Mixed Chaparral	128,611	▸ Baker manzanita stand* ▸ Hoary, common, and Stanford manzanita chaparral* ▸ Eastwood manzanita chaparral ▸ Wedge leaf ceanothus chaparral, Buck brush chaparral ▸ Deer brush chaparral ▸ Hairy leaf - woolly leaf ceanothus chaparral*	▸ Birch leaf mountain mahogany chaparral ▸ California coffee berry scrub ▸ Ocean spray brush* ▸ Deer weed scrub ▸ Silver bush lupine scrub ▸ Holly leaf cherry - toyon - greenbark ceanothus chaparral ▸ Leather oak chaparral ▸ Interior live oak chaparral
Montane Chaparral	6,130	▸ Green leaf manzanita chaparral ▸ Whiteleaf manzanita chaparral ▸ Mountain whitethorn chaparral ▸ Deer brush chaparral	▸ Birch leaf mountain mahogany chaparral ▸ Bush chinquapin chaparral* ▸ Brewer oak scrub ▸ Huckleberry oak chaparral
Herbaceous Habitats			
Annual Grassland	182,054	▸ Barbed goatgrass patch[N] ▸ Wild oat grassland[N] ▸ Upland mustard and other ruderal forbs[N] ▸ Annual brome grassland[N] ▸ Red brome or mediterranean grass grassland[N] ▸ Cheatgrass - medusahead grassland[N]	▸ Yellow star-thistle field[N] ▸ Annual dogtail grassland[N] ▸ Squirreltail patch ▸ California poppy - lupine field ▸ Goldenaster patch* ▸ California goldfields - dwarf plantain - small fescue flower fields California coffee berry scrub
Perennial Grassland	2,019	▸ Bent grass - tall fescue meadow ▸ Water foxtail meadow* ▸ Upland mustard and other ruderal forbs[N] ▸ California brome - blue wildrye prairie* ▸ Small-fruited sedge meadow* ▸ Pampas grass patch[N]	▸ California oat grass prairie* ▸ Squirreltail patch ▸ Idaho fescue grassland* ▸ Ashy ryegrass - creeping ryegrass turf* ▸ Needle grass - melic grass grassland ▸ Harding grass - reed canary grass sward[N] ▸ Kentucky blue grass turf[N]
Total	1,519,502		

*These are designated sensitive natural communities with a state rarity rank of S1 (critically imperiled), S2 (imperiled), or S3 (vulnerable).

[N] These alliances are dominated by nonnative vegetation.

[1] There are no MCV alliances recognized for this CWHR type in this ecoregion.

Source: CWHR 2019, CNPS 2019, Compiled by Ascent Environmental in 2019

Sensitive Biological Resources

Special-Status Species

More than 75 special-status wildlife taxa and 130 plant taxa are known or have the potential to occur within the treatable landscape of the Northern California Coast Ranges Section, including 24 plant taxa and 24 animal taxa that are state or federally listed as rare, threatened, or endangered. Approximately one-third of these plants and animals listed as rare, threatened, or endangered are associated with vernal pools. Over 49 special-status plant species in this ecoregion are associated with serpentine soils. A list of all the special-status plant species known or with potential to occur within the treatable landscape of the Central California Coast Section, along with their listing status and detailed habitat descriptions, is provided in Appendix BIO-3, Table 10a. A list of special-status wildlife (other than fish) species known or with potential to occur in the treatable landscape of this ecoregion, along with the CWHR types they are associated with, is provided in Appendix BIO-3, Table 10b. Special-status fish known or with potential to occur within the treatable landscape of this ecoregion are identified in Appendix BIO-3, Table 19.

Critical Habitat

Critical habitat has been designated within the treatable landscape of this ecoregion for one plant taxa, slender Orcutt grass (*Orcuttia tenuis*), and three wildlife taxa, northern spotted owl (*Strix occidentalis caurina*), marbled murrelet (*Brachyramphus marmoratus*), and California red-legged frog (*Rana draytonii*). Appendix BIO-4 lists and provides the acreage of critical habitat designated within the treatable landscape of this ecoregion for these species.

Sensitive Natural Communities and Habitats

Sensitive Natural Communities

There are 37 sensitive natural communities that may occur within the treatable landscape of the Northern California Coast Ranges Section. The sensitive natural communities associated with each CWHR type in this ecoregion are identified in Table 3.6-18. They include McNab cypress woodland, Sargent cypress woodland, western hemlock forest, foxtail pine woodland, box-elder forest, button-willow thicket, and goldenaster patch.

Wetlands and Other Waters of the United States and Waters of the State

Wetland habitats known to occur within the treatable landscape of the Northern California Coast Ranges Section include freshwater emergent wetland, freshwater forested and shrub wetland, freshwater pond, lake, and riverine wetlands (Table 3.6-2). In addition, torrent sedge patch may be present within areas mapped as montane riparian or valley foothill riparian, and vernal pools, water foxtail meadow, and small-fruited sedge meadow are wetland communities that may be present in areas mapped as annual or perennial grasslands in this ecoregion. Major water features include Clear Lake, the Eel River, and Russian River.

Other Sensitive Habitats

CWHR riparian habitat types identified within the treatable landscape of the Northern California Coast Ranges Section consist of approximately 5,610 acres of montane riparian habitat and 646 acres of valley and foothill riparian habitat. There are 10 MCV alliances that may occur in the montane riparian habitat type and nine that may occur in the valley and foothill riparian habitat. All but four of the riparian alliances are designated sensitive natural communities. Examples include mountain alder thicket, Sitka alder thicket, Hind's walnut and related stand, and brewer willow thicket. All riparian habitats are considered sensitive and those located near rivers, streams, and lakes are protected under California Fish and Game Code.

Approximately 112,575 acres of blue oak woodland and blue oak-foothill pine, 26,913 acres of coastal oak woodland, and 3,822 acres of valley oak woodland habitats have been mapped within the treatable landscape of this ecoregion. Mixed oak forest, canyon live oak forest, Oregon white oak woodland, and interior live oak woodland may be present in the 536,562 acres of montane hardwood.

Chaparral habitats in the treatable landscape consist of approximately 128,611 acres of mixed chaparral, 39,933 acres of chamise-redshank chaparral, and 6,130 acres of montane chaparral. Over 20 MCV chaparral alliances, including five designated as sensitive natural communities, are present within the treatable landscape of this ecoregion. Examples include Eastwood manzanita chaparral, Baker manzanita chaparral, birch leaf mountain mahogany chaparral, hairy leaf-woolly leaf ceanothus chaparral, and bush chinquapin chaparral.

Conservation Lands, Special Management Areas, and Other Biologically Important Lands

Habitat Conservation Plan, Natural Community Conservation Plan, and other Conservation Plan Areas

The treatable landscape in the Northern California Coast Ranges Section includes plan areas for the Green Diamond HCP and Humboldt Redwoods (formerly Pacific Lumber) Company HCP, which have been adopted and are being implemented. Additionally, one HCP and two HCP/NCCPs are currently being planned in the treatable landscape. Table 3.6-19 summarizes the conservation plans adopted or in progress, including the acreages of plan areas within the treatable landscape.

Table 3.6-19 Conservation Plans Adopted or In Progress in the Treatable Landscape—Northern California Coast Ranges Section

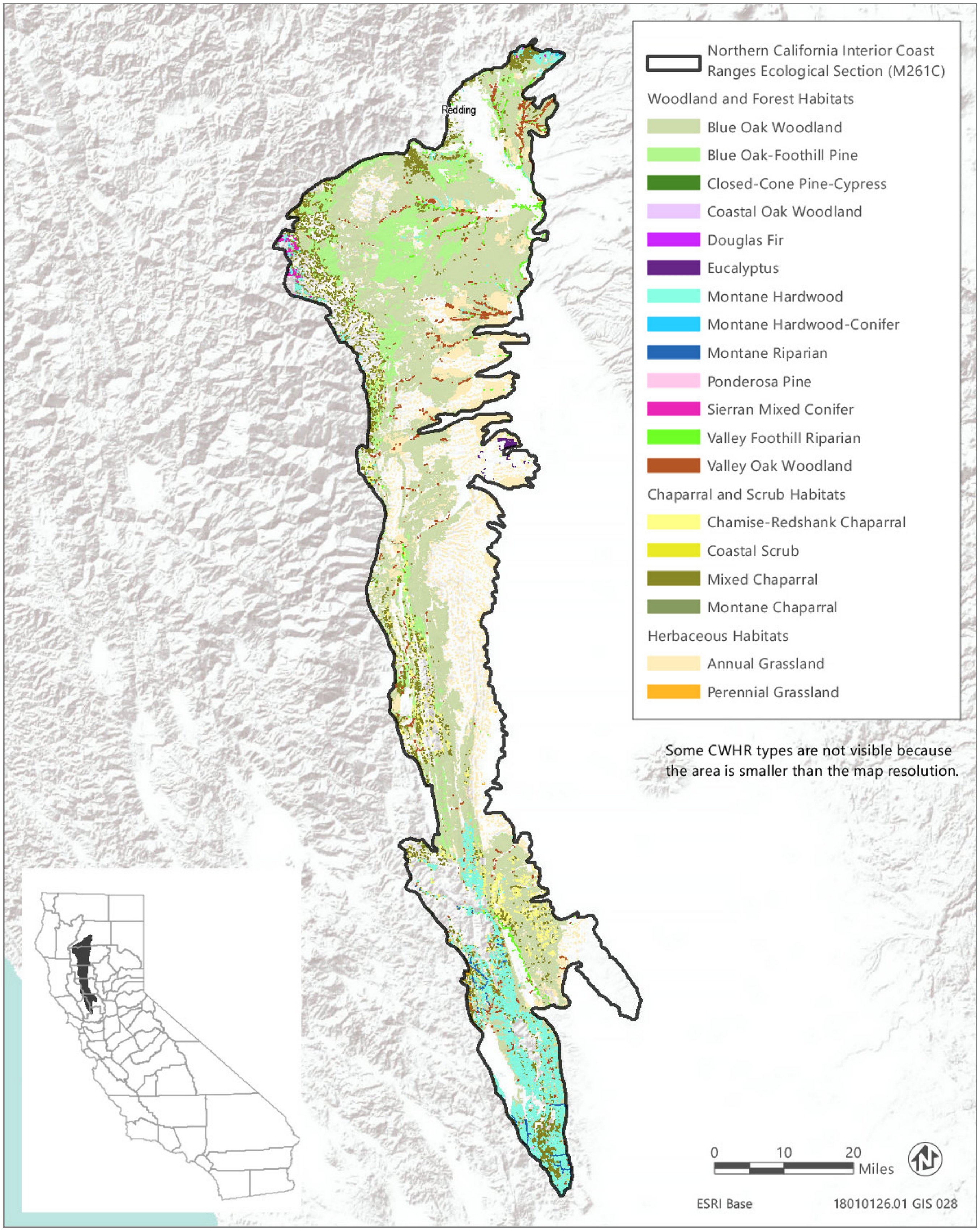
Conservation Plan	Plan Type	Stage	Plan Area Within the Treatable Landscape (Acres)
Green Diamond	HCP	Implementation	87,875
Humboldt Redwoods (formerly Pacific Lumber) Company	HCP	Implementation	638
Solano Multi-Species	HCP	Planning	3,190
Mendocino Redwood Company	HCP/NCCP	Planning	29
Yolo Natural Heritage Program	HCP/NCCP	Planning	100
		Total	**91,832**

Protected Open Space Lands

The treatable landscape in the Northern California Coast Ranges Section contains 93 protected open space units that are recognized in CPAD. These lands cover 47,825 acres, which represent 3 percent of the treatable landscape in the ecoregion. Some of the major land owners include CSLC, CAL FIRE, California Academy of Sciences, CDFW, The Wildlands Conservancy, State Parks, and Napa County Regional Park and Open Space District. Examples of some of the prominent open space units in the Northern California Coast Ranges Section include Boggs Mountain Demonstration State Forest, Pepperwood Ranch Natural Preserve, Cache Creek Wildlife Area, and Clear Lake State Park.

Northern California Interior Coast Ranges Section

The Northern California Interior Coast Ranges Section (M261C) encompasses 1,851,914 acres and consists of the southeastern edge of the northern California Coast Ranges and hills and terraces along the west side and north end of the Sacramento Valley. Elevations range from 200 to 2,500 feet. This ecoregion contains 904,575 acres of treatable landscape, which represents approximately 49 percent of the total landscape within the ecoregion. Within the treatable landscape exist modeled treatment areas for the following treatment types: WUI fuel reduction (384,620 acres), fuel break (144,246 acres), and ecological restoration (474,254 acres). The treatable landscape is dispersed throughout much of this ecoregion, from the city of Redding area in the north to near the city of Vacaville in the south and is displayed in Figure 3.6-12.



Source: Data received from CAL FIRE in 2018

Figure 3.6-12 CWHR Types - Northern California Interior Coast Ranges Ecological Section (M261C)

Vegetation and Habitat Types

Woodland habitats make up the majority of the treatable landscape of the North California Interior Coast Ranges Section and the predominant woodland types are blue oak woodland and blue oak-foothill pine, which comprise approximately 66 percent of the treatable landscape. Eleven other woodland habitats representing up to 22 vegetation alliances are also present and make up approximately 7 percent of the treatable landscape. Annual grassland is the next most common habitat type comprising approximately 21 percent of the treatable landscape. Three chaparral and one scrub habitat type make up approximately 6 percent of the treatable landscape area. The distribution of CWHR types within the treatable landscape of this ecoregion is shown in Figure 3.6-12 and the acreage of each type, as well as associated MCV alliances, is provided in Table 3.6-20.

Table 3.6-20 Vegetation and Habitat Types within the Treatable Landscape for the Northern California Interior and Coast Ranges Ecological Section

CWHR Classification	Acres	MCV Alliances	
Woodland and Forest Habitats			
Blue Oak Woodland	434,646	▶ Blue oak woodland	
Blue Oak-Foothill Pine	164,089	▶ Foothill pine woodland	▶ Blue oak woodland
Closed-Cone Pine-Cypress	6	▶ Knobcone pine forest	
Coastal Oak Woodland	719	▶ Coast live oak woodland	▶ California bay forest*
Douglas Fir	2	▶ Douglas fir forest	
Eucalyptus	991	▶ Eucalyptus - tree of heaven - black locust groves[N]	
Montane Hardwood	41,321	▶ California buckeye grove* ▶ Canyon live oak forest	▶ Oregon white oak woodland* ▶ Interior live oak woodland
Montane Hardwood-Conifer	341	▶ Bigleaf maple forest*	
Montane Riparian	749	▶ White alder grove ▶ Fremont cottonwood forest*	▶ Sandbar willow thicket ▶ Wild grape shrubland*
Ponderosa Pine	106	▶ Ponderosa pine forest	
Sierran Mixed Conifer	687	▶ Mixed conifer forest	
Valley Foothill Riparian	2,826	▶ Box-elder forest* ▶ Button willow thicket* ▶ Fremont cottonwood forest* ▶ Himalayan blackberry - rattlebox - edible fig riparian scrub[N]	▶ Sandbar willow thicket ▶ Red willow thicket* ▶ Wild grape shrubland*
Valley Oak Woodland	6,926	▶ Valley oak woodland*	
Chaparral and Scrub Habitats			
Chamise-Redshank Chaparral	20,948	▶ Chamise chaparral	▶ Wedge leaf ceanothus chaparral/Buck brush chaparral
Coastal Scrub	437	▶ Live-forever - lichen/moss sparse herbaceous rock outcop ▶ California yerba santa scrub ▶ Wright's buckwheat - Heerman's buckwheat - Utah butterfly-bush scrub*	▶ California coffee berry scrub ▶ Goldenaster patch* ▶ Deer weed scrub ▶ Silver bush lupine scrub

Table 3.6-20 Vegetation and Habitat Types within the Treatable Landscape for the Northern California Interior and Coast Ranges Ecological Section

CWHR Classification	Acres	MCV Alliances	
Mixed Chaparral	36,350	▸ Hoary, common, and Stanford manzanita chaparral* ▸ Whiteleaf manzanita chaparral ▸ Wedge leaf ceanothus chaparral, Buck brush chaparral ▸ Hairy leaf - woolly leaf ceanothus chaparral* ▸ Birch leaf mountain mahogany chaparral	▸ Bush poppy scrub ▸ California yerba santa scrub ▸ California coffee berry scrub ▸ Deer weed scrub ▸ Silver bush lupine scrub ▸ Scrub oak chaparral ▸ Leather oak chaparral ▸ Interior live oak chaparral
Montane Chaparral	889	▸ Whiteleaf manzanita chaparral	▸ Birch leaf mountain mahogany chaparral
Herbaceous Habitats			
Annual Grassland	192,383	▸ Fiddleneck - phacelia field ▸ Wild oat grassland[N] ▸ Annual brome grassland[N] ▸ Red brome or mediterranean grass grassland[N] ▸ Cheatgrass - medusahead grasslandN ▸ Yellow star-thistle field[N]	▸ Annual dogtail grassland ▸ Goldenaster patch* ▸ California goldfields - dwarf plantain - small fescue flower fields ▸ Popcorn flower field ▸ White-tip clover swales* ▸ California yerba santa scrub
Perennial Grassland	160	▸ Water foxtail meadow* ▸ Needle grass - melic grass grassland	▸ Curly blue grass grassland*
Total	904,576		

*These are designated sensitive natural communities with a state rarity rank of S1 (critically imperiled), S2 (imperiled), or S3 (vulnerable).

[N] These alliances are dominated by nonnative vegetation.

Source: CWHR 2019, CNPS 2019, Compiled by Ascent Environmental in 2019

Sensitive Biological Resources

Special-Status Species

More than 62 special-status wildlife taxa and 44 plant taxa are known or have the potential to occur within the treatable landscape of the Northern California Interior Coast Ranges Section, including four plant taxa and 32 animal taxa that are state or federally listed as rare, threatened, or endangered, are candidates for listing, or are fully protected. Over 49 special-status plant species in this ecoregion are associated with serpentine soils. A list of all the special-status plant species known or with potential to occur within the treatable landscape of the Central California Coast Section, along with their listing status and detailed habitat descriptions, is provided in Appendix BIO-3, Table 11a. A list of special-status wildlife (other than fish) species known or with potential to occur in the treatable landscape of this ecoregion, along with the CWHR types they are associated with, is provided in Appendix BIO-3, Table 11b. Special-status fish known or with potential to occur within the treatable landscape of this ecoregion are identified in Appendix BIO-3, Table 19.

Critical Habitat

Designated critical habitat is present within the treatable landscape of the Northern California Interior Coast Ranges Section for six species. Four of these species – California tiger salamander, vernal pool fairy shrimp, vernal pool tadpole shrimp, and slender Orcutt grass – are associated with vernal pool habitats. Appendix BIO-4 lists and provides the acreage of critical habitat designated within the treatable landscape of this ecoregion for these species.

Sensitive Natural Communities and Habitats

Sensitive Natural Communities

There are 17 sensitive natural communities that may occur within the treatable landscape of the Northern California Interior Coast Ranges Section. The sensitive natural communities associated with each CWHR type in this ecoregion are identified in Table 3.6-20. Examples of sensitive natural communities in this ecoregion include California bay forest, Oregon white oak woodland, valley oak woodland, white-tip clover swales, and Curly blue grass grassland.

Wetlands and Other Waters of the United States and Waters of the State

Wetland habitats known to occur within the treatable landscape of the Northern California Interior Coast Ranges Section consist of nearly 15,000 acres of freshwater emergent wetland, freshwater forested and shrub wetland, freshwater pond, lake, and riverine wetlands (Table 3.6-2). Vernal pools and swales and water foxtail meadows may also be present in areas mapped as annual or perennial grasslands in this ecoregion.

Other Sensitive Habitats

CWHR riparian habitat types identified within the treatable landscape of the Northern California Interior Coast Ranges Section consist of approximately 2,826 acres of valley and foothill riparian habitat and 749 acres of montane riparian habitat. There are seven MCV alliances that may occur in the valley and foothill riparian habitat and four that may occur in the montane riparian habitat type. Five of the riparian alliances are designated sensitive natural communities. Examples include wild grape shrubland, box-elder forest, button willow thicket, and red willow thicket. All riparian habitats are considered sensitive and those located near rivers, streams, and lakes are protected under California Fish and Game Code.

Approximately 598,735 acres of blue oak woodland and blue oak-foothill pine, 719 acres of coastal oak woodland, and 6,926 acres of valley oak woodland habitats have been mapped within the treatable landscape of this ecoregion. In addition, canyon live oak forest, Oregon white oak woodland, and interior live oak woodland may be present in the 41,321 acres of montane hardwood.

Combined, chaparral and coastal scrub habitats in this ecoregion represent 18 vegetation alliances, and four of these, Hoary, common, and Stanford manzanita chaparral hairy leaf - woolly leaf ceanothus chaparral, Wright's buckwheat - Heerman's buckwheat - Utah butterfly-bush scrub and goldenaster, patches are designated as sensitive natural communities.

<u>Conservation Lands, Special Management Areas, and Other Biologically Important Lands</u>

Habitat Conservation Plan, Natural Community Conservation Plan, and other Conservation Plan Areas

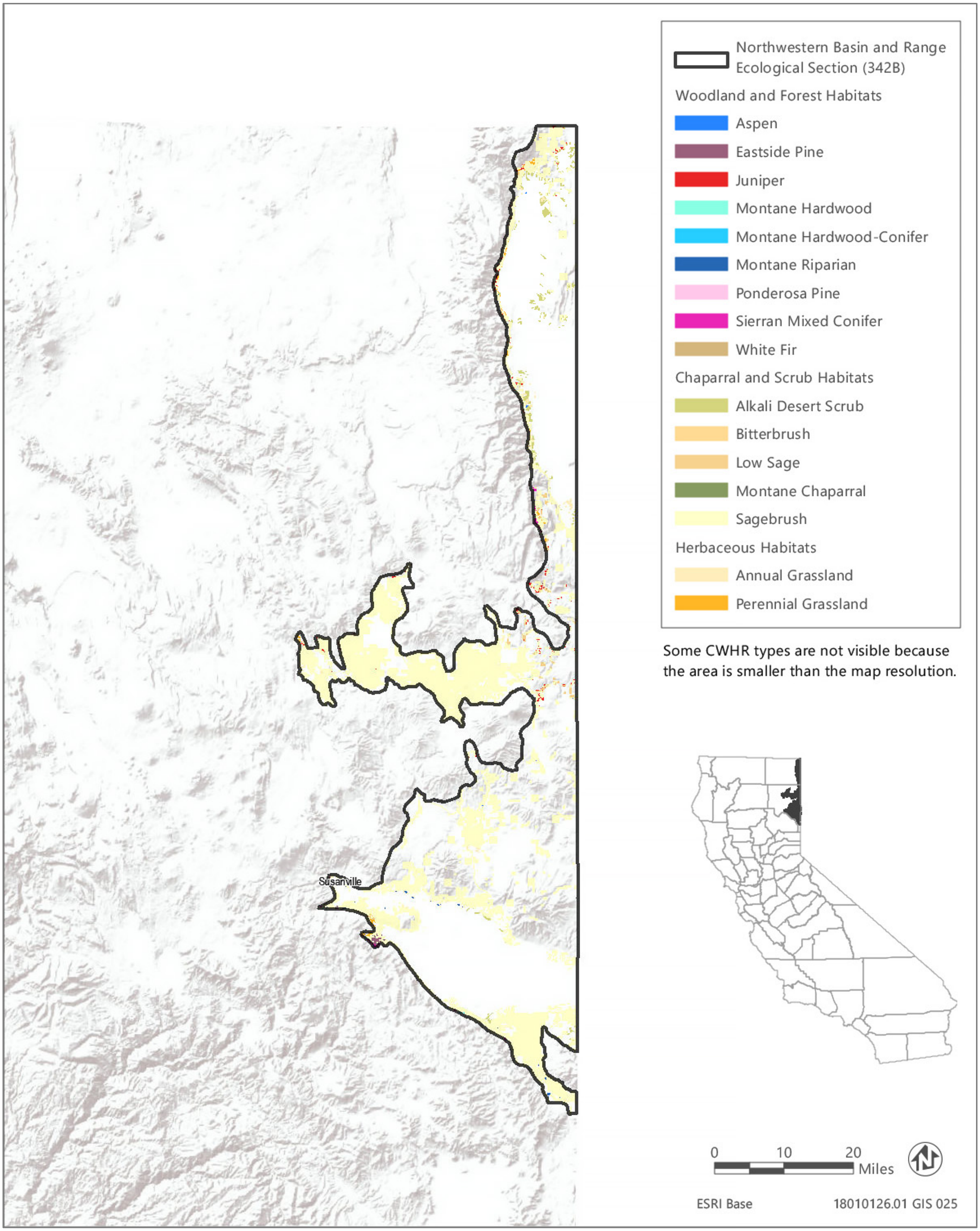
No conservation plans have been adopted for lands within the treatable landscape in the Northern California Interior Coast Ranges Section.

Protected Open Space Lands

The treatable landscape in the Northern California Interior Coast Ranges Section contains 43 protected open space units that are recognized in CPAD. These lands cover 18,677 acres, which represent 2 percent of the treatable landscape in the ecoregion. Some of the major land owners include CDFW, National Audubon Society, University of California, Quail Ridge Wilderness Conservancy, and Yolo County. Examples of some of the prominent open space units in the Northern California Interior Coast Ranges Section include Knoxville Wildlife Area, Bobcat Ranch, Cache Creek Wildlife Area, Putah Creek Wildlife Area, Quail Ridge Ecological Reserve, and Stebbins Cold Canyon Reserve.

Northwestern Basin and Range Section

The Northwestern Basin and Range Section (342B) encompasses 1,291,437 acres and consists of nearly level basins and valleys, long alluvial fans, north-south trending mountain ranges, and volcanic plateaus. Elevations range from 4,000 to 7,200 feet. This ecoregion contains 276,954 acres of treatable landscape, which represents approximately 21 percent of the total landscape within the ecoregion. Within the treatable landscape exist modeled treatment areas for the following treatment types: WUI fuel reduction (50,594 acres), fuel break (58,482 acres), and ecological restoration (216,049 acres). The treatable landscape in dispersed across this ecoregion, located in the northeastern part of the state. The treatable landscape in this ecoregion is displayed in Figure 3.6-13.



Source: Data received from CAL FIRE in 2018

Figure 3.6-13 CWHR Types - Northwestern Basin and Range Ecological Section (342B)

Vegetation and Habitat Types

The predominant CWHR type in the treatable landscape of the Northwestern Basin and Range Section is sagebrush, which makes up about 90 percent of the land cover. There are seven MCV alliances that may be found within areas mapped as sagebrush in this ecoregion. Other scrub habitat types comprise less than 4 percent of the treatable landscape while woodland and forest habitats make up just over 4 percent of the treatable landscape. Annual and perennial grasslands comprise 5,688 acres, or just 2 percent of the treatable landscape. Annual grassland here is composed of nonnative vegetation alliances while perennial grasslands include mostly native alliances that are also sensitive natural communities. The distribution of CWHR types within the treatable landscape of this ecoregion is shown in Figure 3.6-13 and the acreage of each type, as well as associated MCV alliances, is provided in Table 3.6-21.

Table 3.6-21 Vegetation and Habitat Types within the Treatable Landscape for the Northwestern Basin and Range Ecological Section

CWHR Classification	Acres	MCV Alliances	
Woodland and Forest Habitats			
Aspen	366	▶ Aspen groves*	
Eastside Pine	3,166	▶ Ponderosa pine forest	
Juniper	7,458	▶ Western juniper woodland	
Montane Hardwood	135	▶ California black oak forest	
Montane Hardwood-Conifer	115	▶ None[1]	
Montane Riparian	376	▶ Sandbar willow thicket	
Ponderosa Pine	45	▶ Ponderosa pine forest	
White Fir	6	▶ White fir forest	
Chaparral and Scrub Habitats			
Alkali Desert Scrub	5,384	▶ Iodine bush scrub* ▶ Fourwind saltbush scrub ▶ Shadscale scrub ▶ Winterfat scrubland*	▶ Greasewood scrub ▶ Alkali sacaton - scratchgrass - alkali cordgrass alkaline wet meadow* ▶ Bush seepweed scrub*
Bitterbrush	1,416	▶ Bitter brush scrub*	
Low Sage	3,991	▶ Little sagebrush scrub	▶ Lahontan sagebrush scrub
Montane Chaparral	101	▶ Tobacco brush or snow bush chaparral	
Sagebrush	248,457	▶ Little sagebrush scrub ▶ Lahontan sagebrush scrub ▶ Silver sagebrush scrub*	▶ Big sagebrush ▶ Curl leaf mountain mahogany scrub ▶ Rubber rabbitbrush scrub ▶ Bitter brush scrub*
Herbaceous Habitats			
Annual Grassland	4,097	▶ Wild oat grassland[N] ▶ Annual brome grassland[N]	▶ Red brome or mediterranean grass grassland[N] ▶ Cheatgrass - medusahead grassland[N]
Perennial Grassland	1,591	▶ Indian rice grass grassland* ▶ Crested wheatgrass rangeland[N] ▶ Idaho fescue grassland*	▶ Ashy ryegrass - creeping ryegrass turf* ▶ Curly blue grass grassland* ▶ Bluebunch wheat grass grassland*
Total	276,704		

*These are designated sensitive natural communities with a state rarity rank of S1 (critically imperiled), S2 (imperiled), or S3 (vulnerable).

[N] These alliances are dominated by nonnative vegetation.

[1] There are no MCV alliances recognized for this CWHR type in this ecoregion.

Source: CWHR 2019, CNPS 2019, Compiled by Ascent Environmental in 2019

Sensitive Biological Resources

Special-Status Species

There are 55 special-status wildlife taxa and 66 plant taxa known or with potential to occur in the treatable landscape of the Mono Section, including 22 animal taxa that are state or federally listed as rare, threatened, or endangered or fully protected. There are no plant species listed state or federally listed as rare, threatened, or endangered in this ecoregion. A list of all the special-status plant species known or with potential to occur within the treatable landscape of the Great Valley Section, along with their listing status and detailed habitat descriptions, is provided in Appendix BIO-3, Table 12a. A list of special-status wildlife (other than fish) species known or with potential to occur in the treatable landscape of this ecoregion, along with the CWHR types they are associated with, is provided in Appendix BIO-3, Table 12b. Special-status fish known or with potential to occur in the ecoregion are identified in Appendix BIO-3, Table 19.

Critical Habitat

There is no designated critical habitat within the treatable landscape of the Northwestern Basin and Range Section.

Sensitive Natural Communities and Habitats

Sensitive Natural Communities

There are 12 sensitive natural communities that may occur within the treatable landscape of the Northwestern Basin and Range Section. The sensitive natural communities associated with each CWHR type in this ecoregion are identified in Table 3.6-21. Examples of sensitive natural communities in this ecoregion include aspen groves, Bitter brush scrub, Indian rice grass grassland, Idaho fescue grassland, ashy ryegrass - creeping ryegrass turf, and Curly blue grass grassland.

Wetlands and Other Waters of the United States and Waters of the State

Over 52,500 acres of freshwater emergent wetland, freshwater forested and shrub wetland, freshwater pond, lake, and riverine habitats have been mapped within the treatable landscape of the Northwestern Basin and Range Section (Table 3.6-2). Additional wetland types that may be present within other CWHR types in the treatable landscape include alkali sacaton - scratchgrass - alkali cordgrass alkaline wet meadows, silver sagebrush scrub, iodine bush scrub, and bush seepweed scrub.

Other Sensitive Habitats

There are just 375 acres of montane riparian habitat mapped in the treatable landscape of this ecoregion and only one MCV alliance, sandbar willow thicket, associated with this CWHR type in this ecoregion.

A minor amount of black oak forest may be present within the 135 acres of montane hardwood mapped in the treatable landscape of this ecoregion. This is the only MCV alliance recognized to occur in this CWHR type in this ecoregion. Unlike many oak woodlands in the state, black oak forest is not seriously threatened by development and has not sustained substantial losses. There are 101 acres of montane chaparral mapped within the treatable landscape and one MCV alliance, tobacco brush or snow bush chaparral, associated with this type in this ecoregion. This is a fire successional chaparral type with a fire return interval of 40 to 75 years (Sawyer et al. 2009). Both these species sprout vigorously following fire and also reestablish form seed following fire.

Conservation Lands, Special Management Areas, and Other Biologically Important Lands

Habitat Conservation Plan, Natural Community Conservation Plan, and other Conservation Plan Areas

No conservation plans have been adopted for lands within the treatable landscape in the Northwestern Basin and Range Section.

Protected Open Space Lands

The treatable landscape in the Northwestern Basin and Range Section contains 13 protected open space units that are recognized in CPAD. These lands cover 29,711 acres, which represent 11 percent of the treatable landscape in the ecoregion. The four land owners of these open space units are CDFW, CSLC, Lassen County, and Modoc County.

Examples of some of the prominent open space units in the Northwestern Basin and Range Section include Doyle Wildlife Area, Surprise Valley Wildlife Area, Honey Lake Wildlife Area, and Susanville Ranch Park.

Sierra Nevada Section

The Sierra Nevada Section (M261E) encompasses 12,749,269 acres and includes much of the Sierra Nevada, which is a north-northwest aligned mountain range that is much steeper on the east than on the west side. Elevations range from 1,000 to 14,495 feet and include temperate to very cold areas. Local relief ranges from 500 to 2,000 feet. This ecoregion contains 2,138,620 acres of treatable landscape, which represents approximately 17 percent of the total landscape within the ecoregion. Within the treatable landscape exist modeled treatment areas for the following treatment types: WUI fuel reduction (1,083,025 acres), fuel break (236,577 acres), and ecological restoration (1,010,243 acres). The treatable landscape is dispersed across the mountains and ridges of the ecoregion, outside of the large tracts of federal land. The treatable landscape in this ecoregion is displayed in Figure 3.6-14.

Vegetation and Habitat Types

The predominant habitat types in the treatable landscape of the Sierra Nevada Section are Sierran mixed conifer and ponderosa pine, which comprise approximately 28 percent and 10 percent of the treatable landscape, respectively. There are four MCV alliances that may be found within areas mapped as Sierran mixed conifer and three MCV alliances that may be found in areas mapped as ponderosa pine in this ecoregion. Montane hardwood-conifer and annual grassland habitats make up approximately 9 percent each of the treatable landscape area. Chaparral and scrub habitats make up approximately 14 percent of the treatable landscape area and represent a large diversity of vegetation alliances. This ecoregion supports diverse habitat types and the treatable landscape area is comprised of 31 habitat types and over 178 vegetation alliances.

Table 3.6-22 provides the acreage of each CWHR habitat type within the treatable landscape of this ecoregion and the associated MCV vegetation alliances that may occur within each CWHR type in this ecoregion. Alliances that are designated as sensitive natural communities and those that are dominated by nonnative vegetation are indicated in Table 3.6-22. Sensitive natural communities are discussed in more detail below. The distribution of CWHR types within this ecoregion is shown in Figure 3.6-14.

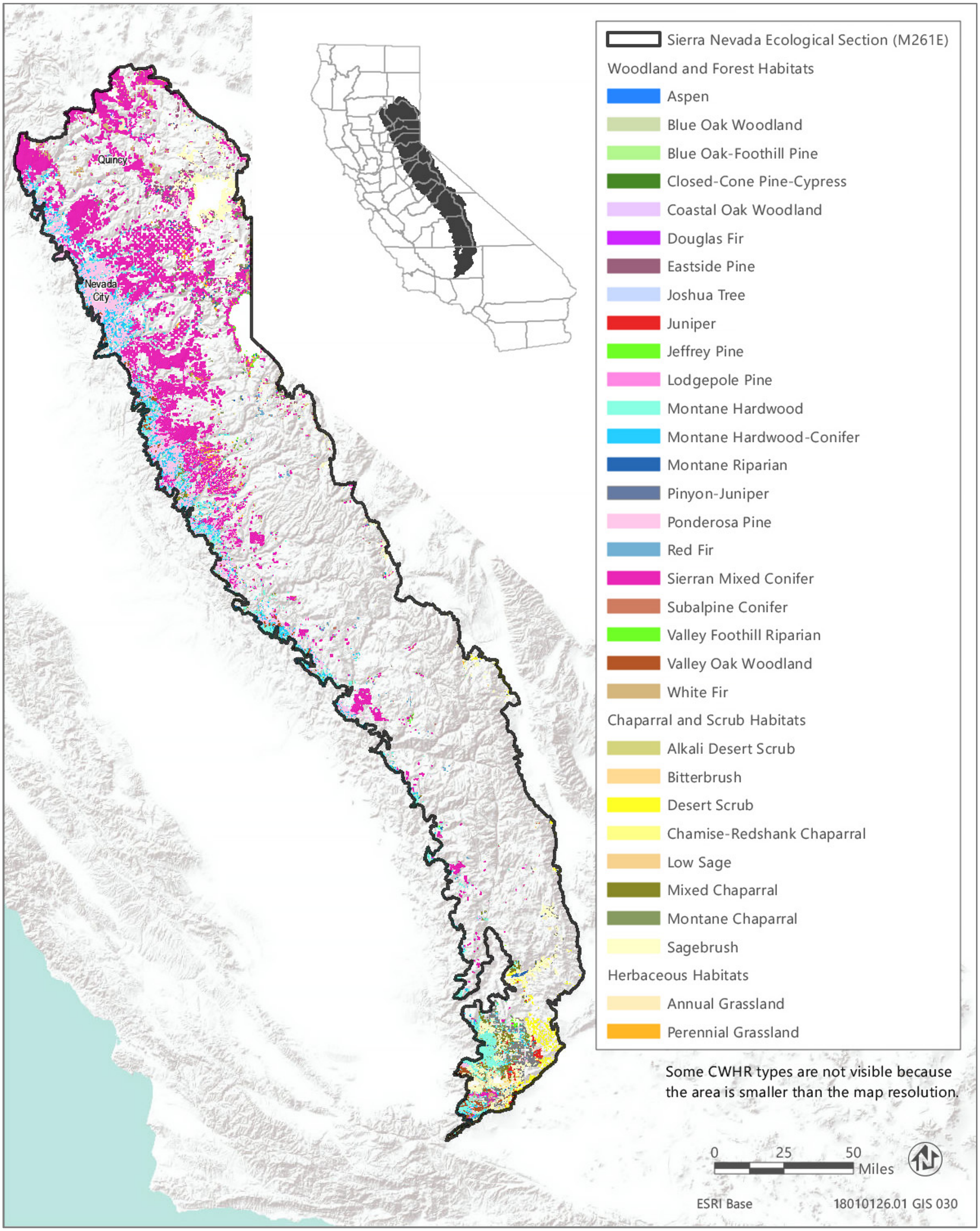
Sensitive Biological Resources

Special-Status Species

There are 118 special-status wildlife taxa and 213 plant taxa known or with potential to occur in the treatable landscape of the Sierra Nevada Section, including 42 animal taxa and 19 plant taxa that are state or federally listed as rare, threatened, or endangered. The Sierra Nevada ecoregion contains over 22 special-status plant species found in the subalpine or alpine zone. A list of all the special-status plant species known or with potential to occur within the treatable landscape of the Sierra Nevada Section, along with their listing status and detailed habitat descriptions, is provided in Appendix BIO-3, Table 13a. A list of special-status wildlife (other than fish) species known or with potential to occur in the treatable landscape of this ecoregion, along with the CWHR types they are associated with, is provided in Appendix BIO-3, Table 13b. Special-status fish known or with potential to occur in the ecoregion are identified in Appendix BIO-3, Table 19.

Critical Habitat

Critical habitat has been designated within the treatable landscape of this ecoregion for one plant taxa, Webber's ivesia (*Ivesia webberi*), and nine wildlife taxa. Appendix BIO-4 lists and provides the acreage of critical habitat designated within the treatable landscape of this ecoregion for these species. Examples of wildlife taxa include Sierra Nevada yellow-legged frog (*Rana sierrae*) and California condor (*Gymnogyps californianus*).



Source: Data received from CAL FIRE in 2018

Figure 3.6-14 CWHR Types - Sierra Nevada Ecological Section (M261E)

Table 3.6-22 Vegetation and Habitat Types within the Treatable Landscape for the Sierra Nevada Ecological Section

CWHR Classification	Acres	MCV Alliances	
Woodland and Forest Habitats			
Aspen	1,187	▶ Aspen groves*	
Blue Oak Woodland	53,836	▶ Blue oak woodland	▶ Interior live oak woodland
Blue Oak-Foothill Pine	25,331	▶ Foothill pine woodland	▶ Blue oak woodland
Closed-Cone Pine-Cypress	154	▶ Baker cypress stand* ▶ Knobcone pine forest	▶ McNab cypress woodland* ▶ Piute cypress woodland*
Coastal Oak Woodland	117	▶ Madrone forest* ▶ California bay forest*	
Douglas Fir	7,297	▶ White fir - Douglas fir forest ▶ Bigleaf maple forest* ▶ Ponderosa pine - Douglas fir forest	▶ Douglas fir forest ▶ Douglas fir - tanoak forest*
Eastside Pine	76,351	▶ Jeffrey pine forest ▶ Ponderosa pine forest	▶ Washoe pine woodland*
Jeffrey Pine	21,165	▶ Jeffrey pine forest	
Joshua Tree	127	▶ Joshua tree woodland*	
Juniper	20,607	▶ Needleleaf rabbitbrush scrub ▶ California juniper woodland ▶ Mountain juniper woodland	▶ Utah juniper woodland* ▶ Singleleaf pinyon - Utah juniper woodlands
Lodgepole Pine	3,715	▶ Lodgepole pine forest	
Montane Hardwood	346,069	▶ Bigleaf maple forest* ▶ California buckeye grove* ▶ Tanoak forest*	▶ Canyon live oak forest ▶ Interior live oak woodland
Montane Hardwood-Conifer	189,323	▶ Bigleaf maple forest*	
Montane Riparian	11,084	▶ Rocky Mountain maple thicket* ▶ Mountain alder thicket* ▶ White alder grove ▶ Water birch thicket* ▶ Torrent sedge patch* ▶ Red osier thicket* ▶ Oregon ash grove* ▶ Fremont cottonwood forest* ▶ Black cottonwood forest* ▶ Western Labrador-tea thicket*	▶ Interior rose thicket* ▶ Sandbar willow thicket ▶ Geyer willow thicket* ▶ Jepson willow thicket* ▶ Lemmon's willow thicket* ▶ Yellow willow thicket* ▶ Sierra gray willow thicket ▶ Tea-leaved willow thicket* ▶ Wild grape shrubland*
Pinyon-Juniper	31,983	▶ Utah juniper woodland*	▶ Singleleaf pinyon - Utah juniper woodlands
Ponderosa Pine	216,768	▶ Ponderosa pine forest ▶ Ponderosa pine - Douglas fir forest	▶ Washoe pine woodland*
Red Fir	4,830	▶ Red fir forest	▶ Red fir - white fir forest
Sierran Mixed Conifer	599,348	▶ Incense cedar forest* ▶ Mixed oak forest	▶ Ponderosa pine - Douglas fir forest ▶ Giant sequoia forest*

Table 3.6-22 Vegetation and Habitat Types within the Treatable Landscape for the Sierra Nevada Ecological Section

CWHR Classification	Acres	MCV Alliances	
Valley Foothill Riparian	8	▶ Torrent sedge patch* ▶ Button willow thicket* ▶ Red osier thicket* ▶ California sycamore woodland* ▶ Fremont cottonwood forest* ▶ Black cottonwood forest*	▶ Himalayan blackberry - rattlebox - edible fig riparian scrub[N] ▶ Sandbar willow thicket ▶ Red willow thicket* ▶ Shining willow groves* ▶ Wild grape shrubland*
Valley Oak Woodland	5,378	▶ Valley oak woodland*	
White Fir	11,544	▶ White fir forest ▶ White fir - sugar pine forest	▶ White fir - Douglas fir forest ▶ Red fir - white fir forest
Chaparral and Scrub Habitats			
Alkali Desert Scrub	262	▶ Shadscale scrub	
Bitterbrush	12,220	▶ Bitter brush scrub*	
Chamise-Redshank Chaparral	8,185	▶ Chamise chaparral ▶ Cup leaf ceanothus chaparral* ▶ Bigberry manzanita chaparral	▶ Wedge leaf ceanothus chaparral/Buck brush chaparral
Desert Scrub	23,922	▶ Coast range stonecrop draperies ▶ Desert needlegrass grassland* ▶ Shadscale scrub ▶ Acton's and Virgin River brittlebush - net-veined goldeneye scrub* ▶ Nevada joint fir - Anderson's boxthorn - spiny hop sage scrub	▶ Narrowleaf goldenbush - bladderpod scrub ▶ California buckwheat - Parish's goldeneye scrub ▶ Wright's buckwheat - Heerman's buckwheat - Utah butterfly-bush scrub* ▶ Desert almond - Mexican bladdersage scrub
Low Sage	480	▶ Little sagebrush scrub	
Mixed Chaparral	97,306	▶ Bigberry manzanita chaparral ▶ Whiteleaf manzanita chaparral ▶ Wedge leaf ceanothus chaparral, Buck brush chaparral ▶ Cup leaf ceanothus chaparral* ▶ Deer brush chaparral ▶ Chaparral whitethorn chaparral ▶ Birch leaf mountain mahogany chaparral	▶ Bush poppy scrub ▶ California yerba santa scrub ▶ Ocean spray brush* ▶ Deer weed scrub ▶ Choke cherry thickets* ▶ Scrub oak chaparral ▶ Tucker oak chaparral ▶ Oak gooseberry thicket*
Montane Chaparral	67,021	▶ Green leaf manzanita chaparral ▶ Whiteleaf manzanita chaparral ▶ Mountain whitethorn chaparral ▶ Deer brush chaparral ▶ Tobacco brush or snow bush chaparral ▶ Birch leaf mountain mahogany chaparral	▶ Bush chinquapin chaparral* ▶ Bitter cherry thicket ▶ Choke cherry thicket* ▶ Brewer oak scrub ▶ Huckleberry oak chaparral
Sagebrush	88,670	▶ Little sagebrush scrub ▶ Silver sagebrush scrub* ▶ Rothrock's sagebrush* ▶ Big sagebrush ▶ Mountain big sagebrush	▶ Curl leaf mountain mahogany scrub ▶ Black brush scrub ▶ Mormon tea scrub ▶ Rubber rabbitbrush scrub ▶ Bitter brush scrub*

Table 3.6-22 Vegetation and Habitat Types within the Treatable Landscape for the Sierra Nevada Ecological Section

CWHR Classification	Acres	MCV Alliances	
Herbaceous Habitats			
Annual Grassland	192,780	▶ Fiddleneck - phacelia field ▶ Wild oat grassland[N] ▶ Upland mustard and other ruderal forbs[N] ▶ Annual brome grassland[N] ▶ Red brome or mediterranean grass grassland[N] ▶ Cheatgrass - medusahead grassland[N] ▶ Yellow star-thistle field[N]	▶ Knapweed and purple-flowered star-thistle field[N] ▶ Needle spike rush stand* ▶ California goldfields - dwarf plantain - small fescue flower fields ▶ Spanish clover field ▶ Monolopia - leafy-stemmed tickseed field*
Perennial Grassland	21,198	▶ Indian rice grass grassland* ▶ Desert needlegrass grassland* ▶ Bent grass - tall fescue meadow ▶ Water foxtail meadow* ▶ Upland mustard and other ruderal forbs[N] ▶ Bluejoint reed grass meadow* ▶ Fell-fields with purple reed grass ▶ Small-fruited sedge meadow* ▶ Knapweed and purple-flowered star-thistle field[N] ▶ California oat grass prairie*	▶ Tufted hair grass meadow ▶ Blue wild rye montane meadow* ▶ Common velvet grass - sweet vernal grass meadow[N] ▶ Ashy ryegrass - creeping ryegrass turf* ▶ Mat muhly meadow ▶ Deer grass bed* ▶ Needle grass - melic grass grassland ▶ Harding grass - reed canary grass sward[N] ▶ Kentucky blue grass turf[N] ▶ Curly blue grass grassland*
Total	2,138,266		

*These are designated sensitive natural communities with a state rarity rank of S1 (critically imperiled), S2 (imperiled), or S3 (vulnerable).

[N] These alliances are dominated by nonnative vegetation.

Source: CWHR 2019, CNPS 2019, Compiled by Ascent Environmental in 2019

Sensitive Natural Communities and Habitats

Sensitive Natural Communities

There are 58 sensitive natural communities that may occur within the treatable landscape of the Sierra Nevada Section. The sensitive natural communities associated with each CWHR type in this ecoregion are identified in Table 3.6-22. They include aspen groves, Washoe pine woodland, Utah juniper woodland, giant sequoia forest, Acton's and Virgin River brittlebush - net-veined goldeneye scrub, and Rothrock's sagebrush.

Wetlands and Other Waters of the United States and Waters of the State

Wetland habitats known to occur within the treatable landscape of the Sierra Nevada Section include freshwater emergent wetland, freshwater forested and shrub wetland, freshwater pond, lake, riverine, and other freshwater wetlands (Table 3.6-2). In addition, needle spike rush stands, water foxtail meadows and small-fruited sedge meadows may be included in areas mapped as annual or perennial grasslands. The headwaters for several major waterways are found in this ecoregion, including the Feather, Yuba, American, San Joaquin, Merced, and Kern Rivers. Other significant waters include Lake Tahoe, vernal pools, bogs and fens, and montane meadows.

Other Sensitive Habitats

CWHR riparian habitat types identified within the treatable landscape of the Sierra Nevada Section consist of approximately 11,092 acres combined of montane riparian and valley foothill riparian habitats. There are 25 MCV alliances that may occur in the montane and valley foothills riparian habitat types. Twenty of these are designated sensitive natural communities. Examples include Rocky mountain maple thickets, mountain alder thicket, water birch thicket, western Labrador-tea thickets, and Geyer, Jepson, Lemmon's, yellow, and tea-leaved willow thickets. All riparian habitats are considered sensitive and those located near rivers, streams, and lakes are protected under California Fish and Game Code.

Approximately 53,836 acres of blue oak woodland, 5,378 acres of valley oak woodland, and 117 acres of coastal oak woodland habitats have been mapped within the treatable landscape of this ecoregion. In addition, 25,331 acres of blue oak-foothill pine and 346,069 acres of montane hardwood habitat within the treatable landscape of this ecoregion support several additional oak alliances, including canyon live oak forest and interior live oak woodland habitats.

Chaparral habitats in the treatable landscape consist of approximately 97,306 acres of mixed chaparral, 67,021 acres of montane chaparral, and 8,185 acres of chamise-redshank chaparral. Mixed chaparral in this ecoregion consist of 15 alliances, including four alliances designated as sensitive natural communities. Montane chaparral in this ecoregion consist of 11 alliances, including two alliances designated as sensitive natural communities. Chamise-redshank chaparral consists of four alliances, one of which is a designated sensitive community.

Conservation Lands, Special Management Areas, and Other Biologically Important Lands

Habitat Conservation Plan, Natural Community Conservation Plan, and other Conservation Plan Areas

The treatable landscape in the Sierra Nevada Section includes plan areas for the West Mojave Plan (HCP), Calaveras County HCP, El Dorado County Integrated Natural Resources Management Plan (INRMP)/HCP, Desert Renewable Energy Plan (HCP/NCCP), and Placer County Conservation Plan (Phase II and III) (HCP/NCP), which are currently being planned in the treatable landscape. Table 3.6-23 summarizes the acreages of the plan areas within the treatable landscape.

Table 3.6-23 Conservation Plans Adopted or In Progress in the Treatable Landscape—Sierra Nevada Section

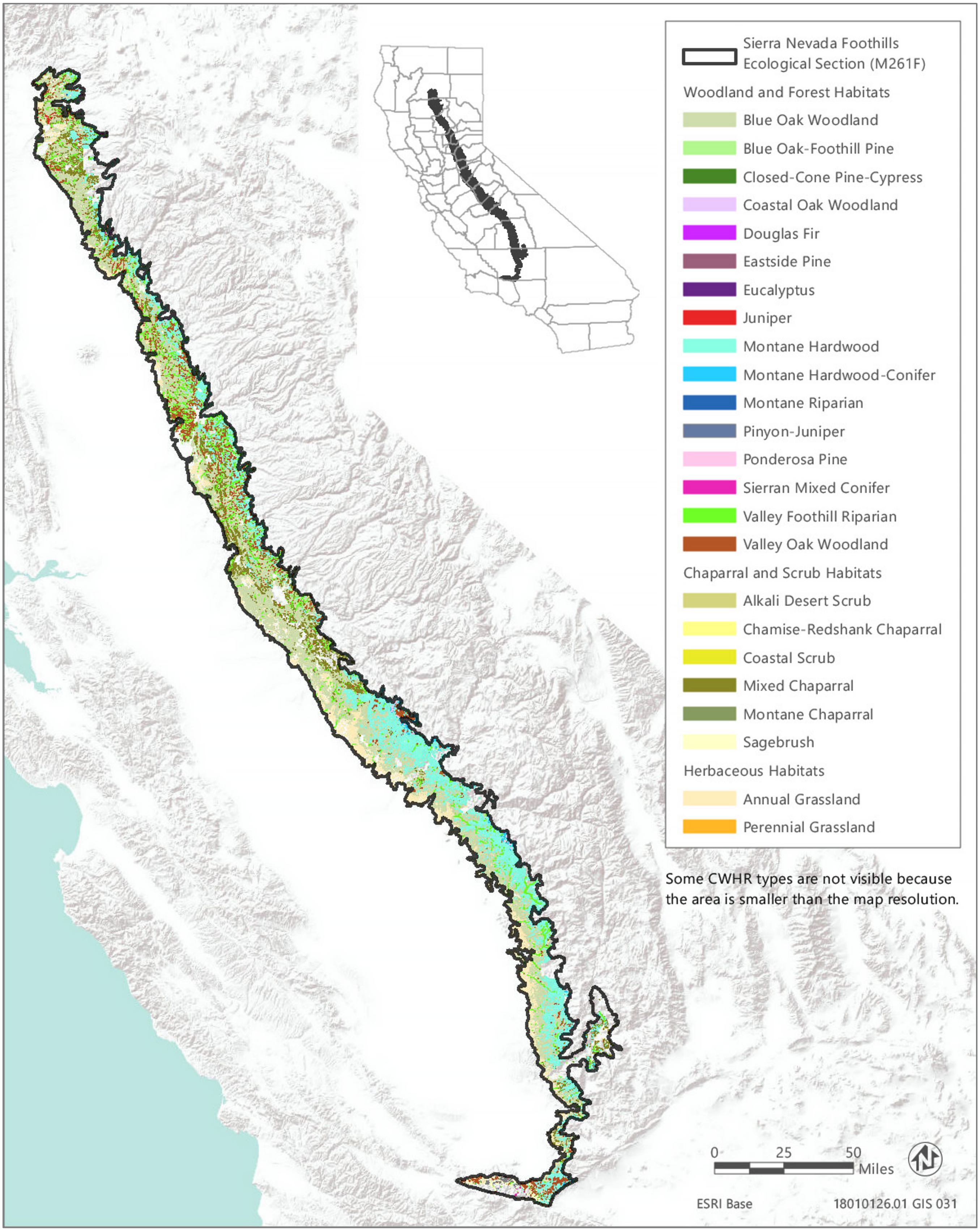
Conservation Plan	Plan Type	Stage	Plan Area Within the Treatable Landscape (Acres)
West Mojave Plan	HCP	Planning	86,542
Calaveras County	HCP	Planning	218,504
El Dorado County	INRMP/HCP	Planning	462,214
Desert Renewable Energy Conservation Plan	HCP/NCCP	Planning	263,221
Placer County Conservation Plan Phase II And III	HCP/NCCP	Planning	234,006
		Total	**1,264,487**

Protected Open Space Lands

The treatable landscape in the Sierra Nevada Section contains 237 protected open space units that are recognized in CPAD. These lands cover 94,059 acres, which represent 4 percent of the treatable landscape in the ecoregion. Some of the major land owners include CDFW, CAL FIRE, State Parks, LADWP, California Tahoe Conservancy, The Nature Conservancy, and Truckee Donner Land Trust. Examples of some of the prominent open space units in the Sierra Nevada Section include Canebrake Ecological Reserve, Antelope Valley Wildlife Area, Calaveras Big Trees State Park, Hope Valley Wildlife Area, Auburn State Recreation Area, and Emerald Bay State Park.

Sierra Nevada Foothills Section

The Sierra Nevada Foothills Section (M261F) encompasses 4,495,115 acres and comprises the foothills on the west side of the Sierra Nevada and the southwestern end of the Cascade Ranges, adjacent to the Great Valley. Elevations range from 500 to 3,500 feet. This ecoregion contains 2,721,585 acres of treatable landscape, which represents approximately 61 percent of the total landscape within the ecoregion. Within the treatable landscape exist modeled treatment areas for the following treatment types: WUI fuel reduction (1,812,275 acres), fuel break (335,937 acres), and ecological restoration (817,565 acres). The treatable landscape is dispersed across the hills and valleys of the entire ecoregion and is displayed in Figure 3.6-15.



Source: Data received from CAL FIRE in 2018

Figure 3.6-15 CWHR Types - Sierra Nevada Foothills Ecological Section (M261F)

Vegetation and Habitat Types

The predominant habitat types in the treatable landscape of the Sierra Nevada Foothills Section are blue oak woodland and annual grassland, which comprise approximately 35 percent and 31 percent of the treatable landscape, respectively. Blue oak woodland and interior live oak woodland vegetation alliances may be found within areas mapped as blue oak woodland habitat and 24 MCV alliances may be found in areas mapped as annual grassland in this ecoregion. Other common habitat types are blue oak-foothill pine woodland and montane hardwood, which comprise approximately 14 and 13 percent of the treatable landscape, respectively. Chaparral habitats make up only five percent of the treatable landscape in this ecoregion.

Annual grassland within this ecoregion is comprised of a diversity of vegetation types, including nonnative vegetation alliances such as wild oat, annual brome, and cheatgrass-medusahead grasslands, and native vegetation alliances, including California poppy-lupine field and popcorn flower field. Annual grassland in the treatable landscape of this ecoregion may also include several vernal pool vegetation alliances, such as Fremont's goldfields- salt grass alkaline vernal pool, Fremont's goldfields-downingia vernal pools, and smooth goldfields vernal pool bottom.

Table 3.6-24 provides the acreage of each CWHR habitat type within the treatable landscape of this ecoregion and the associated MCV vegetation alliances that may occur within each CWHR type in this ecoregion. Alliances that are designated as sensitive natural communities and those that are dominated by nonnative vegetation are indicated in Table 3.6-24. Sensitive natural communities are discussed in more detail below. The distribution of CWHR types within this ecoregion is shown in Figure 3.6-15.

Table 3.6-24 Vegetation and Habitat Types within the Treatable Landscape for the Sierra Nevada Foothills Ecological Section

CWHR Classification	Acres	MCV Alliances	
Woodland and Forest Habitats			
Blue Oak Woodland	946,977	▶ Blue oak woodland	▶ Interior live oak woodland
Blue Oak-Foothill Pine	376,587	▶ Foothill pine woodland	▶ Blue oak woodland
Closed-Cone Pine-Cypress	404	▶ McNab cypress woodland*	
Coastal Oak Woodland	352	▶ Madrone forest*	▶ California bay forest*
Douglas Fir	470	▶ Bigleaf maple forest* ▶ Douglas fir forest	▶ Ponderosa pine - Douglas fir forest
Eastside Pine	79	▶ Jeffrey pine forest	▶ Ponderosa pine forest
Eucalyptus	35	▶ Eucalyptus - tree of heaven - black locust groves[N]	
Juniper	2,799	▶ California juniper woodland	▶ Singleleaf pinyon - Utah juniper woodlands
Montane Hardwood	343,786	▶ Bigleaf maple forest* ▶ California buckeye grove* ▶ Bigcone Douglas fir forest*	▶ Canyon live oak forest ▶ Interior live oak woodland
Montane Hardwood-Conifer	5,145	▶ Bigleaf maple forest*	▶ Bigcone Douglas fir forest*
Montane Riparian	84	▶ White alder grove ▶ Torrent sedge patch* ▶ Red osier thicket* ▶ Oregon ash grove*	▶ Fremont cottonwood forest* ▶ Sandbar willow thicket ▶ Wild grape shrubland*
Pinyon-Juniper	5,601	▶ Singleleaf pinyon - Utah juniper woodlands	
Ponderosa Pine	4,939	▶ Ponderosa pine forest	▶ Ponderosa pine - Douglas fir forest
Sierran Mixed Conifer	506	▶ Incense cedar forest* ▶ Mixed oak forest	▶ Ponderosa pine - Douglas fir forest

Table 3.6-24 Vegetation and Habitat Types within the Treatable Landscape for the Sierra Nevada Foothills Ecological Section

CWHR Classification	Acres	MCV Alliances	
Valley Foothill Riparian	28,118	▶ Torrent sedge patch* ▶ Button willow thicket* ▶ Red osier thicket* ▶ California sycamore woodland* ▶ Fremont cottonwood forest* ▶ California rose briar patch*	▶ Himalayan blackberry - rattlebox - edible fig riparian scrub[N] ▶ Sandbar willow thicket ▶ Red willow thicket* ▶ Pepper tree or Myoporum grove[N] ▶ Wild grape shrubland*
Valley Oak Woodland	23,564	▶ Valley oak woodland*	
Chaparral and Scrub Habitats			
Alkali Desert Scrub	193	▶ Allscale scrub	▶ Alkali sacaton - scratchgrass - alkali cordgrass alkaline wet meadow*
Chamise-Redshank Chaparral	1,857	▶ Chamise chaparral ▶ Bigberry manzanita chaparral	▶ Wedge leaf ceanothus chaparral/Buck brush chaparral
Coastal Scrub	15	▶ Broom patch[N] ▶ Bush monkeyflower scrub* ▶ Live-forever - lichen/moss sparse herbaceous rock outcop ▶ Narrowleaf goldenbush - bladderpod scrub ▶ California yerba santa scrub ▶ California buckwheat - white sage scrub	▶ Wright's buckwheat - Heerman's buckwheat - Utah butterfly-bush scrub* ▶ California coffee berry scrub ▶ Goldenaster patch* ▶ Scale broom scrub* ▶ Deer weed scrub ▶ Silver bush lupine scrub ▶ Coast range stonecrop draperies ▶ Poison oak scrub
Mixed Chaparral	120,716	▶ Hoary, common, and Stanford manzanita chaparral* ▶ Bigberry manzanita chaparral ▶ Ione manzanita chaparral* ▶ Whiteleaf manzanita chaparral ▶ Wedge leaf ceanothus chaparral, Buck brush chaparral ▶ Deer brush chaparral ▶ Chaparral whitethorn chaparral ▶ Birch leaf mountain mahogany chaparral	▶ Bush poppy scrub ▶ California yerba santa scrub ▶ California coffee berry scrub ▶ Deer weed scrub ▶ Silver bush lupine scrub ▶ Holly leaf cherry - toyon - greenbark ceanothus chaparral ▶ Scrub oak chaparral ▶ Leather oak chaparral ▶ Tucker oak chaparral ▶ Poison oak scrub
Montane Chaparral	4,227	▶ Green leaf manzanita chaparral ▶ Whiteleaf manzanita chaparral ▶ Deer brush chaparral	▶ Birch leaf mountain mahogany chaparral ▶ Brewer oak scrub
Sagebrush	4,627	▶ Curl leaf mountain mahogany scrub	
Herbaceous Habitats			
Annual Grassland	850,463	▶ Fiddleneck - phacelia field ▶ Wild oat grassland[N] ▶ Upland mustard and other ruderal forbs[N] ▶ Annual brome grassland[N] ▶ Red brome or mediterranean grass grassland[N] ▶ Cheatgrass - medusahead grassland[N] ▶ Yellow star-thistle field[N]	▶ Fremont's goldfields - salt grass alkaline vernal pool* ▶ Fremont's goldfields - Downingia vernal pools* ▶ Smooth goldfields vernal pool bottom* ▶ Fremont's tidy-tips - blow wives vernal pool* ▶ Perennial rye grass field[N]

Table 3.6-24 Vegetation and Habitat Types within the Treatable Landscape for the Sierra Nevada Foothills Ecological Section

CWHR Classification	Acres	MCV Alliances	
		▸ Tar plant field* ▸ Annual dogtail grassland[N] ▸ Needle spike rush stand* ▸ Squirreltail patch ▸ California poppy - lupine field ▸ Goldenaster patch* ▸ California goldfields - dwarf plantain - small fescue flower fields	▸ Spanish clover field ▸ Monolopia - leafy-stemmed tickseed field* ▸ Water blinks - annual checkerbloom vernal pool* ▸ Popcorn flower field ▸ White-tip clover swales*
Perennial Grassland	42	▸ Bent grass - tall fescue meadow ▸ Water foxtail meadow* ▸ Upland mustard and other ruderal forbs[N] ▸ California brome - blue wildrye prairie* ▸ California oat grass prairie* ▸ Squirreltail patch	▸ Common velvet grass - sweet vernal grass meadow[N] ▸ Ashy ryegrass - creeping ryegrass turf* ▸ Deer grass bed* ▸ Needle grass - melic grass grassland ▸ Harding grass - reed canary grass sward[N]
Total	2,721,586		

*These are designated sensitive natural communities with a state rarity rank of S1 (critically imperiled), S2 (imperiled), or S3 (vulnerable).

[N] These alliances are dominated by nonnative vegetation.

Source: CWHR 2019, CNPS 2019, Compiled by Ascent Environmental in 2019

Sensitive Biological Resources

Special-Status Species

There are 117 special-status wildlife taxa and 135 plant taxa known or with potential to occur in the treatable landscape of the Sierra Nevada Foothills Section, including 48 animal taxa and 30 plant taxa that are state or federally listed as rare, threatened, or endangered. The Sierra Nevada Foothills ecoregion contains over 24 special-status plant species associated with serpentine soils, and 18 special-status plant species and 6 special-status animal species found in vernal pools. A list of all the special-status plant species known or with potential to occur within the treatable landscape of the Sierra Nevada Foothills Section, along with their listing status and detailed habitat descriptions, is provided in Appendix BIO-3, Table 14a. A list of special-status wildlife (other than fish) species known or with potential to occur in the treatable landscape of this ecoregion, along with the CWHR types they are associated with, is provided in Appendix BIO-3, Table 14b. Special-status fish known or with potential to occur in the ecoregion are identified in Appendix BIO-3, Table 19.

Critical Habitat

Critical habitat has been designated within the treatable landscape of this ecoregion for nine plant taxa, and six wildlife taxa. Appendix BIO-4 lists and provides the acreage of critical habitat designated within the treatable landscape of this ecoregion for these species. Examples of wildlife taxa California condor (*Gymnogyps californianus*), vernal pool tadpole shrimp (*Lepidurus packardi*), slender Orcutt grass (*Orcuttia tenuis*), and Butte County meadowfoam (*Limnanthes floccosa* ssp. *californica*).

Sensitive Natural Communities and Habitats

Sensitive Natural Communities

There are 35 sensitive natural communities that may occur within the treatable landscape of the Sierra Nevada Foothills Section. The sensitive natural communities associated with each CWHR type in this ecoregion are identified in Table 3.6-24. Several of these are vernal pool communities that may be interspersed within annual grasslands.

Other examples of sensitive natural communities in this ecoregion include McNab cypress woodland, California sycamore woodland, Ione manzanita chaparral, and California brome – blue wildrye prairie.

Wetlands and Other Waters of the United States and Waters of the State

Wetland habitats known to occur within the treatable landscape of the Sierra Nevada Foothills Section include freshwater emergent wetland, freshwater forested and shrub wetland, freshwater pond, lake, and riverine (Table 3.6-2). Vernal pools are also prevalent in areas mapped as annual grasslands in this ecoregion and may include water blinks - annual checkerbloom vernal pools, Fremont's tidy-tips - blow wives vernal pool, Fremont's goldfields - salt grass alkaline vernal pools, and Fremont's goldfields - Downingia vernal pools, among other vernal pool types. Major waterways in this ecoregion include the Feather, Yuba, American, San Joaquin, Merced, and Kern Rivers and other significant waters including Lake Oroville, Folsom Lake, Don Pedro Reservoir, and Lake Isabella.

Other Sensitive Habitats

CWHR riparian habitat types identified within the treatable landscape of the Sierra Nevada Foothills Section consist of approximately 28,202 acres combined of valley foothill riparian and montane riparian habitats. There are 13 MCV alliances that may occur in the valley foothills and montane riparian habitat types. Nine of these are designated sensitive natural communities. Examples include red osier thicket, Fremont cottonwood forest, wild grape shrubland, California rose briar patch, and red willow thicket. All riparian habitats are considered sensitive and those located near rivers, streams, and lakes are protected under California Fish and Game Code.

Approximately 946,977 acres of blue oak woodland, 23,564 acres of valley oak woodland, and 352 acres of coastal oak woodland habitats have been mapped within the treatable landscape of this ecoregion. In addition, 376,587 acres of blue oak-foothill pine, and 343,786 acres of montane hardwood habitat within the treatable landscape of this ecoregion support several additional oak alliances, including canyon live oak forest and interior live oak woodland habitats.

Chaparral habitats in the treatable landscape consist of approximately 120,716 acres of mixed chaparral, 4,227 acres of montane chaparral, and 1,857 acres of chamise-redshank chaparral. Fifteen acres of coastal scrub also occur in this ecoregion. Chaparral habitats in this ecoregion consist of 23 alliances, including two alliances designated as sensitive natural communities.

Conservation Lands, Special Management Areas, and Other Biologically Important Lands

Habitat Conservation Plan, Natural Community Conservation Plan, and other Conservation Plan Areas

The treatable landscape in the Sierra Nevada Foothills Section includes plan area for the Metropolitan Bakersfield HCP, which has been adopted and is being implemented. Additionally, five HCPs and five HCP/NCCPs are currently being planned in the treatable landscape. Table 3.6-25 summarizes the conservation plans adopted or in progress, including the acreages of plan areas within the treatable landscape.

Table 3.6-25 Conservation Plans Adopted or In Progress in the Treatable Landscape—Sierra Nevada Foothills Section

Conservation Plan	Plan Type	Stage	Plan Area Within the Treatable Landscape (Acres)
Calaveras County	HCP	Planning	330,558
East Fresno	HCP	Planning	205,304
Kern County Valley Floor	HCP	Planning	101,102
Metropolitan Bakersfield	HCP	Implementation	576
South Sacramento	HCP	Planning	13,881
El Dorado County	INRMP/HCP	Planning	301,580
Bakersfield Regional Habitat Conservation Plan	HCP/NCCP	Planning	13,052
Butte Regional Conservation Plan	HCP/NCCP	Planning	171,860

Table 3.6-25 Conservation Plans Adopted or In Progress in the Treatable Landscape—Sierra Nevada Foothills Section

Conservation Plan	Plan Type	Stage	Plan Area Within the Treatable Landscape (Acres)
Placer County Conservation Plan Phase I	HCP/NCCP	Planning	103,342
Placer County Conservation Plan Phase II And III	HCP/NCCP	Planning	26,075
Yuba-Sutter	HCP/NCCP	Planning	560
		Total	1,267,890

Protected Open Space Lands

The treatable landscape in the Sierra Nevada Foothills Section contains 210 protected open space units that are recognized in CPAD. These lands cover 128,116 acres, which represent 5 percent of the treatable landscape in the ecoregion. Some of the major land owners include CDFW, The Wildlands Conservancy, The Nature Conservancy, University of California, State Parks, Placer County, and El Dorado County. Examples of some of the prominent open space units in the Sierra Nevada Foothills Section include Tehama Wildlife Area, Wind Wolves Preserve, Spenceville Wildlife Area, North Table Mountain Ecological Reserve, Folsom Lake State Recreation Area, and Bidwell Park.

Southeastern Great Basin Section

The Southeastern Great Basin Section (341F) encompasses 2,727,547 acres and consists of moderate elevation mountains separated by broad, sediment-filled valleys. Elevations range from 4,700 to 9,400 feet. This ecoregion contains 450 acres of treatable landscape, which represents less than 0.1 percent of the total landscape within the ecoregion. Within the treatable landscape exist modeled treatment areas for the following treatment types: fuel break (198 acres) and ecological restoration (285 acres); there are no WUI fuel reduction treatment areas modeled for this ecoregion. The treatable landscape within this ecoregion consists of a few small isolated areas on the western edges of the mountains and is displayed in Figure 3.6-16.

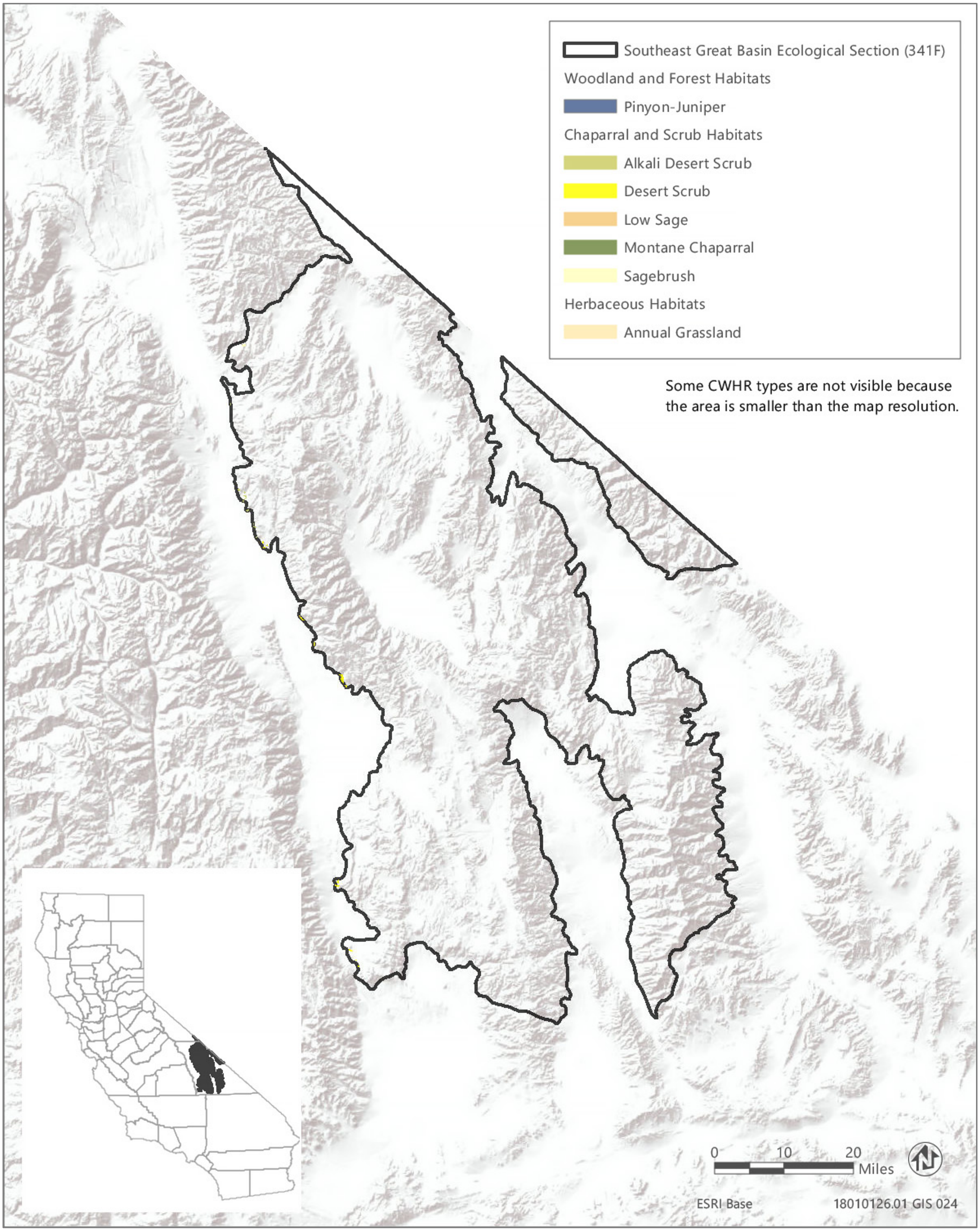
Vegetation and Habitat Types

The most common CWHR types in the treatable landscape of the Southeastern Great Basin Section are desert scrub and alkali desert scrub, which make up about 62 percent and 23 percent of the land cover, respectively. These are diverse habitat types with 26 MCV alliances recognized for the desert scrub category in this ecoregion. Other scrub habitat types comprise approximately 6 percent of the treatable landscape and there is less than 1 acre each of chaparral and grassland habitats. Pinyon-juniper is the only woodland habitat type mapped in the treatable landscape and it comprises 41 acres, or approximately 9 percent of the treatable landscape. The distribution of CWHR types within the treatable landscape of this ecoregion is shown in Figure 3.6-16 and the acreage of each type, as well as associated MCV alliances, is provided in Table 3.6-26.

Sensitive Biological Resources

Special-Status Species

There are 36 special-status wildlife taxa and five plant taxa known or with potential to occur in the treatable landscape of the Southeastern Great Basin Section, including 16 animal taxa that are state or federally listed as rare, threatened, or endangered or fully protected. There is one state listed endangered plant species that may occur within the treatable landscape in this ecoregion. A list of all the special-status plant species known or with potential to occur within the treatable landscape of the Southeastern Great Basin Section, along with their listing status and detailed habitat descriptions, is provided in Appendix BIO-3, Table 15a. A list of special-status wildlife (other than fish) species known or with potential to occur in the treatable landscape of this ecoregion, along with the CWHR types they are associated with, is provided in Appendix BIO-3, Table 15b. Special-status fish known or with potential to occur in the ecoregion are identified in Appendix BIO-3, Table 19.



Source: Data received from CAL FIRE in 2018

Figure 3.6-16 CWHR Types - Southeast Great Basin Ecological Section (341F)

Table 3.6-26 Vegetation and Habitat Types within the Treatable Landscape for the Southeastern Great Basin Ecological Section

CWHR Classification	Acres	MCV Alliances	
Woodland and Forest Habitats			
Pinyon-Juniper	41	▶ Utah juniper woodland*	▶ Singleleaf pinyon - Utah juniper woodlands
Chaparral and Scrub Habitats			
Alkali Desert Scrub	103	▶ Iodine bush scrub* ▶ Fourwing saltbush scrub ▶ Shadscale scrub ▶ Desert holly scrub ▶ Parry's saltbush scrub*	▶ Allscale scrub ▶ Winterfat scrubland* ▶ Alkali sacaton - scratchgrass - alkali cordgrass alkaline wet meadow* ▶ Bush seepweed scrub*
Desert Scrub	278	▶ Desert needlegrass grassland* ▶ Iodine bush scrub* ▶ White bursage scrub ▶ Cheesebush - sweetbush scrub ▶ Fremont's chaffbush - woolly sage scrub* ▶ Fourwing saltbush scrub ▶ Shadscale scrub ▶ Desert holly scrub ▶ Parry's saltbush scrub* ▶ Allscale scrub ▶ Rigid spineflower - hairy desert sunflower ▶ Mojave-Sonoran desert dunes* ▶ Acton's and Virgin River brittlebush - net-veined goldeneye scrub* ▶ Brittle bush scrub ▶ Nevada joint fir - Anderson's boxthorn - spiny hop sage scrub	▶ Narrowleaf goldenbush - bladderpod scrub ▶ California buckwheat - Parish's goldeneye scrub ▶ Wright's buckwheat - Heerman's buckwheat - Utah butterfly-bush scrub* ▶ Winterfat scrubland* ▶ Creosote bush scrub ▶ Creosote bush - white bursage scrub ▶ Creosote bush - brittle bush scrub ▶ Spiny menodora scrub* ▶ James' galleta shrub-steppe* ▶ Desert almond - Mexican bladdersage scrub ▶ Alkali sacaton - scratchgrass - alkali cordgrass alkaline wet meadow* ▶ Bush seepweed scrub*
Low Sage	2	▶ Little sagebrush scrub	▶ Black sagebrush scrub*
Montane Chaparral	<1	▶ Mountain whitethorn chaparral	▶ Tobacco brush or snow bush chaparral
Sagebrush	26	▶ Little sagebrush scrub ▶ Black sagebrush scrub* ▶ Big sagebrush ▶ Small leaf mountain mahogany scrub* ▶ Curl leaf mountain mahogany scrub ▶ Black brush scrub	▶ Death Valley joint fir scrub* ▶ Mormon tea scrub ▶ Rubber rabbitbrush scrub ▶ Stansbury cliff rose scrub* ▶ Bitter brush scrub*
Herbaceous Habitats			
Annual Grassland	<1	▶ Red brome or mediterranean grass grassland[N] ▶ Cheatgrass - medusahead grassland[N]	▶ Yellow star-thistle field[N]
Total	450		

*These are designated sensitive natural communities with a state rarity rank of S1 (critically imperiled), S2 (imperiled), or S3 (vulnerable).

[N] These alliances are dominated by nonnative vegetation.

Source: CWHR 2019, CNPS 2019, Compiled by Ascent Environmental in 2019

Critical Habitat
There is no designated critical habitat within the treatable landscape of the Southeastern Great Basin Section.

Sensitive Natural Communities and Habitats

Sensitive Natural Communities
There are 18 sensitive natural communities associated with the CWHR types mapped in the treatable landscape of the Southeastern Great Basin Section. The sensitive natural communities associated with each CWHR type in this ecoregion are identified in Table 3.6-26. Examples of sensitive natural communities in this ecoregion include Parry's saltbush scrub, spiny menodora scrub, black sagebrush scrub, and desert needlegrass grassland.

Wetlands and Other Waters of the United States and Waters of the State
There is less than 1 acre of wetland habitat mapped in the treatable landscape of the Southeastern Great Basin in the NWI (Table 3.6-2). However, wetland habitats may be present in areas mapped as upland CWHR types. Examples include alkali sacaton – scratchgrass – alkali cordgrass alkaline wet meadow, bush seepweed scrub, and iodine bush scrub.

Other Sensitive Habitats
There are no riparian or oak woodland habitats and less than 1 acre of chaparral habitat mapped in the treatable landscape of this ecoregion. However, montane riparian vegetation could be present along intermittent streams within the treatable landscape that are not captured in the FRAP vegetation source data.

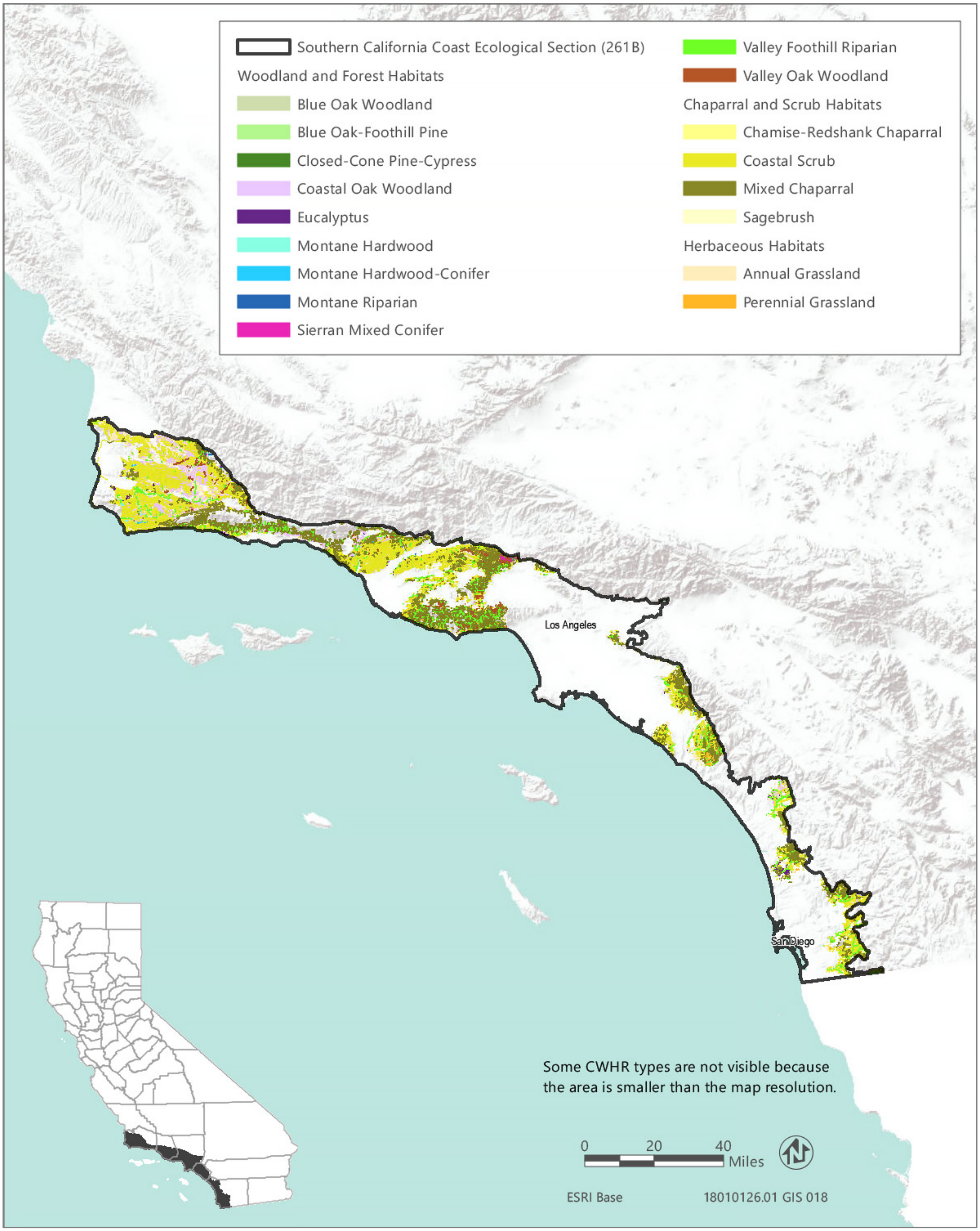
Conservation Lands, Special Management Areas, and Other Biologically Important Lands

Habitat Conservation Plan, Natural Community Conservation Plan, and other Conservation Plan Areas
No conservation plans have been adopted for lands within the treatable landscape in the Southeastern Great Basin Section.

Protected Open Space Lands
The treatable landscape in the Southeastern Great Basin Section contains 259 acres of protected open space owned by LADWP. This protected area represents 58 percent of the treatable landscape in the ecoregion.

Southern California Coast Section
The Southern California Coast Section (261B) encompasses 3,349,763 acres and contains mountains, hills, valleys, and plains of the Transverse Ranges and Peninsular Ranges that are within the marine influence zone, as well as sandy beaches, alluvial river valleys, coastal dunes and terraces, and cliffs along the coastline. Elevations range from sea level to 3,000 feet. This ecoregion contains 860,305 acres of treatable landscape, which represents approximately 26 percent of the total landscape within the ecoregion. Within the treatable landscape exist modeled treatment areas for the following treatment types: WUI fuel reduction (599,915 acres), fuel break (155,782 acres), and ecological restoration (229,177 acres). The treatable landscape is distributed across much of this ecoregion, excluding the urban centers along the coast (e.g., Los Angeles and San Diego). The treatable landscape in this ecoregion is displayed in Figure 3.6-17.

Vegetation and Habitat Types
Habitat types in the treatable landscape of the Southern California Coast Section consist of 11 woodland and forest habitat types, four chaparral and scrub habitat types, and two herbaceous grassland habitat types. Coastal scrub makes up the greatest acreage within the ecoregion, followed by annual grassland, mixed chaparral, and coastal oak woodland. Chaparral and scrub habitats comprise 505,812 acres, or 59 percent, of the treatable landscape. Grasslands comprise 181,668 acres, or 21 percent, and woodland and forest habitats comprise approximately 172,825 acres, or 20 percent, of the treatable landscape, respectively. The acreage breakdown of habitat types is provided in Table 3.6-27. The distribution of CWHR types within this ecoregion is shown in Figure 3.6-17.



Source: Data received from CAL FIRE in 2018

Figure 3.6-17 CWHR Types - Southern California Coast Ecological Section (261B)

Table 3.6-27 Vegetation and Habitat Types within the Treatable Landscape for the Southern California Coast Ecological Section

CWHR Classification	Acres	MCV Alliances	
Woodland and Forest Habitats			
Blue Oak Woodland	53	▶ Blue oak woodland	
Blue Oak-Foothill Pine	159	▶ Blue oak woodland	
Closed-Cone Pine-Cypress	721	▶ Bishop pine - Monterey pine forest*	▶ Torrey pine woodland*
Coastal Oak Woodland	151,835	▶ California walnut groves* ▶ Coast live oak woodland ▶ California bay forest*	▶ Madrone forest* ▶ Engelmann oak woodland*
Eucalyptus	1,477	▶ Eucalyptus - tree of heaven - black locust groves[N]	
Montane Hardwood	587	▶ Coulter pine woodland ▶ Bigcone Douglas fir forest*	▶ Canyon live oak forest
Montane Hardwood-Conifer	346	▶ Coulter pine woodland	▶ Bigcone Douglas fir forest*
Montane Riparian	159	▶ White alder grove ▶ Fremont cottonwood forest* ▶ Black cottonwood forest*	▶ Sandbar willow thicket
Sierran Mixed Conifer	594	▶ Incense cedar forest*	
Valley Foothill Riparian	12,942	▶ California sycamore woodland* ▶ Fremont cottonwood forest* ▶ Black cottonwood forest* ▶ California rose briar patch* ▶ Himalayan blackberry - rattlebox - edible fig riparian scrub[N]	▶ Sandbar willow thicket ▶ Red willow thicket* ▶ Shining willow groves* ▶ Pepper tree or Myoporum grove[N]
Valley Oak Woodland	3,952	▶ Valley oak woodland*	
Chaparral and Scrub Habitats			
Chamise-Redshank Chaparral	6,032	▶ Chamise chaparral ▶ Chamise - white sage chaparral* ▶ Chamise - black sage chaparral ▶ Redshank chaparral ▶ Mission manzanita chaparral*	▶ Eastwood manzanita chaparral ▶ Bigberry manzanita chaparral ▶ Hoary leaf ceanothus chaparral ▶ Wedge leaf ceanothus chaparral/Buck brush chaparral
Coastal Scrub	329,074	▶ Dune mat* ▶ California sagebrush scrub ▶ California sagebrush - California buckwheat scrub ▶ California sagebrush - black sage scrub ▶ Quailbush scrub ▶ Coyote brush scrub ▶ Broom patch[N] ▶ Sea rocket sands ▶ California buckwheat scrub ▶ California buckwheat - white sage scrub ▶ Sawtooth golden bush scrub* ▶ Menzies's golden bush scrub* ▶ Bush mallow scrub ▶ Laurel sumac scrub ▶ Ice plant mats[N]	▶ Sand dune sedge swath* ▶ Blue blossom chaparral ▶ Giant coreopsis scrub* ▶ Bush monkeyflower scrub* ▶ Live-forever - lichen/moss sparse herbaceous rock outcop ▶ California brittle bush - Ashy buckwheat scrub* ▶ Bush penstemon scrub* ▶ Scale broom scrub* ▶ Deer weed scrub ▶ Silver bush lupine scrub ▶ Yellow bush lupine scrub ▶ Silver dune lupine - mock heather scrub* ▶ California desert-thorn scrub*

Table 3.6-27 Vegetation and Habitat Types within the Treatable Landscape for the Southern California Coast Ecological Section

CWHR Classification	Acres	MCV Alliances	
		▶ Coast prickly pear scrub* ▶ Coastal sage and Island scrub oak chaparral* ▶ Lemonade berry scrub* ▶ Bushy spikemoss mats* ▶ Poison oak scrub	▶ White sage scrub* ▶ Purple sage scrub ▶ Black sage scrub ▶ Desert needlegrass grassland*
Mixed Chaparral	170,698	▶ Brittle leaf - woolly leaf manzanita chaparral* ▶ Eastwood manzanita chaparral ▶ Bigberry manzanita chaparral ▶ Bigpod ceanothus chaparral ▶ Hairy leaf - woolly leaf ceanothus chaparral* ▶ Bush poppy scrub ▶ Deer weed scrub ▶ Silver bush lupine scrub ▶ Bush mallow scrub ▶ Laurel sumac scrub ▶ Coastal sage and Island scrub oak chaparral* ▶ Interior live oak chaparral ▶ Sugarbush chaparral ▶ Poison oak scrub ▶ Canyon sunflower scrub*	▶ Burton Mesa chaparral* ▶ Hoary leaf ceanothus chaparral ▶ Wedge leaf ceanothus chaparral, Buck brush chaparral ▶ Wart stemmed ceanothus chaparral* ▶ Birch leaf mountain mahogany chaparral ▶ Holly leaf cherry - toyon - greenbark ceanothus chaparral ▶ Scrub oak chaparral ▶ Scrub oak - chamise chaparral
Sagebrush	8	▶ California sagebrush scrub ▶ California sagebrush - California buckwheat scrub	▶ California sagebrush - black sage scrub
Herbaceous Habitats			
Annual Grassland	179,515	▶ Western ragweed meadow ▶ Fiddleneck - phacelia field ▶ Wild oat grassland[N] ▶ Upland mustard and other ruderal forbs[N] ▶ Annual brome grassland[N] ▶ Red brome or mediterranean grass grassland[N] ▶ Cheatgrass - medusahead grassland[N] ▶ Yellow star-thistle field[N]	▶ Alkali weed - salt grass playas and sinks* ▶ California poppy - lupine field California goldfields - dwarf plantain - small fescue flower fields ▶ California goldfields - dwarf plantain - small fescue flower fields ▶ Perennial rye grass field[N]
Perennial Grassland	2,153	▶ Bent grass - tall fescue meadow ▶ Water foxtail meadow* ▶ European beach grass sward[N] ▶ Purple three-awn meadow* ▶ Upland mustard and other ruderal forbs[N] ▶ California brome - blue wildrye prairie* ▶ Poison hemlock or fennel patch[N] ▶ Sand-aster and perennial buckwheat field ▶ Pampas grass patch[N]	▶ Gum plant patch* ▶ Ashy ryegrass - creeping ryegrass turf* ▶ Giant wild rye grassland* ▶ Sea lyme grass patch* ▶ Needle grass - melic grass grassland ▶ Fountain grass sward[N] ▶ Harding grass - reed canary grass sward[N]
Total	860,305		

*These are designated sensitive natural communities with a state rarity rank of S1 (critically imperiled), S2 (imperiled), or S3 (vulnerable).

[N] These alliances are dominated by nonnative vegetation.

Source: CWHR 2019, CNPS 2019, Compiled by Ascent Environmental in 2019

Sensitive Biological Resources

Special-status Species

There are over 150 special-status plant taxa known to occur within the Southern California Coast Section, including 40 plant taxa that are officially listed as rare, threatened, or endangered. Many of the special-status plants are narrow endemics associated with the maritime chaparral or coastal scrub habitats of the ecoregion, such as the state and federally listed bigleaf crownbeard (*Verbesina dissita*), or with ultramafic soils. A complete list of all the special-status plant species known or with potential to occur within the treatable landscape of the Southern California Coast Section, along with their listing status and detailed habitat descriptions, is provided in Appendix BIO-3, Table 16a.

There are 58 special-status wildlife taxa, not counting fish, known or with potential to occur within the treatable landscape of this ecoregion. These species, along with the CWHR types they are associated with, are listed in Appendix BIO-3, Table 16b. Special-status fish with potential to occur within the ecoregion are identified in Appendix BIO-3, Table 19.

Critical Habitat

Critical habitat has been designated within the treatable landscape of this ecoregion for 14 plant taxa and 13 wildlife taxa, including coastal California gnatcatcher (*Polioptila californica californica*), Quino checkerspot butterfly (Euphydryas editha quino), Otay tarplant (*Deinandra conjugens*), Vandenberg monkeyflower (*Diplacus vandenbergensis*), Lompoc yerba santa (*Eriodictyon capitatum*), and Mexican flannelbush (*Fremontodendron mexicanum*). Appendix BIO-4 lists the acreage of critical habitat designated within the treatable landscape of this ecoregion for each species.

Sensitive Natural Communities and Habitat Types

Sensitive Natural Communities

There are 47 sensitive natural communities that have potential to occur within the treatable landscape of the Southern California Coast Section. The sensitive natural communities associated with each CWHR type in this ecoregion are identified in Table 3.6-27. Notable examples for this ecoregion include Torrey pine woodland, Engelmann oak woodland, Bigcone Douglas fir forest, California brittle bush - Ashy buckwheat scrub, bush penstemon scrub, canyon sunflower scrub, sawtooth golden bush scrub, and giant wild rye grassland.

Waters of the United States and State

Wetland habitats known to occur within the treatable landscape of the Southern California Coast Section include estuarine and marine deepwater, estuarine and marine wetland, freshwater emergent wetland, freshwater forested and shrub wetland, freshwater pond, lake, and riverine wetlands with the most abundant being riverine and freshwater forested and shrub wetland (Table 3.6-2). In addition, sand dune sedge swaths, gum plant patches, alkali weed saltgrass playas and sinks, needle spike rush stands, and water foxtail meadow are wetland types that may be included in areas mapped as scrub or grassland habitats.

Other Sensitive Habitats

CWHR riparian habitat types identified within the treatable landscape of the Southern California Coast Section consist of approximately 12,942 acres of valley foothill riparian habitat and 159 acres of montane riparian habitat. There are nine MCV alliances associated with the valley foothill riparian habitat type within this ecoregion and four MCV alliances associated with the montane riparian habitat type. Many of these are designated sensitive natural communities as indicated in Table 3.6-27.

Oak woodland habitats in the treatable landscape of the Southern California Coast Section consist of approximately 151,835 acres of coastal oak woodland, 3,952 acres of valley oak woodland, 53 acres of blue oak woodland, and 159 acres of blue oak – foothill pine woodland. There are approximately 587 acres of montane hardwood that may include canyon live oak forest stands. The only one of these oak woodland types that is a designated sensitive natural community is valley oak woodland; however, Engelmann oak woodland is a sensitive natural community included in areas mapped as coastal oak woodland. Additional sensitive natural communities that may be present in areas mapped as oak woodlands in this ecoregion, include madrone forest, California bay forest, and California walnut groves.

Southern maritime chaparral occurs in nutrient-poor soils (e.g., weathered sandstone and shale outcrops) on windward slopes and coastal lowlands along the southern California coast from Orange County to San Diego County (Sawyer et al. 2009). These chaparral types contain a high proportion of narrow endemic and special-status shrub species dominated by combinations of chamise, manzanita, sage, ceanothus, and Mission manzanita (*Xylococcus bicolor*). Special-status plant species associated with the southern maritime chaparral include California adolphia (*Adolphia californica*), Del Mar manzanita (*Arctostaphylos glandulosa* ssp. *crassifolia*) Rainbow manzanita (*Arctostaphylos rainbowensis*), wart-stemmed ceanothus (*Ceanothus verrucosus*), and scrub oak (*Quercus dumosa*). Chaparral sensitive natural communities in this ecoregion include chamise - white sage chaparral, mission manzanita chaparral, coastal sage and Island scrub oak chaparral, Burton Mesa chaparral, and wart stemmed ceanothus chaparral.

Coastal scrub habitats in this ecoregion are likewise very diverse and support a high proportion of rare and endemic plant species. There are 37 MCV alliances recognized in coastal scrub habitats in this ecoregion, of which 17 (46 percent) are designated sensitive natural communities. Table 3.6-27 lists all of the chaparral and coastal scrub alliances that may be found in the treatable landscape of this ecoregion and denotes which are sensitive natural communities and which are dominated by nonnative vegetation.

Conservation Lands, Special Management Areas, and Other Biologically Important Lands

Habitat Conservation Plan, Natural Community Conservation Plan, and other Conservation Plan Areas

The treatable landscape in the Southern California Coast Section includes plan areas for the Orange County Southern Subregion HCP, Central/Coastal Orange County HCP/NCCP, San Diego County Multiple Species Conservation Program (HCP/NCCP), San Diego County Water Authority HCP/NCCP, San Diego Gas and Electric Subregional HCP/NCCP, San Diego Multiple Habitat Conservation Program (HCP/NCCP), and Western Riverside County Multiple Species Habitat Conservation Plan (HCP/NCCP), which have been adopted and are being implemented. Additionally, one HCP and three HCP/NCCPs are currently being planned in the treatable landscape. Table 3.6-28 summarizes the conservation plans adopted or in progress, including the acreages of plan areas within the treatable landscape.

Table 3.6-28 Conservation Plans Adopted or In Progress in the Treatable Landscape—Southern California Coast Section

Conservation Plan	Plan Type	Stage	Plan Area Within the Treatable Landscape (Acres)[1]
Orange County Southern Subregion	HCP	Implementation	55,415
Santa Barbara Multi-Species	HCP	Planning	164,868
Central/Coastal Orange County	HCP/NCCP	Implementation	60,389
Orange County Transportation Authority	HCP/NCCP	Planning	118,573
San Diego County Multiple Species Conservation Program	HCP/NCCP	Implementation	97,337[1]
San Diego County Water Authority	HCP/NCCP	Implementation	97,337[1]
San Diego East County Multiple Species Conservation Program	HCP/NCCP	Planning	1,322
San Diego Gas and Electric Subregional	HCP/NCCP	Implementation	97,337[1]
San Diego Multiple Habitat Conservation Program	HCP/NCCP	Implementation	1,701
San Diego North County MSCP	HCP/NCCP	Planning	35,302
Western Riverside County Multiple Species Habitat Conservation Plan	HCP/NCCP	Implementation	3,213
		Total[1]	**538,120**

Notes: [1]The San Diego Water Authority HCP/NCCP and San Diego Gas and Electric Subregional HCP/NCCP cover discrete linear or energy projects but have larger plan areas that are contained within the San Diego County Multiple Species Conservation Program. Therefore, the acreage total does not include separate acreages for these overlapping plan areas.

Protected Open Space Lands

The treatable landscape in the Southern California Coast Section contains 693 protected open space units that are recognized in CPAD. These lands cover 179,573 acres, which represent 21 percent of the treatable landscape in the ecoregion. Some of the major land owners include The Nature Conservancy, State Parks, CDFW, Orange County, City of San Diego, National Audubon Society, and Ventura County. Examples of some of the prominent open space units include Irvine Ranch Open Space, Point Magu State Park, Malibu Creek State Park, Topanga Canyon State Park, Starr Ranch, Hollenbeck Canyon Wildlife Area, and Rancho Jamul Ecological Reserve.

Environmentally Sensitive Habitat Areas

The treatable landscape in the Southern California Coast Section includes the Santa Monica Mountains, which are an established ESHA supporting extremely diverse flora and fauna owing to their geologic diversity. The Santa Monica Mountains support at least 17 native vegetation types and over 400 species of birds, 35 species of amphibians and reptiles, and over 40 mammal species, including over 80 special-status species (California Coastal Commission 2003).

Southern California Mountains and Valleys Section

The Southern California Mountains and Valleys Section (M262B) encompasses 6,807,985 acres and includes mountains, hills, and valleys of the Transverse Ranges and Peninsular Ranges that are near, but not bordering, the Pacific Ocean. The climate is modified only slightly by marine influence on the west side of these ranges. It is bordered by the Colorado and Mojave deserts to the east and the Great Valley and Coast Ranges to the north. Elevations range from 500 to 11,500 feet. This ecoregion contains 1,452,456 acres of treatable landscape, which represents approximately 21 percent of the total landscape within the ecoregion. Within the treatable landscape exist modeled treatment areas for the following treatment types: WUI fuel reduction (1,029,402 acres), fuel break (280,341 acres), and ecological restoration (351,278 acres). The treatable landscape is dispersed across this ecoregion, outside of the federal lands present in the ecoregion. The treatable landscape in this ecoregion is displayed in Figure 3.6-18.

<u>Vegetation and Habitat Types</u>

Habitat types in the treatable landscape of the Southern California Mountains and Valleys Section consists of 18 woodland and forest habitat types, nine chaparral and scrub habitat types, and two herbaceous grassland habitat types. Chaparral and scrub habitats comprise 1,011,089 acres, or 70 percent, of the treatable landscape with mixed chaparral being the predominant type followed by coastal scrub. Woodland and forest habitats make up 20 percent of the habitat cover. Grasslands comprise 143,634 acres, or 21 percent, and woodland and forest habitats comprise approximately 172,825 acres, or less than 10 percent, of the treatable landscape. The acreage breakdown of habitat types is provided in Table 3.6-29. The distribution of CWHR types within this ecoregion is shown in Figure 3.6-18.

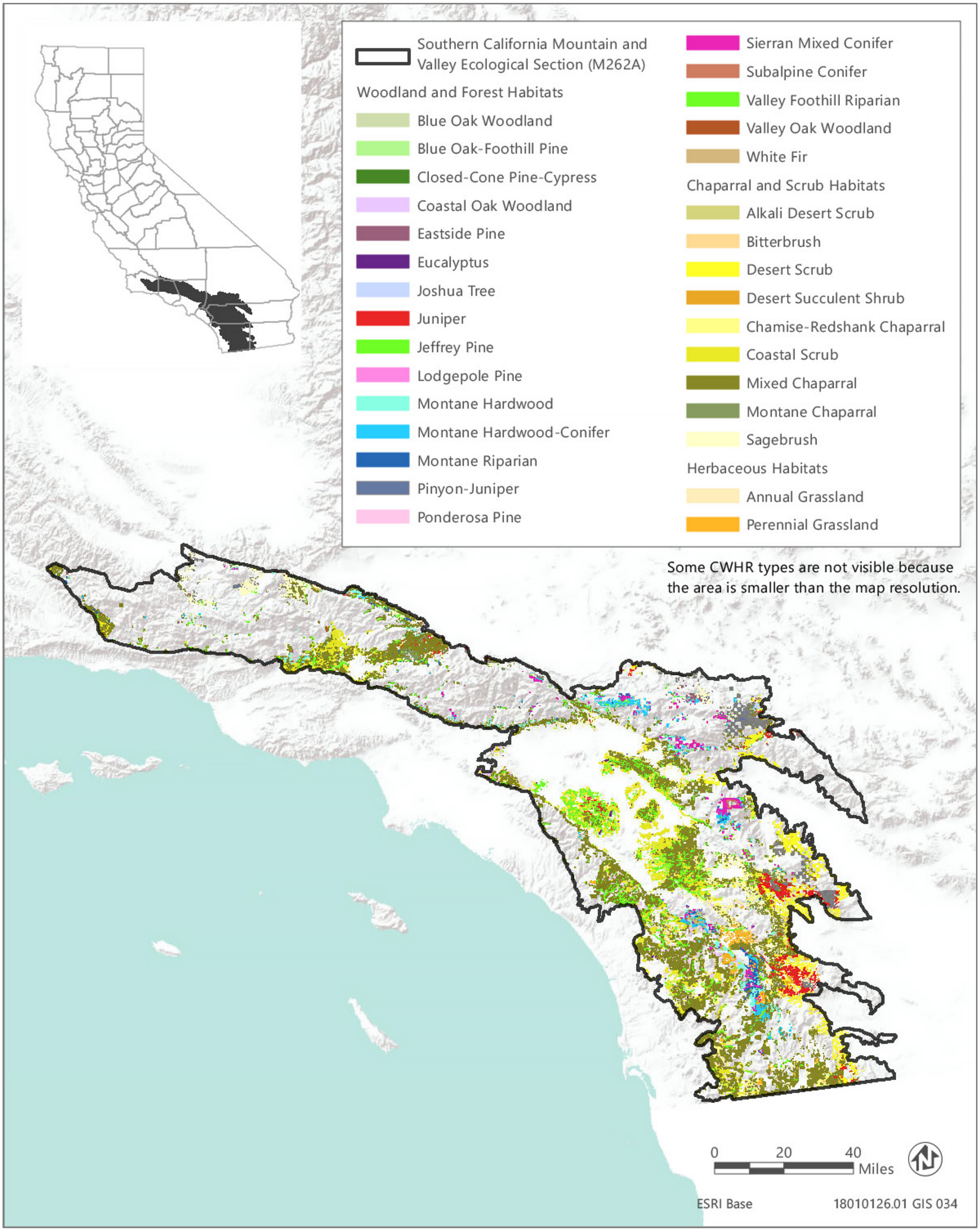
<u>Sensitive Biological Resources</u>

Special-Status Species

There are at least 273 special-status plant taxa known or expected to occur within the Southern California Mountains and Valleys Section, including 46 plant taxa that are officially listed as rare, threatened, or endangered. A list of all the special-status plant species known or with potential to occur within the treatable landscape of this ecoregion, along with their listing status and detailed habitat descriptions, is provided in Appendix BIO-3, Table 17a. There are over 125 special-status wildlife taxa, not including fish, that may occur within the treatable landscape of this ecoregion, as listed in Appendix BIO-3, Table 17b. Special-status fish with potential to occur within the ecoregion are identified in Appendix BIO-3, Table 19.

Critical Habitat

Critical habitat has been designated within the treatable landscape of this ecoregion for 19 plant taxa and 17 wildlife taxa. These include Munz’s onion (*Allium munzii*), ash-grey paintbrush (*Castilleja cinerea*), southern mountain wild buckwheat (*Eriogonum kennedyi* var. *austromontanum*), San Bernardino Mountains bladderpod (*Lesquerella kingii* ssp. *bernardina*), arroyo toad, Laguna Mountains skipper (*Pyrgus ruralis lagunae*) mountain yellow-legged frog, southwestern willow flycatcher (*Empidonax traillii extimus*), San Bernardino Merriam's kangaroo rat (*Dipodomys merriami parvus*), and Santa Ana sucker (*Catostomus santaanae*). Appendix BIO-4 provides the acreage of critical habitat designated within the treatable landscape of this ecoregion for these species.



Source: Data received from CAL FIRE in 2018

Figure 3.6-18 CWHR Types - Southern California Mountain and Valley Ecological Section (M262B)

Table 3.6-29 Vegetation and Habitat Types within the Treatable Landscape for the Southern California Mountains and Valleys Ecological Section

CWHR Classification	Acres	MCV Alliances	
Woodland and Forest Habitats			
Blue Oak Woodland	1,181	▶ Blue oak woodland	▶ Interior live oak woodland
Blue Oak-Foothill Pine	312	▶ Foothill pine woodland	▶ Blue oak woodland
Closed-Cone Pine-Cypress	110	▶ Tecate cypress stand* ▶ Sargent cypress woodland*	▶ Cuyamaca cypress stand* ▶ Knobcone pine forest
Coastal Oak Woodland	81,668	▶ Madrone forest* ▶ California walnut groves* ▶ Coast live oak woodland	▶ Engelmann oak woodland* ▶ California bay forest*
Eastside Pine	5,906	▶ Jeffrey pine forest	▶ Ponderosa pine forest
Eucalyptus	994	▶ Eucalyptus - tree of heaven - black locust groves[N]	
Joshua Tree	3,724	▶ Joshua tree woodland*	
Juniper	54,469	▶ Needleleaf rabbitbrush scrub ▶ California juniper woodland ▶ Mountain juniper woodland ▶ Utah juniper woodland*	▶ Singleleaf pinyon - Utah juniper woodlands ▶ Parry pinyon woodland*
Lodgepole Pine	9	▶ Lodgepole pine forest	▶
Montane Hardwood	33,081	▶ Coulter pine woodland ▶ Bigcone Douglas fir forest*	▶ Canyon live oak forest ▶ Interior live oak woodland
Montane Hardwood-Conifer	22,153	▶ Coulter pine woodland	▶ Bigcone Douglas fir forest*
Montane Riparian	9,102	▶ White alder grove ▶ Fremont cottonwood forest* ▶ Black cottonwood forest*	▶ Sandbar willow thicket ▶ Wild grape shrubland*
Pinyon-Juniper	39,345	▶ Utah juniper woodland* ▶ Singleleaf pinyon - Utah juniper woodlands	▶ Parry pinyon woodland*
Ponderosa Pine	408	▶ Ponderosa pine forest	
Sierran Mixed Conifer	13,487	▶ Incense cedar forest*	▶ Mixed oak forest
Valley Foothill Riparian	19,664	▶ Wild tarragon patch ▶ California sycamore woodland* ▶ Fremont cottonwood forest* ▶ Black cottonwood forest* ▶ California rose briar patch* ▶ Himalayan blackberry - rattlebox - edible fig riparian scrub[N]	▶ Sandbar willow thicket ▶ Red willow thicket* ▶ Shining willow groves* ▶ Pepper tree or Myoporum grove[N] ▶ Wild grape shrubland*
Valley Oak Woodland	306	▶ Valley oak woodland*	
White Fir	303	▶ White fir forest ▶ White fir - sugar pine forest	
Chaparral and Scrub Habitats			
Alkali Desert Scrub	882	▶ Fourwind saltbush scrub ▶ Quailbush scrub	▶ Alkali sacaton - scratchgrass - alkali cordgrass alkaline wet meadow* ▶ Bush seepweed scrub*
Bitterbrush	23	▶ Bitter brush scrub*	

Table 3.6-29 Vegetation and Habitat Types within the Treatable Landscape for the Southern California Mountains and Valleys Ecological Section

CWHR Classification	Acres	MCV Alliances	
Chamise-Redshank Chaparral	125,460	▸ Chamise chaparral ▸ Chamise - white sage chaparral* ▸ Chamise - black sage chaparral ▸ Redshank chaparral ▸ Eastwood manzanita chaparral	▸ Bigberry manzanita chaparral ▸ Hoary leaf ceanothus chaparral ▸ Wedge leaf ceanothus chaparral/Buck brush chaparral ▸ Cup leaf ceanothus chaparral* ▸ Mission manzanita chaparral*
Coastal Scrub	275,280	▸ California sagebrush scrub ▸ California sagebrush - California buckwheat scrub ▸ California sagebrush - black sage scrub ▸ Quailbush scrub ▸ Coyote brush scrub ▸ Broom patch[N] ▸ Live-forever - lichen/moss sparse herbaceous rock outcop ▸ California brittle bush - Ashy buckwheat scrub* ▸ Brittle bush scrub ▸ Palmer's goldenbush scrub* ▸ California buckwheat scrub ▸ California buckwheat - white sage scrub ▸ Wright's buckwheat - Heerman's buckwheat - Utah butterfly-bush scrub*	▸ California coffee berry scrub ▸ Menzies's golden bush scrub* ▸ Bush penstemon scrub* ▸ Scale broom scrub* ▸ Deer weed scrub ▸ Bush mallow scrub ▸ Laurel sumac scrub ▸ Ice plant mats[N] ▸ Coast prickly pear scrub* ▸ White sage scrub* ▸ Purple sage scrub ▸ Black sage scrub ▸ Coast range stonecrop draperies ▸ Bushy spikemoss mats* ▸ Jojoba scrub* ▸ Bush seepweed scrub* ▸ Poison oak scrub
Desert Scrub	94,864	▸ Desert agave scrub* ▸ White bursage scrub ▸ Desert needlegrass grassland* ▸ Fourwind saltbush scrub ▸ Quailbush scrub ▸ Rigid spineflower - hairy desert sunflower ▸ Mojave-Sonoran Desert dunes* ▸ Acton's and Virgin River brittlebush - net-veined goldeneye scrub* ▸ Brittle bush scrub ▸ Nevada joint fir - Anderson's boxthorn - spiny hop sage scrub ▸ California buckwheat - Parish's goldeneye scrub	▸ Wright's buckwheat - Heerman's buckwheat - Utah butterfly-bush scrub* ▸ Snakeweed scrub* ▸ Creosote bush scrub ▸ Creosote bush - white bursage scrub ▸ Big galleta shrub-steppe* ▸ Desert almond - Mexican bladdersage scrub ▸ Desert apricot scrub* ▸ Catclaw acacia - desert lavender - chuparosa scrub ▸ Jojoba scrub* ▸ Alkali sacaton - scratchgrass - alkali cordgrass alkaline wet meadow* ▸ Bush seepweed scrub*
Desert Succulent Shrub	3,661	▸ Desert agave scrub* ▸ Elephant tree stand*	▸ Nolina scrub* ▸ Mojave yucca scrub
Mixed Chaparral	476,149	▸ Eastwood manzanita chaparral ▸ Bigberry manzanita chaparral ▸ Pointleaf manzanita - pink-bract manzanita chaparral* ▸ Hoary leaf ceanothus chaparral ▸ Wedge leaf ceanothus chaparral, Buck brush chaparral	▸ California coffee berry scrub ▸ Deer weed scrub ▸ Bush mallow scrub ▸ Laurel sumac scrub ▸ Holly leaf cherry - toyon - greenbark ceanothus chaparral

Table 3.6-29 Vegetation and Habitat Types within the Treatable Landscape for the Southern California Mountains and Valleys Ecological Section

CWHR Classification	Acres	MCV Alliances	
		▶ Cup leaf ceanothus chaparral* ▶ Deer brush chaparral ▶ Chaparral whitethorn chaparral ▶ Bigpod ceanothus chaparral ▶ Hairy leaf - woolly leaf ceanothus chaparral* ▶ Wart stemmed ceanothus chaparral* ▶ Birch leaf mountain mahogany chaparral ▶ Bush poppy scrub ▶ Thick leaf yerba santa scrub*	▶ Choke cherry thickets* ▶ Scrub oak chaparral ▶ Scrub oak - chamise chaparral ▶ Canyon live oak chaparral* ▶ Muller oak chaparral ▶ Tucker oak chaparral ▶ Palmer oak chaparral* ▶ Interior live oak chaparral ▶ Sugarbush chaparral ▶ Oak gooseberry thicket* ▶ Poison oak scrub
Montane Chaparral	11,484	▶ Green leaf manzanita chaparral ▶ Mountain whitethorn chaparral ▶ Deer brush chaparral	▶ Birch leaf mountain mahogany chaparral ▶ Bush chinquapin chaparral* ▶ Choke cherry thicket*
Sagebrush	23,286	▶ California sagebrush scrub ▶ California sagebrush - California buckwheat scrub ▶ California sagebrush - black sage scrub ▶ Black sagebrush scrub* ▶ Rothrock's sagebrush*	▶ Big sagebrush ▶ Small leaf mountain mahogany scrub* ▶ Curl leaf mountain mahogany scrub ▶ Black brush scrub ▶ Rubber rabbitbrush scrub ▶ Bitter brush scrub*
Herbaceous Habitats			
Annual Grassland	133,508	▶ Western ragweed meadow ▶ Fiddleneck - phacelia field ▶ Wild oat grassland[N] ▶ Upland mustard and other ruderal forbs[N] ▶ Annual brome grassland[N] ▶ Red brome or Mediterranean grass grassland[N] ▶ Cheatgrass - medusahead grassland[N] ▶ Yellow star-thistle field[N] ▶ Tar plant field*	▶ Annual dogtail grassland[N] ▶ Clustered tarweed field* ▶ California poppy - lupine field ▶ California goldfields - dwarf plantain - small fescue flower fields ▶ Spanish clover field ▶ Monolopia - leafy-stemmed tickseed field*
Perennial Grassland	10,126	▶ Bent grass - tall fescue meadow ▶ Purple three-awn meadow* ▶ Upland mustard and other ruderal forbs[N] ▶ California brome - blue wildrye prairie* ▶ Small-fruited sedge meadow* ▶ Sand-aster and perennial buckwheat field ▶ Pampas grass patch[N]	▶ Ashy ryegrass - creeping ryegrass turf* ▶ Deer grass bed* ▶ Needle grass - melic grass grassland ▶ Fountain grass sward[N] ▶ Harding grass - reed canary grass sward[N] ▶ Kentucky blue grass turf[N] ▶ Curly blue grass grassland*
Total	1,440,945		

*These are designated sensitive natural communities with a state rarity rank of S1 (critically imperiled), S2 (imperiled), or S3 (vulnerable).

[N] These alliances are dominated by nonnative vegetation.

Source: CWHR 2019, CNPS 2019, Compiled by Ascent Environmental in 2019

Sensitive Natural Communities and Habitats

Sensitive Natural Communities

There are 63 sensitive natural communities that have potential to occur within the treatable landscape of the Southern California Mountains and Valleys Section. The sensitive natural communities associated with each CWHR type in this ecoregion are identified in Table 3.6-29. Notable examples for this ecoregion include Tecate cypress stands, Cuyamaca cypress stands, Joshua tree woodland, Parry pinyon woodland, Palmer's goldenbush scrub, Menzies's golden bush scrub, snakeweed scrub, desert apricot scrub, jojoba scrub, and clustered tarweed field. Chaparral sensitive natural communities are discussed below.

Wetlands and Other Waters of the United States and Waters of the State

Over 28,000 acres of wetland habitats have been identified in the NWI within the treatable landscape of the Southern California Mountains and Valleys Section consisting of freshwater emergent wetland, freshwater forested and shrub wetland, freshwater pond, lake, and riverine wetlands with the most abundant being riverine and freshwater forested and shrub wetland (Table 3.6-2). In addition, alkali sacaton - scratchgrass - alkali cordgrass alkaline wet meadow, small-fruited sedge meadows, and bent grass-tall fescue meadows are wetland types that may be included in areas mapped as scrub or grassland habitats. Vernal pools and swales may also be present, as well as other seasonal wetlands.

Other Sensitive Habitats

CWHR riparian habitat types identified within the treatable landscape of the Southern California Mountains and Valleys Section consist of approximately 19,664 acres of valley foothill riparian habitat and 9,102 acres of montane riparian habitat. There are 11 MCV alliances associated with the valley foothill riparian habitat type within this ecoregion and five MCV alliances associated with the montane riparian habitat type. Seven of these are designated sensitive natural communities as indicated in Table 3.6-29.

Oak woodland habitats in the treatable landscape of the Southern California Mountains and Valleys Section consist of approximately 81,668 acres of coastal oak woodland, 1,181 acres of blue oak woodland, and 312 acres of blue oak – foothill pine woodland, and 306 acres of valley oak woodland. There are approximately 33,081 acres of montane hardwood that may include oak woodlands stands. Valley oak woodland is a designated sensitive natural community and Engelmann oak woodland is a sensitive natural community that may be present in areas mapped as coastal oak woodland. Additional sensitive natural communities that may be present in areas mapped as oak woodlands in this ecoregion, include madrone forest, California bay forest, and California walnut groves.

Chaparral and coastal scrub habitats in the treatable landscape of the Southern California Mountains and Valleys Section consist of approximately 125,460 acres of chamise – redshank chaparral, 476,149 acres of mixed chaparral, 11,484 acres of montane chaparral, and 275,280 acres of coastal scrub. Chaparral habitat in this ecoregion is extremely diverse with 30 MCV alliances recognized in the mixed chaparral type, 10 recognized in the chamise-redshank chaparral type, and six in the montane chaparral type. Thirteen of these chaparral types are designated sensitive natural communities, including cup leaf ceanothus chaparral, mission manzanita chaparral, pointleaf manzanita - pink-bract manzanita chaparral, thick leaf yerba santa scrub, canyon live oak chaparral, Palmer oak chaparral, and bush chinquapin chaparral. The southern maritime chaparral extends into this ecoregion and, as in the Southern California Coast Section, there is a high degree of endemism and several special-status chaparral species are present including San Gabriel manzanita (*Arctostaphylos glandulosa* ssp. *gabrielensis*), Otay manzanita (*Arctostaphylos otayensis*), Rainbow manzanita, Otay Mountain ceanothus (*Ceanothus otayensis*), wart-stemmed ceanothus, and scrub oak.

The coastal scrub habitat is also very diverse in this ecoregion with 30 MCV alliances recognized and all but two of these are native vegetation types. Eleven of the recognized alliances are designated sensitive natural communities as noted in Table 3.6-29. There is a high degree of plant species endemism within chaparral and coastal scrub habitats in this ecoregion and numerous special-status plant and wildlife species are associated with the coastal scrub habitat in this ecoregion.

Conservation Lands, Special Management Areas, and Other Biologically Important Lands

Habitat Conservation Plan, Natural Community Conservation Plan, and other Conservation Plan Areas

The treatable landscape in the Southern California Mountains and Valleys Section includes plan areas for the Orange County Southern Subregion HCP, Central/Coastal Orange County HCP/NCCP, Coachella Valley Multiple Species Habitat Conservation Plan (HCP/NCCP), San Diego County Multiple Species Conservation Program (HCP/NCCP), San Diego County Water Authority HCP/NCCP, San Diego Gas and Electric Subregional HCP/NCCP, San Diego Multiple Habitat Conservation Program (HCP/NCCP), and Western Riverside County Multiple Species Habitat Conservation Plan (HCP/NCCP), which have been adopted and are being implemented. Additionally, two HCPs and four HCP/NCCPs are currently being planned in the treatable landscape. Table 3.6-30 summarizes the conservation plans adopted or in progress, including the acreages of plan areas within the treatable landscape.

Table 3.6-30 Conservation Plans Adopted or In Progress in the Treatable Landscape—Southern California Mountains and Valleys Section

Conservation Plan	Plan Type	Stage	Plan Area Within the Treatable Landscape (Acres)[1]
West Mojave Plan	HCP	Planning	78,500
City of Colton Habitat Conservation Plan	HCP	Planning	213
Orange County Southern Subregion	HCP	Implementation	2,659
Central/Coastal Orange County	HCP/NCCP	Implementation	4,148
Coachella Valley Multiple Species Habitat Conservation Plan	HCP/NCCP	Implementation	77,189
Desert Renewable Energy Conservation Plan	HCP/NCCP	Planning	144,056
Orange County Transportation Authority	HCP/NCCP	Planning	17,818
San Diego County Multiple Species Conservation Program	HCP/NCCP	Implementation	109,806[1]
San Diego County Water Authority	HCP/NCCP	Implementation	109,806[1]
San Diego East County MSCP	HCP/NCCP	Planning	545,169
San Diego Gas and Electric Subregional	HCP/NCCP	Implementation	109,806[1]
San Diego Multiple Habitat Conservation Program	HCP/NCCP	Implementation	3,328
San Diego North County Multiple Species Conservation Plan	HCP/NCCP	Planning	184,372
Western Riverside County Multiple Species Habitat Conservation Plan	HCP/NCCP	Implementation	520,888
		Total[1]	**1,688,146**

Notes: [1]The San Diego Water Authority HCP/NCCP and San Diego Gas and Electric Subregional HCP/NCCP cover discrete linear or energy projects but have larger plan areas that are contained within the San Diego County Multiple Species Conservation Program. Therefore, the acreage total does not include separate acreages for these overlapping plan areas.

Protected Open Space Lands

The treatable landscape in the Southern California Mountains and Valleys Section contains 525 protected open space units that are recognized in CPAD. These lands cover 373,229 acres, which represent 26 percent of the treatable landscape in the ecoregion. Some of the major land owners include State Parks, CDFW, The Wildlands Conservancy, San Diego County, University of California, Riverside County, and The Nature Conservancy. Examples of some of the prominent open space units in the Southern California Mountains and Valleys Section include Anza-Borrego Desert State Park, Cuyamaca Rancho State Park, Santa Rosa Plateau Ecological reserve, and Santa Rosa Wildlife Area.

Southern Cascades Section

The Southern Cascades Section (M261D) encompasses 4,208,496 acres and comprises the mountains, hills, and valleys of the southern Cascade Ranges. These volcanic mountains are scattered and do not form a distinct range. Elevations range from 1,500 to 14,000 feet. This ecoregion contains 1,535,830 acres of treatable landscape, which represents approximately 36 percent of the total landscape within the ecoregion. Within the treatable landscape exist modeled treatment areas for the following treatment types: WUI fuel reduction (342,872 acres), fuel break (243,034 acres), and ecological restoration (1,168,867 acres). The treatable landscape covers much of this ecoregion, outside of the valleys, plateaus, and federal land in the east portion of the ecoregion. The treatable landscape in this ecoregion is displayed in Figure 3.6-19.

Vegetation and Habitat Types

Forest and woodland habitat types make up 85 percent the treatable landscape of the Southern Cascades Section. Twenty forest and woodland CWHR types occur in the treatable landscape and Sierran mixed conifer is the predominant forest type, covering nearly 640,000 acres, followed by ponderosa pine at just over 208,000 acres. There are approximately 40 MCV alliances associated with the forest and woodland habitats in this ecoregion. Chaparral and scrub habitat types compose approximately 8 percent of the treatable landscape and consist of alkali desert scrub, bitterbrush, low sage, mixed chaparral, and sagebrush, which is the most prevalent scrub type. Fourteen MCV alliances are associated with the chaparral and scrub CWHR types in this ecoregion. Annual and perennial grasslands make up approximately 4 percent and 2 percent of the treatable landscape, respectively. There are 11 MCV alliances recognized in the perennial grassland type in this ecoregion and seven of these are sensitive natural communities.

Table 3.6-31 provides the acreage of each CWHR habitat type within the treatable landscape of this ecoregion and the associated MCV vegetation alliances that may occur within each CWHR type in this ecoregion. Alliances that are designated as sensitive natural communities and those that are dominated by nonnative vegetation are indicated in Table 3.6-31. Sensitive natural communities are discussed in more detail below. The distribution of CWHR types within this ecoregion is shown in Figure 3.6-19.

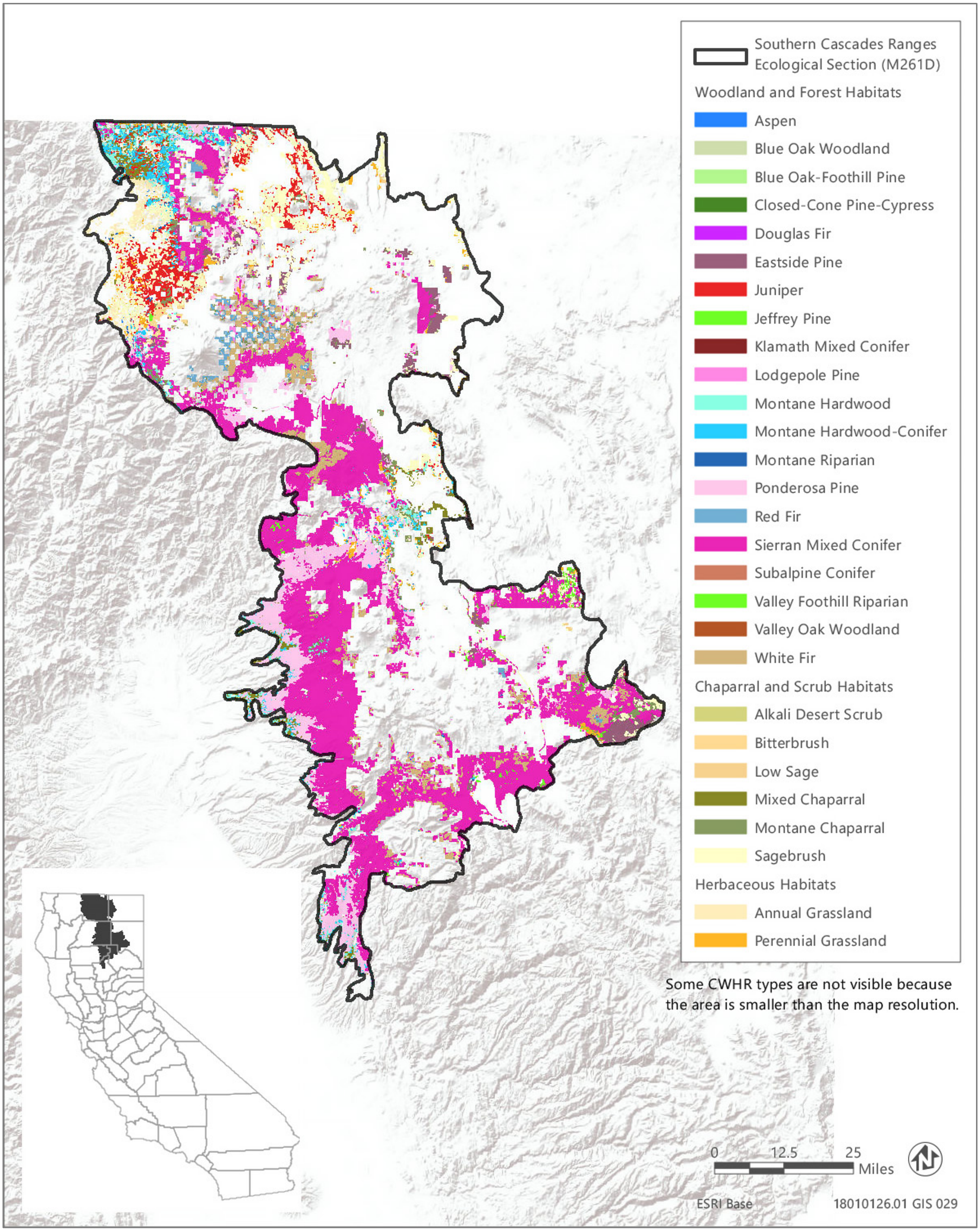
Sensitive Biological Resources

Special-Status Species

There are 36 special-status wildlife taxa and at least 116 special-status plant taxa known or with potential to occur in the treatable landscape of the Southern Cascades Section, including 16 animal taxa and five plant taxa that are state or federally listed as rare, threatened, or endangered or fully protected. Approximately 35 percent of the special-status plant species in this ecoregion are associated with wetland or riparian habitats and several others are associated with serpentine substrates. A list of all the special-status plant species known or with potential to occur within the treatable landscape of the Southern Cascades Section, along with their listing status and detailed habitat descriptions, is provided in Appendix BIO-3, Table 18a. A list of special-status wildlife (other than fish) species known or with potential to occur in the treatable landscape of this ecoregion, along with the CWHR types they are associated with, is provided in Appendix BIO-3, Table 18b. Special-status fish known or with potential to occur in the ecoregion are identified in Appendix BIO-3, Table 19.

Critical Habitat

Critical habitat exists within the treatable landscape of this ecoregion for northern spotted owl, slender Orcutt grass, and Greene's tuctoria (*Tuctoria greenei*). Appendix BIO-4 provides the acreage of critical habitat designated within the treatable landscape of this ecoregion for these species.



Source: Data received from CAL FIRE in 2018

Figure 3.6-19 CWHR Types - Southern Cascades Ecological Section (M261D)

Table 3.6-31 Vegetation and Habitat Types within the Treatable Landscape for the Southern Cascades Ecological Section

CWHR Classification	Acres	MCV Alliances	
Woodland and Forest Habitats			
Aspen	539	▶ Aspen groves*	
Blue Oak Woodland	11,878	▶ Blue oak woodland	
Blue Oak-Foothill Pine	4,478	▶ Foothill pine woodland	▶ Blue oak woodland
Closed-Cone Pine-Cypress	454	▶ Baker cypress stands* ▶ McNab cypress woodland*	▶ Knobcone pine forest
Douglas Fir	821	▶ White fir - Douglas fir forest ▶ Bigleaf maple forest* ▶ Ponderosa pine - Douglas fir forest	▶ Douglas fir forest ▶ Douglas fir - tanoak forest*
Eastside Pine	111,981	▶ Jeffrey pine forest ▶ Ponderosa pine forest	▶ Washoe pine woodland*
Jeffrey Pine	20,740	▶ Jeffrey pine forest	
Juniper	93,042	▶ Western juniper woodland	
Klamath Mixed Conifer	144	▶ Engelmann spruce forest*	
Lodgepole Pine	10,731	▶ Lodgepole pine forest	
Montane Hardwood	43,375	▶ Bigleaf maple forest* ▶ Tanoak forest* ▶ Mixed oak forest	▶ Canyon live oak forest ▶ Oregon white oak woodland*
Montane Hardwood-Conifer	31,739	▶ Bigleaf maple forest*	
Montane Riparian	3,040	▶ Rocky Mountain maple thicket* ▶ Mountain alder thicket* ▶ White alder grove ▶ Resin birch thicket* ▶ Water birch thicket*	▶ Torrent sedge patch* ▶ Red osier thicket* ▶ Oregon ash grove* ▶ Black cottonwood forest* ▶ Sandbar willow thicket
Ponderosa Pine	208,200	▶ Ponderosa pine forest ▶ Ponderosa pine - Douglas fir forest	▶ Washoe pine woodland*
Red Fir	16,291	▶ Red fir forest	▶ Red fir - white fir forest
Sierran Mixed Conifer	639,777	▶ Incense cedar forest* ▶ Mixed oak forest	▶ Ponderosa pine - Douglas fir forest
Subalpine Conifer	506	▶ Engelmann spruce forest* ▶ Whitebark pine forest	▶ Western white pine forest ▶ Mountain hemlock forest
Valley Foothill Riparian	483	▶ Torrent sedge patch* ▶ Red osier thicket* ▶ Black cottonwood forest*	▶ Sandbar willow thicket ▶ Himalayan blackberry - rattlebox - edible fig riparian scrub[N]
Valley Oak Woodland	3	▶ Valley oak woodland*	
White Fir	50,231	▶ White fir forest ▶ White fir - sugar pine forest	▶ White fir - Douglas fir forest ▶ Red fir - white fir forest
Chaparral and Scrub Habitats			
Alkali Desert Scrub	18	▶ Alkali sacaton - scratchgrass - alkali cordgrass alkaline wet meadow*	
Bitterbrush	21,080	▶ Bitter brush scrub*	

Table 3.6-31 Vegetation and Habitat Types within the Treatable Landscape for the Southern Cascades Ecological Section

CWHR Classification	Acres	MCV Alliances	
Low Sage	4,166	▶ Little sagebrush scrub	
Mixed Chaparral	45,105	▶ Whiteleaf manzanita chaparral ▶ Wedge leaf ceanothus chaparral, Buck brush chaparral ▶ Deer brush chaparral ▶ Birch leaf mountain mahogany chaparral	▶ Ocean spray brush* ▶ Shrub tanoak chaparral* ▶ Scrub oak chaparral
Sagebrush	60,249	▶ Big sagebrush ▶ Mountain big sagebrush ▶ Curl leaf mountain mahogany scrub ▶ Little sagebrush scrub ▶ Bitter brush scrub*	▶ Rubber rabbitbrush scrub
Herbaceous Habitats			
Annual Grassland	65,103	▶ Wild oat grassland ▶ Annual brome grassland[N] ▶ Red brome or mediterranean grass grassland[N]	▶ Cheatgrass - medusahead grassland[N] ▶ Yellow star-thistle field[N] ▶ Needle spike rush stand*
Perennial Grassland	25,863	▶ Water foxtail meadow* ▶ Small-fruited sedge meadow* ▶ California oat grass prairie* ▶ Harding grass - reed canary grass sward[N] ▶ Kentucky blue grass turf[N]	▶ Tufted hair grass meadow ▶ Idaho fescue grassland* ▶ Ashy ryegrass - creeping ryegrass turf* ▶ Mat muhly meadow ▶ Curly blue grass grassland* ▶ Bluebunch wheat grass grassland*
Total	1,470,037		

*These are designated sensitive natural communities with a state rarity rank of S1 (critically imperiled), S2 (imperiled), or S3 (vulnerable).

[N] These alliances are dominated by nonnative vegetation.

Source: CWHR 2019, CNPS 2019, Compiled by Ascent Environmental in 2019

Sensitive Natural Communities and Habitats

Sensitive Natural Communities

There are 31 sensitive natural communities that may occur within the treatable landscape of the Southern Cascades Section. The sensitive natural communities associated with each CWHR type in this ecoregion are identified in Table 3.6-31. Examples include Baker cypress stands, bigleaf maple forest, Engelmann spruce forest, Douglas fir-tanoak forest, ocean spray brush, shrub tanoak chaparral, bluebunch wheat grass grassland, and California oat grass prairie. Some of these sensitive natural communities are dominated by special-status species. Engelmann spruce (*Picea engelmannii*) and Baker's cypress (*Hesperocyparis bakeri*) are special-status plants that characterize sensitive natural communities in this ecoregion.

Wetlands and Other Waters of the United States and Waters of the State

Approximately 30,300 acres of wetland habitats have been mapped in the NWI within the treatable landscape of the Southern Cascades Section, consisting of freshwater emergent wetland, freshwater forested and shrub wetland, freshwater pond, lake, and riverine wetlands with the most abundant being freshwater emergent and freshwater forested and shrub wetland (Table 3.6-2). In addition, alkali sacaton - scratchgrass - alkali cordgrass alkaline wet meadow, small-fruited sedge meadows, water foxtail meadows, and needle spike rush stands are wetland types that may be included in areas mapped as scrub or grassland habitats.

Other Sensitive Habitats

CWHR riparian habitat types identified within the treatable landscape of the Southern Cascades Section consist of approximately 3,040 acres of montane riparian habitat and 483 acres of valley and foothill riparian habitat that may include 11 MCV alliances. Eight of these are designated sensitive natural communities as indicated in Table 3.6-31. Resin birch thickets are dominated by the special-status plant species resin birch (*Betula glandulosa*).

Blue oak and valley oak woodland have been mapped in the treatable landscape and mixed oak, canyon live oak, and Oregon white oak may be present in areas mapped as montane hardwood.

A little over 45,000 acres of mixed chaparral habitat are present in the treatable landscape of this ecoregion and may include seven different MCV alliances, of which two, ocean spray brush and shrub tanoak chaparral, are sensitive natural communities.

<u>Conservation Lands, Special Management Areas, and Other Biologically Important Lands</u>

Habitat Conservation Plan, Natural Community Conservation Plan, and other Conservation Plan Areas

No conservation plans have been adopted for lands within the treatable landscape in the Southern Cascades Section.

Protected Open Space Lands

The treatable landscape in the Southern Cascades Section contains 46 protected open space units that are recognized in CPAD. These lands cover 29,527 acres, which represent 2 percent of the treatable landscape in the ecoregion. Some of the major land owners include CAL FIRE, CDFW, State Parks, The Nature Conservancy, CSLC, and Feather River Land Trust. Examples of some of the prominent open space units in the Southern Cascades Section include Ahjumawi Lava Springs State Park, Latour Demonstration State Forest, Shasta Big Springs Ranch, Horseshoe Ranch Wildlife Area, Butte Valley Wildlife Area, Warner Valley Wildlife Area, and McArthur-Burney Falls Memorial State Park.

3.6.2 Regulatory Setting

Biological resources in California are protected and/or regulated by a variety of federal and state laws and policies. Key federal and state regulatory and conservation planning issues applicable to the program are discussed below. No specific local regulations are discussed in this section. As stated below, this PEIR assumes that any vegetation treatments proposed by local agencies under the CalVTP would be consistent with local plans, policies, and ordinances.

FEDERAL

Federal Endangered Species Act

The ESA requires formal or informal consultation with USFWS or the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service when it is likely that a project could affect species federally listed as threatened or endangered. The purpose of the ESA is to conserve the ecosystems upon which listed species depend. The law's ultimate goal is to "recover" listed species such that the protections of the act are no longer needed. The ESA requires that recovery plans be developed that describe the steps necessary to restore the species. Similarly, the act provides for the designation of "critical habitat" when prudent and determinable. Critical habitat is geographic areas that contain physical and biological features essential to the conservation of the species and that may require special management considerations or protection. Critical habitat designations affect only federal agency actions or federally funded or permitted activities.

The act also regulates the "taking" of a species listed as threatened or endangered under the ESA. Under the ESA, the definition of "take" is to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." USFWS has also interpreted the definition of "harm" to include significant habitat modification that could result in take. If implementing a project would result in take of a federally listed species, either the project applicant must acquire an incidental take permit under Section 10(a) of the ESA or, if a federal discretionary action is involved, the federal agency must consult with USFWS under Section 7 of the act.

Marine Mammal Protection Act

The Marine Mammal Protection Act (MMPA; 16 U.S.C. Chapter 31), first enacted in 1972, provides for protection of all marine mammals (whales, dolphins, seals and sea lions) in the United States. The MMPA provides that it shall be unlawful, with certain permitted exceptions, to take a marine mammal in waters of the United States. Under the MMPA, "take" is defined as "to harass, hunt, capture, collect, or kill, or attempt to harass, hunt, capture, collect, or kill any marine mammal."

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act declares it is illegal to "take" bald eagles, including their parts, nests, or eggs, unless authorized. "Take" is defined as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." "Disturb" means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, injury to an eagle; a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or nest abandonment. In addition to immediate impacts, this definition also covers impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits and causes injury, nest abandonment, or death.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA), first enacted in 1918, provides for protection of international migratory birds and authorizes the Secretary of the Interior to regulate the taking of migratory birds. MBTA provides that it shall be unlawful, except as permitted by regulations, to pursue, take, or kill any migratory bird, or any part, nest, or egg of any such bird. Under the MBTA, "take" is defined as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or any attempt to carry out these activities." A take does not include habitat destruction or alteration, as long as there is not a direct taking of birds, nests, eggs, or parts thereof. The current list of species protected by the MBTA can be found in Title 50 of the Code of Federal Regulations (CFR), Section 10.13 (50 CFR 10.13). The list includes nearly all birds native to the United States.

Clean Water Act

Section 404 of the CWA requires a project applicant to obtain a permit before engaging in any activity that involves any discharge of dredged or fill material into waters of the United States, including wetlands. Fill material is material placed in waters of the United States that has the effect of replacing any portion of waters of the United States with dry land or changing the bottom elevation of any portion of waters of the United States. Waters of the United States include navigable waters; interstate waters; all other waters where the use, degradation, or destruction of the waters could affect interstate or foreign commerce; relatively permanent tributaries to any of these waters; and wetlands adjacent to these waters. Wetlands are defined as those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Potentially jurisdictional wetlands typically must meet three wetland delineation criteria: hydrophytic vegetation, hydric soil types, and wetland hydrology. Wetlands that meet the delineation criteria may be jurisdictional under Section 404 of the CWA pending USACE verification.

Under Section 401 of the CWA, an applicant for a Section 404 permit must obtain a certificate from the appropriate state agency stating that the intended dredging or filling activity is consistent with the state's water quality standards and criteria. In California, the authority to grant water quality certification is delegated by the State Water Resources Control Board to the nine regional water quality control boards (RWQCBs).

Coastal Zone Management Act

The Coastal Zone Management Act provides for the management of the nation's coastal resources. It is administered by NOAA with the goal to preserve, protect, develop, and, where possible, restore or enhance the resources of the nation's coastal zone. Portions of the assessment area for this PEIR fall within the coastal zone.

Z'berg-Nejedly Forest Practice Act

Although the proposed CalVTP excludes timber removal for commercial purposes, the Z'berg -Nejedly Forest Practice Act (Forest Practice Act) may be pertinent as it relates to identifying operating methods and procedures that seek to protect fish, wildlife, forests, and streams within timber harvesting areas where qualifying CalVTP treatments may also be implemented. The Forest Practice Act is intended to achieve "maximum sustained production of high-quality timber products…while giving consideration to values relating to recreation, watershed, wildlife, range and forage, fisheries, regional economic vitality, employment and aesthetic enjoyment" (PRC Section 4513[b]). The regulations created by the Forest Practice Act define factors such as the: size and location of harvest areas, include measures to prevent unreasonable damage to residual trees, and address the protection of riparian areas, water courses and lakes, wildlife, and habitat areas.

STATE

California Environmental Quality Act

CEQA (PRC Section 21000 et seq.) and the State CEQA Guidelines (CCR Section 15000 et seq.) provide that public agencies whose activities may affect the environment shall prevent environmental damage. Rare, threatened, or endangered plant species, subspecies, and varieties are specifically considered in various sections of CEQA and the Guidelines. State CEQA Guidelines Section 15380(b) provides the criteria for endangered, rare, and threatened species. Section 15380(d) states that species that are not on state and federal lists but meet the criteria in Section 15380(b) "shall nevertheless be considered to be endangered, rare or threatened." California Rare Plant Rank 1A, 1B, 2A, and 2B species are presumed to meet these criteria. Additionally, under Section 15380, species will be considered endangered, rare, or threatened if they are listed as such under the CESA or the ESA. Species designated as candidates for listing by the California Fish and Game Commission under CESA also are "presumed to be endangered." CESA presumes that candidate species meet the criteria for listing as endangered, rare, or threatened.

California Endangered Species Act

CDFW regulates the taking of species listed as threatened or endangered under CESA, which prohibits the taking of state-listed endangered or threatened species, as well as candidate species being considered for listing, without the issuance of incidental take permits. Project proponents may obtain an incidental take permit pursuant to Fish and Game Code Section 2081 if the impacts of the take are minimized and fully mitigated and if the take would not jeopardize the continued existence of the species. A "take" of a species, under CESA, is defined as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill" an individual of a species. The CESA definition of "take" does not include "harm" or "harass" as is included in the ESA definition. As a result, the threshold for take under CESA may be higher than under the ESA.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Act requires that each of the nine RWQCBs prepare and periodically update basin plans for water quality control. Each basin plan sets forth water quality standards for surface water and groundwater and actions to control nonpoint and point sources of pollution to achieve and maintain these standards. Basin plans offer an opportunity to protect wetlands through the establishment of water quality objectives. The RWQCB's jurisdiction includes waters of the United States, as well as areas that meet the definition of "waters of the state." "Waters of the state" is defined as any surface water or groundwater, including saline waters, within the boundaries of the state. The RWQCB has the discretion to take jurisdiction over areas not federally protected under CWA Section 404 provided they meet the definition of waters of the state and the State Water Resources Control Board published a new set of procedures for discharges of dredged or fill material into waters of the state on March 22, 2019. Mitigation requiring no net loss of wetlands functions and values of waters of the state typically is required by the RWQCB.

The State Water Resources Control Board has adopted the following definition of wetlands:

An area is wetland if, under normal circumstances, (1) the area has continuous or recurrent saturation of the upper substrate caused by groundwater or shallow surface water or both; (2) the duration of such saturation is sufficient to cause anaerobic conditions in the upper substrate; and (3) the area's vegetation is dominated by hydrophytes the area lacks vegetation.

Section 1602 of the California Fish and Game Code

All diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake in California that supports wildlife resources are subject to regulation by CDFW under Section 1600 et seq. of the California Fish and Game Code. Under Section 1602, it is unlawful for any person to substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake designated by CDFW, or use any material from the streambeds, without first notifying CDFW of such activity and obtaining a final agreement authorizing such activity. CDFW's jurisdiction in altered or artificial waterways is based on the value of those waterways to fish and wildlife.

Native Plant Protection Act

The Native Plant Protection Act (NPPA) (California Fish and Game Code Section 1900 et seq.) allows the California Fish and Game Commission to designate plants as rare or endangered. Sixty-four species, subspecies, and varieties of plants are protected as rare under the NPPA. The act prohibits take of endangered or rare native plants but includes exceptions for agricultural and nursery operations; for emergencies; and, after proper notification of CDFW, for vegetation removal from canals, roads, and other building sites, changes in land use, and other situations.

Fully Protected Species

Protection of fully protected species is described in Sections 3511, 4700, 5050, and 5515 of the California Fish and Game Code. These statutes prohibit take or possession of fully protected species and generally do not provide for authorization of incidental take. CDFW has informed nonfederal agencies and private parties that their actions must avoid take of any fully protected species. On October 8, 2011, the governor signed Senate Bill 618, authorizing CDFW to permit the incidental take of fully protected species if the species is covered and conserved in a natural community conservation plan.

Protection for Bird Nests and Raptors

Section 3503 of the California Fish and Game Code states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Section 3503.5 specifically states that it is unlawful to take, possess, or destroy any raptors (e.g., hawks, owls, eagles, and falcons), including their nests or eggs. Section 3513 of the California Fish and Game Code codifies the federal MBTA. Compliance with sections 3503 and 3503.5 is typically achieved by implementing avoidance and minimization measures to prevent project-related loss of active nests (e.g., conducting activities outside of the nesting bird season; identifying and avoiding disturbance by limiting project activities near an active nest; or monitoring active nests and delaying project activities near the nest until after young have fledged or the nest otherwise becomes inactive).

Natural Community Conservation Planning Act

The Natural Community Conservation Planning (NCCP) Act of 1991 is designed to conserve natural communities at the ecosystem scale while accommodating compatible land uses. CDFW is the principal state agency implementing the NCCP Program. Section 2800 et seq. of the California Fish and Game Code addresses NCCPs and a 2835 permit is issued by CDFW for all NCCPs. The Act established a process to allow for comprehensive, regional multi-species planning in a manner that satisfies the requirements of the State and federal ESAs (through a companion regional Habitat Conservation Plan). The NCCP program has provided the framework for innovative efforts by the State, local governments, and private interests to plan for the protection of regional biodiversity and the ecosystems upon which it depends. NCCPs seek to ensure the long-term conservation of multiple species, while allowing for compatible and appropriate economic activity to proceed.

LOCAL

When state agencies, including CAL FIRE, are conducting governmental activities under the authority of state law or the State Constitution, in this case, treatments implemented under the proposed CalVTP, they are exempt from local government plans, policies, and ordinances (unless a constitutional provision or statute directs otherwise). Nonetheless, CAL FIRE voluntarily seeks to operate consistently with local governance to the extent feasible. Given its statewide extent and the possible number of local and regional responsible agencies, this PEIR does not identify potentially applicable local government plans, policies, and ordinances. This PEIR assumes that any vegetation treatments proposed by local or regional agencies under the CalVTP would be consistent with local plans, policies, and ordinances to the extent the project is subject to them, as required by SPR AD-3.

California Coastal Act

The California Coastal Act (CCA), administered by the California Coastal Commission (CCC), includes policies for development proposed within the coastal zone and recognizes California ports, harbors, and coastline beaches as economic and coastal resources. The CCC regulates all jurisdictional wetlands that are under the joint jurisdiction of USACE and the RWQCBs, as well as riparian habitat under the jurisdiction of CDFW. The CCA also defines "Environmentally Sensitive [Habitat] Area" as "any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments" (Section 30107.5). The CCA requires that such areas be protected and that development projects within or adjacent to such areas be planned and sited to prevent significant disruption or degradation of environmentally sensitive areas. Portions of the treatable landscape for this PEIR fall within the coastal zone. The California Coastal Zone is defined as land and water area of the State of California from the Oregon border to the border of the Republic of Mexico, extending seaward to the state's outer limit of jurisdiction, including all offshore islands, and extending inland generally 1,000 yards from the mean high tide line of the sea. In significant coastal estuarine, habitat, and recreational areas it extends inland to the first major ridgeline paralleling the sea or five miles from the mean high tide line of the sea, whichever is less, and in developed urban areas the zone generally extends inland less than 1,000 yards. The coastal zone does not include the area of jurisdiction of the San Francisco Bay Conservation and Development Commission, nor any area contiguous thereto, including any river, stream, tributary, creek, or flood control or drainage channel flowing into such area.

3.6.3 Impact Analysis and Mitigation Measures

ANALYSIS METHODOLOGY

This section describes impacts to biological resources from vegetation treatment under the CalVTP. It describes the methods used to determine the impacts, lists the criteria used to conclude whether an impact would be significant, and characterizes the impact. Measures to mitigate (i.e., avoid, minimize, rectify, reduce, eliminate, or compensate for) significant impacts accompany each impact discussion.

Among other factors, the determination of impacts includes an evaluation of whether treatments under the proposed CalVTP could result in a loss of habitat function. Maintenance of habitat function is one of the performance standards for mitigation. Habitat function is defined here as the arrangement and capability of habitat features to provide refuge, foraging, and reproduction habitat to plants and animals, and thereby contribute to the conservation of biological and genetic diversity and evolutionary processes (de Groot et al. 2002). Some modification of habitat characteristics may occur without causing a significant effect, provided that habitat function is maintained (i.e., the location, essential habitat features, and species supported are not substantially changed). Essential habitat features are those that provide food, water, shelter, living space, breeding areas or substrates, and nursery areas to the species that reside in or migrate through the habitat type.

Significance determinations assume that project proponents implementing qualifying treatments under the CalVTP would comply with relevant federal, state, and local ordinances and regulations to the extent the project is subject to them. Significance determinations also account for the influence of relevant SPRs, which are incorporated into treatment design and listed below.

- SPR AD-3 Consistency with Local Plans, Policies, and Ordinances: The project proponent will design and implement the treatment in a manner that is consistent with applicable local plans (e.g., general plans), policies, and ordinances to the extent the project is subject to them. This SPR applies to all treatment activities and treatment types.
- SPR AQ-3 Create Burn Plan: The project proponent will create a burn plan using the CAL FIRE burn plan template for all prescribed burns. The burn plan will include a fire behavior model output of First Order Fire Effects Model and BEHAVE or other fire behavior modeling simulation and that is performed by a qualified fire behavior technical specialist that predicts fire behavior, calculates consumption of fuels, tree mortality, predicted emissions, greenhouse gas emissions, and soil heating. The project proponent will minimize soil burn severity from broadcast burning to reduce the potential for runoff and soil erosion. The burn plan will be created with input from a qualified technician or certified State burn boss. This SPR applies only to prescribed burning treatment activities and all treatment types.
- SPR AQ-4 Minimize Dust: To minimize dust during treatment activities, the project proponent will implement the following measures:
  - Limit the speed of vehicles and equipment traveling on unpaved areas to 15 miles per hour to reduce fugitive dust emissions, in accordance with the California Air Resources Board (CARB) Fugitive Dust protocol.
  - If road use creates excessive dust, the project proponent will wet appurtenant, unpaved, dirt roads using water trucks or treat roads with a non-toxic chemical dust suppressant (e.g., emulsion polymers, organic material) during dry, dusty conditions. Any dust suppressant product used will be environmentally benign (i.e., non-toxic to plants and will not negatively impact water quality) and its use will not be prohibited by ARB, EPA, or the State Water Resources Control Board (SWRCB). The project proponent will not over-water exposed areas such that the water results in runoff. The type of dust suppression method will be selected by the project proponent based on soil, traffic, site-specific conditions, and air quality regulations.

- Remove visible dust, silt, or mud tracked-out on to public paved roadways where sufficient water supplies and access to water is available. The project proponent will remove dust, silt, and mud from vehicles at the conclusion of each workday, or at a minimum of every 24 hours for continuous treatment activities, in accordance with Vehicle Code Section 23113.
- Suspend ground-disturbing treatment activities, including land clearing and bulldozer lines, when there is visible dust transport (particulate pollution) outside the treatment boundary, if the particulate emissions may "cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or that endanger the comfort, repose, health, or safety of any of those persons or the public, or that cause, or have a natural tendency to cause, injury or damage to business or property," per Health and Safety Code Section 41700.

This SPR applies to all treatment activities and treatment types.

GENERAL BIOLOGICAL RESOURCES

Biological resource SPRs and mitigation measures require that qualified individuals implement components of the measures. The requirements listed below will be met to be considered qualified and may be performed by individuals of various titles (including biologist, botanist, ecologist, Registered Professional Forester (RPF), biological technician, or supervised designees working at the direction of a qualified professional) as long as they are qualified for the task at hand.

Qualified RPF or Biologist: To be qualified, an RPF or biologist would hold a wildlife biology, botany, ecology, forestry, or other relevant degree from an accredited university and: 1) be knowledgeable in relevant species life histories and ecology, 2) be able to correctly identify relevant species and habitats, 3) have experience conducting field surveys of relevant species or resources, 4) be knowledgeable about survey protocols, 5) be knowledgeable about state and federal laws regarding the protection of special-status species, and 6) have experience with CDFW's California Natural Diversity Database (CNDDB) and Biogeographic Information and Observation System (BIOS). The project proponent will review the resume and approve the qualifications of RPFs or biologists. If species-specific protocol surveys are performed, surveys would be conducted by qualified RPFs or biologists with the minimum qualifications required by the appropriate protocols, including having CDFW or USFWS approval to conduct such surveys, if required by certain protocols.

Qualified RPF or Botanist: To be qualified, an RPF or botanist would 1) be knowledgeable about plant taxonomy, 2) be familiar with plants of the region, including special-status plants, 3) have experience conducting floristic botanical field surveys as described in CDFW "Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities" (current version dated March 20, 2018), or experience conducting such botanical field surveys under the direction of an experienced botanical field surveyor, 4) be familiar with the California Manual of Vegetation (Sawyer et al. 2009 or current version), and 5) be familiar with federal, state, and local statutes and regulations related to plants and plant collecting. The project proponent will review the resume and approve the qualifications of RPFs or botanists.

Qualified RPF or Biological Technician: To be qualified, an RPF or biological technician would 1) be knowledgeable in relevant species life histories and ecology, 2) be able to correctly identify relevant species and habitats, 3) have experience conducting biological monitoring of relevant species or resources, and 4) be knowledgeable about state and federal laws regarding the protection of special-status species. The project proponent will review the resume and approve the qualifications of RPFs or biological technicians.

- **SPR BIO-1: Review and Survey Project-Specific Biological Resources.** The project proponent will require a qualified RPF or biologist to conduct a data review and reconnaissance-level survey prior to treatment. The data reviewed will include the biological resources setting, species and sensitive natural communities tables, and habitat information in this PEIR for the ecoregion(s) where the treatment will occur. It will also include review of the best available, current data for the area, including vegetation mapping data, species distribution/range information, CNDDB, California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants of California, relevant

BIOS queries, and relevant general and regional plans. Reconnaissance-level biological surveys will be general surveys that include visual and auditory inspection for biological resources to help determine the environmental setting of a project site. The qualified surveyor will 1.) identify and document sensitive resources, such as riparian or other sensitive habitats, sensitive natural community, wetlands, or wildlife nursery site or habitat (including bird nests), and 2.) assess the suitability of habitat for special-status plant and animal species. The surveyor will also record any incidental wildlife observations. Habitat assessments will be completed at a time of year that is appropriate for identifying habitat and no more than one year prior to the submittal of the Project Specific Analysis (Appendix PD-3) for each treatment project, unless it can be demonstrated that habitat assessments older than one year remain valid. Based on the results of the data review and reconnaissance-level survey, the project proponent, in consultation with a qualified RPF or biologist, will determine which one of the following best characterizes the treatment:

1. **Suitable Habitat Is Present but Adverse Effects Can Be Clearly Avoided**. If, based on the data review and reconnaissance-level survey, the qualified RPF or biologist determines that suitable habitat for sensitive biological resources is present but adverse effects on the suitable habitat can clearly be avoided through one of the following methods, the avoidance mechanism will be implemented prior to initiating treatment and will remain in effect throughout the treatment:

    a. by physically avoiding the suitable habitat, or

    b. by conducting treatment outside of the season when a sensitive resource could be present within the suitable habitat or outside the season of sensitivity (e.g., outside of special-status bird nesting season, during dormant season of sensitive annual or geophytic plant species, or outside of maternity and rearing season at wildlife nursery sites).

    Physical avoidance will include flagging, fencing, stakes, or clear, existing landscape demarcations (e.g., edge of a roadway) to delineate the boundary of the avoidance area around the suitable habitat. For physical avoidance, a buffer may be implemented as determined necessary by the qualified RPF or biologist.

2. **Suitable Habitat is Present and Adverse Effects Cannot Be Clearly Avoided**. Further review and surveys will be conducted to determine presence/absence of sensitive biological resources that may be affected, as described in the SPRs below. Further review may include contacting USFWS, NOAA Fisheries, CDFW, CNPS, or local resource agencies as necessary to determine the potential for special-status species or other sensitive biological resources to be affected by the treatment activity. Focused or protocol-level surveys will be conducted as necessary to determine presence/absence. If protocol surveys are conducted, survey procedures will adhere to methodologies approved by resource agencies and the scientific community, such as those that are available on the CDFW webpage at: https://www.wildlife.ca.gov/Conservation/Survey-Protocols. Specific survey requirements are addressed for each resource type in relevant SPRs (e.g., additional survey requirements are presented for special-status plants in SPR BIO-7).

This SPR applies to all treatment activities and treatment types.

- **SPR BIO-2: Require Biological Resource Training for Workers.** The project proponent will require crew members and contractors to receive training from a qualified RPF or biologist prior to beginning a treatment project. The training will describe the appropriate work practices necessary to effectively implement the biological SPRs and mitigation measures and to comply with the applicable environmental laws and regulations. The training will include the identification, relevant life history information, and avoidance of pertinent special-status species; identification and avoidance of sensitive natural communities and habitats with the potential to occur in the treatment area; impact minimization procedures; and reporting requirements. The training will instruct workers when it is appropriate to stop work and allow wildlife encountered during treatment activities to leave the area unharmed and when it is necessary to report encounters to a qualified RPF, biologist, or biological technician. The qualified RPF, biologist, or biological technician will immediately contact CDFW or USFWS, as appropriate, if any wildlife protected by the California Endangered Species Act (CESA) or Federal Endangered Species Act (ESA) is encountered and cannot leave the site on its own (without being handled). This SPR applies to all treatment activities and treatment types.

SENSITIVE NATURAL COMMUNITIES AND OTHER SENSITIVE HABITATS

- SPR BIO-3: Survey Sensitive Natural Communities and Other Sensitive Habitats. If SPR BIO-1 determines that sensitive natural communities or sensitive habitats may be present and adverse effects cannot be avoided, the project proponent will:
  - require a qualified RPF or biologist to perform a protocol-level survey following the CDFW "Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities" (current version dated March 20, 2018) of the treatment area prior to the start of treatment activities for sensitive natural communities and sensitive habitats. Sensitive natural communities will be identified using the best means possible, including keying them out using the most current edition of *A Manual of California Vegetation*, or referring to relevant reports (e.g., reports found on the VegCAMP website).
  - map and digitally record, using a Global Positioning System (GPS), the limits of any potential sensitive habitat and sensitive natural community identified in the treatment area.

  This SPR applies to all treatment activities and treatment types.

- SPR BIO-4: Design Treatment to Avoid Loss or Degradation of Riparian Habitat Function. Project proponents, in consultation with a qualified RPF or qualified biologist, will design treatments in riparian habitats to retain or improve habitat functions by implementing the following within riparian habitats:
  - Retain at least 75 percent of the overstory and 50 percent of the understory canopy of native riparian vegetation within the limits of riparian habitat identified and mapped during surveys conducted pursuant to SPR BIO-3. Native riparian vegetation will be retained in a well distributed multi-storied stand composed of a diversity of species similar to that found before the start of treatment activities.
  - Treatments will be limited to removal of uncharacteristic fuel loads (e.g., removing dead or dying vegetation), trimming/limbing of woody species as necessary to reduce ladder fuels, and select thinning of vegetation to restore densities that are characteristic of healthy stands of the riparian vegetation types characteristic of the region. This includes hand removal (or mechanized removal where topography allows) of dead or dying riparian trees and shrubs, invasive plant removal, selective thinning, and removal of encroaching upland species.
  - Removal of large, native riparian hardwood trees (e.g., willow, ash, maple, oak, alder, sycamore, cottonwood) will be minimized to the extent feasible and 75 percent of the pretreatment native riparian hardwood tree canopy will be retained. Because tree size varies depending on vegetation type present and site conditions, the tree size retention parameter will be determined on a site-specific basis depending on vegetation type present and setting; however, live, healthy, native trees that are considered large for that type of tree and large relative to other trees in that location will be retained.
  - Removed trees will be felled away from adjacent streams or waterbodies and piled outside of the riparian vegetation zone (unless there is an ecological reason to do otherwise that is approved by applicable regulatory agencies, such as adding large woody material to a stream to enhance fish habitat, e.g., see *Accelerated Wood Recruitment and Timber Operations: Process Guidance from the California Timber Harvest Review Team Agencies and National Marine Fisheries Service*).
  - Vegetation removal that could reduce stream shading and increase stream temperatures will be avoided.
  - Ground disturbance within riparian habitats will be limited to the minimum necessary to implement effective treatments.
  - Only hand application of herbicides will be allowed and only during low-flow periods or when seasonal streams are dry.
  - The project proponent will notify CDFW pursuant to California Fish and Game Code Section 1602 prior to implementing any treatment activities in riparian habitats. Notification will identify the treatment activities,

map the vegetation to be removed, identify the impact avoidance identification methods to be used (e.g., flagging), and appropriate protections for the retention of shaded riverine habitat, including buffers and other applicable measures to prevent erosion into the waterway.

- In consideration of spatial variability of riparian vegetation types and condition and consistent with California Forest Practice Rules Section 916.9(v), a different set of vegetation retention standards and protection measures from those specified in the above bullets may be implemented on a site-specific basis if the qualified RPF and the project proponent demonstrate through substantial evidence that alternative design measures provide a more effective means of achieving the treatment goals and would result in effects to the Beneficial Functions of Riparian Zones equal or more favorable than those expected to result from application of the above measures. Deviation from the above design specifications and implementation of different protection measures will only be approved when the treatment plan incorporates an evaluation of beneficial functions of the riparian habitat and with written concurrence from CDFW.

This SPR applies to all treatment activities and treatment types.

- **SPR BIO-5**: **Avoid Environmental Effects of Type Conversion and Maintain Habitat Function in Chaparral and Coastal Sage Scrub.** The project proponent will design treatment activities to avoid type conversion where native coastal sage scrub and chaparral are present. An ecological definition of type conversion is used in the CalVTP PEIR for assessment of environmental effects: a change from a vegetation type dominated by native shrub species that are characteristic of chaparral and coastal sage scrub vegetation alliances to a vegetation type characterized predominantly by weedy herbaceous cover or annual grasslands. For the PEIR, type conversion is considered in terms of habitat function, which is defined here as the arrangement and capability of habitat features to provide refuge, food source, and reproduction habitat to plants and animals, and thereby contribute to the conservation of biological and genetic diversity and evolutionary processes (de Groot et al. 2002). Some modification of habitat characteristics may occur provided habitat function is maintained (i.e., the location, essential habitat features, and species supported are not substantially changed).

During the reconnaissance-level survey required in SPR BIO-1, a qualified RPF or biologist will identify chaparral and coastal sage scrub vegetation to the alliance level and determine the condition class and fire return interval departure of the chaparral and/or coastal sage scrub present in each treatment area.

For all treatment types in chaparral and coastal sage scrub, the project proponent, in consultation with a qualified RPF or qualified biologist will:

- Develop a treatment design that avoids environmental effects of type conversion in coastal chaparral and coastal sage scrub vegetation alliances, which will include evaluating and determining the appropriate spatial scale at which the proponent would consider type conversion, and substantiating its appropriateness. The project proponent will demonstrate with substantial evidence that the habitat function of chaparral and coastal sage scrub would be at least maintained within the identified spatial scale at which type conversion is evaluated for the specific treatment project.
- The treatment design will seek to maintain a minimum percent cover of mature native shrubs within the treatment area to maintain habitat function; the appropriate percent cover will be identified by the project proponent in the development of treatment design and be specific to the vegetation alliances that are present in the identified spatial scale used to evaluate type conversion. Mature native shrubs that are retained will be distributed contiguously or in patches within the stand. If the stand consists of multiple age classes, patches representing a range of middle to old age classes will be retained to maintain and improve heterogeneity, to the extent needed to avoid type conversion.

These SPR requirements apply to all treatment activities and all treatment types.

Additional measures will be applied to ecological restoration treatment types:

- For ecological restoration treatment types, complete removal of the mature shrub layer will not occur in native coastal chaparral and coastal sage scrub vegetation types.

- Ecological restoration treatments will not be implemented in vegetation types that are within their natural fire return interval (i.e., time since last burn is less than the average time listed as the fire return interval range in Table 3.6-1) unless the project proponent demonstrates with substantial evidence that the habitat function of chaparral and coastal sage scrub would be improved.
- A minimum of 35 percent of existing shrubs and associated native vegetation will be retained at existing densities in patches distributed in a mosaic pattern within the treated area or the shrub canopy will be thinned by no more than 20 percent from baseline density (i.e., if baseline shrub canopy density is 60 percent, post treatment shrub canopy density will be no less than 40 percent). A different percent can be retained if the project proponent demonstrates with substantial evidence that alternative treatment design measures would result in effects on the habitat function of chaparral and coastal sage scrub that are equal or more favorable than those expected to result from application of the above measures.
- If the stand within the treatment area consists of multiple age classes, patches representing a range of middle to old age classes will be retained to maintain and improve heterogeneity.

These SPR requirements apply to all treatment activities and only the ecosystem restoration treatment type.

A determination of compliance with the SB 1260 prohibition of type conversion in chaparral and coastal sage scrub is a statutory issue separate from CEQA compliance that may involve factors additional to the ecological definition and habitat functions presented in the PEIR, such as geographic context. It is beyond the legal scope of the PEIR to define SB 1260 type conversion and statutory compliance. The project proponent, acting as lead agency for the proposed later treatment project, will be responsible for defining type conversion in the context of the project and making the finding that type conversion would not occur, as required by SB 1260. The project proponent will determine its criteria for defining and avoiding type conversion and, in making its findings, may draw upon information presented in this PEIR.

- **SPR BIO-6: Prevent Spread of Plant Pathogens**. When working in sensitive natural communities or oak woodlands that are at risk from plant pathogens (e.g., Ione chaparral, blue oak woodland), the project proponent will implement the following best management practices to prevent the spread of *Phytopthora* and other plant pathogens (e.g., pitch canker (*Fusarium*), goldspotted oak borer, bark beetle):
  - clean and sanitize vehicles, equipment, tools, footwear, and clothes before arriving at a treatment site and when leaving a contaminated site;
  - include training on *Phytopthora* diseases and other plant pathogens in the worker awareness training;
  - minimize soil disturbance as much as possible by limiting the number of vehicles, avoiding off-road travel as much as possible, and limiting use of mechanized equipment;
  - minimize movement of soil and plant material within the site, especially between areas with high and low risk of contamination;
  - clean soil and debris from equipment and sanitize hand tools, buckets, gloves, and footwear when moving from high risk to low risk areas or between widely separated portions of a treatment area; and
  - follow the procedures listed in Guidance for plant pathogen prevention when working at contaminated restoration sites or with rare plants and sensitive habitat (Working Group for *Phytopthoras* in Native Habitats 2016).

  This SPR applies to all treatment activities and treatment types.

SPECIAL-STATUS PLANTS

- **SPR BIO-7: Survey for Special-Status Plants.** If SPR BIO-1 determines that suitable habitat for special-status plant species is present and cannot be avoided, the project proponent will require a qualified RPF or botanist to conduct protocol-level surveys for special-status plant species with the potential to be affected by a treatment prior to initiation of the treatment. The survey will follow the methods in the current version of CDFW's "Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities."

Surveys to determine the presence or absence of special-status plant species will be conducted in suitable habitat that could be affected by the treatment and timed to coincide with the blooming or other appropriate phenological period of the target species (as determined by a qualified RPF or botanist), or all species in the same genus as the target species will be assumed to be special-status.

If potentially occurring special-status plants are listed under CESA or ESA, protocol-level surveys to determine presence/absence of the listed species will be conducted in all circumstances, unless determined otherwise by CDFW or USFWS.

For other special-status plants not listed under CESA or ESA, as defined in Section 3.6.1 of this PEIR, surveys will not be required under the following circumstances:

- If protocol-level surveys, consisting of at least two survey visits (e.g., early blooming season and later blooming season) during a normal weather year, have been completed in the last 5 years and no special-status plants were found, and no treatment activity has occurred following the protocol-level survey, treatment may proceed without additional plant surveys.
- If the target special-status plant species is an herbaceous annual, stump-sprouting, or geophyte species, the treatment may be carried out during the dormant season for that species or when the species has completed its annual lifecycle without conducting presence/absence surveys provided the treatment will not alter habitat or destroy seeds, stumps, or roots, rhizomes, bulbs and other underground parts in a way that would make it unsuitable for the target species to reestablish following treatment.

This SPR applies to all treatment activities and treatment types.

ENVIRONMENTALLY SENSITIVE HABITAT AREAS

- **SPR BIO-8: Identify and Minimize Impacts in Coastal Zone ESHAs.** When planning a treatment project within the Coastal Zone, the project proponent will identify the habitat types and species present to determine if the area qualifies as an Environmentally Sensitive Habitat Area (ESHA). All treatment projects in the coastal zone would require a coastal development permit (CDP) pursuant to the Coastal Act, regardless of whether it qualifies as an ESHA. If the area is an ESHA, the ecological restoration treatment type may be allowed pursuant to this PEIR, if it meets the following conditions; however, a CDP may modify these conditions:

  - The treatment will be designed, in compliance with the Coastal Act and Local Coastal Program (LCP) where applicable, if a site is within a certified plan area, to improve the habitat function of the affected ESHA, improve habitat values, and prevent loss or type conversion of habitat and vegetation types that define the ESHA, or loss of special-status species that inhabit the ESHA.
  - Treatment actions will be limited to eradication or control of invasive plants, removal of uncharacteristic fuel loads (e.g., removing dead or dying vegetation), trimming/limbing of woody species as necessary to reduce ladder fuels, and select thinning of vegetation to restore densities that are characteristic of healthy stands of the vegetation types present in the ESHA.
  - A qualified biologist or RPF familiar with the ecology of the treatment area will monitor all treatment activities in ESHAs.
  - Appropriate no-disturbance buffers will be developed in compliance with the relevant LCP policies for treatment activities in the vicinity of ESHAs to avoid adverse direct and indirect effects to ESHAs.

  This SPR applies to all treatment activities and only the ecosystem restoration treatment type.

INVASIVE PLANTS

- **SPR BIO-9: Prevent Spread of Invasive Plants and Noxious Weeds.** The project proponent will take the following actions to prevent the spread of invasive plants and noxious weeds:
  - clean clothing, footwear, and equipment used during treatments of soil, seeds, vegetative matter or other debris or seed-bearing material before entering the treatment area or when leaving an area with infestations of invasive plants and noxious weeds;
  - for all heavy equipment and vehicles traveling off road, pressure wash, if feasible, or otherwise appropriately decontaminate equipment at a designated weed-cleaning station prior to entering the treatment area from an area with infestations of invasive plants and noxious weeds. Anti-fungal wash agents will be specified if the equipment has been exposed to any pathogen that could affect native species;
  - inspect all heavy equipment, vehicles, tools, or other treatment-related materials for mud or other signs that weed seeds or propagules could be present prior to use in the treatment area. If the equipment is not clean, the qualified RPF or biological technician will deny entry to the work areas;
  - stage equipment in areas free of invasive plant infestations unless there are no uninfested areas present within a reasonable proximity to the treatment area;
  - identify significant infestations of invasive plant species (i.e., those rated as invasive by Cal-IPC or designated as noxious weeds by California Department of Food and Agriculture) during reconnaissance-level surveys and target them for removal during treatment activities. Treatment methods will be selected based on the invasive species present and may include herbicide application, manual or mechanical treatments, prescribed burning, and/or herbivory, and will be designed to maximize success in killing or removing the invasive plants and preventing reestablishment based on the life history characteristics of the invasive plant species present. Treatments will be focused on removing invasive plant species that cause ecological harm to native vegetation types, especially those that can alter fire cycles;
  - treat invasive plant biomass onsite to eliminate seeds and propagules and prevent reestablishment or dispose of invasive plant biomass offsite at an appropriate waste collection facility (if not kept on site); transport invasive plant materials in a closed container or bag to prevent the spread of propagules during transport; and
  - implement Fire and Fuel Management BMPs outlined in the "Preventing the Spread of Invasive Plants: Best Management Practices for Land Mangers" (Cal-IPC 2012, or current version).

  This SPR applies to all treatment activities and treatment types.

WILDLIFE

- **SPR BIO-10: Survey for Special-Status Wildlife and Nursery Sites.** If SPR BIO-1 determines that suitable habitat for special-status wildlife species or nurseries of any wildlife species is present and cannot be avoided, the project proponent will require a qualified RPF or biologist to conduct focused or protocol-level surveys for special-status wildlife species or nursery sites (e.g., bat maternity roosts, deer fawning areas, heron or egret rookeries) with potential to be directly or indirectly affected by a treatment activity. The survey area will be determined by a qualified RPF or biologist based on the species and habitats and any recommended buffer distances in agency protocols.

  The qualified RPF or biologist will determine if following an established protocol is required, and the project proponent may consult with CDFW and/or USFWS for technical information regarding appropriate survey protocols. Unless otherwise specified in a protocol, the survey will be conducted no more than 14 days prior to the beginning of treatment activities. Focused or protocol surveys for a special-status species with potential to occur in the treatment area may not be required if presence of the species is assumed.

  This SPR applies to all treatment activities and treatment types.

- **SPR BIO-11. Install Wildlife-Friendly Fencing (Prescribed Herbivory).** If temporary fencing is required for prescribed herbivory treatment, a wildlife-friendly fencing design will be used. The project proponent will require a qualified RPF or biologist to review and approve the design before installation to ensure that the risk of wildlife entanglement is low. The fencing design will meet the following standards:
  - Minimize the chance of wildlife entanglement by avoiding barbed wire, loose or broken wires, or any material that could impale or snag a leaping animal; and, if feasible, keeping electric netting-type fencing electrified at all times or laid down while not in use.
  - Charge temporary electric fencing with intermittent pulse energizers; continuous output fence chargers will not be permitted.
  - Allow wildlife to jump over easily without injury by installing fencing that can flex as animals pass over it and installing the top wire low enough (no more than approximately 40 inches high on flat ground) to allow adult ungulates to jump over it. The determination of appropriate fence height will consider slope, as steep slopes are more difficult for wildlife to pass.
  - Be highly visible to birds and mammals by using high-visibility tape or wire, flagging, or other markers.

  This SPR applies only to prescribed herbivory and all treatment types.
- **SPR GEO-1 Suspend Disturbance during Heavy Precipitation:** The project proponent will suspend mechanical, prescribed herbivory, and herbicide treatments if the National Weather Service forecast is a "chance" (30 percent or more) of rain within the next 24 hours. Activities that cause mechanical soil disturbance may resume when precipitation stops and soils are no longer saturated (i.e., when soil and/or surface material pore spaces are filled with water to such an extent that runoff is likely to occur). Indicators of saturated soil conditions may include, but are not limited to: (1) areas of ponded water, (2) pumping of fines from the soil or road surfacing, (3) loss of bearing strength resulting in the deflection of soil or road surfaces under a load, such as the creation of wheel ruts, (4) spinning or churning of wheels or tracks that produces a wet slurry, or (5) inadequate traction without blading wet soil or surfacing materials. This SPR applies only to mechanical, prescribed herbivory, and herbicide treatment activities and all treatment types.
- **SPR GEO-3 Stabilize Disturbed Soil Areas:** The project proponent will stabilize soil disturbed during mechanical and prescribed herbivory treatments with mulch or equivalent immediately after treatment activities, to the maximum extent practicable, to minimize the potential for substantial sediment discharge. If mechanical or prescribed herbivory treatment activities could result in substantial sediment discharge from soil disturbed by machinery or animal hooves, organic material from mastication or mulch will be incorporated onto at least 75 percent of the disturbed soil surface where the soil erosion hazard is moderate or high, and 50 percent of the disturbed soil surface where soil erosion hazard is low to help prevent erosion. Where slash mulch is used, it will be packed into the ground surface with heavy equipment so that it is sufficiently in contact with the soil surface. This SPR only applies to mechanical and prescribed herbivory treatment activities and all treatment types.
- **SPR GEO-4 Erosion Monitoring:** The project proponent will inspect treatment areas for the proper implementation of erosion control SPRs and mitigations prior to the rainy season. Additionally, the project proponent will inspect for evidence of erosion after the first large storm or rainfall event (i.e., ≥ 1.5 inches in 24 hours) as soon as is feasible after the event. Any area of erosion that will result in substantial sediment discharge will be remediated. This SPR applies only to mechanical and prescribed burning treatment activities and all treatment types.
- **SPR GEO-5 Drain Stormwater via Water Breaks:** The project proponent will drain compacted and/or bare linear treatment areas capable of generating storm runoff via water breaks using the spacing and erosion control guidelines contained in Sections 914.6, 934.6, and 954.6(c) of the California Forest Practice Rules. Where waterbreaks cannot effectively disperse surface runoff, including where waterbreaks cause surface run-off to be concentrated on downslopes, other erosion controls will be installed as needed to comply with 14 CCR 914 [934, 954]. This SPR applies only to mechanical, manual, and prescribed burn treatment activities and all treatment types.

- **SPR GEO-7 Minimize Erosion:** To minimize erosion, the project proponent will:

  (1) Prohibit use of heavy equipment where any of the following conditions are present:

    (i) Slopes steeper than 65 percent.

    (ii) Slopes steeper than 50 percent where the erosion hazard rating is high or extreme.

    (iii) Slopes steeper than 50 percent that lead without flattening to sufficiently dissipate water flow and trap sediment before it reaches a watercourse or lake.

  (2) On slopes between 50 percent and 65 percent where the erosion hazard rating is moderate, and all slope percentages are for average slope steepness based on sample areas that are 20 acres, or less, heavy equipment will be limited to:

    (i) Existing tractor roads that do not require reconstruction, or

    (ii) New tractor roads flagged by the project proponent prior to the treatment activity.

  This SPR applies to all treatment activities and all treatment types.

- **SPR HAZ-5 Spill Prevention and Response Plan:** The project proponent or licensed Pest Control Advisor (PCA) will prepare a Spill Prevention and Response Plan (SPRP) prior to beginning any herbicide treatment activities to provide protection to onsite workers, the public, and the environment from accidental leaks or spills of herbicides, adjuvants, or other potential contaminants. The SPRP will include (but not be limited to):

  - a map that delineates staging areas, and storage, loading, and mixing areas for herbicides;
  - a list of items required in an onsite spill kit that will be maintained throughout the life of the activity;
  - procedures for the proper storage, use, and disposal of any herbicides, adjuvants, or other chemicals used in vegetation treatment.

  This SPR applies only to herbicide treatment activities and all treatment types.

- **SPR HAZ-6 Comply with Herbicide Application Regulations:** The project proponent will coordinate pesticide use with the applicable County Agricultural Commissioner(s), and all required licenses and permits will be obtained prior to herbicide application. The project proponent will prepare all herbicide applications to do the following:

  - Be implemented consistent with recommendations prepared annually by a licensed PCA.
  - Comply with all appropriate laws and regulations pertaining to the use of pesticides and safety standards for employees and the public, as governed by the EPA, DPR, and applicable local jurisdictions.
  - Adhere to label directions for application rates and methods, storage, transportation, mixing, container disposal, and weather limitations to application such as wind speed, humidity, temperature, and precipitation.
  - Be applied by an applicator appropriately licensed by the State.

  This SPR applies only to herbicide treatment activities and all treatment types.

- **SPR HYD-1 Comply with Water Quality Regulations:** The project proponent will comply with all applicable water quality requirements adopted by the appropriate Regional Water Quality Control Board and approved by the SWRCB (i.e., Basin Plan). If applicable, this includes compliance with the conditions of general waste discharge requirements (GWDR) and waste discharge requirement waivers for timber or silviculture activities where these waivers are designed to apply to non-commercial fuel reduction and forest health projects. In general, GWDR and Waiver waivers of waste discharge requirements for fuel reduction and forest health activities require that wastes, including but not limited to petroleum products, soil, silt, sand, clay, rock, felled trees, slash, sawdust, bark, ash, and pesticides must not be discharged to surface waters or placed where it may be carried into surface waters; and that Water Board staff must be allowed reasonable access to the property in order to determine compliance with the waiver conditions. The specifications for each GWDR and Waiver vary by region. Regions 2 (San Francisco Bay), 4 (Los Angeles), 8 (Santa Ana), and 7 (Colorado River) are highly urban or minimally forested and do not offer GWDR or Waivers for fuel reduction or vegetation management activities. The current applicable GWDR and Waivers for timber and vegetation management activities are included in Appendix HYD-1. This SPR applies to all treatment activities and treatment types.

- SPR HYD-3 Water Quality Protections for Prescribed Herbivory: The project proponent will include the following water quality protections for all prescribed herbivory treatments:
  - Environmentally sensitive areas such as waterbodies, wetlands, or riparian areas will be identified and excluded from prescribed herbivory project areas using temporary fencing or active herding. A buffer of approximately 50 feet will be maintained between sensitive and actively grazed areas.
  - Water will be provided for grazing animals in the form of an on-site stock pond or a portable water source located outside of environmentally sensitive areas.
  - Grazing animals will be herded out of an area if accelerated soil erosion is observed.

  This SPR applies to prescribed herbivory treatment activities and all treatment types.
- SPR HYD-4 Identify and Protect Watercourse and Lake Protection Zones: The project proponent will establish Watercourse and Lake Protection Zones (WLPZs) as defined in 14 CCR Section 916 .5 of the California Forest Practice Rules on either side of watercourses. WLPZ's are classified based on the uses of the stream and the presence of aquatic life. Wider WLPZs are required for steep slopes.
- The following WLPZ protections will be applied for all treatments:
  - Treatment activities with WLPZs will meet the overstory and understory vegetation retention guidelines and ground disturbance limitations described in 14 CCR Section 916.4 [936.4, 956.4] Subsection (b) and Section 916.5, including retention of at least 75 percent surface cover and undisturbed area.
  - Equipment, including tractors and vehicles, must not be driven in wet areas or WLPZs, except over existing roads or watercourse crossings where vehicle tires or tracks remain dry.
  - Equipment used in vegetation removal operations will not be serviced in WLPZs, within wet meadows or other wet areas, or in locations that would allow grease, oil, or fuel to pass into lakes, watercourses, or wet areas
  - WLPZs will be kept free of slash, debris, and other material that harm the beneficial uses of water. Accidental deposits will be removed immediately.
  - Burn piles will be located outside of WLPZs.
  - No fire ignition will occur within WLPZs however low intensity backing fires may be allowed to enter or spread into WLPZs.
  - Large areas of bare soil within WLPZs that are exposed by treatment activities will be stabilized with mulching, rip-rap, grass seeding, or soil stabilizers prior to the beginning of the rainy season, as described in 14 CCR 916.7.
  - Equipment limitation zones (ELZs) will be designated adjacent to Class III and Class IV watercourses with minimum widths of 25 feet where side-slope is less than 30 percent and 50 feet where side-slope is 30 percent or greater. An RPF will describe the limitations of heavy equipment within the ELZ and, where appropriate, will include additional measures to protect the beneficial uses of water.

  This SPR applies to all treatment activities and treatment types.
- SPR HYD-5 Protect Non-Target Vegetation and Special-status Species from Herbicides: The project proponent will implement the following measures when applying herbicides:
  - Locate herbicide mixing sites in areas devoid of vegetation and where there is no potential of a spill reaching non-target vegetation or a waterway.
  - Use only herbicides labeled for use in aquatic environments when working in riparian habitats or other areas where there is a possibility the herbicide could come into direct contact with water.

- No herbicides will be applied within a 50-foot buffer of ESA or CESA listed plant species or within 50 feet of dry vernal pools.
- For spray applications in and adjacent to habitats suitable for special-status species, use herbicides containing dye (registered for aquatic use by DPR, if warranted) to prevent overspray.
- Spray application of herbicides will not be carried out when wind speeds are 7 miles per hour or greater.
- No herbicide will be applied during precipitation events or if precipitation is forecast 24 hours before or after project activities.

This SPR applies to herbicide treatment activities and all treatment types.

THRESHOLDS OF SIGNIFICANCE

The thresholds of significance used to evaluate impacts on biological resources incorporate the mandatory findings of significance, as listed in Section 15065 and Appendix G of the State CEQA Guidelines. The CalVTP would result in a significant impact related to biological resources if it would:

- have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife, U.S. Fish and Wildlife Service, or NOAA Fisheries;
- have a substantial adverse impact on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by the California Department of Fish and Wildlife, U.S. Fish and Wildlife Service, or NOAA Fisheries;
- have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;
- interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;
- conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance;
- conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan; and
- substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or animal community; or substantially reduce the number or restrict the range of an endangered, rare, or threatened species.

ISSUES NOT EVALUATED FURTHER

Special-status Wildlife Species Not Evaluated Further

Several marine mammals and seabird species were identified as having potential to occur within the treatable landscape. Marine mammal species include Guadalupe fur-seal (*Arctocephalus townsendi*), Steller sea lion (*Eumetopias jubatus*), and southern sea otter (*Enhydra lutris nereis*). Seabird species include tufted puffin (*Fratercula cirrhata*), fork-tailed storm-petrel (*Oceanodroma furcata*), ashy storm-petrel (*Oceanodroma homochroa*), black storm-petrel (*Oceanodroma melania*), brown pelican (*Pelecanus occidentalis*), Cassin's auklet (*Ptychoramphus aleuticus*), and Scripp's murrelet (*Synthliboramphus scrippsi*). While these species use non-marine habitat for breeding and resting, these habitats are predominately within intertidal and rocky shoreline habitats, or offshore rocks. While treatment activities may occur within the coastal zone, they would not occur within intertidal or rocky shoreline habitats. Therefore, there would be no impact and these species are not considered further.

Six special-status bird species are present within California only in the winter and breed elsewhere: Barrow's goldeneye (*Bucephala islandica*), brant (*Branta bernicla*), common loon (*Gavia immer*), tule greater white-fronted goose (*Anser albifrons elgasi*), wood stork (*Mycteria americana*), and mountain plover (*Charadrius montanus*). Barrow's goldeneye, brant, and common loon occur within aquatic habitat in California (e.g., bay, estuary, brackish lake, riverine). Treatment activities would not occur in these habitats. Tule greater white-fronted goose occurs within rice fields, flooded uplands and marshes, and open water habitat; particularly habitats with alkali bulrush (*Bolboschoenus maritimus*). Treatment activities would not occur within these habitats. Wood stork occurs in California only within the southern end of the Salton Sea and is closely associated with aquatic habitat, where treatment would not occur. Mountain plovers overwinter in California within chenopod scrub and valley and foothill grassland habitats, most frequently where vegetation is short (less than 3 inches) and cover is less than 65 percent (Hunting et al. 2001). Mountain plovers can be found in short grasslands, freshly plowed fields, newly sprouting grain fields, and sometimes sod farms, especially fallow, grazed or burned sites (Hunting et al. 2001). While these habitat types could occur within some portions of the treatable landscape, agricultural habitats will likely not be targeted for treatment, because they are generally outside of the SRA. Treatment activities would not result in direct or indirect adverse effects to these species; therefore, they are not discussed further.

IMPACT ANALYSIS

Impact BIO-1: Substantially Affect Special-Status Plant Species Either Directly or Through Habitat Modifications

Vegetation treatment activities could result in direct removal or destruction, or indirect death or reduced vigor of special-status plants through habitat modifications. Implementation of SPRs BIO-1, BIO-2, BIO-7, and BIO-9 require special-status plants to be identified prior to treatment activities, Worker Environmental Awareness Program (WEAP) training for workers, and actions to prevent the spread of invasive plants that could threaten special-status plant populations. While SPRs would minimize impacts, treatment activities could inadvertently damage or destroy special-status plants and adversely modify their habitat resulting in reduced growth and reproduction or death and loss of special-status plant occurrences. This would be a **potentially significant** impact.

The proposed treatment activities could result in death, altered growth, or reduced seed set through physically breaking, crushing, burning, scorching, trampling, or uprooting special-status plants. Special-status plants that have potential to occur in each ecoregion of the treatable landscape are listed in Appendix BIO-2. Any of the treatment activities have the potential to kill or damage special-status plants, if present within a treatment area, and each of the treatment activities could be used in every treatment type. The likelihood of a given treatment activity being implemented for a particular treatment type and in a particular fuel type (i.e., tree, shrub, or grass) is shown in Table 2-3 of Chapter 2, "Program Description."

Treatment activities could also alter growth and reproduction of special-status plants through habitat modifications. An indirect impact would occur if ground disturbance during treatment activities altered habitat or site conditions in a manner that later resulted in the death or lack of regeneration of special-status plants. Treatment activities could disrupt ecosystem, community, or population structure or processes in ways that reduce growth, survival, and reproduction of special-status plants. Habitat alteration could make the habitat conditions unsuitable to support special-status plants in the long term. Indirect beneficial effects could result from improved habitat conditions by restoring the normal fire return interval, removing invasive plant infestations and unnatural buildup of litter and debris, and thinning live trees and shrubs and removing dead or dying trees and shrubs. This would open up the canopy where tree or shrub densities are uncharacteristic of healthy or desired examples of the vegetation type and result in both immediate and long-term benefits to special-status plants.

In the ecological restoration treatment type, the objective is to restore degraded, damaged, or destroyed ecosystems and habitats in fire-adapted vegetation types by returning them to their natural fire regime and returning vegetation in Condition Classes 2 and 3 to Condition Class 1[1]. This would benefit special-status plants associated with these habitats in the long-term by restoring the historic vegetation composition, structure, and habitat values and function under which these species evolved. Removal of overgrown shrubs and thinning tree canopies could benefit special-status plant populations in the short term by allowing more light to reach them and by removing competition for water, light, and nutrients; however, removal of overstory vegetation could alter microhabitat conditions in a way that is detrimental to special-status plant species in the short term if they are adapted to growing in shade or if the loss of overstory vegetation results in adverse changes in soil moisture, or destabilizes soil resulting in erosion that limits sensitive plant establishment and growth or washes away sensitive plants or their seeds and propagules with eroding soil. While the ecological restoration treatment type is focused in the landscape outside the WUI, ecological enhancements would be included in WUI treatments and could have some of the same beneficial and adverse effects to special-status plants in the WUI. WUI fuel reduction treatments, however, are primarily focused on strategic reduction of vegetation density for direct protection of communities and assets at risk. WUI treatments also serve as emergency access points and staging areas for firefighters and equipment and reduce flammable vegetation along emergency evacuation routes for the community. Therefore, there is less focus on ecological enhancement and the risk of direct removal or eventual death of special-status plants is greater in the WUI treatment type than in the ecological restoration treatment type.

In comparison to the other treatment types, a non-shaded fuel break has the greatest potential to result in substantial adverse effects on special-status plants because it would remove most of the vegetation from the treatment area. This would not only result in direct removal of special-status plants present during treatment, but could also leave the habitat unsuitable for reestablishment of special-status plant populations; these areas would be maintained relatively free of understory vegetation, and microhabitat conditions, such as soil moisture, light intensity, and temperature, would be altered by vegetation removal. The non-shaded fuel break has greater potential for adverse modification of microhabitat conditions that could lead to death of special-status plants in the long term because the tree canopy would be completely removed in addition to understory vegetation affecting light intensity, soil moisture, and temperature. Herbaceous special-status plants that are disturbance adapted could survive within a shaded fuel break but for many species, the continued disturbance to maintain the understory free of vegetation would likely lead to their elimination. Therefore, this treatment type would typically not be suitable in areas occupied by special-status plants, especially species that are threatened with extinction (e.g., species listed as threatened or endangered under ESA or CESA) because there is a high probably that special-status plants would be eliminated from the fuel break either directly or over time as a result of long-term habitat modification.

SPRs AQ-3, AQ-4, GEO-1, GEO-3, GEO-4, GEO-5, and GEO-7 require implementation of measures to minimize soil erosion and fugitive dust thereby reducing potential indirect impacts on special-status plants from soil destabilization and dusting. SPR BIO-9 requires implementation of actions to prevent the spread of invasive plants and noxious weeds that could compete with special-status plants for water, light, and nutrients, so indirect impacts on special-status plants from invasive plants as a result of the program would be minimized.

As explained above, relevant SPRs would be integrated into the design of qualifying treatments under the CalVTP to avoid and minimize impacts. While SPRs would minimize impacts, treatment activities could still adversely affect special-status plant species. The following sections describe impact mechanisms that are unique to each treatment activity. Most treatment activities would be implemented in combination with other treatment activities to achieve the objectives of a treatment type (i.e., WUI fuel reduction, fuel breaks, ecological restoration). For example, mechanical and manual treatments could be used together to remove vegetation, which could then be piled and burned. Broadcast burning also involves establishing a containment line around the burn perimeter, typically using mechanical and manual treatment activities prior to burning. Prescribed herbivory or herbicide application may be used in combination with manual or mechanical treatments.

1 Condition class categories are described in Table 2-1 of Chapter 2, "Program Description."

Prescribed Burning

Prescribed burning could result in directly burning up, scorching, or wilting special-status plants or their propagules if prescribed fire is close to special-status plant populations. Prescribed burns could consume special-status plants completely or could scorch, singe, or wilt parts of plants, adversely affecting their growth and reproduction but not immediately killing or consuming them. In addition, prescribed burning could destroy or reduce the viability of seedbanks of special-status plant species if they are not adapted to fire or if the fire burns too hot for the seedbank to tolerate.

Mechanical Treatment

In comparison to other treatment activities, mechanical treatments have the highest potential to harm special-status plants. Masticating, tilling, grubbing, and raking can disturb soil several inches below the surface affecting roots, rhizomes, bulbs and other underground parts of special-status plants, as well as the seedbed, and affecting soil stability. In addition, the removal of vegetation using mechanical treatments is less precise (in comparison to manual treatments); therefore, this treatment activity is used at sites where precision removal is not necessary. Mechanical treatments in areas occupied by special-status plants would likely directly kill or damage these plants. This treatment activity would also have the highest potential to adversely modify habitat in a way that reduces survivorship, growth, and reestablishment of special-status plant populations because of the large-scale vegetation removal and soil disturbance.

Manual Treatment

Manual treatments typically result in less ground disturbance than mechanical treatments and therefore have a lower risk of damaging or removing special-status plants that may be present in treatment areas. Special-status plants may be trampled by workers, damaged if beneath debris piles, or inadvertently removed if not identified for avoidance prior to treatment.

Prescribed Herbivory

Special-status plants could be consumed or trampled by grazing livestock resulting in their death or reduced reproduction and growth. Special-status plants could also be crushed, trampled, broken or otherwise damaged during installation or removal of fencing used to contain the herbivores. Prescribed herbivory is typically used on a relatively small scale to reduce a target plant population, such as an invasive plant infestation, thereby reducing fire fuels or competition with desirable plant species.

Herbicides

Application of herbicides during treatment could damage or kill special-status plants through inadvertent direct application or through herbicide drift. For example, some herbicides can drift up to 68 feet from the target when applied during wind speeds of 15 miles per hour (mph) (USFS 2015). Herbicides may drift to nontarget areas through spray particle drift or vapor drift to foliage of special-status plants, and herbicide-contaminated soil may affect underground roots, rhizomes, or bulbs of special-status plant species. The risk of herbicide damage to special-status plants depends on the plant species affected, which herbicide is used, and the application rate and treatment method used. For example, downward spray application and spot spraying methods have a greater risk of affecting nontarget species than stem injection or paint-on stem application. The CalVTP does not include aerial application as an herbicide application method. SPR HYD-5 would avoid and minimize potential impacts to special-status plants by requiring protective buffers for herbicide use near special-status plants and measures to prevent drift and other non-target application.

Conclusion

Adverse effects to special-status plant species as a result of program implementation could occur from direct removal or from habitat modification. For special-status plants that are already listed, or candidates for listing under ESA or CESA, loss of a single population or occurrence could reduce their population below self-sustaining numbers, or substantially reduce their numbers or restrict their range. A total of 218 plant taxa that are listed under ESA and/or CESA have potential to occur in the treatable landscape; 69 of these are CESA-listed only, 48 are ESA listed only, and 101 are dually listed (see Appendix BIO-3, “Special-Status Species Tables”).

There are 1,023 special-status plant taxa that are not listed, or candidates for listing under ESA or CESA, that have potential to occur in the treatable landscape. The threshold of significance may be higher for these taxa because they are generally not as rare as those protected under CESA and ESA. However, some of these plant taxa have narrow ranges or limited distribution, and loss of occurrences could substantially reduce regional population numbers or further reduce their range and contribute to a trend toward listing as threatened or endangered. Other special-status species have more widespread distributions but are not abundant anywhere they occur. For these species, loss of individual occurrences or populations could substantially reduce local or regional population numbers, thereby resulting in a reduction of species range and potentially contributing to a trend toward listing as threatened or endangered. Furthermore, because of the geographic scale of the CalVTP's treatable landscape, it has potential to remove or reduce the size of multiple occurrences of special-status plant taxa.

SPR BIO-1 requires data review and reconnaissance surveys to identify potential habitat for and previously documented occurrences of special-status plants. SPR BIO-7 requires surveys for special-status plants be conducted if they have potential to occur in a treatment area. SPR BIO-2 requires biological resource training for workers to make them aware of the presence of special-status plants and the mitigation measures, work practices, and laws and regulations that protect these plants. SPR BIO-9 requires BMPs to be implemented to prevent the spread of invasive plants and noxious weeds that could have indirect adverse effects on special-status plants through competition for resources and habitat degradation. SPRs BIO-1 and BIO-7 would avoid and minimize impacts to special-status plants by identifying them before treatment activities are implemented so they can be avoided, and appropriate mitigation measures can be implemented to protect them. Implementation of these SPRs would avoid and minimize direct and indirect impacts to special-status plants from treatment and most qualifying treatments implemented under the CalVTP could implement SPRs to avoid substantial adverse effects to special-status plants. However, even with implementation of SPRs, some proposed treatments at specific sites where special-status plants occur could result in direct removal of special-status plants or habitat modifications that leads to reduced growth and reproduction or death and loss of special-status plant occurrences as a result of treatment activities. This would be a **potentially significant** impact.

Mitigation Measures

Mitigation Measure BIO-1a: Avoid Loss of Special-Status Plants Listed under ESA or CESA

If listed plants are determined to be present through application of SPR BIO-1 and SPR BIO-7, the project proponent will avoid and protect these species by establishing a no-disturbance buffer around the area occupied by listed plants and marking the buffer boundary with high-visibility flagging, fencing, stakes, or clear, existing landscape demarcations (e.g., edge of a roadway), exceptions to this requirement are listed later in this measure. The no-disturbance buffers will generally be a minimum of 50 feet from listed plants, but the size and shape of the buffer zone may be adjusted if a qualified RPF or botanist determines that a smaller buffer will be sufficient to avoid killing or damaging listed plants or that a larger buffer is necessary to sufficiently protect plants from the treatment activity. The appropriate buffer size will be determined based on plant phenology at the time of treatment (e.g., whether the plants are in a dormant, vegetative, or flowering state), the individual species' vulnerability to the treatment method being used, and environmental conditions and terrain. For example, paint-on or wicking application of herbicides to invasive plants may be implemented within 50 feet of listed plant species without posing a risk, especially if the listed plants are dormant at the time of application.

For species listed under ESA or CESA, if the project proponent cannot avoid loss by implementing no-disturbance buffers, the project proponent will implement Mitigation Measure BIO-1c.

The only exception to this mitigation approach is in cases where it is determined by a qualified RPF or botanist, in consultation with CDFW and USFWS, as appropriate depending on species status and location, that the listed plants would benefit from treatment in the occupied habitat area even though some of the listed plants may be lost during treatment activities. If it is determined that treatment activities would be beneficial to listed plants, no compensatory mitigation for loss of individuals will be required.

Mitigation Measure BIO-1b: Avoid Loss of Special-Status Plants Not Listed Under ESA or CESA

If non-listed special-status plant species (i.e., species not listed under ESA or CESA, but meeting the definition of special-status as stated in Section 3.6.1 of the Program EIR) are determined to be present through application of SPR BIO-1 and SPR BIO-7, the project proponent will implement the following measures to avoid loss of individuals and maintain habitat function of occupied habitat:

- Physically avoid the area occupied by the special-status plants by establishing a no-disturbance buffer around the area occupied by species and marking the buffer boundary with high-visibility flagging, fencing, stakes, or clear, existing landscape demarcations (e.g., edge of a roadway). The no-disturbance buffers will generally be a minimum of 50 feet from special-status plants, but the size and shape of the buffer zone may be adjusted if a qualified RPF or botanist determines that a smaller buffer will be sufficient to avoid loss of or damaging to special-status plants or that a larger buffer is necessary to sufficiently protect plants from the treatment activity. The appropriate size and shape of the buffer zone will be determined by a qualified RPF or botanist and will depend on plant phenology at the time of treatment (e.g., whether the plants are in a dormant, vegetative, or flowering state), the individual species' vulnerability to the treatment method being used, and environmental conditions and terrain.
- Treatments may be conducted within this buffer if the potentially affected special-status plant species is a geophytic, stump-sprouting, or annual species, and the treatment can be conducted outside of the growing season (e.g., after it has completed its annual life cycle) or during the dormant season using only treatment activities that would not damage the stump, root system or other underground parts of special-status plants or destroy the seedbank.
- Treatments will be designed to maintain the function of special-status plant habitat. For example, for a fuel break proposed in treatment areas occupied by special-status plants, if the removal of shade cover would degrade the special-status plant habitat despite the requirement to physically or seasonally avoid the special-status plant itself, habitat function would be diminished and the treatment would need to be modified or precluded from implementation.

A qualified RPF or botanist with knowledge of the special-status plant species habitat and life history will review the treatment design and applicable impact minimization measures (potentially including others not listed above) to determine if the anticipated residual effects of the treatment would be significant under CEQA because implementation of the treatment would not maintain habitat function of the special-status plant habitat (i.e., the habitat would be rendered unsuitable) or because the loss of special-status plants would substantially reduce the number or restrict the range of a special-status plant species. If the project proponent determines the impact on special-status plants would be less than significant, no further mitigation will be required. If the project proponent determines that the loss of special-status plants or degradation of occupied habitat would be significant under CEQA after implementing feasible treatment design alternatives and impact minimization measures, then Mitigation Measure BIO-1c will be implemented.

The only exception to this mitigation approach is in cases where it is determined by a qualified RPF or botanist that the special-status plants would benefit from treatment in the occupied habitat area even though some of the non-listed special-status plants may be killed during treatment activities. If it is determined that treatment activities would be beneficial to special-status plants, no compensatory mitigation will be required.

Mitigation Measure BIO-1c: Compensate for Unavoidable Loss of Special-Status Plants

If significant impacts on listed or non-listed special-status plants cannot feasibly be avoided as specified under the circumstances described under Mitigation Measures BIO-1a and 1b, the project proponent will prepare a Compensatory Mitigation Plan that identifies the residual significant impacts that require compensatory mitigation and describes the compensatory mitigation strategy being implemented and how unavoidable losses of special-status plants will be compensated. If the special-status plant taxa are listed under ESA or CESA, the plan will be submitted to CDFW and/or USFWS (as appropriate) for review and comment.

The first priority for compensatory mitigation will be preserving and enhancing existing populations outside of the treatment area, or if that is not an option because existing populations that can be preserved in perpetuity are not available, one of the following mitigation options will be implemented instead:

- creating populations on mitigation sites outside of the treatment area through seed collection and dispersal (annual species) or transplantation (perennial species);
- purchasing mitigation credits from a CDFW- or USFWS-approved conservation or mitigation bank in sufficient quantities to offset the loss of occupied habitat; and
- if the affected special-status plants are not listed under ESA or CESA, compensatory mitigation may include restoring or enhancing degraded habitats so that they are made suitable to support special-status plant species in the future.

If relocation efforts are part of the Compensatory Mitigation Plan, the plan will include details on the methods to be used, including collection, storage, propagation, receptor site preparation, installation, long-term protection and management, monitoring and reporting requirements, success criteria, and remedial action responsibilities should the initial effort fail to meet long-term monitoring requirements. The following performance standards will be applied for relocation:

- the extent of occupied area will be substantially similar to the affected occupied habitat and will be suitable for self-producing populations. Re-located/re-established populations will be considered suitable for self-producing when:
- habitat conditions allow for plants to reestablish annually for a minimum of 5 years with no human intervention, such as supplemental seeding; and
- reestablished habitats contain an occupied area comparable to existing occupied habitat areas in similar habitat types in the region.

If preservation of existing populations or creation of new populations is part of the mitigation plan, the Compensatory Mitigation Plan will include a summary of the proposed compensation lands and actions (e.g., the number and type of credits, location of mitigation bank or easement, restoration or enhancement actions), parties responsible for the long-term management of the land, and the legal and funding mechanisms (e.g., holder of conservation easement or fee title). The project proponent will submit evidence that the necessary mitigation has been implemented or that the project proponent has entered into a legal agreement to implement it.

If mitigation includes dedication of conservation easements, purchase of mitigation credits, or other offsite conservation measures, the details of these measures will be included in the mitigation plan, including information on responsible parties for long-term management, conservation easement holders, long-term management requirements, funding assurances, and success criteria such as those listed above and other details, as appropriate to target the preservation of long term viable populations.

If mitigation includes restoring or enhancing habitat within the treatment area or outside of the treatment area, the Compensatory Mitigation Plan will include a description of the proposed habitat improvements, success criteria that demonstrate the performance standard of maintained habitat function has been met, legal and funding mechanisms, and parties responsible for long-term management and monitoring of the restored habitat.

If the loss of occupied habitat cannot be offset (e.g., if preservation of existing populations or creation of new populations through relocation efforts are not available for a certain species), and as a result treatment activities would substantially reduce the number or restrict the range of listed plant species, then the treatment will not qualify as within the scope of this PEIR.

Compensatory mitigation may be satisfied through compliance with permit conditions, or other authorizations obtained by the project proponent (e.g., incidental take permit for state-listed plants), if these requirements are equally or more effective than the mitigation identified above.

<u>Significance after Mitigation</u>

Implementing Mitigation Measures BIO-1a, BIO-1b, and BIO-1c would reduce potentially significant impacts on special-status plants because it would require avoidance of special-status plant occurrences, which would be identified and delineated under SPRs BIO-1 and BIO-7, with physical buffers or seasonal restrictions, and would require compensation for unavoidable losses of special-status plants. Mitigation Measures BIO-1a and BIO-1b would reduce significant impacts because placing a no-disturbance buffer around the area occupied by special-status plants would keep workers from implementing treatment activities that could damage or destroy special-status plants to be retained within the area where the special-status plants are living so these populations would be retained and their population numbers would not be reduced, they would not be eliminated from an area, and their range would not be reduced. In instances where treatments would be allowed in areas occupied by special-status plants, under the specific conditions described under BIO-1a and 1b, additional impact minimization and avoidance measures or design alternatives to reduce impacts to less than significant would be identified in consultation with the resource agencies, as appropriate. The project proponent would then determine if the impact on special-status plants has been reduced below the level of significance and if not, Mitigation Measure BIO-1c would compensate for unavoidable losses by creating, enhancing, or preserving populations to offset plants killed by treatment activities such that no special-status plant population would be reduced below self-sustaining levels and treatment activities would not contribute to a trend toward a species not already listed becoming listed as threatened or endangered, or substantially reduce the number or restrict the range of a species that is already listed as endangered, rare, or threatened. With implementation of mitigation, this impact would be **less than significant**.

There is a potential long-term benefit to special-status plants from implementation of the CalVTP because it would reduce the risk of catastrophic wildfires that can eliminate special-status plant populations. Given the unpredictability of wildfire, in terms of location and severity, evaluating the specific benefits to biological resources is not feasible and is not considered in determining the significance of this impact under CEQA. There could also be long-term benefits to fire-adapted special-status plants through the introduction of low-intensity prescribed fire.

Impact BIO-2: Substantially Affect Special-Status Wildlife Species Either Directly or Through Habitat Modifications

Treatment activities implemented under the proposed CalVTP, including prescribed burning, mechanical treatment, manual treatment, prescribed herbivory, and herbicide treatment, could result in direct or indirect adverse effects to special-status wildlife species. SPRs require pre-treatment surveys to identify special-status wildlife and habitats and avoidance and protection of certain sensitive habitats. While implementation of SPRs would minimize impacts, vegetation treatment activities would still remove vegetation and disturb the ground surface, which could result in the disturbance to or loss of individuals, reduced breeding productivity of affected species, or loss of habitat function. The loss of special-status wildlife species and habitat function would be a **potentially significant** impact.

Because of the large geographic scope of the treatable landscape and large number of special-status wildlife species considered in this analysis, species are grouped into life history categories (or guilds) that would respond similarly to the range of proposed treatment activities (Table 3.6-32). The following analysis is organized by these life history categories; the narrative provides examples or representative special-status wildlife species and discusses potential effects of the proposed treatment activities for each life history category. A list of the special-status wildlife species considered in this analysis is presented in Table 3.6-32. Appendix BIO-3, Tables 1a through 19 list the special-status wildlife species known or with potential to occur in the treatable landscape for each ecoregion. Table 3.6-33 presents the relevant SPRs, summarizes the potential residual impacts to special-status wildlife for each treatment activity after implementation of SPRs, and identifies relevant mitigation measures.

Table 3.6-32 Special-Status Species Considered in this PEIR Grouped by Life History Characteristics

Life History Grouping	Federally/State Listed and Fully Protected Species	Non-Listed Special-Status Species
Tree-nesting and Cavity-nesting Wildlife	▶ American peregrine falcon ▶ Bald eagle ▶ California condor ▶ California spotted owl ▶ Elf owl ▶ Gila woodpecker ▶ Gilded flicker ▶ Golden eagle ▶ Great gray owl ▶ Marbled murrelet ▶ Northern spotted owl ▶ Swainson's hawk ▶ White-tailed kite ▶ Western yellow-billed cuckoo ▶ California wolverine ▶ Fisher - West Coast DPS ▶ Humboldt marten	▶ Black swift ▶ Long-eared owl ▶ Northern goshawk ▶ Olive-sided flycatcher ▶ Purple martin ▶ Short-eared owl ▶ Summer tanager ▶ Vaux's swift ▶ Vermilion flycatcher ▶ San Bernardino flying squirrel ▶ Sonoma tree vole
Shrub-nesting Wildlife	▶ Arizona Bell's vireo ▶ Coastal California gnatcatcher ▶ Inyo California towhee ▶ Least Bell's vireo ▶ Little willow flycatcher ▶ Southwestern willow flycatcher ▶ Tricolored blackbird ▶ Valley elderberry longhorn beetle ▶ Willow flycatcher	▶ Alameda song sparrow ▶ Bendire's thrasher ▶ Clark's marsh wren ▶ Coastal cactus wren ▶ Crissal thrasher ▶ Gray vireo ▶ Kern red-winged blackbird ▶ Le Conte's thrasher (San Joaquin population) ▶ Loggerhead shrike ▶ Lucy's warbler ▶ Saltmarsh common yellowthroat/San Francisco common yellowthroat ▶ San Pablo (= Samuels) song sparrow ▶ Song sparrow ("Modesto" population) ▶ Sonoran yellow warbler ▶ Suisun song sparrow ▶ Yellow warbler ▶ Yellow-breasted chat ▶ Yellow-headed blackbird
Ground-nesting Wildlife	▶ Bryant's savannah sparrow ▶ California black rail ▶ California least tern ▶ California Ridgway's rail ▶ Greater sage grouse ▶ Greater sandhill crane ▶ Light-footed Ridgway's rail ▶ Riparian woodrat ▶ Snowy plover ▶ Yuma Ridgway's rail ▶ Buena Vista Lake ornate shrew ▶ Monterey shrew, Salinas ornate shrew ▶ Mount Lyell shrew ▶ Salt marsh wandering shrew ▶ Southern California salt marsh shrew ▶ Suisun shrew	▶ American white pelican ▶ Belding's savannah sparrow ▶ Black skimmer ▶ Black tern ▶ Fulvous whistling-duck ▶ Grasshopper sparrow ▶ Gull-billed tern ▶ Harlequin duck ▶ Large-billed savannah sparrow ▶ Least bittern ▶ Lesser sandhill crane ▶ Mount Pinos sooty grouse ▶ Northern harrier ▶ Oregon vesper sparrow ▶ Redhead ▶ Yellow rail ▶ Colorado River cotton rat ▶ Monterey dusky-footed woodrat ▶ Oregon snowshoe hare ▶ San Diego black-tailed jackrabbit ▶ San Diego desert woodrat ▶ San Francisco dusky-footed woodrat ▶ Sierra Nevada snowshoe hare ▶ western white-tailed jackrabbit ▶ Yuma hispid cotton rat
Burrowing or Denning Wildlife	▶ Amargosa vole ▶ California wolverine ▶ Fresno kangaroo rat ▶ Giant kangaroo rat ▶ Gray wolf ▶ Morro Bay kangaroo rat ▶ Nelson's antelope squirrel ▶ Pacific pocket mouse ▶ Palm Springs round-tailed ground squirrel ▶ Point Arena mountain beaver ▶ Riparian brush rabbit ▶ Salt-marsh harvest mouse ▶ San Bernardino kangaroo rat ▶ San Joaquin kit fox ▶ Sierra Nevada red fox ▶ Stephens' kangaroo rat ▶ Tipton kangaroo rat ▶ Bank swallow	▶ American badger ▶ Big-eared kangaroo rat ▶ Dulzura pocket mouse ▶ Jacumba pocket mouse ▶ Los Angeles pocket mouse ▶ Marsh vole ▶ Marysville California kangaroo rat ▶ Mohave ground squirrel ▶ Mohave river vole ▶ Monterey vole ▶ Northwestern San Diego pocket mouse ▶ Owens Valley vole ▶ Point Reyes jumping mouse ▶ Point Reyes mountain beaver ▶ Pygmy rabbit ▶ Salinas pocket mouse ▶ San Pablo vole ▶ Short-nosed kangaroo rat ▶ Sierra Nevada mountain beaver ▶ Southern grasshopper mouse ▶ Southwestern river otter ▶ Stephens' California vole

Table 3.6-32 Special-Status Species Considered in this PEIR Grouped by Life History Characteristics

Life History Grouping	Federally/State Listed and Fully Protected Species	Non-Listed Special-Status Species
		▶ Pallid San Diego pocket mouse ▶ Palm Springs pocket mouse ▶ Piute ground squirrel ▶ Tehachapi pocket mouse ▶ Tulare grasshopper mouse ▶ White-eared pocket mouse ▶ Burrowing owl
Insects and Other Terrestrial Invertebrates	▶ Casey's June beetle ▶ Delhi Sands flower-loving fly ▶ Delta green ground beetle ▶ Morro shoulderband (=banded dune) snail ▶ Mount Hermon (=barbate) June beetle ▶ Ohlone tiger beetle ▶ Trinity bristle snail ▶ Zayante band-winged grasshopper ▶ Bay checkerspot butterfly ▶ Behren's silverspot butterfly ▶ Callippe silverspot butterfly ▶ Carson wandering skipper ▶ El Segundo blue butterfly ▶ Kern primrose sphinx moth ▶ Hermes copper butterfly ▶ Laguna Mountains skipper ▶ Lange's metalmark butterfly ▶ Lotis blue butterfly ▶ Mission blue butterfly ▶ Myrtle's silverspot butterfly ▶ Oregon silverspot butterfly ▶ Palos Verdes blue butterfly ▶ Quino checkerspot butterfly ▶ San Bruno elfin butterfly ▶ Smith's blue butterfly ▶ Crotch bumble bee ▶ Franklin's bumble bee ▶ Western bumble bee ▶ Suckley cuckoo bumble bee	None
Bats	None	▶ Arizona myotis ▶ Big free-tailed bat ▶ California leaf-nosed bat ▶ Cave myotis ▶ Mexican long-tongued bat ▶ Pallid bat ▶ Pocketed free-tailed bat ▶ Spotted bat ▶ Townsend's big-eared bat ▶ Western mastiff bat ▶ Western red bat ▶ Western yellow bat
Ungulates	▶ Desert bighorn sheep ▶ Peninsular bighorn sheep DPS ▶ Sierra Nevada bighorn sheep	▶ Pronghorn
Fish and Aquatic Invertebrates	▶ Bonytail ▶ Bull trout ▶ Chinook salmon - California coastal ESU ▶ Chinook salmon - Central Valley spring-run ESU ▶ Chinook salmon - Sacramento River winter-run ESU ▶ Chinook salmon - spring-run Klamath-Trinity Rivers pop. ▶ Clear Lake hitch ▶ Coho salmon - central California coast ESU ▶ Coho salmon - southern Oregon / northern California ESU ▶ Razorback sucker ▶ Rough sculpin ▶ Santa Ana sucker ▶ Shortnose sucker ▶ Southern steelhead - southern California DPS ▶ Steelhead - central California coast DPS ▶ Steelhead - Central Valley DPS ▶ Steelhead - northern California DPS ▶ Steelhead - south/central California coast DPS ▶ Tidewater goby ▶ Unarmored threespine stickleback ▶ California freshwater shrimp	▶ Amargosa Canyon speckled dace ▶ Amargosa pupfish ▶ Arroyo chub ▶ Bigeye marbled sculpin ▶ Blue chub ▶ California golden trout ▶ Chinook salmon - Central Valley fall-run ESU ▶ Coastal cutthroat trout ▶ Cow Head tui chub ▶ Eagle Lake rainbow trout ▶ Eagle Lake tui chub ▶ Goose Lake lamprey ▶ Goose Lake redband trout ▶ Goose Lake sucker ▶ Goose Lake tui chub ▶ Gualala roach ▶ McCloud River redband trout ▶ Monterey roach ▶ Mountain sucker ▶ Navarro roach ▶ northern California brook lamprey ▶ Owens speckled dace ▶ Owens sucker ▶ Pacific lamprey ▶ Pit roach ▶ Red Hills roach ▶ River lamprey ▶ Russian River tule perch ▶ Sacramento perch ▶ Sacramento splittail ▶ Salt Creek pupfish ▶ San Joaquin roach

Table 3.6-32 Special-Status Species Considered in this PEIR Grouped by Life History Characteristics

Life History Grouping	Federally/State Listed and Fully Protected Species	Non-Listed Special-Status Species
	▶ Colorado pikeminnow ▶ Cottonball Marsh pupfish ▶ Delta smelt ▶ Desert pupfish ▶ Eulachon ▶ Green sturgeon ▶ Lahontan cutthroat trout ▶ Little Kern golden trout ▶ Longfin smelt ▶ Lost River sucker ▶ Modoc sucker ▶ Mohave tui chub ▶ Owens pupfish ▶ Owens tui chub ▶ Paiute cutthroat trout ▶ Conservancy fairy shrimp ▶ Longhorn fairy shrimp ▶ Nevares Spring naucorid bug ▶ Riverside fairy shrimp ▶ San Diego fairy shrimp ▶ Shasta crayfish ▶ Vernal pool fairy shrimp ▶ Vernal pool tadpole shrimp	▶ Hardhead ▶ Kern brook lamprey ▶ Klamath largescale sucker ▶ Klamath River lamprey ▶ Kern River rainbow trout ▶ Lahontan Lake tui chub ▶ Long Valley speckled dace ▶ Santa Ana speckled dace ▶ Saratoga Springs pupfish ▶ Shoshone pupfish ▶ Steelhead - Klamath Mountains Province DPS ▶ Steelhead - northern California DPS (summer run) ▶ Summer-run steelhead trout ▶ Tomales roach
Amphibians and Reptiles	▶ Arroyo toad ▶ Black toad ▶ California red-legged frog ▶ California tiger salamander ▶ Cascades frog ▶ Desert slender salamander ▶ Foothill yellow-legged frog ▶ Limestone salamander ▶ Kern Canyon slender salamander ▶ Oregon spotted frog ▶ Santa Cruz long-toed salamander ▶ Scott Bar salamander ▶ Shasta salamander ▶ Sierra Nevada yellow-legged frog ▶ Siskiyou Mountains salamander ▶ Southern mountain yellow-legged frog ▶ Tehachapi slender salamander ▶ Yosemite toad ▶ Alameda striped racer (whipsnake) ▶ Blunt-nosed leopard lizard ▶ Coachella Valley fringe-toed lizard ▶ Giant garter snake ▶ Mohave Desert tortoise ▶ San Francisco garter snake ▶ Southern rubber boa ▶ Switak's banded gecko	▶ California giant salamander ▶ California newt (Monterey County and South) ▶ Couch's spadefoot ▶ coastal tailed frog ▶ Inyo Mountains salamander ▶ Lesser slender salamander ▶ Lowland leopard frog ▶ Northern leopard frog ▶ Northern red-legged frog ▶ Red-bellied newt ▶ Relictual slender salamander ▶ Santa Cruz black salamander ▶ Sonoran Desert toad ▶ Southern long-toed salamander ▶ Southern torrent salamander ▶ Western spadefoot ▶ Baja California coachwhip ▶ Banded gila monster ▶ Blainville's horned lizard ▶ California glossy snake ▶ California legless lizard ▶ Coast patch-nosed snake ▶ Colorado Desert fringe-toed lizard ▶ Cope's leopard lizard ▶ Flat-tailed horned lizard ▶ Panamint alligator lizard ▶ San Diegan tiger whiptail ▶ Mohave fringe-toed lizard ▶ Northwestern western pond turtle ▶ Regal ring-necked snake ▶ Red diamond rattlesnake ▶ San Diego banded gecko ▶ Sandstone night lizard ▶ Sierra night lizard ▶ San Joaquin coachwhip ▶ Sonora mud turtle ▶ South coast garter snake ▶ Two-striped garter snake

Table 3.6-33 Applicable SPRs, Residual Potential Impacts to Special-Status Wildlife for Each Treatment Activity, and Mitigation Measures

Applicable SPRs		Residual Impacts after Application of SPRs	Mitigation Measures	Significance After Mitigation
Tree-Nesting and Cavity-Nesting Wildlife				
SPR BIO-1 SPR BIO-2 SPR BIO-3 SPR BIO-4 SPR BIO-5 SPR BIO-8	SPR BIO-10 SPR BIO-11 SPR HAZ-5 SPR HAZ-6 SPR HYD-5	Potentially Significant (All Treatment Activities)	BIO-2a BIO-2b BIO-2c BIO-3a BIO-3b BIO-3c	Less than Significant
Shrub-Nesting Wildlife				
SPR BIO-1 SPR BIO-2 SPR BIO-3 SPR BIO-4 SPR BIO-5 SPR BIO-8	SPR BIO-10 SPR BIO-11 SPR HAZ-5 SPR HAZ-6 SPR HYD-5	Potentially Significant (All Treatment Activities)	BIO-2a BIO-2b BIO-2c BIO-2d BIO-3a BIO-3b BIO-3c	Less than Significant
Ground-Nesting Wildlife				
SPR BIO-1 SPR BIO-2 SPR BIO-3 SPR BIO-4 SPR BIO-5 SPR BIO-8	SPR BIO-10 SPR BIO-11 SPR HAZ-5 SPR HAZ-6 SPR HYD-5	Potentially Significant (All Treatment Activities)	BIO-2a BIO-2b BIO-2c BIO-3a BIO-3b BIO-3c	Less than Significant
Burrowing of Denning Wildlife				
SPR BIO-1 SPR BIO-2 SPR BIO-3 SPR BIO-4 SPR BIO-5 SPR BIO-8	SPR BIO-10 SPR BIO-11 SPR HAZ-5 SPR HAZ-6 SPR HYD-5	Potentially Significant (All Treatment Activities)	BIO-2a BIO-2b BIO-2c BIO-3a BIO-3b BIO-3c	Less than Significant
Insects and Other Terrestrial Invertebrates				
SPR BIO-1 SPR BIO-2 SPR BIO-3 SPR BIO-4 SPR BIO-5 SPR BIO-8	SPR BIO-10 SPR BIO-11 SPR HAZ-5 SPR HAZ-6 SPR HYD-5	Potentially Significant (All Treatment Activities)	BIO-2a BIO-2b BIO-2c BIO-2e BIO-2f BIO-2g BIO-3a BIO-3b BIO-3c	Potentially Significant and Unavoidable (bumble bees) Less than Significant (other insects and terrestrial invertebrates)
Bats				
SPR BIO-1 SPR BIO-2 SPR BIO-3 SPR BIO-4 SPR BIO-5 SPR BIO-8	SPR BIO-10 SPR BIO-11 SPR HAZ-5 SPR HAZ-6 SPR HYD-5	Potentially Significant (All Treatment Activities)	BIO-2a BIO-2b BIO-2c BIO-3a BIO-3b BIO-3c	Less than Significant

Table 3.6-33 Applicable SPRs, Residual Potential Impacts to Special-Status Wildlife for Each Treatment Activity, and Mitigation Measures

Applicable SPRs		Residual Impacts after Application of SPRs	Mitigation Measures	Significance After Mitigation
Ungulates				
SPR BIO-1 SPR BIO-2 SPR BIO-3 SPR BIO-4 SPR BIO-5	SPR BIO-10 SPR BIO-11 SPR HAZ-5 SPR HAZ-6	Potentially Significant (Prescribed Burning, Mechanical Treatment, Manual Treatment, Prescribed Herbivory) Less than Significant (Herbicide Treatment)	BIO-2a BIO-2b BIO-2c BIO-2h BIO-3a BIO-3b BIO-3c	Less than Significant
Fish and Aquatic Invertebrates				
SPR BIO-1 SPR BIO-2 SPR BIO-3 SPR BIO-4 SPR BIO-5 SPR BIO-8 SPR BIO-10	SPR HAZ-5 SPR HAZ-6 SPR HYD-1 SPR HYD-3 SPR HYD-4 SPR HYD-5	Potentially Significant (All Treatment Activities)	BIO-2a BIO-2b BIO-2c BIO-3a BIO-3b BIO-3c BIO-4	Less than Significant
Amphibians and Reptiles				
SPR BIO-1 SPR BIO-2 SPR BIO-3 SPR BIO-4 SPR BIO-5 SPR BIO-8 SPR BIO-10	SPR BIO-11 SPR HAZ-5 SPR HAZ-6 SPR HYD-1 SPR HYD-3 SPR HYD-4 SPR HYD-5	Potentially Significant (All Treatment Activities)	BIO-2a BIO-2b BIO-2c BIO-3a BIO-3b BIO-3c BIO-4	Less than Significant

Source: Compiled by Ascent Environmental in 2019

Tree-Nesting and Cavity-Nesting Wildlife

The treatable landscape contains suitable habitat for several special-status tree-nesting and cavity-nesting species. Special-status tree-nesting species include raptors (e.g., bald eagle [*Haliaeetus leucocephalus*], northern spotted owl, Swainson's hawk [*Buteo swainsoni*]), non-raptors (e.g., gilded flicker [*Colaptes chrysoides*], olive-sided flycatcher [*Contopus cooperi*]), and rodents (e.g., San Bernardino flying squirrel [*Glaucomys sabrinus californicus*], Sonoma tree vole [*Arborimus pomo*]). Table 3.6-32 provides a comprehensive list of special-status tree-nesting and cavity-nesting species known or with potential to occur in the treatable landscape and considered in this analysis. These species nest or den in a variety of habitat types; some species prefer mature or old-growth forest habitat with high canopy closure, some prefer forest edge habitats, and others prefer riparian forest habitat. Some species, like marbled murrelet, occur within a limited range, while others like bald eagle, occur in various ecoregions throughout the state.

Cavity-nesting species, which include special-status denning mammals like Humboldt marten (*Martes caurina humboldtensis*), fisher (*Pekania pennanti*), and California wolverine (*Gulo gulo*), typically prefer cavities within large, mature trees or snags. Additionally, species such as Humboldt marten and fisher have very specific habitat requirements that include high canopy closure and complex forest structure with snags and downed woody debris to provide refuge from predators while moving through the forest.

Treatment design of qualifying projects under the CalVTP would integrate the SPRs identified above. SPR BIO-1 requires a reconnaissance-level survey of the proposed treatment site to determine whether there is potential for special-status wildlife, including tree- and cavity-nesting species, to occur. If it is determined that special-status wildlife may occur, then SPR BIO-10 requires focused or protocol-level survey for special-status wildlife to ensure that these species are identified prior to treatment so that they can be avoided under other measures. SPR BIO-2 requires crew members and contractors to receive training regarding biological resources from a qualified RPF or biologist familiar with the life history of the species so crews are aware of potential special-status wildlife in the treatment area and measures to reduce adverse effects. SPRs designed to identify sensitive natural communities (SPR BIO-3), retain the habitat function of riparian habitat and limit herbicide use within riparian habitat (SPR BIO-4 and SPR HYD-5, respectively), avoid environmental effects of type conversion within chaparral and coastal sage scrub habitats (SPR BIO-5), and limit treatments within ESHAs in the coastal zone (SPR BIO-8) reduce the likelihood of impacts to tree- and cavity-nesting species within these habitats. However, many of these special-status species would be present outside of these habitats and therefore would not be protected by these SPRs. SPR BIO-11 requires the use of wildlife-friendly fencing during prescribed herbivory treatments, which reduces the likelihood of adverse interactions between special-status wildlife and fencing (e.g., entanglement, collision). SPR HAZ-5 and SPR HAZ-6 require safe handling of herbicides (e.g., spill prevention, spill response) and compliance with current regulations for the application of herbicides. While SPRs would minimize impacts, treatment activities could still result in direct or indirect adverse effects on tree- and cavity-nesting special-status wildlife if these species and their habitat are not sufficiently avoided after identification and if these species occur within areas or habitats that are not avoided by implementation of the SPRs. Potential impacts to special-status tree- and cavity-nesting species are described for each treatment activity below.

<u>Prescribed Burning</u>

Prescribed burning treatment activities would include pile burning and broadcast burning. If prescribed burning occurs during the breeding season (varies by species), active nests or dens (in trees and cavities) present in the treatable landscape could be burned directly, removed or damaged by falling, or otherwise damaged by fire (e.g., heat scorch, smoke damage). This could result in the direct mortality of adults or young, if present. These potential adverse effects would be more likely due to broadcast burning than pile burning, because pile burning would occur in a discrete location rather than throughout the understory. Additionally, tree- and cavity-nesting species could be alarmed by the visual, auditory, and olfactory cues of prescribed burns (e.g., flames, smoke) and by the presence of associated personnel and equipment (e.g., vehicles, helicopters). This could result in nest or den abandonment, and potential mortality of young or loss of eggs. In addition to breeding-season impacts, several species may use cavity habitat during the non-breeding season (e.g., San Bernardino flying squirrel, fisher, Humboldt marten, California wolverine). Thus, potential adverse effects on these and other species as a result of prescribed burning treatment activities would not be limited to the breeding season.

Depending on severity, prescribed burning treatment activities could result in reduced understory complexity if understory trees, shrubs, and downed woody debris are burned. Removal of these understory features may benefit some species by facilitating movement in the forest floor (McIver et al. 2013). However, because these understory features provide refuge for species such as Humboldt marten, fisher, and California wolverine, changes to understory complexity may result in loss of habitat function and exclusion of these species from the treatment site.

<u>Mechanical Treatment</u>

Mechanical treatment activities would include cutting, uprooting, crushing/compacting, or chopping of existing vegetation. If mechanical treatment occurs during the breeding season, these activities could result in the direct loss of tree nests or cavity nests and dens if present within trees that are subject to cutting or other removal methods. This could result in the direct mortality of adults or young, if present. Additionally, tree- and cavity-nesting species could be alarmed by the presence of personnel or heavy equipment (e.g., masticators, trucks) that may cause noise, vibration, and dust, which could result in nest or den abandonment, and potential mortality of young or loss of eggs. In addition to breeding-season impacts, several species may use cavity habitat during the non-breeding season (e.g., San Bernardino flying squirrel, fisher, Humboldt marten, California wolverine). Thus, potential adverse effects on these and other species as a result of mechanical treatment activities would not be limited to the breeding season.

Mechanical treatment activities could result in reduced canopy cover and reduced understory complexity if canopy trees, understory trees, shrubs, snags, and downed woody debris are removed (e.g., cut, uprooted, chopped). Overstory thinning may result in increased light penetration and increased growth of herbaceous plant species, which may benefit some wildlife species (McIver et al. 2013). However, because many special-status wildlife species have specific habitat requirements, including high canopy cover and complex understory structure, major changes to the character of these understory features could result in loss of habitat function and exclusion of these species from the treatment site.

Manual Treatment

Manual treatment activities would include the use of hand tools (e.g., loppers) and hand-operated power tools (e.g., chainsaws) to prune, thin, or remove vegetation. If manual treatment, including manual removal of trees or tree limbs, occurs during the breeding season, these activities could result in the direct loss of tree nests or cavity nests or dens if present within the trees that are subject to cutting or other removal methods. This could result in the direct mortality of adults or young, if present. Additionally, tree- and cavity-nesting species could be alarmed by the presence of personnel which could result in nest or den abandonment, and potential mortality of young or loss of eggs. In addition to breeding-season impacts, several species may use cavity habitat during the non-breeding season (e.g., San Bernardino flying squirrel, fisher, Humboldt marten, California wolverine). Thus, potential adverse effects on these and other species as a result of manual treatment activities would not be limited to the breeding season.

Manual treatment activities could result in reduced canopy cover and reduced understory complexity if canopy trees, understory trees, shrubs, snags, and downed woody debris are removed (e.g., cut, uprooted, chopped). Because many special-status wildlife species have specific habitat requirements, including high canopy cover and complex understory features, major changes to the character of forest these understory features could result in loss of habitat function and exclusion of these species from the treatment site.

Prescribed Herbivory

Prescribed herbivory would include the use of domestic livestock (e.g., cows, goats, sheep) to reduce a target plant population. Prescribed herbivory would not result in the direct loss of nest trees or cavities, as herbivores are only capable of removing herbaceous or woody vegetation within the understory. Some special-status wildlife species may be acclimated to the presence of livestock. For example, golden eagle (*Aquila chrysaetos*) and Swainson's hawk are known to nest within or adjacent to rangeland or agricultural habitat. However, the presence of herbivores in a confined area would generally be a novel presence for most special-status species. Consequently, if prescribed herbivory activities occur within the view of tree- or cavity-nesting species, it is likely that these species could be alarmed by the presence of many cows, goats, or sheep. Additionally, the presence of personnel and equipment (e.g., trucks) associated with installation and removal of fencing and other related infrastructure could also alarm nesting special-status species. The presence of herbivores, personnel, and equipment could potentially result in disruption of breeding behavior and nest or den abandonment. Temporary electric fences to control grazing animals would not result in injury or mortality of special-status wildlife due to electrocution. Temporary electric fences produce high voltage shocks with very low amperage, which deters livestock from escaping without causing injury or death.

Herbicides

Herbicide treatment would include ground-level application (e.g., paint-on stems, backpack hand-applicator, hypo-hatchet tree injection, hand placement of pellets) and potential downward spray application using a boom applicator attached to an all-terrain vehicle or tractor. Herbicide treatment could result in adverse effects on tree- and cavity-nesting species if an animal ingested or came into direct contact with herbicides, as some herbicides may be toxic to these species. Additionally, tree- and cavity-nesting species could be alarmed by the presence of vehicles and personnel associated with herbicide treatment, which could result in nest or den abandonment, and potential mortality of young or loss of eggs.

<u>Conclusion</u>

Relevant SPRs would be implemented to avoid and minimize treatment-related disturbances and long-term habitat loss for special-status tree- and cavity-nesting species (listed in Table 3.6-33). SPR BIO-1 requires data review (e.g., vegetation mapping, databases with existing special-status wildlife and plant occurrences) and a reconnaissance-level survey of the proposed treatment site to determine whether there is potential for special-status wildlife to occur. If it is determined that special-status wildlife may occur, then SPR BIO-10 requires focused or protocol-level survey for special-status wildlife to determine whether the species is present. Several tree-nesting special-status wildlife species require specific protocol-level surveys to determine occupancy, including marbled murrelet and northern spotted owl. SPR BIO-2 requires crew members and contractors to receive training regarding biological resources from a qualified RPF or biologist familiar with the life history of the species so crews are aware of potential special-status wildlife in the treatment area and measures to reduce adverse effects. SPRs designed to identify sensitive natural communities (SPR BIO-3) and retain the habitat function of riparian habitat (SPR BIO-4) reduce the likelihood of impacts to tree- and cavity-nesting species within these habitats. SPR BIO-5 avoids environmental effects of type conversion within native coastal sage scrub and chaparral and would reduce the likelihood of impacts (e.g., habitat loss) to special-status species that nest and otherwise use these habitats. SPR BIO-8 limits treatments within ESHAs in the coastal zone, reducing likelihood of impacts to tree- and cavity-nesting species in these areas of the coastal zone. SPR BIO-11 requires the use of wildlife-friendly fencing during prescribed herbivory treatments, which reduces the likelihood of adverse interactions between special-status wildlife and fencing (e.g., entanglement, collision). SPR HAZ-5 and SPR HAZ-6 require safe handling of herbicides (e.g., spill prevention, spill response) and compliance with current regulations for the application of herbicides. SPR HYD-5 would reduce potential impacts to riparian tree-nesting species by limiting herbicide use within riparian habitat. While SPRs would minimize impacts, treatment activities could still result in the direct or indirect adverse effects described above on tree- and cavity-nesting special-status wildlife if these species occur within areas or habitats that are not avoided by implementation of the SPRs. As described above, potential direct adverse effects include mortality or injury of special-status species or their nests and dens. Indirect adverse effects would include disturbance to nests or dens due to the presence of crews or heavy machinery, or loss of habitat function as a result of treatment activities (e.g., prescribed burning, mechanical treatment). Substantial adverse effects on special-status tree- or cavity-nesting species due to direct injury or mortality or habitat modifications would be a **potentially significant** impact.

Mitigation Measures

Mitigation Measure BIO-2a: Avoid Mortality, Injury, or Disturbance and Maintain Habitat Function for Listed Wildlife Species and California Fully Protected Species (All Treatment Activities)

If California Fully Protected Species or species listed under ESA or CESA are observed during reconnaissance surveys (conducted pursuant to SPR BIO-1) or focused or protocol-level surveys (conducted pursuant to SPR BIO-10), the project proponent will avoid adverse effects to the species by implementing the following.

<u>Avoid Mortality, Injury, or Disturbance of Individuals</u>

- The project proponent will implement one of the following 2 measures to avoid mortality, injury, or disturbance of individuals:
  1. Treatment will not be implemented within the occupied habitat. Any treatment activities outside occupied habitat will be a sufficient distance from the occupied habitat such that mortality, injury, or disturbance of the species will not occur, as determined by a qualified RPF or biologist; OR
  2. Treatment will be implemented outside the sensitive period of the species’ life history (e.g., outside the breeding or nesting season) during which the species may be more susceptible to disturbance, or disturbance could result in loss of eggs or young. For species present year-round, CDFW and/or USFWS will be consulted to determine if there is a period of time within which treatment could occur that would avoid mortality, injury, or disturbance of the species.

- For species listed under ESA or CESA, if the project proponent cannot avoid mortality, injury or disturbance by implementing one of the two options listed above, the project proponent will implement Mitigation Measure BIO-2c.
- Injury or mortality of California Fully Protected Species is prohibited pursuant to Sections 3511, 4700, 5050, and 5515 of the California Fish and Game Code and will be avoided.

Maintain Habitat Function

- The project proponent will design treatment activities to maintain the habitat function, by implementing the following:
  - While performing review and surveys for SPR BIO-1 and SPR BIO-10, a qualified RPF or biologist will identify any habitat features that are necessary for survival (e.g., habitat necessary for breeding, foraging, shelter, movement) of the affected wildlife species (e.g., trees with complex structure, trees with large cavities, trees with nesting platforms; tree snags; large raptor nests [including inactive nests]; downed woody debris). These habitat features will be marked and treatments applied to the features will be designed to minimize or avoid the loss or degradation of suitable habitat for listed species during treatments. Identification and treatment of these features will be based on the life history and habitat requirements of the affected species.
  - If it is determined during implementation of SPR BIO-1 and SPR BIO-10 that listed or fully protected wildlife with specific requirements for high canopy cover (e.g., Humboldt marten, fisher, spotted owl, coastal California gnatcatcher, riparian woodrat) are present within a treatment area, then tree or shrub canopy cover within existing suitable areas will be retained at the percentage preferred by the species (as determined by expert opinion, published habitat association information, or other documented standards that are commonly accepted [e.g., 50 percent for coastal California gnatcatcher]) such that habitat function is maintained.
- A qualified RPF or biologist will determine if, after implementation of the impact avoidance measures listed above, the habitat function will remain for the affected species after implementation of the treatment. Because this measure pertains to species listed under CESA or ESA or are fully protected, the qualified RPF or biologist will consult with CDFW and/or USFWS regarding the determination that habitat function is maintained. If consultation determines that the treatment will not maintain habitat function for the special-status species, the project proponent will implement Mitigation Measure BIO-2c.

Mitigation Measure BIO-2b: Avoid Mortality, Injury, or Disturbance and Maintain Habitat Function for Other Special-Status Wildlife Species (All Treatment Activities)

If other special-status wildlife species (i.e., species not listed under CESA or ESA or California Fully Protected, but meeting the definition of special status as stated in Section 3.6.1 of the Program EIR) are observed during reconnaissance surveys (conducted pursuant to SPR BIO-1) or focused or protocol-level surveys (conducted pursuant to SPR BIO-10), the project proponent will avoid or minimize adverse effects to the species by implementing the following.

Avoid Mortality, Injury, or Disturbance of Individuals

- The project proponent will implement the following to avoid mortality, injury, or disturbance of individuals:
  - For all treatment activities except prescribed burning, the project proponent will establish a no-disturbance buffer around occupied sites (e.g., nests, dens, roosts, middens, burrows, nurseries). Buffer size will be determined by a qualified RPF or biologist; however, buffers will generally be a minimum of 100 feet, unless site conditions indicate a smaller buffer would be sufficient for protection or a larger buffer would be needed. Factors to be considered in determining buffer size will include, but not be limited to, the presence of natural buffers provided by vegetation or topography; nest height; locations of foraging territory; baseline levels of noise and human activity; and treatment activity. Buffer size may be adjusted if the qualified RPF or biologist determines that such an adjustment would not be likely to adversely affect (i.e., cause mortality, injury, or disturbance to) the species within the nest, den, burrow, or other occupied site. No-disturbance buffers will be marked with high-visibility flagging, fencing, stakes, or clear, existing landscape demarcations

(e.g., edge of a roadway). No activity will occur within the buffer areas until the qualified RPF or biologist has determined that the young have fledged or dispersed; the nest, den, or other occurrence is no longer active; or reducing the buffer would not likely result in disturbance, mortality, or injury. A qualified RPF, biologist, or biological technician may be required to monitor the nest, den, burrow, or other occurrence during treatment if the treatment activity has the potential to result in mortality, injury, or disturbance.

  - For prescribed burning, the project proponent will implement the treatment outside the sensitive period of the species' life history (e.g., outside the breeding or nesting season) during which the species may be more susceptible to disturbance, or disturbance could result in loss of eggs or young. For species present year-round, the qualified RPF or biologist will determine the period of time within which prescribed burning could occur that will avoid or minimize mortality, injury, or disturbance of the species. The project proponent may consult with CDFW and/or USFWS for technical information regarding appropriate limited operating periods.

Maintain Habitat Function

- For all treatment activities, the project proponent will design treatment activities to maintain the habitat function by implementing the following:
  - While performing review and surveys for SPR BIO-1 and SPR BIO-10, a qualified RPF or biologist will identify any habitat features that are necessary for survival (e.g., habitat necessary for breeding, foraging, shelter, movement) of the affected wildlife species (e.g., trees with complex structure, trees with large cavities, trees with nesting platforms; tree snags; large raptor nests [including inactive nests]; downed woody debris). These habitat features will be marked and treatments applied to the features will be designed to minimize or avoid the loss or degradation of suitable habitat for listed species during treatments. Identification and treatment of these features will be based on the life history and habitat requirements of the affected species.
  - If it is determined during implementation of SPR BIO-1 and SPR BIO-10 that special-status wildlife with specific requirements for high canopy cover (e.g., northern goshawk, Sierra Nevada snowshoe hare) are present within a treatment area, then tree or shrub canopy cover within existing suitable areas will be retained at the percentage preferred by the species (as determined by expert opinion, published habitat association information, or other documented standards that are commonly accepted) such that the habitat function is maintained.
- A qualified RPF or biologist will determine if, after implementation of the impact avoidance measures listed above, the habitat function will remain for the affected species after implementation of the treatment. The qualified RPF or biologist may consult with CDFW and/or USFWS for technical information regarding habitat function.

A qualified RPF or biologist with knowledge of the special-status wildlife species habitat and life history will review the treatment design and applicable impact minimization measures (potentially including others not listed above) to determine if the anticipated residual effects of the treatment would be significant under CEQA because implementation of the treatment will not maintain habitat function of the special-status wildlife species' habitat or because the loss of special-status wildlife would substantially reduce the number or restrict the range of a special-status wildlife species. If the project proponent determines the impact on special-status wildlife would be less than significant, no further mitigation will be required. If the project proponent determines that the loss of special-status wildlife or degradation of occupied habitat would be significant under CEQA after implementing feasible treatment design alternatives and impact minimization measures, then Mitigation Measure BIO-2c will be implemented.

The only exception to this mitigation approach is in cases where it is determined by a qualified RPF or biologist that the special-status wildlife would benefit from treatment in the occupied habitat area even though some of the non-listed special-status wildlife may be killed, injured, or disturbed during treatment activities. If it is determined that treatment activities would be beneficial to special-status wildlife, no compensatory mitigation will be required.

Mitigation Measure BIO-2c: Compensate for Mortality, Injury, or Disturbance and Loss of Habitat Function for Special-Status Wildlife if Applicable (All Treatment Activities)

If the provisions of Mitigation Measure BIO-2a, BIO-2b, BIO-2d, BIO-2e, BIO-2f, or BIO-2g cannot be implemented and the project proponent determines that additional mitigation is necessary to reduce significant impacts, the project proponent will compensate for such impacts to species or habitat by acquiring and/or protecting land that provides (or will provide in the case of restoration) habitat function for affected species that is at least equivalent to the habitat function removed or degraded as a result of the treatment.

Compensation may include:

1. Preserving existing habitat outside of the treatment area in perpetuity; this may entail purchasing mitigation credits and/or lands from a CDFW- or USFWS-approved entity in sufficient quantity to offset the residual significant impacts, generally at a ratio of 1:1 for habitat; and
2. Restoring or enhancing habitat within the treatment area or outside of the treatment area (including decommissioning roads, adding or removing perching structures, or removing movement barriers or other features that are adversely affecting the species).

The project proponent will prepare a Compensatory Mitigation Plan that identifies the residual significant effects that require compensatory mitigation and describes the compensatory mitigation strategy being implemented to reduce residual effects, and:

1. For preserving existing habitat outside of the treatment area in perpetuity, the Compensatory Mitigation Plan will include a summary of the proposed compensation lands (e.g., the number and type of credits, location of mitigation bank or easement), parties responsible for the long-term management of the land, and the legal and funding mechanisms for long-term conservation (e.g., holder of conservation easement or fee title). The project proponent will submit evidence that the necessary mitigation has been implemented or that the project proponent has entered into a legal agreement to implement it.
2. For restoring or enhancing habitat within the treatment area or outside of the treatment area, the Compensatory Mitigation Plan will include a description of the proposed habitat improvements, success criteria that demonstrate the performance standard of maintained habitat function has been met, legal and funding mechanisms, and parties responsible for long-term management and monitoring of the restored habitat.

Review requirements are as follows:

- For species listed under ESA or CESA or a California Fully Protected Species, the project proponent will submit the mitigation plan to CDFW and/or USFWS for review and comment.
- For other special-status wildlife species the project proponent may consult with CDFW and/or USFWS regarding the availability and applicability of compensatory mitigation and other related technical information.

Compensatory mitigation may be satisfied through compliance with permit conditions, or other authorizations obtained by the project proponent (e.g., incidental take permit), if these requirements are equally or more effective than the mitigation identified above.

Mitigation Measure BIO-3a: Design Treatments to Avoid Loss of Sensitive Natural Communities and Oak Woodlands

The project proponent will implement the following measures when working in treatment areas that contain sensitive natural communities identified during surveys conducted pursuant to SPR BIO-3:

- Reference the *Manual of California Vegetation*, Appendix 2, Table A2, *Fire Characteristics* (Sawyer et al. 2009) or other best available information to determine the natural fire regime of the specific sensitive natural community type (i.e., alliance) present. The condition class and fire return interval departure of the vegetation alliances present will also be determined.
- Design treatments in sensitive natural communities and oak woodlands to restore the natural fire regime and return vegetation composition and structure to their natural condition to maintain or improve habitat function of the

affected sensitive natural community. Treatments will be designed to replicate the fire regime attributes for the affected sensitive natural community or oak woodland type including seasonality, fire return interval, fire size, spatial complexity, fireline intensity, severity, and fire type as described in *Fire in California's Ecosystems* (Van Wagtendonk et al. 2018) and the *Manual of California Vegetation* (Sawyer et al. 2009). Treatments will not be implemented in sensitive natural communities that are within their natural fire return interval (i.e., time since last burn is less than the average time required for that vegetation type to recover from fire) or within Condition Class 1.

- To the extent feasible, no fuel breaks will be created in sensitive natural communities with rarity ranks of S1 (critically imperiled) and S2 (imperiled).
- To the extent feasible, fuel breaks will not remove more than 20 percent of the native vegetation cover from a stand of sensitive natural community vegetation in sensitive natural communities with a rarity rank of S3 (vulnerable) or in oak woodlands. In forest and woodland sensitive natural communities with a rarity rank of S3, and in oak woodlands, only shaded fuel breaks will be installed, and they will not be installed in more than 20 percent of the stand of sensitive natural community or oak woodland vegetation (i.e., if the sensitive natural community covers 100 acres, no more than 20 acres will be converted to create the fuel break).
- Use prescribed burning as the primary treatment activity in sensitive natural communities that are fire dependent (e.g., closed-cone forest and woodland alliances, chaparral alliances characterized by fire-stimulated, obligate seeders), to the extent feasible and appropriate based on the fire regime attributes as described in *Fire in California's Ecosystems* (Van Wagtendonk et al. 2018) and the *Manual of California Vegetation* (Sawyer et al. 2009).
- Time prescribed herbivory to occur when non-target vegetation is not susceptible to damage (e.g. non-target vegetation is dormant or has completed its reproductive cycle for the year). For example, use herbivores to control invasive plants growing in sensitive habitats or sensitive natural communities when sensitive vegetation is dormant but invasive plants are growing. Timing of herbivory to avoid non-target vegetation will be determined by a qualified botanist, RPF, or biologist based on the specific vegetation alliance being treated, the life forms and life conditions of its characteristic plant species, and the sensitivity of the non-target vegetation to the effects of herbivory.

A qualified RPF or botanist with knowledge of the affected sensitive natural community will review the treatment design and applicable impact minimization measures (potentially including others not listed above) to determine if the anticipated residual effects of the treatment would be significant under CEQA because implementation of the treatment will not maintain habitat functions of the sensitive natural community or oak woodland. If the project proponent determines the impact on sensitive natural communities or oak woodlands would be less than significant, no further mitigation will be required. If the project proponent determines that the loss or degradation of sensitive natural communities or oak woodlands would be significant under CEQA after implementing feasible treatment design alternatives and impact minimization measures, then Mitigation Measure BIO-3b will be implemented.

The only exception to this mitigation approach is in cases where it is determined by a qualified RPF or botanist that the sensitive natural community or oak woodland would benefit from treatment in the occupied habitat area even though some loss may occur during treatment activities. If it is determined that treatment activities would be beneficial to sensitive natural communities or oak woodlands, no compensatory mitigation will be required.

Mitigation Measure BIO-3b: Compensate for Loss of Sensitive Natural Communities and Oak Woodlands

If significant impacts on sensitive natural communities or oak woodlands cannot feasibly be avoided or reduced as specified under Mitigation Measure BIO-3a, the project proponent will implement the following actions:

- Compensate for unavoidable losses of sensitive natural community and oak woodland acreage and function by:
  - restoring sensitive natural community or oak woodland functions and acreage within the treatment area;
  - restoring degraded sensitive natural communities or oak woodlands outside of the treatment area at a sufficient ratio to offset the loss of acreage and habitat function; or

  - preserving existing sensitive natural communities or oak woodlands of equal or better value to the sensitive natural community lost through a conservation easement at a sufficient ratio to offset the loss of acreage and habitat function.
- The project proponent will prepare a Compensatory Mitigation Plan that identifies the residual significant effects on sensitive natural communities or oak woodlands that require compensatory mitigation and describes the compensatory mitigation strategy being implemented to reduce residual effects, and:
  1. For preserving existing habitat outside of the treatment area in perpetuity, the Compensatory Mitigation Plan will include a summary of the proposed compensation lands (e.g., the number and type of credits, location of mitigation bank or easement), parties responsible for the long-term management of the land, and the legal and funding mechanism for long-term conservation (e.g., holder of conservation easement or fee title). The project proponent will submit evidence that the necessary mitigation has been implemented or that the project proponent has entered into a legal agreement to implement it.
  2. For restoring or enhancing habitat within the treatment area or outside of the treatment area, the Compensatory Mitigation Plan will include a description of the proposed habitat improvements, success criteria that demonstrate the performance standard of maintained habitat function has been met, legal and funding mechanisms, and parties responsible for long-term management and monitoring of the restored habitat.

Mitigation Measure BIO-3c: Compensate for Unavoidable Loss of Riparian Habitat

If, after implementation of SPR BIO-4, impacts to riparian habitat remain significant under CEQA, the project proponent will implement the following:

- Compensate for unavoidable losses of riparian habitat acreage and function by:
  - restoring riparian habitat functions and acreage within the treatment area;
  - restoring degraded riparian habitat outside of the treatment area;
  - purchasing riparian habitat credits at a CDFW-approved mitigation bank; or
  - preserving existing riparian habitat of equal or better value to the riparian habitat lost through a conservation easement at a sufficient ratio to offset the loss of riparian habitat function and value.
- The project proponent will prepare a Compensatory Mitigation Plan that identifies the residual significant effects on riparian habitat that require compensatory mitigation and describes the compensatory mitigation strategy being implemented to reduce residual effects, and:
  1. For preserving existing riparian habitat outside of the treatment area in perpetuity, the Compensatory Mitigation Plan will include a summary of the proposed compensation lands (e.g., the number and type of credits, location of mitigation bank or easement), parties responsible for the long-term management of the land, and the legal and funding mechanism for long-term conservation (e.g., holder of conservation easement or fee title). The project proponent will submit evidence that the necessary mitigation has been implemented or that the project proponent has entered into a legal agreement to implement it.
  2. For restoring or enhancing riparian habitat within the treatment area or outside of the treatment area, the Compensatory Mitigation Plan will include a description of the proposed habitat improvements, success criteria that demonstrate the performance standard of maintained habitat function has been met, legal and funding mechanisms, and parties responsible for long-term management and monitoring of the restored habitat.

  Compensatory mitigation may be satisfied through compliance with permit conditions, or other authorizations obtained by the project proponent (e.g., Lake and Streambed Alteration Agreement), if these requirements are equally or more effective than the mitigation identified above.

<u>Significance after Mitigation</u>

Mitigation Measures BIO-2a, BIO-2b, and BIO-2c would reduce potential impacts on special-status tree- and cavity-nesting species by requiring avoidance and protection of these species from injury, mortality, and other disturbance; maintenance of habitat function through retention of important habitat features such that there would be no substantial long-term loss or degradation of habitat; and compensation for impacts if these impacts cannot be avoided. Mitigation Measures BIO-3a, BIO-3b, and BIO-3c would require project proponents to avoid or offset the loss of the habitat function of special-status wildlife habitat (i.e., sensitive natural communities, riparian habitat). Implementation of these mitigation measures would reduce impacts to special-status tree- and cavity-nesting species such that no populations of these species would be reduced below self-sustaining levels and treatment activities would not contribute to a trend toward a species not already listed becoming listed as threatened or endangered, or substantially reduce the number or restrict the range of a species that is already listed as endangered, rare, or threatened. Impacts would be reduced to **less than significant**.

Shrub-Nesting Wildlife

Shrub-nesting special-status species with potential to occur in the treatable landscape include species associated with riparian deciduous shrubs such as willows (*Salix* spp.), cottonwood (*Populus* spp.), blackberry (*Rubus* spp.) (e.g., southwestern willow flycatcher, yellow warbler [*Setophaga petechia*], tricolored blackbird [*Agelaius tricolor*]), or species associated with upland scrub or chaparral habitat (e.g., coastal California gnatcatcher, loggerhead shrike [*Lanius ludovicianus*]). Table 3.6-32 provides a comprehensive list of special-status shrub-nesting species known or with potential to occur in the treatable landscape and considered in this analysis. Some shrub-nesting species have very specific habitat requirements that include minimum shrub canopy cover percentages and shrub heights. For example, the preferred habitat of coastal California gnatcatcher contains at least 50 percent shrub canopy cover, and the species may be displaced from areas with significant reduction in canopy cover (Beyers and Wirtz II 1995). One special-status invertebrate species, valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), occurs exclusively within elderberry shrubs (*Sambucus nigra caerulea*) and spends most of its life cycle within the stems of these shrubs. Elderberry shrubs occur primarily within riparian habitat but may also occur either singly or in groups in valley oak and blue oak woodland and annual grasslands.

Treatment design of qualifying projects under the CalVTP would integrate the SPRs identified above. SPR BIO-1 requires a reconnaissance-level survey of the proposed treatment site to determine whether there is potential for special-status wildlife, including shrub-nesting species, to occur. If it is determined that special-status wildlife may occur, then SPR BIO-10 requires focused or protocol-level survey for special-status wildlife to ensure that these species are identified prior to treatment so that they can be avoided under other measures. SPR BIO-2 requires crew members and contractors to receive training regarding biological resources from a qualified RPF or biologist familiar with the life history of the species so crews are aware of potential special-status wildlife in the treatment area and measures to reduce adverse effects. SPRs designed to identify sensitive natural communities (SPR BIO-3), retain the habitat function of riparian habitat and limit herbicide use within riparian habitat (SPR BIO-4 and SPR HYD-5, respectively), avoid environmental effects of type conversion within chaparral and coastal sage scrub habitats (SPR BIO-5), and limit treatments within ESHAs in the coastal zone (SPR BIO-8) reduce the likelihood of impacts to shrub-nesting species within these habitats. However, many of these special-status species would be present outside of these habitats and would not be protected by these SPRs. SPR BIO-11 requires the use of wildlife-friendly fencing during prescribed herbivory treatments, which reduces the likelihood of adverse interactions between special-status wildlife and fencing (e.g., entanglement, collision). SPR HAZ-5 and SPR HAZ-6 require safe handling of herbicides (e.g., spill prevention, spill response) and compliance with current regulations for the application of herbicides. While SPRs would minimize impacts, treatment activities could still result in direct or indirect adverse effects on shrub-nesting special-status wildlife if these species and their habitat are not sufficiently avoided after identification and if these species occur within areas or habitats that are not avoided by implementation of the SPRs. Potential impacts to special-status shrub-nesting species are described for each treatment activity below.

Prescribed Burning

Prescribed burning treatment activities within shrub-dominated habitats would include pile burning and broadcast burning. If prescribed burning occurs during the breeding seasons for special-status species, active nests present in treatment areas could be burned directly, removed or damaged by falling, or otherwise damaged by fire (e.g., heat scorch, smoke damage). This could result in the direct mortality of adults or young, if present. These potential adverse effects would be more likely due to broadcast burning than pile burning, because pile burning would occur in a discrete or concentrated location rather than throughout the understory. Additionally, shrub-nesting species could be alarmed by the visual, auditory, and olfactory cues of prescribed burns (e.g., flames, smoke) and by the presence of associated personnel and equipment (e.g., vehicles, helicopters). This could result in nest abandonment, and potential mortality of young or loss of eggs. Prescribed burning treatment activities could reduce shrub canopy cover, which may result in loss of habitat function and reduce or eliminate habitat suitability for certain shrub-nesting species and displace/exclude them from the treatment site.

Treatment activities within the range of valley elderberry longhorn beetle (i.e., Central California Coast, Great Valley, Klamath Mountains, Northern California Coast Ranges, Northern California Interior and Coast Ranges, Southern Cascades, Sierra Nevada, Sierra Nevada Foothills, and Central California Coast Ranges ecoregions) could result in mortality of valley elderberry longhorn beetles primarily from direct destruction of their elderberry shrub habitat or treatment activities directly adjacent to this habitat. Additionally, potential adverse effects as a result of prescribed burning treatment activities would not be limited to the breeding season because most of the life cycle of this species takes place within the elderberry shrub.

Mechanical Treatment

Mechanical treatment activities would include cutting, uprooting, crushing/compacting, or chopping of existing vegetation. If mechanical treatment occurs during the breeding season, these activities could result in the direct loss of nests within shrub habitat, if present within shrubs that are subject to cutting or other removal methods. This could result in the direct mortality of adults or young, if present. Additionally, shrub-nesting species could be alarmed by the presence of personnel or heavy equipment (e.g., masticators, trucks) that may cause noise, vibration, and dust, which could result in nest abandonment, and potential mortality of young or loss of eggs. Mechanical treatment activities could result in reduced shrub canopy cover. Some chaparral bird species may respond positively to reduced shrub canopy cover, including granivores, or seed-eating birds (Newman et al. 2018). However, other wildlife species, including some birds, may respond negatively, and reduced shrub canopy cover may result in loss of habitat function and in exclusion of certain shrub-nesting species from the treatment site. These trends may apply to special-status shrub-nesting birds in the treatable landscape.

Treatment activities within the range of valley elderberry longhorn beetle could result in mortality of valley elderberry longhorn beetles primarily from direct destruction of their elderberry shrub habitat or treatment activities directly adjacent to this habitat. Additionally, potential adverse effects as a result of mechanical treatment activities would not be limited to the breeding season because most of the life cycle of this species takes place within the elderberry shrub.

Manual Treatment

Manual treatment activities would include the use of hand tools (e.g., loppers) and hand-operated power tools (e.g., chainsaws) to prune, thin, or remove vegetation. If manual treatment, including manual removal of trees or tree limbs, occurs during the breeding season, these activities could result in the direct loss of nest in shrub habitat if present within shrubs that are subject to cutting or other removal methods. This could result in the direct mortality of adults or young, if present. Additionally, shrub-nesting species could be alarmed by the presence of personnel which could result in nest abandonment, and potential mortality of young or loss of eggs. Manual treatment activities could result in reduced shrub canopy cover, which may result in loss of habitat function and in exclusion of certain shrub-nesting species from the treatment site.

Treatment activities within the range of valley elderberry longhorn beetle could result in mortality of valley elderberry longhorn beetles primarily from direct destruction of their elderberry shrub habitat or treatment activities directly adjacent to this habitat. Additionally, potential adverse effects as a result of manual treatment activities would not be limited to the breeding season because most of the life cycle of this species takes place within the elderberry shrub.

<u>Prescribed Herbivory</u>

Prescribed herbivory would include the use of domestic livestock (e.g., cows, goats, sheep) to reduce a target plant population. Prescribed herbivory could result in the direct loss of shrubs containing nests, if present within the target plant population. The presence of herbivores in a confined area would likely be a novel presence for shrub-nesting special-status species. Consequently, if prescribed herbivory activities occur within the view of a nest, it is likely that these species could be alarmed by the presence of several cows, goats, or sheep. Additionally, the presence of personnel and equipment (e.g., trucks) associated with installation and removal of fencing and other related infrastructure could also alarm nesting special-status species. The novel presence of herbivores, personnel, and equipment could potentially result in disruption of breeding behavior and nest abandonment. Prescribed herbivory activities could also result in reduced shrub canopy cover, which may result in loss of habitat function and in exclusion of certain shrub-nesting species from the treatment site. Temporary electric fences to control grazing animals would not result in injury or mortality of special-status wildlife due to electrocution. Temporary electric fences produce high voltage shocks with very low amperage, which deters livestock from escaping without causing injury or death.

Treatment activities within the range of valley elderberry longhorn beetle could result in mortality of valley elderberry longhorn beetles primarily from direct destruction of their elderberry shrub habitat or treatment activities directly adjacent to this habitat. Additionally, potential adverse effects as a result of prescribed herbivory activities would not be limited to the breeding season because most of the life cycle of this species takes place within the elderberry shrub.

<u>Herbicides</u>

Herbicide treatment would include ground-level application (e.g., paint-on stems, backpack hand-applicator, hypo-hatchet tree injection, hand placement of pellets) and potential downward spray application using a boom applicator attached to an all-terrain vehicle or tractor. Herbicide treatment could result in adverse effects on shrub-nesting wildlife if an animal ingested or came into direct contact with herbicides, as some herbicides may be toxic to these species. Additionally, shrub-nesting species could be alarmed by the presence of vehicles and personnel associated with herbicide treatment, which could result in nest abandonment, and potential mortality of young or loss of eggs.

Adverse effects on valley elderberry longhorn beetle could occur if herbicides are applied to elderberry shrubs. Loss of elderberry shrubs related to herbicide treatment would result in loss of suitable habitat or direct mortality of valley elderberry longhorn beetle if present within stems of the shrub during herbicide application.

<u>Conclusion</u>

Relevant SPRs would be implemented to avoid and minimize treatment-related disturbances and long-term habitat loss for special-status shrub-nesting species (listed in Table 3.6-33). SPR BIO-1 requires data review (e.g., vegetation mapping, databases with existing special-status wildlife and plant occurrences) and a reconnaissance-level survey of the proposed treatment site to determine whether there is potential for special-status wildlife to occur. If it is determined that special-status wildlife may occur, then SPR BIO-10 requires focused or protocol-level survey for special-status wildlife to determine whether the species is present. Several shrub-nesting special-status wildlife species require protocol-level surveys to determine occupancy, including valley elderberry longhorn beetle, coastal California gnatcatcher, and least Bell's vireo (*Vireo bellii pusillus*). SPR BIO-2 requires crew members and contractors to receive training regarding biological resources from a qualified RPF or biologist familiar with the life history of the species so crews are aware of potential special-status wildlife in the treatment area and measures to reduce adverse effects. SPRs designed to identify sensitive natural communities (SPR BIO-3) and retain the habitat function of riparian habitat (SPR BIO-4) reduce the likelihood of impacts to shrub-nesting species within these habitats. SPR BIO-5 avoids environmental effects of type conversion within native coastal sage scrub and chaparral and would likely reduce the likelihood of impacts (e.g., habitat loss) to special-status species that nest and otherwise use these habitats. SPR BIO-8 limits treatments within ESHAs in the coastal zone, reducing likelihood of impacts to shrub-nesting species in the coastal zone. SPR BIO-11 requires the use of wildlife-friendly fencing during prescribed herbivory treatments, which reduces the likelihood of adverse interactions between special-status wildlife and fencing (e.g., entanglement, collision). SPR HAZ-5 and SPR HAZ-6 require safe handling of herbicides (e.g., spill prevention, spill response) and compliance with current regulations for the application of herbicides. SPR HYD-5 would reduce potential impacts to riparian shrub-nesting species by limiting herbicide use within riparian habitat. While SPRs would minimize impacts, treatment activities could still result in the direct or indirect adverse effects described above on shrub-nesting special-status wildlife if these species occur within areas or habitats that are not avoided by implementation of the SPRs. As described above, potential direct adverse effects include mortality or injury of special-status species or their nests. Indirect adverse effects would include disturbance to nests due to the presence of crews or heavy machinery, or loss of habitat function as a result of treatment activities (e.g., prescribed burning, mechanical treatment). Substantial adverse effects on special-status shrub-nesting species due to direct injury or mortality or habitat modifications would be a **potentially significant** impact.

Mitigation Measures

Mitigation Measure BIO-2a: Avoid Mortality, Injury, or Disturbance and Maintain Habitat Function for Listed Wildlife Species and California Fully Protected Species (All Treatment Activities)

Mitigation Measure BIO-2b: Avoid Mortality, Injury, or Disturbance and Maintain Habitat Function for Other Special-Status Wildlife Species (All Treatment Activities)

Mitigation Measure BIO-2c: Compensate for Mortality, Injury, or Disturbance and Loss of Habitat Function for Special-Status Wildlife if Applicable (All Treatment Activities)

Mitigation Measure BIO-2d: Implement Protective Measures for Valley Elderberry Longhorn Beetle (All Treatment Activities)

If elderberry shrubs within the documented range of valley elderberry longhorn beetle are identified during review and surveys for SPR BIO-1, and valley elderberry longhorn beetle or likely occupied suitable elderberry habitat (e.g., within riparian, within historic riparian, containing exit holes) is confirmed to be present during protocol-level surveys following the protocol outlined in USFWS *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle* (USFWS 2017) per SPR BIO-10, the following protective measures will be implemented to avoid and minimize impacts to valley elderberry longhorn beetle:

- If elderberry shrubs are 165 feet or more from the treatment area, and treatment activities would not encroach within this distance, direct or indirect impacts are not expected and further mitigation is not required.
- If elderberry shrubs are located within 165 feet of the treatment area, the following measures will be implemented:
  - A minimum avoidance area of at least 20 feet from the dripline of each elderberry plant will be fenced or flagged and maintained to avoid direct impacts (e.g., damage to root system) that could damage or kill the plant, with the exception of the following activities:
    - Manual trimming of elderberry shrubs will only occur between November and February and will avoid removal of any branches or stems that are greater than or equal to 1 inch in diameter to avoid and minimize adverse effects on valley elderberry longhorn beetle.
    - Manual or mechanical vegetation treatment within the drip-line of any elderberry shrub will be limited to the season when adults are not active (August – February), will be limited to methods that do not cause ground disturbance, and will avoid damaging the elderberry.
  - A qualified RPF or biologist familiar with valley elderberry longhorn beetle and its life history will monitor the work area to ensure the avoidance and minimization measures are implemented.

If the project proponent cannot implement the measures above to avoid mortality, injury, or disturbance of VELB or degradation of occupied habitat such that its function would not be maintained, the project proponent will implement Mitigation Measure BIO-2c.

Mitigation Measure BIO-3a: Design Treatments to Avoid Loss of Sensitive Natural Communities and Oak Woodlands

Mitigation Measure BIO-3b: Compensate for Loss of Sensitive Natural Communities and Oak Woodlands

Mitigation Measure BIO-3c: Compensate for Unavoidable Loss of Riparian Habitat

<u>Significance after Mitigation</u>

Mitigation Measures BIO-2a, BIO-2b, and BIO-2c would reduce potential impacts on special-status shrub-nesting species by requiring avoidance and protection of these species from injury, mortality, and other disturbance; maintenance of habitat function through retention of important habitat features such that there would be no substantial long-term loss or degradation of habitat; and compensation for impacts if these impacts cannot be avoided. Mitigation Measure BIO-2d would further reduce potential impacts on valley elderberry longhorn beetle by requiring avoidance and protection of elderberry shrubs within the treatment area or compensation if valley elderberry longhorn beetle cannot be avoided. Mitigation Measures BIO-3a, BIO-3b, and BIO-3c would require project proponents to avoid or compensate for loss of the habitat function of special-status wildlife habitat (i.e., sensitive natural communities, riparian habitat,). Implementation of these mitigation measures would reduce impacts to special-status shrub-nesting species such that no populations of these species would be reduced below self-sustaining levels and treatment activities would not contribute to a trend toward a species not already listed becoming listed as threatened or endangered, or substantially reduce the number or restrict the range of a species that is already listed as endangered, rare, or threatened. Impacts would be reduced to **less than significant**.

Ground-Nesting Wildlife

The treatable landscape contains suitable habitat for several special-status ground-nesting species. Special-status ground-nesting species include wildlife species associated with marsh or wetland habitat (e.g., Buena Vista Lake ornate shrew [*Sorex ornatus relictus*], California black rail [*Laterallus jamaicensis coturniculus*], California Ridgway's rail [*Rallus obsoletus obsoletus*], northern harrier [*Circus hudsonius*], redhead [*Aythya americana*]), riparian habitat (e.g., riparian woodrat [*Neotoma fuscipes riparia*], Sierra Nevada snowshoe hare [*Lepus americanus tahoensis*]), sagebrush habitat (e.g., greater sage-grouse [*Centrocercus urophasianus*], western white-tailed jackrabbit [*Lepus townsendii*]), and grassland habitat (e.g., grasshopper sparrow [*Ammodramus savannarum*]). Table 3.6-32 provides a comprehensive list of special-status ground-nesting species known or with potential to occur in the treatable landscape and considered in this analysis. The structure of ground nests vary for these species but may include cups or mounds made of grasses or other vegetation, simple scrapes on the ground, or in the case of woodrats, large middens made of leaves, twigs, and other debris. Some ground-nesting species prefer specific habitat characteristics depending on the stage of their life history. For example, greater sage-grouse prefer more open areas in the sagebrush-grassland matrix (e.g., burns) for lekking and denser stands of sagebrush for rearing chicks (McAdoo and Back 2001).

Treatment design of qualifying projects under the CalVTP would integrate the SPRs identified above. SPR BIO-1 requires a reconnaissance-level survey of the proposed treatment site to determine whether there is potential for special-status wildlife, including ground-nesting species, to occur. If it is determined that special-status wildlife may occur, then SPR BIO-10 requires focused or protocol-level survey for special-status wildlife to ensure that these species are identified prior to treatment so that they can be avoided under other measures. SPR BIO-2 requires crew members and contractors to receive training regarding biological resources from a qualified RPF or biologist familiar with the life history of the species so crews are aware of potential special-status wildlife in the treatment area and measures to reduce adverse effects. SPRs designed to identify sensitive natural communities (SPR BIO-3), retain the habitat function of riparian habitat and limit herbicide use within riparian habitat (SPR BIO-4 and SPR HYD-5, respectively), avoid environmental effects of type conversion within chaparral and coastal sage scrub habitats (SPR BIO-5), and limit treatments within ESHAs in the coastal zone (SPR BIO-8) reduce the likelihood of impacts to ground-nesting species within these habitats. However, many of these special-status species would be present outside of these habitats and would not be protected by these SPRs. SPR BIO-11 requires the use of wildlife-friendly fencing during prescribed herbivory treatments, which reduces the likelihood of adverse interactions between special-status wildlife and fencing (e.g., entanglement, collision). SPR HAZ-5 and SPR HAZ-6 require safe handling of herbicides (e.g., spill prevention, spill response) and compliance with current regulations for the application of herbicides. While SPRs would minimize impacts, treatment activities could still result in direct or indirect adverse effects on ground-nesting special-status wildlife if these species and their habitat are not sufficiently avoided after identification and if these species occur within areas or habitats that are not avoided by implementation of the SPRs. Potential impacts to special-status ground-nesting species are described for each treatment activity below.

Prescribed Burning

Prescribed burning treatment activities would include pile burning and broadcast burning. If prescribed burning occurs during the breeding season, active ground nests present in treatment areas could be burned directly by broadcast fires or by pile burning if the piles are placed on top of or adjacent to ground nests. This could result in the direct mortality of adults or young, if present. Additionally, ground-nesting species could be alarmed by the visual, auditory, and olfactory cues of prescribed burns (e.g., flames, smoke) and by the presence of associated personnel and equipment (e.g., vehicles, helicopters). This could result in nest abandonment, and potential mortality of young or loss of eggs. In addition to breeding-season impacts, woodrat species use their middens year-round; thus, potential adverse effects on these species as a result of prescribed burning treatment activities would not be limited to the breeding season. Prescribed burning treatment activities could result in a reduction in vegetative cover, which may benefit some ground-dwelling species by facilitating movement in the forest floor (McIver et al. 2013). However, these activities may also reduce the habitat suitability for some ground-nesting species or result in their displacement from the treatment site.

Mechanical Treatment

Mechanical treatment activities would include cutting, uprooting, crushing/compacting, or chopping of existing vegetation. If mechanical treatment occurs during the breeding season, these activities could result in the direct loss of ground nests, which could be crushed if present within the vicinity of mechanical treatment activities. This could result in the direct mortality of adults or young, if present. Additionally, ground-nesting species could be alarmed by the presence of heavy equipment (e.g., masticators, trucks) and personnel, which could result in nest abandonment, and potential mortality of young or loss of eggs. In addition to breeding-season impacts, some species use ground nests year-round (e.g. woodrat middens); thus, potential adverse effects on these species as a result of mechanical treatment activities would not be limited to the breeding season. Mechanical treatment activities could result in a reduction in vegetative cover, which may reduce the habitat function for some ground-nesting species or result in their exclusion from the treatment site.

Manual Treatment

Manual treatment activities would include the use of hand tools (e.g., loppers) and hand-operated power tools (e.g., chainsaws) to prune, thin, or remove vegetation. If manual treatment occurs during the breeding season, ground nests could be accidentally crushed by foot traffic from crews or otherwise damaged. This could result in the direct mortality of adults or young, if present. Additionally, ground-nesting species could be alarmed by the presence of personnel, which could result in nest abandonment, and potential mortality of young or loss of eggs. In addition to breeding-season impacts, woodrat species use their middens year-round; thus, potential adverse effects on these species as a result of manual treatment activities would not be limited to the breeding season. Manual treatment activities could result in a reduction in vegetative cover, which may reduce the habitat function for some ground-nesting species or result in their exclusion from the treatment site.

Prescribed Herbivory

Prescribed herbivory would include the use of domestic livestock (e.g., cows, goats, sheep) to reduce a target plant population. Livestock used in prescribed herbivory treatments could crush or otherwise destroy ground nests, if present within the treatment area. The presence of herbivores in a confined area would also likely be a novel presence for ground-nesting special-status species. Consequently, if prescribed herbivory activities occur within the view of a nest, it is likely that these species could be alarmed by the presence of livestock. Additionally, the presence of personnel and equipment (e.g., trucks) associated with installation and removal of fencing and other related infrastructure could also alarm nesting special-status species. The novel presence of herbivores, personnel, and equipment could potentially result in disruption of breeding behavior and nest abandonment. In addition to breeding-season impacts, woodrat species use their middens year-round; thus, potential adverse effects on these species as a result of prescribed herbivory activities would not be limited to the breeding season. Prescribed herbivory activities could result in a reduction in vegetative cover, which may reduce the habitat function for some ground-nesting species or result in their exclusion from the treatment site.

<u>Herbicides</u>

Herbicide treatment would include ground-level application (e.g., paint-on stems, backpack hand-applicator, hypo-hatchet tree injection, hand placement of pellets) and potential downward spray application using a boom applicator attached to an all-terrain vehicle or tractor. Herbicide treatment could result in adverse effects on ground-nesting wildlife if an animal ingested or came into direct contact with herbicides, as some herbicides may be toxic to these species. Additionally, ground-nesting species could be alarmed by the presence of vehicles and personnel associated with herbicide treatment, which could result in nest abandonment, and potential mortality of young or loss of eggs.

<u>Conclusion</u>

Relevant SPRs would be implemented to avoid and minimize treatment-related disturbances and long-term habitat loss for special-status ground-nesting species (listed in Table 3.6-33). SPR BIO-1 requires data review (e.g., vegetation mapping, databases with existing special-status wildlife and plant occurrences) and a reconnaissance-level survey of the proposed treatment site to determine whether there is potential for special-status wildlife to occur. If it is determined that special-status wildlife may occur, then SPR BIO-10 requires focused or protocol-level survey for special-status wildlife to determine whether the species is present. SPR BIO-2 requires crew members and contractors to receive training regarding biological resources from a qualified RPF or biologist familiar with the life history of the species so crews are aware of potential special-status wildlife in the treatment area and measures to reduce adverse effects. SPRs designed to identify sensitive natural communities (SPR BIO-3), retain the habitat function of riparian habitat (SPR BIO-4), and avoid environmental effects of type conversion within native coastal sage scrub and chaparral (SPR BIO-5) reduce the likelihood of impacts (e.g., habitat loss) to ground-nesting species within these habitats. SPR BIO-8 limits treatments within ESHAs in the coastal zone, reducing likelihood of impacts to ground-nesting species in the coastal zone. SPR BIO-11 requires the use of wildlife-friendly fencing during prescribed herbivory treatments, which reduces the likelihood of adverse interactions between special-status wildlife and fencing (e.g., entanglement, collision). SPR HAZ-5 and SPR HAZ-6 require safe handling of herbicides (e.g., spill prevention, spill response) and compliance with current regulations for the application of herbicides. SPR HYD-5 would reduce potential impacts ground-nesting species that use riparian habitat by limiting herbicide use within riparian habitat. While SPRs would minimize impacts, treatment activities could still result in direct or indirect adverse effects described above on ground-nesting special-status wildlife if these species occur within areas or habitats that are not avoided by implementation of the SPRs. As described above, direct adverse effects include mortality or injury of special-status species or their nests. Indirect adverse effects would include disturbance to nests due to the presence of crews or heavy machinery, or loss of habitat function as a result of treatment activities (e.g., prescribed burning, mechanical treatment). Substantial adverse effects on special-status ground-nesting species due to direct injury or mortality or habitat modifications would be a **potentially significant** impact.

Mitigation Measures

Mitigation Measure BIO-2a: Avoid Mortality, Injury, or Disturbance and Maintain Habitat Function for Listed Wildlife Species and California Fully Protected Species (All Treatment Activities)

Mitigation Measure BIO-2b: Avoid Mortality, Injury, or Disturbance and Maintain Habitat Function for Other Special-Status Wildlife Species (All Treatment Activities)

Mitigation Measure BIO-2c: Compensate for Mortality, Injury, or Disturbance and Loss of Habitat Function for Special-Status Wildlife if Applicable (All Treatment Activities)

Mitigation Measure BIO-3a: Design Treatments to Avoid Loss of Sensitive Natural Communities and Oak Woodlands

Mitigation Measure BIO-3b: Compensate for Loss of Sensitive Natural Communities and Oak Woodlands

Mitigation Measure BIO-3c: Compensate for Unavoidable Loss of Riparian Habitat

<u>Significance after Mitigation</u>

Mitigation Measures BIO-2a, BIO-2b, and BIO-2c would reduce potential impacts on special-status ground-nesting species by requiring avoidance and protection of these species from injury, mortality, and other disturbance; maintenance of habitat function through retention of important habitat features such that there would be no substantial long-term loss or degradation of habitat; and compensation for impacts if these impacts cannot be avoided. Mitigation Measures BIO-3a, BIO-3b, and BIO-3c would require project proponents to avoid or offset the loss of the habitat function of special-status wildlife habitat (i.e., sensitive natural communities, riparian habitat). Implementation of these mitigation measures would reduce impacts to special-status ground-nesting species such that no populations of these species would be reduced below self-sustaining levels and treatment activities would not contribute to a trend toward a species not already listed becoming listed as threatened or endangered, or substantially reduce the number or restrict the range of a species that is already listed as endangered, rare, or threatened. Impacts would be reduced to **less than significant**.

Burrowing or Denning Wildlife

The treatable landscape contains suitable habitat for several special-status species that nest, den, or otherwise take refuge in burrows (Table 3.6-32). Special-status wildlife in this category include rodents such as kangaroo rats (e.g., Fresno kangaroo rat [*Dipodomys nitratoides exilis*], giant kangaroo rat [*Dipodomys ingens*], Tipton kangaroo rat [*Dipodomys nitratoides nitratoides*]), squirrels (e.g., Nelson's antelope squirrel [*Ammospermophilus nelsoni*], Mohave ground squirrel [*Xerospermophilus mohavensis*]), and mice (e.g., Los Angeles pocket mouse [*Perognathus longimembris brevinasus*]). Several species of mesocarnivores and large carnivores use underground burrows or dens, including San Joaquin kit fox (*Vulpes macrotis mutica*), gray wolf (*Canis lupus*), California wolverine, and American badger (*Taxidea taxus*). Burrowing owl (*Athene cunicularia*) is one of the few bird species in California that use burrow habitat. Bank swallows (*Riparia riparia*) nest in colonies within cavities on sandy banks or cliffs near aquatic habitat. Table 3.6-32 provides a comprehensive list of special-status burrowing or denning species known or with potential to occur in the treatable landscape and considered in this analysis.

Treatment design of qualifying projects under the CalVTP would integrate the SPRs identified above. SPR BIO-1 requires a reconnaissance-level survey of the proposed treatment site to determine whether there is potential for special-status wildlife, including burrowing or denning species, to occur. If it is determined that special-status wildlife may occur, then SPR BIO-10 requires focused or protocol-level survey for special-status wildlife to ensure that these species are identified prior to treatment so that they can be avoided under other measures. SPR BIO-2 requires crew members and contractors to receive training regarding biological resources from a qualified RPF or biologist familiar with the life history of the species so crews are aware of potential special-status wildlife in the treatment area and measures to reduce adverse effects. SPRs designed to identify sensitive natural communities (SPR BIO-3), retain the habitat function of riparian habitat and limit herbicide use within riparian habitat (SPR BIO-4 and SPR HYD-5, respectively), avoid environmental effects of type conversion within chaparral and coastal sage scrub habitats (SPR BIO-5), and limit treatments within ESHAs in the coastal zone (SPR BIO-8) reduce the likelihood of impacts to burrowing or denning species within these habitats. However, many of these special-status species would be present outside of these habitats and would not be protected by these SPRs. SPR BIO-11 requires the use of wildlife-friendly fencing during prescribed herbivory treatments, which reduces the likelihood of adverse interactions between special-status wildlife and fencing (e.g., entanglement, collision). SPR HAZ-5 and SPR HAZ-6 require safe handling of herbicides (e.g., spill prevention, spill response) and compliance with current regulations for the application of herbicides. While SPRs would minimize impacts, treatment activities could still result in direct or indirect adverse effects on burrowing or denning special-status wildlife if these species and their habitat are not sufficiently avoided after identification and if these species occur within areas or habitats that are not avoided by implementation of the SPRs. Potential impacts to special-status burrowing or denning species are described for each treatment activity below.

<u>Prescribed Burning</u>

Prescribed burning treatment activities would include pile burning and broadcast burning. It is possible that many individuals of burrowing or denning wildlife species would escape from the area of a broadcast burn, and that the broadcast burn would move through the area without permanent adverse effects on a burrow. However, depending on the speed and intensity of the fire, and the character of the habitat surrounding the burrow, broadcast burns could result in adverse effects on burrow habitat and adults or young within the burrows. If prescribed burning treatment activities occur during the breeding season, it is likely that young would not be able to escape the fire because they are not sufficiently mobile, or that eggs (e.g., for burrowing owl) could be destroyed. Pile burning could result in adverse effects on burrowing special-status wildlife if the piles are placed on top of or adjacent to burrow habitat. These activities could result in the direct mortality of adults or young, if present. Additionally, burrow-nesting species could be alarmed by the visual, auditory, and olfactory cues of prescribed burns (e.g., flames, smoke) and by the presence of associated personnel and equipment (e.g., vehicles, helicopters). This could result in nest abandonment, and potential mortality of young or loss of eggs (for special-status birds). In addition to breeding-season impacts, many special-status species use their burrows year-round; thus, potential adverse effects on these species as a result of prescribed burning treatment activities would not be limited to the breeding season.

Mechanical Treatment

Mechanical treatment activities would include cutting, uprooting, crushing/compacting, or chopping of existing vegetation. If mechanical treatment occurs during the breeding season, these activities could result in the direct loss of burrows, which could be crushed or otherwise disturbed if present within the vicinity of mechanical treatment activities like uprooting, skidding, or other use of heavy machinery. This could result in the direct mortality of adults or young, if present. Additionally, burrowing special-status species could be alarmed by the presence of heavy equipment (e.g., masticators, trucks) and personnel, which could result in nest abandonment, and potential mortality of young or loss of eggs (for special-status birds). In addition to breeding-season impacts, several special-status species use their burrows year-round; thus, potential adverse effects on these species as a result of mechanical treatment activities would not be limited to the breeding season. Mechanical treatment may also result in compaction of the earth which could prevent recolonization of the treatment area. Depending on the treatment type and ongoing maintenance activities, this could result in loss of habitat function and long-term loss of habitat for burrowing or denning species.

Manual Treatment

Manual treatment activities would include the use of hand tools (e.g., loppers) and hand-operated power tools (e.g., chainsaws) to prune, thin, or remove vegetation. While this treatment activity would be less likely to result in adverse effects than prescribed burning and mechanical treatment, active burrows could be accidentally crushed or otherwise damaged by personnel or equipment (e.g., trucks). This could result in the direct mortality of adults or young, if present. Additionally, burrowing special-status species could be alarmed by the presence of personnel which could result in nest abandonment, and potential mortality of young or loss of eggs (for special-status birds). In addition to breeding-season impacts, many species use their burrows year-round; thus, potential adverse effects on these species as a result of manual treatment activities would not be limited to the breeding season.

Prescribed Herbivory

Prescribed herbivory would include the use of domestic livestock (e.g., cows, goats, sheep) to reduce a target plant population. Livestock used in prescribed herbivory treatments could crush or otherwise destroy active burrows, if present within the treatment area. The threat of burrow crushing is greater for cattle than for sheep and goats because cows are larger and heavier. Additionally, installation of temporary fencing to contain livestock could also result in burrow crushing if fence posts or other infrastructure are installed on or near burrows. The presence of herbivores in a confined area would also likely be a novel presence for burrowing special-status species. Consequently, if prescribed herbivory activities occur within the view of a burrow, it is likely that these species could be alarmed by the presence of livestock. Additionally, the presence of personnel and equipment (e.g., trucks) associated with installation and removal of fencing and other related infrastructure could also alarm special-status species. The novel presence of herbivores, personnel, and equipment could potentially result in disruption of breeding behavior and nest abandonment. In addition to breeding-season impacts, many species use their burrows year-round; thus, potential adverse effects on these species as a result of prescribed herbivory activities would not be limited to the breeding season. Temporary electric fences to control grazing animals would not result in injury or mortality of special-status wildlife due to electrocution. Temporary electric fences produce high voltage shocks with very low amperage, which deters livestock from escaping without causing injury or death.

Herbicides

Herbicide treatment would include ground-level application (e.g., paint-on stems, backpack hand-applicator, hypo-hatchet tree injection, hand placement of pellets) and potential downward spray application using a boom applicator attached to an all-terrain vehicle or tractor. Herbicide treatment could result in adverse effects on burrowing or denning wildlife if an animal ingested or came into direct contact with herbicides, as some herbicides may be toxic to these species. Additionally, burrowing or denning wildlife species could be alarmed by the presence of vehicles and personnel associated with herbicide treatment, which could result in nest or den abandonment, and potential mortality of young or loss of eggs (for special-status birds).

Conclusion

Relevant SPRs would be implemented to avoid and minimize treatment-related disturbances and long-term habitat loss for special-status burrowing or denning wildlife species (listed in Table 3.6-33). SPR BIO-1 requires data review (e.g., vegetation mapping, databases with existing special-status wildlife and plant occurrences) and a reconnaissance-level survey of the proposed treatment site to determine whether there is potential for special-status wildlife to occur. If it is determined that special-status wildlife may occur, then SPR BIO-10 requires focused or protocol-level survey for special-status wildlife to determine whether the species is present. Several burrowing special-status wildlife species require protocol-level surveys to determine occupancy, including several species of kangaroo rat and burrowing owl. SPR BIO-2 requires crew members and contractors to receive training regarding biological resources from a qualified RPF or biologist familiar with the life history of the species so crews are aware of potential special-status wildlife in the treatment area and measures to reduce adverse effects SPRs designed to identify sensitive natural communities (SPR BIO-3), retain the habitat function of riparian habitat (SPR BIO-4), and avoid environmental effects of type conversion within native coastal sage scrub and chaparral (SPR BIO-5) reduce the likelihood of impacts (e.g., habitat loss) to burrowing or denning wildlife species within these habitats. SPR BIO-8 limits treatments within ESHAs in the coastal zone, reducing likelihood of impacts to burrowing or denning wildlife species in the coastal zone. SPR BIO-11 requires the use of wildlife-friendly fencing during prescribed herbivory treatments, which reduces the likelihood of adverse interactions between special-status wildlife and fencing (e.g., entanglement, collision). SPR HAZ-5 and SPR HAZ-6 require safe handling of herbicides (e.g., spill prevention, spill response) and compliance with current regulations for the application of herbicides. SPR HYD-5 would reduce potential impacts to burrowing species that use riparian habitat by limiting herbicide use within riparian habitat. While SPRs would minimize impacts, treatment activities could still result in direct or indirect adverse effects described above on burrowing or denning special-status wildlife if these species occur within areas or habitats that are not avoided by implementation of the SPRs. As described above, potential direct adverse effects include mortality or injury of special-status species or their burrows and dens. Indirect adverse effects would include disturbance to burrows or dens due to the presence of crews or heavy machinery, or loss of habitat function as a result of treatment activities (e.g., prescribed burning, mechanical treatment). Substantial adverse effects on special-status burrowing or denning species due to direct injury or mortality or habitat modifications would be a **potentially significant** impact.

Mitigation Measures

Mitigation Measure BIO-2a: Avoid Mortality, Injury, or Disturbance and Maintain Habitat Function for Listed Wildlife Species and California Fully Protected Species (All Treatment Activities)

Mitigation Measure BIO-2b: Avoid Mortality, Injury, or Disturbance and Maintain Habitat Function for Other Special-Status Wildlife Species (All Treatment Activities)

Mitigation Measure BIO-2c: Compensate for Mortality, Injury, or Disturbance and Loss of Habitat Function for Special-Status Wildlife if Applicable (All Treatment Activities)

Mitigation Measure BIO-3a: Design Treatments to Avoid Loss of Sensitive Natural Communities and Oak Woodlands

Mitigation Measure BIO-3b: Compensate for Loss of Sensitive Natural Communities and Oak Woodlands

Mitigation Measure BIO-3c: Compensate for Unavoidable Loss of Riparian Habitat

Significance after Mitigation

Mitigation Measures BIO-2a, BIO-2b, and BIO-2c would reduce potential impacts on special-status burrowing or denning wildlife species by requiring avoidance and protection of these species from injury, mortality, and other disturbance; maintenance of habitat function through retention of important habitat features such that there would be no substantial long-term loss or degradation of habitat; and compensation for impacts if these impacts cannot be avoided. Mitigation Measures BIO-3a, BIO-3b, and BIO-3c would require project proponents to avoid or offset loss of the habitat function of special-status wildlife habitat (i.e., sensitive natural communities, riparian habitat,). Implementation of these mitigation measures would reduce impacts to special-status burrowing-nesting species such that no populations of these species would be reduced below self-sustaining levels and treatment activities would not contribute to a trend toward a species not already listed becoming listed as threatened or endangered, or substantially reduce the number or restrict the range of a species that is already listed as endangered, rare, or threatened. Impacts would be reduced to **less than significant**.

Insects and Other Terrestrial Invertebrates

The treatable landscape contains suitable habitat for several special-status invertebrate species, including insects (i.e., butterflies, flies, beetles, bumble bees) and snails. Table 3.6-32 provides a comprehensive list of special-status insects or other terrestrial invertebrates known or with potential to occur in the treatable landscape and considered in this analysis. Many of these species occur only within an extremely limited range, and in many cases, the range of these species is poorly understood. For example, callippe silverspot butterfly (*Speyeria callippe callippe*) is only known to occur in two locations: one in San Mateo County and one in Alameda County. Franklin's bumble bee (*Bombus franklini*) is only known to occur within a limited area in the Klamath Mountains. Other species are limited to very specific habitat, specific host plants, and particular soil characteristics. Bay checkerspot butterfly (*Euphydryas editha bayensis*) occurs only on shallow serpentine soil. Mount Hermon June beetle (*Polyphylla barbata*) and Zayante band-winged grasshopper (*Trimerotropis infantilis*) occur only within "Sandhills" habitat (i.e., certain habitats containing Zayante soils, which are excessively drained sandy soils that formed in weakly consolidated marine sediments) in Santa Cruz County. Mount Hermon June beetle larvae live underground feeding on the roots of plants. Zayante band-winged grasshopper occur within open sandy habitat and use shrub habitat for refuge during hot weather. Treatment design of qualifying projects under the CalVTP would integrate the SPRs identified above. SPR BIO-1 requires a reconnaissance-level survey of the proposed treatment site to determine whether there is potential for special-status wildlife, including insects and other terrestrial invertebrates, to occur. If it is determined that special-status wildlife may occur, then SPR BIO-10 requires focused or protocol-level survey for special-status wildlife to ensure that these species are identified prior to treatment so that they can be avoided under other measures. SPR BIO-2 requires crew members and contractors to receive training regarding biological resources from a qualified RPF or biologist familiar with the life history of the species so crews are aware of potential special-status wildlife in the treatment area and measures to reduce adverse effects. SPRs designed to identify sensitive natural communities (SPR BIO-3), retain the habitat function of riparian habitat and limit herbicide use within riparian habitat (SPR BIO-4 and SPR HYD-5, respectively), prevent herbicide drift and other non-target application (SPR HYD-5), avoid environmental effects of type conversion within chaparral and coastal sage scrub habitats (SPR BIO-5), and limit treatments within ESHAs in the coastal zone (SPR BIO-8) reduce the likelihood of impacts to special-status insects and other terrestrial invertebrates within these habitats. However, many of these special-status species would be present outside of these habitats and would not be protected by these SPRs. SPR BIO-11 requires the use of wildlife-friendly fencing during prescribed herbivory treatments, which reduces the likelihood of adverse interactions between special-status wildlife and fencing (e.g., entanglement, collision). SPR HAZ-5 and SPR HAZ-6 require safe handling of herbicides (e.g., spill prevention, spill response) and compliance with current regulations for the application of herbicides. While SPRs would minimize impacts, treatment activities could still result in direct or indirect adverse effects on special-status insects and other terrestrial invertebrates if these species and their habitat are not sufficiently avoided after identification and if these species occur within areas or habitats that are not avoided by implementation of the SPRs. Potential impacts to special-status insects and other terrestrial invertebrates are described for each treatment activity below.

Prescribed Burning

Prescribed burning treatment activities would include pile burning and broadcast burning. It is likely that special-status invertebrates that fly (e.g., butterflies, flies, beetles, bumble bees) would successfully flee from fires, possibly using smoke as a cue. However, the larvae of these species may be present on host plants or underground and could be killed by the fires (broadcast and piles). In addition, invertebrate species that cannot fly, namely Morro shoulderband snail (*Helminthoglypta walkeriana*) and Trinity bristle snail (*Monadenia infumata setosa*), would not be able to escape and would likely be killed by prescribed fires burning leaf litter if present within the treatment site. In addition, while there is still much to be learned about the nesting and overwintering biology of special-status bumble bees, any near-surface or subsurface disturbance of the ground, including prescribed burning, could kill bumble bees in colonies, including overwintering queens. Prescribed burning within occupied or suitable habitat could result in the complete removal of habitat and loss of habitat function for special-status invertebrates within the area being treated, including removal of leaf litter, removal of special-status butterfly host plants, and removal of floral resources for special-status bumble bees.

Mechanical Treatment

Mechanical treatment activities would include cutting, uprooting, crushing/compacting, or chopping of existing vegetation. It is likely that special-status invertebrates that fly would successfully flee from mechanical treatment activities. However, the larvae of these species may be present (e.g., on host plants or underground) and could be killed if present within the vicinity of mechanical treatment activities like uprooting, skidding, or other use of heavy machinery. Morro shoulderband snail and Trinity bristle snail would not be able to escape these activities and would likely be killed by ground disturbance if present within the treatment site. In addition, while there is still much to be learned about the nesting and overwintering biology of special-status bumble bees, mechanical treatment activities could kill bumble bees in nesting or overwintering colonies (e.g., in underground rodent holes, loose soil, leaf litter, log/tree cavities, surface vegetation). Mechanical treatment activities that involve ground disturbance could also result in the complete removal of habitat and loss of habitat function for special-status invertebrates within the area being treated, including removal of leaf litter, removal of special-status butterfly host plants, and removal of floral resources for special-status bumble bees.

Manual Treatment

Manual treatment activities would include the use of hand tools (e.g., loppers) and hand-operated power tools (e.g., chainsaws) to prune, thin, or remove vegetation. It is likely that special-status invertebrates with the capability of flying would flee from the presence of personnel or equipment associated with manual treatment and would not be directly affected by manual treatment activities. However, the larvae of these species may be present on host plants or underground and could be killed if present within the vicinity of manual treatment activities including vegetation removal, ground disturbance, or other use of equipment (e.g., trucks). Morro shoulderband snail and Trinty bristle snail would not be able to escape these activities and could be inadvertently crushed underfoot, or killed during ground disturbance activities (e.g., pulling of plants) if present within the treatment site. In addition, while there is still much to be learned about the nesting and overwintering biology of special-status bumble bees, any near-surface or subsurface disturbance of the ground, including from manual treatment, could kill bumble bees in nesting or overwintering colonies. Manual treatment activities could also result in the complete removal of habitat and loss of habitat function for special-status invertebrates within the area being treated, including removal of leaf litter, removal of special-status butterfly host plants, and removal of floral resources for special-status bumble bees.

Prescribed Herbivory

Prescribed herbivory would include the use of domestic livestock (e.g., cows, goats, sheep) to reduce a target plant population. It is likely that special-status invertebrates with the capability of flying would flee from the presence of livestock associated with prescribed herbivory, if threatened, and would not be directly affected by these activities. However, the larvae of these species may be killed if present on host plants that are consumed by livestock or present underground and crushed underfoot. Morro shoulderband snail, Trinity bristle snail, and some special-status bumble bees within colonies would likely not be able to escape these activities and could be inadvertently crushed underfoot by livestock if present within the treatment site. Additionally, installation of temporary fencing to contain livestock could also result in inadvertent crushing of invertebrate species during the installation of fence posts or other infrastructure. Prescribed herbivory could also result in the complete removal of habitat and loss of habitat function for special-status invertebrates within the area being treated, including removal of leaf litter, removal of special-status butterfly host plants, and removal of floral resources for special-status bumble bees.

Herbicides

Herbicide treatment would include ground-level application (e.g., paint-on stems, backpack hand-applicator, hypo-hatchet tree injection, hand placement of pellets) and potential downward spray application using a boom applicator attached to an all-terrain vehicle or tractor. Herbicide treatment could result in adverse effects on insects and other terrestrial invertebrates if an animal ingested or came into direct contact with herbicides, as some herbicides may be toxic to these species. Additionally, if herbicides are applied on or in the vicinity of host plants for special-status butterflies or floral resources for special-status bumble bees, suitable habitat and habitat function for these species could be reduced or eliminated.

Conclusion

Relevant SPRs would be implemented to avoid and minimize treatment-related disturbances and long-term habitat loss for special-status insects and other terrestrial invertebrates (listed in Table 3.6-33). SPR BIO-1 requires data review (e.g., vegetation mapping, databases with existing special-status wildlife and plant occurrences) and a reconnaissance-level survey of the proposed treatment site to determine whether there is potential for special-status wildlife to occur. If it is determined that special-status wildlife may occur, then SPR BIO-10 requires focused or protocol-level survey for special-status wildlife to determine whether the species is present. SPR BIO-2 requires crew members and contractors to receive training regarding biological resources from a qualified RPF or biologist familiar with the life history of the species so crews are aware of potential special-status wildlife in the treatment area and measures to reduce adverse effects. SPRs designed to identify sensitive natural communities (SPR BIO-3), retain the habitat function of riparian habitat (SPR BIO-4), and avoid environmental effects of type conversion within native coastal sage scrub and chaparral (SPR BIO-5) reduce the likelihood of impacts (e.g., habitat loss) to special-status insects and other terrestrial invertebrates within these habitats. SPR BIO-8 limits treatments within ESHAs in the coastal zone, reducing likelihood of impacts to special-status insects and other terrestrial invertebrates in the coastal zone. SPR BIO-11 requires the use of wildlife-friendly fencing during prescribed herbivory treatments, which reduces the likelihood of adverse interactions between special-status wildlife and fencing (e.g., entanglement, collision). SPR HAZ-5 and SPR HAZ-6 require safe handling of herbicides (e.g., spill prevention, spill response) and compliance with current regulations for the application of herbicides. SPR HYD-5 would reduce potential impacts to special-status insects and other terrestrial invertebrates that use riparian habitat by limiting herbicide use within riparian habitat. SPR HYD-5 would also avoid and minimize potential impacts to special-status insects and other terrestrial invertebrates by requiring measures to prevent herbicide drift and other non-target application. While SPRs would minimize impacts, implementation of treatment activities could still result in direct or indirect adverse effects described above on special-status insects and other terrestrial invertebrates, including mortality, injury, disturbance, or loss of habitat, if these species occur within areas or habitats that are not avoided by implementation of the SPRs. Because of the limited range and rarity of some of these special-status insects and other terrestrial invertebrate species, loss of individuals or habitat function of suitable habitat could substantially reduce the number or restrict the range of these species or threaten to eliminate populations of these species, or the species itself (in the case of special-status butterflies with extremely limited ranges), entirely. Substantial adverse effects on special-status insects and other terrestrial invertebrates due to direct injury or mortality or habitat modifications could threaten to eliminate or substantially reduce the number or restrict the range of these species. This would be a **potentially significant** impact.

Mitigation Measures

Mitigation Measure BIO-2a: Avoid Mortality, Injury, or Disturbance and Maintain Habitat Function for Listed Wildlife Species and California Fully Protected Species (All Treatment Activities)

Mitigation Measure BIO-2b: Avoid Mortality, Injury, or Disturbance and Maintain Habitat Function for Other Special-Status Wildlife Species (All Treatment Activities)

Mitigation Measure BIO-2c: Compensate for Mortality, Injury, or Disturbance and Loss of Habitat Function for Special-Status Wildlife if Applicable (All Treatment Activities)

Mitigation Measure BIO-2d: Implement Protective Measures for Valley Elderberry Longhorn Beetle (All Treatment Activities)

Mitigation Measure BIO-2e: Design Treatment to Retain Special-Status Butterfly Host Plants (All Treatment Activities)

If federally listed butterflies are identified as occurring or having potential to occur during review and surveys for SPR BIO-1 and confirmed during protocol-level surveys per SPR BIO-10, then the following measures will be implemented:

- Treatment areas within the range of these species will be surveyed for the host plant for each species (Table 3.6-34).
- Host plants for federally listed butterflies within the occupied habitat will be marked with high-visibility flagging, fencing, or stakes, and no treatment activities will occur within 10 feet of these plants.
- Because prescribed herbivory could result in the indiscriminate removal of the host plants for federally listed butterflies, this treatment type will not be used within occupied habitat of any federally listed butterfly species, unless it is known that the host plant is unpalatable to the herbivore.
- Treatment areas that are not occupied but are within the range of the federally listed butterfly will be divided into as many treatment units as feasible such that the entirety of the habitat is not treated within the same year.
- Treatments will be conducted in a patchy pattern to the extent feasible in areas that are not occupied but are within the range of the federally listed butterfly, such that the entirety of the habitat is not burned or removed and untreated portions of suitable habitat are retained.

If the project proponent cannot implement the measures above to avoid mortality, injury, or disturbance of federally listed butterflies or degradation of occupied habitat (host plants) such that its function would not be maintained, the project proponent will implement Mitigation Measure BIO-2c.

CESA and ESA Listed Species. A qualified RPF or biologist will determine if, after implementation of any feasible impact avoidance measures (potentially including others not listed above), the treatment will result in mortality, injury, or disturbance, or if after implementation of the treatment, habitat function will remain for the affected species. For species listed under CESA or ESA or that are fully protected, the qualified RPF or biologist will consult with CDFW and/or USFWS regarding this determination. If consultation determines that mortality, injury, or disturbance of listed butterflies or degradation of occupied habitat such that its function would not be maintained would occur, the project proponent will implement Mitigation Measure BIO-2c.

Other Special-status Species. A qualified RPF or biologist with knowledge of the special-status species' habitat and life history will review the treatment design and applicable impact minimization measures (potentially including others not listed above) to determine if the anticipated residual effects of the treatment would be significant under CEQA, because implementation of the treatment will not maintain habitat function of the special-status species' habitat or because the loss of special-status individuals would substantially reduce the number or restrict the range of a special-status species. If the project proponent determines the impact on special-status butterflies would be less than significant, no further mitigation will be required. If the project proponent determines that the loss of special-status butterflies or degradation of occupied habitat would be significant under CEQA after implementing feasible treatment design alternatives and impact minimization measures, then Mitigation Measure BIO-2c will be implemented.

The only exception to this mitigation approach is in cases where it is determined by a qualified RPF or biologist that the special-status butterfly would benefit from treatment in the occupied habitat area even though some may be killed, injured or disturbed during treatment activities. If it is determined that treatment activities would be beneficial to special-status butterflies, no compensatory mitigation will be required.

Table 3.6-34 Special-status Butterflies and Associated Host Plants

Butterfly Species	Host Plants
bay checkerspot butterfly	dwarf plantain (*Plantago virginica*), purple owl's clover (*Castilleja exserta*)
Behren's silverspot butterfly	blue violet (*Viola adunca*)
callippe silverspot butterfly	California golden violet (*Viola pedunculata*)
Carson wandering skipper	salt grass (*Distichlis spicata*)
El Segundo blue butterfly	seacliff buckwheat (*Eriogonum parvifolium*)
Hermes copper butterfly	spiny redberry (*Rhamnus crocea*)
Kern primrose sphinx moth	plains evening-primrose (*Camissonia contorta*), field primrose (*Camissonia campestris*)
Laguna Mountains skipper	Cleveland's horkelia (*Horkelia clevelandii*), sticky cinquefoil (*Drymocallis glandulosa*)
Lange's metalmark butterfly	naked-stemmed buckwheat (*Eriogonum nudum*)
lotis blue butterfly	seaside bird's foot trefoil (*Hosackia gracilis*)
Mission blue butterfly	lupine (*Lupinus* spp.)
Myrtle's silverspot butterfly	blue violet
Oregon silverspot butterfly	blue violet
Palos Verdes blue butterfly	Santa Barbara milkvetch (*Astragalus trichopodus*), common deerweed (*Acmispon glaber*)
San Bruno elfin butterfly	broadleaf stonecrop (*Sedum spathulifolium*), manzanita (*Arctostaphylos* spp.), huckleberry (*Vaccinuum* spp.)
Smith's blue butterfly	seacliff buckwheat, seaside buckwheat (*Eriogonum latifolium*)
Quino checkerspot butterfly	dwarf plantain, purple owl's clover

Mitigation Measure BIO-2f: Avoid Habitat for Special-Status Beetles, Flies, Grasshoppers, and Snails (All Treatment Activities)

If treatment activities would occur within the limited range of any state or federally listed beetle, fly, grasshopper, or snail, and these species are identified as occurring or having potential to occur due to the presence of potentially suitable habitat during review and surveys for SPR BIO-1 and surveys for SPR BIO-10, then the following measures will be implemented:

- To avoid and minimize impacts to Mount Hermon June beetle and Zayante band-winged grasshopper, treatment activities will not occur within "Sandhills" habitat in Santa Cruz County, the only suitable habitat for these species.
- To avoid and minimize impacts to Casey's June beetle, Delhi Sands flower-loving fly (*Rhaphiomidas terminates abdominalis*), Delta green ground beetle (*Elaphrus virisis*), Morro shoulderband snail, Ohlone tiger beetle (*Cicindela ohlone*), and Trinity bristle snail, treatment activities will not occur within habitat in the range of these species that is deemed suitable by a qualified RPF or biologist with familiarity of the species.

If the project proponent cannot implement the measures above to avoid mortality, injury or disturbance to listed beetles, flies, grasshoppers, and snails, or degradation of suitable habitat such that its function would not be maintained, the project proponent will implement Mitigation Measure BIO-2c.

Mitigation Measure BIO-2g: Design Treatment to Avoid Mortality, Injury, or Disturbance and Maintain Habitat Function for Special-Status Bumble Bees (All Treatment Activities)

If special-status bumble bees are identified as occurring during review and surveys under SPR BIO-1 and confirmed during protocol-level surveys per SPR BIO-10, or if suitable habitat for special-status bumble bees is identified during review and surveys under SPR BIO-1 (e.g., wet meadow, forest meadow, riparian, grassland, or coastal scrub habitat containing sufficient floral resources within the range of the species), then the project proponent will implement the following measures, as feasible:

- Prescribed burning within occupied or suitable habitat for special-status bumble bees will occur from October through February to avoid the bumble bee flight season.
- Treatment areas in occupied or suitable habitat will be divided into a sufficient number of treatment units such that the entirety of the habitat is not treated within the same year; the objective of this measure is to provide refuge for special-status bumble bees during treatment activities and temporary retention of suitable floral resources proximate to the treatment area.
- Treatments will be conducted in a patchy pattern to the extent feasible in occupied or suitable habitat, such that the entirety of the habitat is not burned or removed and untreated portions of occupied or suitable habitat are retained (e.g., fire breaks will be aligned to allow for areas of unburned floral resources for special-status bumble bees within the treatment area).
- Herbicides will not be applied to flowering native plants within occupied or suitable habitat to the extent feasible during the flight season (March through September).

CESA and ESA Listed Species. A qualified RPF or biologist will determine if, after implementation of feasible avoidance measures (potentially including others not listed above), the treatment will result in mortality, injury, or disturbance to the species, or if after implementation of the treatment, habitat function will remain for the affected species. For species listed under CESA or ESA or that are fully protected, the qualified RPF or biologist will consult with CDFW and/or USFWS regarding this determination. If consultation determines that mortality, injury, or disturbance of listed bumble bees (in the event the Candidate listing is confirmed) or degradation of occupied (or assumed to be occupied) habitat such that its function would not be maintained would occur, the project proponent will implement Mitigation Measure BIO-2c.

Other Special-status Species. A qualified RPF or biologist with knowledge of the special-status species' habitat and life history will review the treatment design and applicable impact minimization measures (potentially including others not listed above) to determine if the anticipated residual effects of the treatment would be significant under CEQA because implementation of the treatment will not maintain habitat function of the special-status species' habitat or because the loss of special-status individuals would substantially reduce the number or restrict the range of a special-status species. If the project proponent determines the impact on special-status bumble bees would be less than significant, no further mitigation will be required. If the project proponent determines that the loss of special-status bumble bees or degradation of occupied (or assumed to be occupied) habitat would be significant under CEQA after implementing feasible treatment design alternatives and impact minimization measures, then Mitigation Measure BIO-2c will be implemented.

The only exception to this mitigation approach is in cases where it is determined by a qualified RPF or biologist that the special-status bumble bee would benefit from treatment in the occupied (or assumed to be occupied) habitat area even though some of the non-listed special-status bumble bees may be killed, injured, or disturbed during treatment activities. If it is determined that treatment activities would be beneficial to special-status bumble bees, no compensatory mitigation will be required.

Mitigation Measure BIO-3a: Design Treatments to Avoid Loss of Sensitive Natural Communities and Oak Woodlands

Mitigation Measure BIO-3b: Compensate for Loss of Sensitive Natural Communities and Oak Woodlands

Mitigation Measure BIO-3c: Compensate for Unavoidable Loss of Riparian Habitat

Significance after Mitigation

Mitigation Measures BIO-2a, BIO-2b, and BIO-2c would reduce potential impacts on special-status insects and other terrestrial invertebrates by requiring avoidance and protection of these species from injury, mortality, and other disturbance; maintenance of habitat function through retention of important habitat features such that there would be no substantial long-term loss or degradation of habitat; and compensation for impacts if these impacts cannot be avoided. Mitigation Measures BIO-2d would reduce potential impacts on valley elderberry longhorn beetle by requiring avoidance and protection of elderberry shrubs within the range of the species or compensation for unavoidable loss of valley elderberry longhorn beetle. Mitigation Measure BIO-2e would reduce potential impacts on special-status butterflies by requiring retention and protection of host plants in the range of these species or compensation for unavoidable loss of special-status butterflies. Mitigation Measure BIO-2f would reduce potential impacts on special-status beetles, flies, grasshoppers, and snails by requiring avoidance of potentially occupied habitat within the range of these species or compensation for unavoidable loss of special-status beetles, flies, grasshoppers, or snails. Mitigation Measure BIO-2g would reduce potential impacts on special-status bumble bees by requiring avoidance of prescribed burning and herbicide treatment within the flight season and retention of suitable habitat in the range of these species or compensation for unavoidable loss of special-status bumble bees or habitat function. Mitigation Measures BIO-3a, BIO-3b, and BIO-3c would require project proponents to avoid or offset loss of habitat function of special-status wildlife habitat (i.e., sensitive natural communities, riparian habitat). Implementation of these mitigation measures would reduce impacts to special-status insects and other terrestrial invertebrates, except special-status bumble bees, such that no populations of these species would be reduced below self-sustaining levels and treatment activities would not contribute to a trend toward a species not already listed becoming listed as threatened or endangered, or substantially reduce the number or restrict the range of a species that is already listed as endangered, rare, or threatened. Impacts to special-status insects and other terrestrial invertebrates, except special-status bumble bees, would be reduced to **less than significant**.

Regarding special-status bumble bees, there is little known about the life history characteristics and behaviors of the species. Additionally, their presence is difficult to detect. While there is much to be learned about the special-status bumble bee colonies, they are generally believed to overwinter near the ground surface in loose soil or under leaf litter or other debris. Nests for special-status bumble bees typically occur in abandoned rodent burrows or other animal nests, but may also occur in above-ground cavities. There is no established methodology for detecting overwintering or nesting colonies of these species. The sizes of the colonies for these species are not well documented; however, western bumble bee colonies can contain over 1,600 workers and produce up to 360 new queens (Xerces Society et al. 2018).

There is evidence of widespread population declines, which led in part to the recent determination by CDFW to designate four bumble bees as Candidate species for listing under CESA. Primary threats to the survival of special-status bumble bees include habitat loss or modification due to development, agriculture, high-intensity fire, fire suppression, and herbicide use (Xerces Society et al. 2018). As described above, herbicide use under the CalVTP may exacerbate threats to special-status bumble bees. Pursuant to its objectives, implementation of the CalVTP is intended to reduce the occurrence of high-intensity wildfire and modify past practices of fire suppression, which could beneficially decrease an existing threat to special-status bumble bees. Although Mitigation Measure BIO-2g would reduce impacts to foraging special-status bumble bees and their floral resources, substantial adverse effects could still occur to special-status bumble bee species during nesting and overwintering, because vegetation treatment activities, such as prescribed burning, soil disturbance, or use of heavy equipment, could kill individuals or crush or disturb overwintering or nesting colonies. Because little is known about the potential nesting and overwintering behavior and habitat for these species, many habitat types within the species range may be suitable with the presence of nesting or overwintering substrate (e.g., loose soil or under leaf litter or other debris). Additionally, there is no established methodology for detecting overwintering or nesting colonies of these species. Because these species have not yet been well studied and colonies are likely difficult to detect, there is little evidence to guide effective impact avoidance or minimization strategies to protect nesting or overwintering colonies. Mitigation Measure BIO-2g presents feasible impact avoidance and minimization measures that are based on emerging, early understanding of species protection; as their candidacy for listing is reviewed by CDFW, additional guidance may emerge and could be implemented by project proponents to reduce impacts. Project proponents can and should stay abreast of new information, as research and scientific understanding evolve. However, with the current state of the science and species knowledge, if underground colonies cannot be detected, they cannot be avoided and, in this case, the extent and severity of impacts to special-status bumble bees from vegetation treatment cannot be predicted with meaningful certainty. Therefore, given the rarity of these candidate species, if colonies were to be destroyed, it is possible that populations of these species would be reduced below self-sustaining levels, and treatment activities could substantially reduce the number or restrict the range of species. Over time, as avoidance strategies are developed with research and improved scientific understanding, adequate protection of the species may become feasible. However, at this time, recognizing the difficulty in detecting overwintering and nesting bumble bees and determining the occurrence and severity of impacts, for purposes of good faith, full disclosure under CEQA, this impact is designated in the PEIR to be **potentially significant and unavoidable**.

Bats

Several special-status bat species are known to occur within the treatable landscape. Table 3.6-32 provides a comprehensive list of special-status bats known or with potential to occur in the treatable landscape and considered in this analysis. These species use a variety of habitats for roosting, including rock crevices, buildings, caves, mines, bridges, sloughing bark, tree cavities, and broad-leaf vegetation. Some bat species known to occur in the treatable landscape have limited ranges in California (e.g., Mexican long-tongued bat [*Choeronycteris mexicana*]) while other species have potential to occur in suitable habitat throughout the state (e.g., pallid bat [*Antrozous pallidus*]). Many bat species aggregate in colonies; hibernating colonies or roosts in the winter and maternity colonies (composed of adult females and their young) from spring to early fall. The size of these colonies varies based on species and roost substrate used, but most species are highly sensitive to disturbance.

Treatment design of qualifying projects under the CalVTP would integrate the SPRs identified above. SPR BIO-1 requires a reconnaissance-level survey of the proposed treatment site to determine whether there is potential for special-status wildlife, including special-status bats, to occur. If it is determined that special-status wildlife may occur, then SPR BIO-10 requires focused or protocol-level survey for special-status wildlife to ensure that these species are identified prior to treatment so that they can be avoided under other measures. SPR BIO-2 requires crew members and contractors to receive training regarding biological resources from a qualified RPF or biologist familiar with the life history of the species so crews are aware of potential special-status wildlife in the treatment area and measures to reduce adverse effects. SPRs designed to identify sensitive natural communities (SPR BIO-3), retain the habitat function of riparian habitat and limit herbicide use within riparian habitat (SPR BIO-4 and SPR HYD-5, respectively), avoid environmental effects of type conversion within chaparral and coastal sage scrub habitats (SPR BIO-5), and limit treatments within ESHAs in the coastal zone (SPR BIO-8) reduce the likelihood of impacts to special-status bats within these habitats. However, many of these special-status species would be present outside of these habitats and would not be protected by these SPRs. SPR BIO-11 requires the use of wildlife-friendly fencing during prescribed herbivory treatments, which reduces the likelihood of adverse interactions between special-status wildlife and fencing (e.g., entanglement, collision). SPR HAZ-5 and SPR HAZ-6 require safe handling of herbicides (e.g., spill prevention, spill response) and compliance with current regulations for the application of herbicides. While SPRs would minimize impacts, treatment activities could still result in direct or indirect adverse effects on special-status bats if these species and their habitat are not sufficiently avoided after identification and if these species occur within areas or habitats that are not avoided by implementation of the SPRs. Potential impacts to special-status bats are described for each treatment activity below.

Prescribed Burning

Prescribed burning treatment activities would include pile burning and broadcast burning. These activities are not anticipated to directly remove suitable roost or colony sites for special-status bats such as rock crevices, buildings, caves, mines, or bridges. However, if prescribed burning occurs within the vicinity of special-status bat roosts in trees (e.g., sloughing tree bark, tree cavities, leaves), these activities could result in the direct mortality or injury of special-status bats within roosts or maternity colonies. These potential adverse effects would be more likely due to broadcast burning than pile burning, because pile burning would occur in a discrete location rather than throughout the understory. In rare instances, tree foliage-roosting bats such as the western red bat (*Lasiurus blosevillii*) may roost in leaf litter on the forest floor and would be at risk for injury or death from broadcast burning. Further, prescribed burning treatment activities during the spring to early fall may have greater potential to adversely affect special-status bats, because female bats and their young are present within maternity colonies during this time and young bats may be unable to fly, thus unable to escape. Additionally, special-status bats within tree habitat and other habitats (e.g., bridges, caves, mines, rock crevices) could be alarmed by the visual, auditory, and olfactory cues of prescribed burns (e.g., flames, smoke) and by the presence of associated personnel and equipment (e.g., vehicles, helicopters) if these activities are in the vicinity of the roost or maternity colony. This could result in abandonment of the colony and potential mortality of young.

Mechanical Treatment

Mechanical treatment activities would include cutting, uprooting, crushing/compacting, or chopping of existing vegetation. It is not anticipated that these activities would result in direct impacts to special-status bat habitat such as rock crevices, buildings, caves, mines, or bridges. However, mechanical treatment could result in the direct removal of trees potentially being used by special-status bat species as roosts or maternity colonies. Removal of this habitat could result in mortality of special-status bats if present within the trees. Further, mechanical treatment activities during the spring to early fall may have greater potential to adversely affect special-status bats, because female bats and their young are present within maternity colonies during this time and young bats may be unable to fly, thus unable to escape. Additionally, special-status bats within tree habitat and other habitats (e.g., bridges, caves, mines, rock crevices) could be alarmed by the presence of heavy equipment (e.g., masticators, trucks) and personnel, which could result in abandonment of the colony, and potential mortality of young.

Manual Treatment

Manual treatment activities would include the use of hand tools (e.g., loppers) and hand-operated power tools (e.g., chainsaws) to prune, thin, or remove vegetation. It is not anticipated that these activities would result in direct impacts to special-status bat habitat such as rock crevices, buildings, caves, mines, or bridges. However, manual treatment could result in the direct removal of trees potentially being used by special-status bat species as roosts or maternity colonies. Removal of this habitat could result in mortality of special-status bats if present within the trees. Further, manual treatment activities during the spring to early fall may have greater potential to adversely affect special-status bats, because female bats and their young are present within maternity colonies during this time and young bats may be unable to fly, thus unable to escape. Additionally, special-status bats within tree habitat and other habitats (e.g., bridges, caves, mines, rock crevices) could be alarmed by the presence of personnel which could result in abandonment of the colony, and potential mortality of young.

Prescribed Herbivory

Prescribed herbivory would include the use of domestic livestock (e.g., cows, goats, sheep) to reduce a target plant population. Prescribed herbivory would not result in the direct loss of roost habitat for special-status bats, as herbivores are only capable of removing herbaceous or woody vegetation within the understory. The presence of herbivores in a confined area would likely be a novel presence for special-status bat colonies. Consequently, if prescribed herbivory activities occur within the view of roosts or maternity colonies, it is possible that these species could be alarmed by the presence of many cows, goats, or sheep. Additionally, the presence of personnel and equipment (e.g., trucks) associated with installation and removal of fencing and other related infrastructure could also alarm special-status bats, potentially resulting in disruption of breeding behavior and colony abandonment. Adverse effects to bat colonies as a result of prescribed herbivory may be pronounced during the spring to early fall, because female bats and their young are present within maternity colonies during this time and young bats may be unable to fly, thus unable to escape. Temporary electric fences to control grazing animals would not result in injury or mortality of special-status wildlife due to electrocution. Temporary electric fences produce high voltage shocks with very low amperage, which deters livestock from escaping without causing injury or death.

Herbicides

Herbicide treatment would include ground-level application (e.g., paint-on stems, backpack hand-applicator, hypo-hatchet tree injection, hand placement of pellets) and potential downward spray application using a boom applicator attached to an all-terrain vehicle or tractor. Herbicide treatment could result in adverse effects on bats if the bat ingested or came into direct contact with herbicides, as some herbicides may be toxic to these species. Additionally, bats could be alarmed by the presence of vehicles and personnel associated with herbicide treatment, which could result in colony abandonment, and potential mortality of young.

Conclusion

Relevant SPRs would be implemented to avoid and minimize treatment-related disturbances and long-term habitat loss for special-status bats (listed in Table 3.6-33). SPR BIO-1 requires data review (e.g., vegetation mapping, databases with existing special-status wildlife and plant occurrences) and a reconnaissance-level survey (e.g., visual inspection of habitat features that may provide roosting habitat for special-status bats, acoustic surveys) of the proposed treatment site to determine whether there is potential for special-status wildlife to occur. If it is determined that special-status wildlife may occur, then SPR BIO-10 requires focused or protocol-level survey for special-status wildlife to determine whether the species is present. SPR BIO-2 requires crew members and contractors to receive training regarding biological resources from a qualified RPF or biologist familiar with the life history of the species so crews are aware of potential special-status wildlife in the treatment area and measures to reduce adverse effects. SPRs designed to identify sensitive natural communities (SPR BIO-3), retain the habitat function of riparian habitat (SPR BIO-4), and avoid environmental effects of type conversion within native coastal sage scrub and chaparral (SPR BIO-5) reduce the likelihood of impacts (e.g., habitat loss) to special-status bats within these habitats. SPR BIO-8 limits treatments within ESHAs in the coastal zone, reducing likelihood of impacts to special-status bats in the coastal zone. SPR BIO-11 requires the use of wildlife-friendly fencing during prescribed herbivory treatments, which reduces the likelihood of adverse interactions between special-status wildlife and fencing (e.g., entanglement, collision). SPR HAZ-5 and SPR HAZ-6 require safe handling of herbicides (e.g., spill prevention, spill response) and compliance with current regulations for the application of herbicides. SPR HYD-5 would reduce potential impacts to special-status bats that use riparian habitat by limiting herbicide use within riparian habitat. While SPRs would minimize impacts, treatment activities could still result in direct or indirect adverse effects described above on special-status bats if these species occur within areas or habitats that are not avoided by implementation of the SPRs. As described above, direct adverse effects include mortality or injury to special-status bats. Indirect adverse effects would include disturbance to roosts due to the presence of crews or heavy machinery, or loss of habitat function as a result of treatment activities (e.g., prescribed burning, mechanical treatment). Substantial adverse effects on special-status bats due to direct injury or mortality or habitat modifications would be a **potentially significant** impact.

Mitigation Measures

Mitigation Measure BIO-2a: Avoid Mortality, Injury, or Disturbance and Maintain Habitat Function for Listed Wildlife Species and California Fully Protected Species (All Treatment Activities)

Mitigation Measure BIO-2b: Avoid Mortality, Injury, or Disturbance and Maintain Habitat Function for Other Special-Status Wildlife Species (All Treatment Activities)

Mitigation Measure BIO-2c: Compensate for Mortality, Injury, or Disturbance and Loss of Habitat Function for Special-Status Wildlife if Applicable (All Treatment Activities)

Mitigation Measure BIO-3a: Design Treatments to Avoid Loss of Sensitive Natural Communities and Oak Woodlands

Mitigation Measure BIO-3b: Compensate for Loss of Sensitive Natural Communities and Oak Woodlands

Mitigation Measure BIO-3c: Compensate for Unavoidable Loss of Riparian Habitat

Significance after Mitigation

Mitigation Measures BIO-2a, BIO-2b, and BIO-2c would reduce potential impacts on special-status bats by requiring avoidance and protection of these species from injury, mortality, and other disturbance; maintenance of habitat function through retention of important habitat features such that there would be no substantial long-term loss or degradation of habitat; and compensation for impacts if these impacts cannot be avoided. Mitigation Measures BIO-3a, BIO-3b, and BIO-3c would require project proponents to avoid or offset loss of habitat function of special-status wildlife habitat (i.e., sensitive natural communities, riparian habitat). Implementation of these mitigation measures would reduce impacts to special-status bats such that no populations of these species would be reduced below self-sustaining levels and treatment activities would not contribute to a trend toward a species not already listed becoming listed as threatened or endangered, or substantially reduce the number or restrict the range of a species that is already listed as endangered, rare, or threatened. Impacts would be reduced to **less than significant**.

Ungulates

Four special-status ungulate species occur within the treatable landscape: desert bighorn sheep (*Ovis canadensis nelsoni*), peninsular bighorn sheep, Sierra Nevada bighorn sheep, and pronghorn (*Antilocapra americana*; Table 3.6-32). Ungulates are primary prey species for large predators in their range (e.g., mountain lions [*Puma concolor*]), and as a result their behavior and habitat selection are driven strongly by predator avoidance. For example, bighorn sheep and pronghorn favor open terrain and generally avoid heavily forested areas and other dense vegetation. These special-status ungulate species have fairly limited ranges in California. Bighorn sheep and pronghorn make seasonal migrations between summer and winter ranges; pronghorn traveling greater distances in general than bighorn sheep.

Treatment design of qualifying projects under the CalVTP would integrate the SPRs identified above. SPR BIO-1 requires a reconnaissance-level survey of the proposed treatment site to determine whether there is potential for special-status wildlife, including special-status ungulates, to occur. If it is determined that special-status wildlife may occur, then SPR BIO-10 requires focused or protocol-level survey for special-status wildlife to identify species prior to treatment so that they can be avoided under other measures. SPR BIO-2 requires crew members and contractors to receive training regarding biological resources from a qualified RPF or biologist familiar with the life history of the species so crews are aware of potential special-status wildlife in the treatment area and measures to reduce adverse effects. SPRs designed to identify sensitive natural communities (SPR BIO-3), retain the habitat function of riparian habitat (SPR BIO-4), and avoid environmental effects of type conversion within chaparral and coastal sage scrub habitats (SPR BIO-5), reduce the likelihood of impacts to ungulates within these habitats. However, these special-status species may be present outside of these habitats and would not be protected by these SPRs. SPR BIO-11 requires the use of wildlife-friendly fencing during prescribed herbivory treatments, which reduces the likelihood of adverse interactions between special-status wildlife and fencing (e.g., entanglement, collision). SPR HAZ-5 and SPR HAZ-6 require safe handling of herbicides (e.g., spill prevention, spill response) and compliance with current regulations for the application of herbicides. While SPRs would minimize impacts, treatment activities could still result in direct or indirect adverse effects special-status ungulates if these species and their habitat are not sufficiently avoided after identification and if these species occur within areas or habitats that are not avoided by implementation of the SPRs. Potential impacts to special-status ungulates are described for each treatment activity below.

Prescribed Burning

Prescribed burning treatment activities would include pile burning and broadcast burning. These activities would not result in substantial direct adverse effects on special-status ungulate species because bighorn sheep and pronghorn are highly mobile and would leave the area. Bighorn sheep and pronghorn have large home ranges; the mean home range size for male bighorn sheep is approximately 38 square miles (USFWS 2007) and pronghorn may move up to 93 mi between ranges in California (CDFW 2005). Some studies have suggested that prescribed burning treatment activities may actually result in improved habitat quality for bighorn sheep by increasing nutrient availability and open terrain (Holl et al. 2012). Prescribed burning treatment activities may include the use of a helicopter with a helitorch in areas of terrain with limited accessibility, which could possibly overlap with the steep terrain occupied by bighorn sheep species. Helicopter overflights may result in disturbance to special-status ungulates, if present during these operations. Helicopter overflights have been shown to adversely affect foraging efficiency in bighorn sheep (Stockwell et al. 1991).

Mechanical Treatment

Mechanical treatment activities would include cutting, uprooting, crushing/compacting, or chopping of existing vegetation. These activities would not result in direct adverse effects on special-status ungulate species because bighorn sheep and pronghorn are highly mobile and would leave the area. Bighorn sheep and pronghorn have large home ranges, and mechanical treatment activities would not result in exclusion of these species from suitable habitat.

Manual Treatment

Manual treatment activities would include the use of hand tools (e.g., loppers) and hand-operated power tools (e.g., chainsaws) to prune, thin, or remove vegetation. These activities would not result in direct adverse effects on special-status ungulate species because bighorn sheep and pronghorn are highly mobile and would leave the area. Bighorn sheep and pronghorn have large home ranges, and manual treatment activities would not result in exclusion of these species from suitable habitat.

Prescribed Herbivory

Prescribed herbivory would include the use of domestic livestock (e.g., cows, goats, sheep) to reduce a target plant population. Bighorn sheep are extremely susceptible to respiratory disease caused by pathogens carried by domestic sheep and goats, and impacts resulting from the transmission of disease from domestic sheep and goats have been well-documented. Pneumonia is the most significant disease threat for bighorn sheep and is thought to have been responsible for large die-offs in the past (USFWS 2000, USFWS 2007). Transmission of disease between domestic livestock and pronghorn has not been as well-documented. If prescribed herbivory activities are initiated within the range of bighorn sheep or pronghorn, it is possible that these species could come into contact with livestock and that livestock could transmit diseases to these species. Disease transmission from livestock to bighorn sheep or pronghorn could cause impaired health, reduced reproductive success, or mortality of individuals. Temporary electric fences would not result in injury or mortality of special-status ungulates due to electrocution. Temporary electric fences produce high voltage shocks with very low amperage, which is intended to deter livestock from escaping without causing injury or death.

Herbicides

Herbicide treatment would include ground-level application (e.g., paint-on stems, backpack hand-applicator, hypo-hatchet tree injection, hand placement of pellets) and potential downward spray application using a boom applicator attached to an all-terrain vehicle or tractor. Herbicide treatment is not expected to result in direct effects on special-status ungulates, because their large home ranges would reduce the likelihood of prolonged contact with herbicides applied locally in a relatively small treatment area.

Conclusion

Several SPRs would be implemented to avoid and minimize treatment-related disturbances and long-term habitat loss for special-status ungulates (listed in Table 3.6-33). SPR BIO-1 requires data review (e.g., vegetation mapping, databases with existing special-status wildlife and plant occurrences) and a reconnaissance-level survey of the proposed treatment site to determine whether there is potential for special-status wildlife to occur. If it is determined that special-status wildlife may occur, then SPR BIO-10 requires focused or protocol-level survey for special-status wildlife to determine whether the species is present. SPR BIO-2 requires crew members and contractors to receive training regarding biological resources from a qualified RPF or biologist familiar with the life history of the species so crews are aware of potential special-status wildlife in the treatment area and measures to reduce adverse effects. SPRs designed to identify sensitive natural communities (SPR BIO-3), retain the habitat function of riparian habitat (SPR BIO-4), and avoid environmental effects of type conversion within native coastal sage scrub and chaparral (SPR BIO-5) reduce the likelihood of impacts (e.g., habitat loss) to special-status ungulates within these habitats. SPR BIO-11 requires the use of wildlife-friendly fencing during prescribed herbivory treatments, which reduces the likelihood of adverse interactions between special-status wildlife and fencing (e.g., entanglement, collision). Fencing in general would reduce the likelihood of escape of livestock used for prescribed herbivory, thus reducing the risk for interactions between domestic livestock and special-status ungulates. SPR HAZ-5 and SPR HAZ-6 require safe handling of herbicides (e.g., spill prevention, spill response) and compliance with current regulations for the application of herbicides. While SPRs would minimize impacts, treatment activities could still result in the direct or indirect adverse effects described above on special-status ungulates if these species occur within areas or habitats that are not avoided by implementation of the SPRs. While substantial direct adverse effects on special-status ungulates due to treatment activities are not expected, indirect adverse effects would include transmission of disease from domestic livestock used during prescribed herbivory treatment. Substantial adverse effects on special-status ungulates due to direct injury or mortality or habitat modifications would be a **potentially significant** impact.

Mitigation Measures

Mitigation Measure BIO-2a: Avoid Mortality, Injury, or Disturbance and Maintain Habitat Function for Listed Wildlife Species and California Fully Protected Species (All Treatment Activities)

Mitigation Measure BIO-2b: Avoid Mortality, Injury, or Disturbance and Maintain Habitat Function for Other Special-Status Wildlife Species (All Treatment Activities)

Mitigation Measure BIO-2c: Compensate for Mortality, Injury, or Disturbance and Loss of Habitat Function for Special-Status Wildlife if Applicable (All Treatment Activities)

Mitigation Measure BIO-2h: Avoid Potential Disease Transmission Between Domestic Livestock and Special-Status Ungulates (Prescribed Herbivory)

The project proponent will implement the following measure if treatment activities are planned within the range of desert bighorn sheep, peninsular bighorn sheep, Sierra Nevada bighorn sheep, or pronghorn:

- Prescribed herbivory activities will be prohibited within a 14-mile buffer around suitable habitat for any species of bighorn sheep within the range of these species consistent with the more stringent recommendations in the Recovery Plan for Sierra Nevada bighorn sheep (USFWS 2007).
- Prescribed herbivory activities will be avoided within the range of pronghorn where feasible (where this range does not overlap with the range of any species of bighorn sheep).

Mitigation Measure BIO-3a: Design Treatments to Avoid Loss of Sensitive Natural Communities and Oak Woodlands

Mitigation Measure BIO-3b: Compensate for Loss of Sensitive Natural Communities and Oak Woodlands Mitigation

Measure BIO-3c: Compensate for Unavoidable Loss of Riparian Habitat

Significance after Mitigation

Mitigation Measures BIO-2a, BIO-2b, and BIO-2c would reduce potential impacts on special-status ungulates by requiring avoidance and protection of these species from injury, mortality, and other disturbance; maintenance of habitat function through retention of important habitat features such that there would be no substantial long-term loss or degradation of habitat; and compensation for impacts if these impacts cannot be avoided. Mitigation Measure BIO-2h would reduce potential impacts due to the transmission of disease from domestic livestock to special-status ungulates by prohibiting prescribed herbivory within a buffer around bighorn sheep habitat to prevent interaction between bighorn sheep and domestic livestock and avoiding prescribed herbivory within the range of pronghorn, where feasible. Mitigation Measures BIO-3a, BIO-3b, and BIO-3c would require project proponents to avoid or offset loss of habitat function of habitat (i.e., sensitive natural communities, riparian habitat), some of which may provide habitat for special-status ungulates. Implementation of these mitigation measures would reduce impacts on special-status ungulates such that no populations of these species would be reduced below self-sustaining levels and treatment activities would not contribute to a trend toward a species not already listed becoming listed as threatened or endangered, or substantially reduce the number or restrict the range of a species that is already listed as endangered, rare, or threatened. Impacts would be reduced to **less than significant**.

Fish and Aquatic Invertebrates

Many special-status aquatic species are known to occur within or adjacent to the treatable landscape, including fish and aquatic invertebrates (e.g., fairy shrimp, tadpole shrimp, crayfish). Table 3.6-32 provides a comprehensive list of special-status fish and aquatic invertebrates known or with potential to occur in the treatable landscape and considered in this analysis. Special-status aquatic species occur within rivers, smaller tributary streams, human-made aquatic features (e.g., stock ponds, irrigation canals), springs, vernal pools, lakes, and wetlands. The CalVTP does not propose treatment activities of any kind in state and federally protected wetlands, or other aquatic habitats, and wetland and aquatic habitats that have been mapped at a statewide level and are included in the FRAP vegetation data were excluded from the treatable landscape. However, many wetlands are defined at a finer scale than is available in the FRAP vegetation layer or in the NWI. Wetland habitats that may occur within the treatable landscape of each ecoregion but would not necessarily have been included in the FRAP vegetation data are discussed in the setting section of this PEIR for each ecoregion.

Treatment design of qualifying projects under the CalVTP would integrate the SPRs identified above. SPR BIO-1 requires a reconnaissance-level survey of the proposed treatment site to determine whether there is potential for special-status wildlife, including fish and aquatic invertebrates, to occur. If it is determined that special-status wildlife may occur, then SPR BIO-10 requires focused or protocol-level survey for special-status wildlife to ensure that these species are identified prior to treatment so that they can be avoided under other measures. SPR BIO-2 requires crew members and contractors to receive training regarding biological resources from a qualified RPF or biologist familiar with the life history of the species so crews are aware of potential special-status wildlife in the treatment area and measures to reduce adverse effects. SPRs designed to identify sensitive natural communities (SPR BIO-3), retain the habitat function of riparian habitat and limit herbicide use within riparian habitat (SPR BIO-4 and SPR HYD-5, respectively), avoid environmental effects of type conversion within chaparral and coastal sage scrub habitats (SPR BIO-5), and limit treatments within ESHAs in the coastal zone (SPR BIO-8) reduce the likelihood of impacts to special-status fish and aquatic invertebrates within these habitats. However, many of these special-status species would be present outside of these habitats and would not be protected by these SPRs. SPR HAZ-5 and SPR HAZ-6 require safe handling of herbicides (e.g., spill prevention, spill response) and compliance with current regulations for the application of herbicides. SPR HYD-1, SPR HYD-3, and SPR HYD-4 provide protection of aquatic habitat by requiring compliance with applicable water quality requirements, prohibiting prescribed herbivory treatments within aquatic and riparian habitat, and implementation of WLPZs on each side of watercourses identified within treatment areas. While SPRs would minimize impacts, treatment activities could still result in direct or indirect adverse effects on special-status fish and aquatic invertebrates if these species and their habitat are not sufficiently avoided after identification and if these species occur within areas or habitats that are not avoided by implementation of the SPRs. Potential impacts to special-status fish and aquatic invertebrates are described for each treatment activity below.

<u>Prescribed Burning</u>

Prescribed burning treatment activities would include pile burning and broadcast burning. Major aquatic habitat types that were identified and mapped at a coarse scale are excluded from the treatable landscape; however, it is expected that smaller aquatic features (e.g., wetlands, vernal pools) could be present at the site level. Broadcast burning and pile burning would not result in substantial adverse effects on special-status aquatic species within the aquatic habitat that has been identified and excluded from the treatable landscape because fire is inherently low. However, these activities could result in adverse effects on smaller aquatic features within the treatable landscape. Additionally, prescribed burning treatment activities would remove vegetation, which could result in instability or erosion in areas adjacent or upstream of aquatic habitat. Erosion could result in inadvertent discharge of silt into watersheds, which could result in indirect adverse effects on aquatic species.

<u>Mechanical Treatment</u>

Mechanical treatment activities would include cutting, uprooting, crushing/compacting, or chopping of existing vegetation. Mechanical treatment would not result in substantial adverse effects on special-status aquatic species within the aquatic habitat that has been identified and excluded from the treatable landscape. However, if these activities occurred within or adjacent to smaller aquatic features, the activities could result in inadvertent fill of these features, potentially having an adverse effect on special-status wildlife if present. Additionally, mechanical treatment activities would remove vegetation, which could result in instability or erosion in areas adjacent or upstream of aquatic habitat. Erosion could result in inadvertent discharge of silt into watersheds, which could result in indirect adverse effects on aquatic species.

Manual Treatment

Manual treatment activities would include the use of hand tools (e.g., loppers) and hand-operated power tools (e.g., chainsaws) to prune, thin, or remove vegetation. If manual treatment activities occurred within or adjacent to smaller aquatic features in the treatable landscape, the activities could result in inadvertent fill of these features, potentially having an adverse effect on special-status wildlife if present. Additionally, manual treatment activities would remove vegetation which could result in instability or erosion in areas adjacent or upstream of aquatic habitat. Erosion could result in inadvertent discharge of silt into watersheds, which could result in indirect adverse effects on aquatic species.

Prescribed Herbivory

Prescribed herbivory would include the use of domestic livestock (e.g., cows, goats, sheep) to reduce a target plant population. If prescribed herbivory occurred within or adjacent to smaller aquatic features in the treatable landscape, the activities could result in trampling of aquatic species or inadvertent fill of these features, potentially having an adverse effect on special-status wildlife if present.

Herbicides

Herbicide treatment would include ground-level application (e.g., paint-on stems, backpack hand-applicator, hypo-hatchet tree injection, hand placement of pellets) and potential downward spray application using a boom applicator attached to an all-terrain vehicle or tractor. If herbicide application occurred within or adjacent to smaller aquatic features in the treatable landscape, herbicide treatment could result in adverse effects on special-status fish and aquatic invertebrates, if these species were to come into direct contact with herbicides, as some herbicides may be toxic to aquatic species. The water quality effects addressed in Impact HYD-4 in Section 3.11, "Hydrology and Water Quality" also pertain to special-status fish and aquatic invertebrates.

Conclusion

Relevant SPRs would be implemented to avoid and minimize treatment-related disturbances and long-term habitat loss for special-status fish and aquatic invertebrates (listed in Table 3.6-33). SPR BIO-1 requires a data review (e.g., vegetation mapping, databases with existing special-status wildlife and plant occurrences) and a reconnaissance-level survey of the proposed treatment site to determine whether there is potential for special-status aquatic wildlife and sensitive habitat (including wetlands and aquatic habitat) to occur. If it is determined that special-status wildlife may occur, then SPR BIO-10 requires focused or protocol-level survey for special-status wildlife to determine whether the species is present. SPR BIO-2 requires crew members and contractors to receive training regarding biological resources from a qualified RPF or biologist familiar with the life history of the species so crews are aware of potential special-status wildlife in the treatment area and measures to reduce adverse effects. SPRs designed to identify sensitive natural communities (SPR BIO-3), retain the habitat function of riparian habitat (SPR BIO-4), and avoid environmental effects of type conversion within native coastal sage scrub and chaparral (SPR BIO-5) reduce the likelihood of impacts (e.g., habitat loss, inadvertent fill of aquatic habitat) to special-status fish and aquatic invertebrates within these habitats. SPR BIO-8 limits treatments within ESHAs in the coastal zone, reducing likelihood of impacts to special-status fish and aquatic invertebrates in the coastal zone. SPR HAZ-5 and SPR HAZ-6 require safe handling of herbicides (e.g., spill prevention, spill response) and compliance with current regulations for the application of herbicides. SPR HYD-1 requires treatments to comply with applicable water quality requirements adopted by the appropriate Regional Water Quality Control Board and approved by the SWRCB. SPR HYD-3 prohibits prescribed herbivory treatments within sensitive waterbodies, wetlands, or riparian areas. SPR HYD-4 requires implementation of WLPZs on each side of watercourses identified within treatment areas. SPR HYD-5 would reduce potential impacts to special-status aquatic species by limiting herbicide use within riparian habitat. Implementation of these SPRs reduces the likelihood of impacts to special-status fish species, and other special-status aquatic wildlife within river, stream, and lake habitats, including those that have been identified and excluded from the treatable landscape, to **less than significant**.

While implementation of SPRs would minimize impacts, treatment activities could still result in the adverse effects described above on special-status aquatic wildlife within smaller aquatic features such as wetlands and vernal pools (e.g., fairy shrimp, tadpole shrimp). These aquatic features likely have not been fully identified and excluded from the treatable landscape, and implementation of treatment activities within or adjacent to these features could result in inadvertent fill, potentially resulting in direct mortality of special-status aquatic species or loss of aquatic habitat function. Substantial adverse effects on special-status fish and aquatic invertebrates due to direct injury or mortality or habitat modifications would be a **potentially significant** impact.

Mitigation Measures

Mitigation Measure BIO-2a: Avoid Mortality, Injury, or Disturbance and Maintain Habitat Function for Listed Wildlife Species and California Fully Protected Species (All Treatment Activities)

Mitigation Measure BIO-2b: Avoid Mortality, Injury, or Disturbance and Maintain Habitat Function for Other Special-Status Wildlife Species (All Treatment Activities)

Mitigation Measure BIO-2c: Compensate for Mortality, Injury, or Disturbance and Loss of Habitat Function for Special-Status Wildlife if Applicable (All Treatment Activities)

Mitigation Measure BIO-3a: Design Treatments to Avoid Loss of Sensitive Natural Communities and Oak Woodlands

Mitigation Measure BIO-3b: Compensate for Loss of Sensitive Natural Communities and Oak Woodlands

Mitigation Measure BIO-3c: Compensate for Unavoidable Loss of Riparian Habitat

Mitigation Measure BIO-4: Avoid State and Federally Protected Wetlands

Impacts to wetlands will be avoided using the following measures:

- The qualified RPF or biologist will delineate the boundaries of federally protected wetlands according to methods established in the USACE wetlands delineation manual (Environmental Laboratory 1987) and the appropriate regional supplement for the ecoregion in which the treatment is being implemented.
- The qualified RPF or biologist will delineate the boundaries of wetlands that may not meet the definition of waters of the United States, but would qualify as waters of the state, according to the state wetland procedures (California Water Boards 2019 or current procedures).
- A qualified RPF or biologist will establish a buffer around wetlands and mark the buffer boundary with high-visibility flagging, fencing, stakes, or clear, existing landscape demarcations (e.g., edge of a roadway). The buffer will be a minimum width of 25 feet but may be larger if deemed necessary. The appropriate size and shape of the buffer zone will be determined in coordination with the qualified RPF or biologist and will depend on the type of wetland present (e.g., seasonal wetland, wet meadow, freshwater marsh, vernal pool), the timing of treatment (e.g., wet or dry time of year), whether any special-status species may occupy the wetland and the species' vulnerability to the treatment activities, environmental conditions and terrain, and the treatment activity being implemented.
- A qualified RPF or biological technician will periodically inspect the materials demarcating the buffer to confirm that they are intact and visible, and wetland impacts are being avoided.
- Within this buffer, herbicide application is prohibited.
- Within this buffer, soil disturbance is prohibited. Accordingly, the following activities are not allowed within the buffer zone: mechanical treatments, prescribed herbivory, equipment and vehicle access or staging.
- Only prescribed (broadcast) burning may be implemented in wetland habitats if it is determined by a qualified RPF or biologist that:
  - No special-status species are present in the wetland habitat
  - The wetland habitat function would be maintained

- The prescribed burn is within the normal fire return interval for the wetland vegetation types present
- Fire containment lines and pile burning are prohibited within the buffer

Significance after Mitigation

Mitigation Measures BIO-2a, BIO-2b, and BIO-2c would reduce potential impacts on special-status fish and aquatic invertebrates by requiring avoidance and protection of these species from injury, mortality, and other disturbance; maintenance of habitat function through retention of important habitat features such that there would be no substantial long-term loss or degradation of habitat; and compensation for impacts if these impacts cannot be avoided. Mitigation Measure BIO-3a, BIO-3b, and BIO-3c would require project proponents to avoid or offset loss of habitat, such as sensitive natural communities and riparian habitat, some of which may provide habitat for special-status fish and aquatic invertebrates. Mitigation Measure BIO-4 would further reduce potential impacts by requiring protection of state and federally protected wetlands, including vernal pools, which may provide habitat for special-status aquatic invertebrates. Implementation of these mitigation measures would reduce impacts on special-status fish and aquatic invertebrates such that no populations of these species would be reduced below self-sustaining levels and treatment activities would not contribute to a trend toward a species not already listed becoming listed as threatened or endangered, or substantially reduce the number or restrict the range of a species that is already listed as endangered, rare, or threatened. Impacts would be reduced to **less than significant**.

Amphibians and Reptiles

Many special-status amphibian and reptile species are known to occur within the treatable landscape. Special-status amphibians known to occur in the treatable landscape include frogs (e.g., California red-legged frog, foothill yellow-legged frog [*Rana boylii*]), toads (e.g., arroyo toad [*Anaxyrus californicus*], western spadefoot [*Spea hammondii*]), newts (e.g., red-bellied newt [*Taricha rivularis*]), and salamanders (e.g., California tiger salamander, Santa Cruz long-toed salamander [*Aneides flavipunctatus niger*], southern torrent salamander [*Rhyacotriton variegatus*]). Special-status reptiles known to occur in the treatable landscape include snakes (e.g., Alameda striped racer, giant garter snake [*Thamnophis gigas*], red diamond rattlesnake [*Crotalus ruber*]), lizards (e.g., blunt-nosed leopard lizard [*Gambelia sila*], banded gila monster [*Heloderma suspectum cinctum*]), and tortoises and turtles (Mohave desert tortoise [*Gopherus agassizii*], northwestern western pond turtle [*Actinemys marmorata*]). Table 3.6-32 provides a comprehensive list of special-status amphibians and reptiles known or with potential to occur in the treatable landscape and considered in this analysis. Special-status amphibians, and some special-status reptiles (e.g., giant garter snake, northwestern western pond turtle) in the treatable landscape are closely associated with aquatic habitat, including wetlands, vernal pools, streams, and irrigation canals. Special-status reptiles in the treatable landscape are associated with a variety of habitats, including desert, riparian habitat, and coastal scrub. Most special-status amphibians and reptiles use underground burrow habitat for egg-laying and estivation.

The CalVTP does not propose treatment activities of any kind in state and federally protected wetlands, or other aquatic habitats, and wetland and aquatic habitats that have been mapped at a statewide level and are included in the FRAP vegetation data were excluded from the treatable landscape. However, many wetlands are defined at a finer scale than is available in the FRAP vegetation layer or in the NWI. Wetland habitats that may occur within the treatable landscape of each ecoregion but would not necessarily have been included in the FRAP vegetation data are discussed in the setting section of this PEIR for each ecoregion.

Treatment design of qualifying projects under the CalVTP would integrate the SPRs identified above. SPR BIO-1 requires a reconnaissance-level survey of the proposed treatment site to determine whether there is potential for special-status wildlife, including amphibians and reptiles, to occur. If it is determined that special-status wildlife may occur, then SPR BIO-10 requires focused or protocol-level survey for special-status wildlife to ensure that these species are identified prior to treatment so that they can be avoided under other measures. SPR BIO-2 requires crew members and contractors to receive training regarding biological resources from a qualified RPF or biologist familiar with the life history of the species so crews are aware of potential special-status wildlife in the treatment area and measures to reduce adverse effects. SPRs designed to identify sensitive natural communities (SPR BIO-3), retain the habitat function of riparian habitat and limit herbicide use within riparian habitat (SPR BIO-4 and SPR HYD-5, respectively), avoid environmental effects of type conversion within chaparral and coastal sage scrub habitats (SPR

BIO-5), and limit treatments within ESHAs in the coastal zone (SPR BIO-8) reduce the likelihood of impacts to special-status amphibians and reptiles within these habitats. However, many of these special-status species would be present outside of these habitats and would not be protected by these SPRs. SPR BIO-11 requires the use of wildlife-friendly fencing during prescribed herbivory treatments, which reduces the likelihood of adverse interactions between special-status wildlife and fencing (e.g., entanglement, collision). SPR HAZ-5 and SPR HAZ-6 require safe handling of herbicides (e.g., spill prevention, spill response) and compliance with current regulations for the application of herbicides. SPR HYD-1, SPR HYD-3, and SPR HYD-4 provide protection of aquatic habitat which could be used by some special-status amphibians and reptiles, by requiring compliance with applicable water quality requirements, prohibiting prescribed herbivory treatments within aquatic and riparian habitat, and requiring implementation of WLPZs on each side of watercourses identified within treatment areas. While SPRs would minimize impacts, treatment activities could still result in direct or indirect adverse effects on special-status amphibians and reptiles if these species and their habitat are not sufficiently avoided after identification and if these species occur within areas or habitats that are not avoided by implementation of the SPRs. Potential impacts to special-status amphibians and reptiles are described for each treatment activity below.

Prescribed Burning

Prescribed burning treatment activities would include pile burning and broadcast burning. It is possible that special-status amphibians and reptiles could escape from the area of a broadcast burn, and that the broadcast burn would move through the area without permanent adverse effects on burrows occupied by these species. However, depending on the speed and intensity of the fire, and the character of the habitat broadcast burns could result in mortality of these species if they were unable to escape. Pile burning could result in adverse effects on special-status amphibians and reptiles if the piles are placed on top of or adjacent to burrows occupied by these species. These activities could result in the direct mortality of these species, if present. Broadcast burning and pile burning would not result in substantial adverse effects on aquatic amphibians and reptiles within the aquatic habitat that has been identified and excluded from the treatable landscape. However, these activities could result in adverse effects (e.g., inadvertent fill) on smaller aquatic features (e.g., wetlands, vernal pools) and special-status amphibians that may occupy these habitats.

Mechanical Treatment

Mechanical treatment activities would include cutting, uprooting, crushing/compacting, or chopping of existing vegetation. If mechanical treatment occurs during the breeding season, these activities could result in the direct loss of special-status amphibians or reptiles and their burrows, which could be crushed or otherwise disturbed if present within the vicinity of mechanical treatment activities like uprooting, skidding, or other use of heavy machinery. This could result in the direct mortality of these species, if present. Mechanical treatment would not result in substantial adverse effects on aquatic amphibians and reptiles within the aquatic habitat that has been identified and excluded from the treatable landscape. However, these activities could result in adverse effects (e.g., inadvertent fill) on smaller aquatic features (e.g., wetlands, vernal pools) and special-status amphibians that may occupy these habitats.

Manual Treatment

Manual treatment activities would include the use of hand tools (e.g., loppers) and hand-operated power tools (e.g., chainsaws) to prune, thin, or remove vegetation. While this treatment activity would be less likely to result in adverse effects than prescribed burning and mechanical treatment, special-status amphibians or reptiles and their burrows could be accidentally crushed or otherwise damaged by personnel or equipment (e.g., trucks). This could result in the direct mortality of these species, if present. Manual treatment would not result in substantial adverse effects on aquatic amphibians and reptiles within the aquatic habitat that has been identified and excluded from the treatable landscape. However, these activities could result in adverse effects (e.g., inadvertent fill) on smaller aquatic features (e.g., wetlands, vernal pools) and special-status amphibians that may occupy these habitats.

Prescribed Herbivory

Prescribed herbivory would include the use of domestic livestock (e.g., cows, goats, sheep) to reduce a target plant population. Livestock used in prescribed herbivory treatments could crush special-status amphibians or reptiles if present within underground burrow habitat, or otherwise destroy active burrows, if present within the treatment area.

The threat of burrow crushing is greater for cattle than for sheep and goats because cows are larger and heavier. Additionally, installation of temporary fencing to contain livestock could also result in crushing of active burrow habitat if fence posts or other infrastructure are installed on or near burrows. Prescribed herbivory would not result in substantial adverse effects on aquatic amphibians and reptiles within the aquatic habitat that has been identified and excluded from the treatable landscape. However, these activities could result in adverse effects (e.g., inadvertent fill) on smaller aquatic features (e.g., wetlands, vernal pools) and special-status amphibians that may occupy these habitats. Temporary electric fences to control grazing animals would not result in injury or mortality of special-status wildlife due to electrocution. Temporary electric fences produce high voltage shocks with very low amperage, which deters livestock from escaping without causing injury or death.

<u>Herbicides</u>

Herbicide treatment would include ground-level application (e.g., paint-on stems, backpack hand-applicator, hypo-hatchet tree injection, hand placement of pellets) and potential downward spray application using a boom applicator attached to an all-terrain vehicle or tractor. Herbicide treatment within terrestrial and aquatic habitat could result in adverse effects on amphibians and reptiles, if an animal ingested or came into direct contact with herbicides, as some herbicides may be toxic to these species.

<u>Conclusion</u>

Relevant SPRs would be implemented to avoid and minimize treatment-related disturbances and long-term habitat loss for special-status amphibians and reptiles (listed in Table 3.6-33). SPR BIO-1 requires a data review (e.g., vegetation mapping, databases with existing special-status wildlife and plant occurrences) and a reconnaissance-level survey of the proposed treatment site to determine whether there is potential for special-status aquatic wildlife and sensitive habitat (including wetlands and aquatic habitat) to occur. If it is determined that special-status wildlife may occur, then SPR BIO-10 requires focused or protocol-level survey for special-status wildlife to determine whether the species is present. SPR BIO-2 requires crew members and contractors to receive training regarding biological resources from a qualified RPF or biologist familiar with the life history of the species so crews are aware of potential special-status wildlife in the treatment area and measures to reduce adverse effects. SPRs designed to identify sensitive natural communities (SPR BIO-3), retain the habitat function of riparian habitat (SPR BIO-4), and avoid environmental effects of type conversion within native coastal sage scrub and chaparral (SPR BIO-5) reduce the likelihood of impacts (e.g., habitat loss) to special-status amphibians and reptiles within these habitats. SPR BIO-8 limits treatments within ESHAs in the coastal zone, reducing likelihood of impacts to special-status amphibians and reptiles in the coastal zone. SPR HAZ-5 and SPR HAZ-6 require safe handling of herbicides (e.g., spill prevention, spill response) and compliance with current regulations for the application of herbicides. SPR HYD-1 requires treatments to comply with applicable water quality requirements adopted by the appropriate Regional Water Quality Control Board and approved by the SWRCB. SPR HYD-3 prohibits prescribed herbivory treatments within sensitive waterbodies, wetlands, or riparian areas. SPR HYD-4 requires implementation of WLPZs on each side of watercourses identified within treatment areas. SPR HYD-5 would reduce potential impacts to special-status amphibians and reptiles by limiting herbicide use within riparian habitat. Implementation of these SPRs reduce the likelihood of the impacts described above to special-status amphibians and reptiles within river, stream, and lake habitats, including those that have been identified and excluded from the treatable landscape, to **less than significant**.

While implementation of SPRs would minimize impacts, treatment activities could still result in the adverse effects described above on special-status amphibians within smaller aquatic features such as wetlands and vernal pools (e.g., salamanders, frogs) or associated riparian habitat. These aquatic features likely have not been fully identified and excluded from the treatable landscape, and implementation of treatment activities within or adjacent to these features could result in inadvertent fill, potentially resulting in direct mortality of special-status amphibians or destruction of habitat. Additionally, treatment activities could result in adverse effects on special-status amphibians and reptiles within non-aquatic (upland) habitats if these habitats that are not avoided with implementation of the SPRs. As described above, direct adverse effects include mortality or injury of special-status amphibians or reptiles or destruction of burrows, and loss of habitat function within these habitats. Substantial adverse effects on special-status amphibians and reptiles due to direct injury or mortality or upland habitat modifications would be a **potentially significant** impact.

Mitigation Measures

Mitigation Measure BIO-2a: Avoid Mortality, Injury, or Disturbance and Maintain Habitat Function for Listed Wildlife Species and California Fully Protected Species (All Treatment Activities)

Mitigation Measure BIO-2b: Avoid Mortality, Injury, or Disturbance and Maintain Habitat Function for Other Special-Status Wildlife Species (All Treatment Activities)

Mitigation Measure BIO-2c: Compensate for Mortality, Injury, or Disturbance and Loss of Habitat Function for Special-Status Wildlife if Applicable (All Treatment Activities)

Mitigation Measure BIO-3a: Design Treatments to Avoid Loss of Sensitive Natural Communities and Oak Woodlands (All Treatment Activities)

Mitigation Measure BIO-3b: Compensate for Loss of Sensitive Natural Communities and Oak Woodlands

Mitigation Measure BIO-3c: Compensate for Unavoidable Loss of Riparian Habitat

Mitigation Measure BIO-4: Avoid State and Federally Protected Wetlands

Significance after Mitigation

Mitigation Measures BIO-2a, BIO-2b, and BIO-2c would reduce potential impacts on special-status amphibians and reptiles by requiring avoidance and protection of these species from injury, mortality, and other disturbance; maintenance of habitat function through retention of important habitat features such that there would be no substantial long-term loss or degradation of habitat; and compensation for impacts if these impacts cannot be avoided. Mitigation Measures BIO-3a, BIO-3b, and BIO-3c would require project proponents to avoid or offset loss of special-status wildlife habitat (i.e., sensitive natural communities, riparian habitat). Mitigation Measure BIO-4 would further reduce potential impacts by requiring protection of state and federally protected wetlands, including vernal pools, which may provide habitat for some special-status reptiles and amphibians. Implementation of these mitigation measures would reduce impacts on special-status reptiles and amphibians such that no populations of these species would be reduced below self-sustaining levels and treatment activities would not contribute to a trend toward a species not already listed becoming listed as threatened or endangered, or substantially reduce the number or restrict the range of a species that is already listed as endangered, rare, or threatened. Impacts would be reduced to **less than significant**.

Long-Term Effects of Treatment Types

Fuel treatment activities typically reduce surface and ladder fuels and increase tree crown spacing with the goal of modifying wildland fire behavior and thereby the probability of uncharacteristically severe fire effects (Agee and Skinner 2005, Stephens et al. 2009). A reduction in hazardous wildland fire effects typically provides increased ecosystem resilience (i.e., the ability of an ecosystem to maintain characteristic structure and function in the face of external disturbance; (Folke et al. 2004) to ecosystems. For example, in forest ecosystems, multiple studies on the impacts of fuel reduction in western U.S. forests indicate that fuel treatments effectively lead to reduced wildfire severity and to conditions consistent with the restoration of natural fire behavior (Fule' et al. 2012). Few negative consequences for forest ecosystem components were observed (e.g., soils, small mammals, songbirds) (Fontaine and Kennedy 2012, Stephens et al. 2012). These studies suggest that treated forests are generally more resilient than untreated forests in the short term. However, fuel treatments can result in other ancillary positive, neutral, or negative effects on ecosystems and special-status species, depending on the elements examined and timing, intensity, and type of treatment. Furthermore, the long-term effects of fuel reduction treatments on special-status wildlife species and habitat are not fully understood (Collins et al. 2014).

Fuel treatment activities under the proposed CalVTP have the potential to modify habitat by removing trees, shrubs, and coarse woody debris on the ground. Some special-status wildlife species are closely associated with these habitat features (McIver et al. 2013). Features such as large mature trees, snags with large cavities, and large diameter coarse woody debris on the ground often take decades, if not a century to grow or accumulate (Shaffer et al. 2018). Removal of trees can result in increased light penetration, which in turn can lead to changes in understory herbaceous cover (McIver et al. 2013). In instances where trees are not removed, prescribed burning activities can weaken large trees, or attract bark beetles which can weaken trees potentially leading to their eventual death (McIver et al. 2013).

While fuel treatment activities would remove vegetation and modify habitat locally, these activities are not expected to cause permanent habitat degradation or conversion to a different habitat type on a landscape scale that would substantially reduce habitat for special-status wildlife over the long term. Indirect beneficial effects from improved habitat conditions could result from implementation of treatment types that restore ecosystem processes, conditions, and resiliency by moderating uncharacteristic wildland fuel conditions. This is a central tenant of the ecological restoration treatment type that would be implemented under the CalVTP. WUI fuel reduction and fuel breaks may also integrate fire resiliency and ecosystem restoration goals if compatible with treatment area conditions and treatment objectives. Many treated areas would retain some pre-treatment vegetation (e.g., up to 70 percent for prescribed fire) that provides habitat for wildlife. In forested environments, fuel breaks would be shaded and large trees and other vegetation would remain. Non-shaded fuel breaks, established outside of forest settings, would typically occur in areas where some level of fragmentation already occurs (e.g., adjacent to roads, where there is a natural change in vegetation types) or in areas with a low percentage of vegetation cover (e.g., rocky outcrops or ridgelines).

As described in the discussion of impacts above, special-status wildlife species could be directly or indirectly adversely affected (e.g., killed, injured, or disturbed) by treatment activities, if present within the treatment area. Although large-scale long-term wildlife habitat degradation is not expected, special-status wildlife species could be affected indirectly by local habitat modifications and loss of habitat function. Where habitat function is lost in essential wildlife habitat, special-status wildlife species that depend on this habitat may be displaced until the features and functions return (Shaffer et al. 2018). Many special-status wildlife species require specific habitat characteristics, including high canopy cover or complex understory features. For example, suitable habitat for coastal California gnatcatcher typically contains at least 50 percent scrub cover (Beyers and Wirtz 1995). If treatment activities were to reduce scrub cover within the range of this species, coastal California gnatcatcher could be displaced from the habitat until the scrub cover returned to at least 50 percent, which would typically take up to five years (Beyers and Wirtz 1995). Conversely, special-status wildlife species that prefer habitat with a more open canopy or food sources enhanced by fire (e.g., insects) may benefit from these treatment activities, in particular for ecological restoration treatment types (Shaffer et al. 2018). Reduction in understory leaf litter may benefit special-status snakes and lizards which prefer bare soil for basking and movement (McIver et al. 2013). Northern goshawks forage within openings in otherwise intact forest habitat (Shaffer et al. 2018). Additionally, some wildlife habitat types are specifically adapted to fire and could benefit substantially from prescribed burning if they are outside of their natural fire regime (i.e., Condition Classes 1 and 2).

Fire suppression activities in California have led to uncharacteristically dense vegetation (e.g., forest, shrub), and large wildfires, especially within these dense vegetation conditions, can result in catastrophic loss to wildlife or wildlife habitat. Small or isolated populations of special-status species and populations near the edge of their species' distribution would likely be disproportionately affected by wildfires (Shaffer and Hedwall 2018). There is a potential long-term benefit to special-status wildlife from implementation of the CalVTP because it is intended to reduce the risk of wildfires that can eliminate special-status wildlife individuals and populations. Balancing the potential short-term adverse effects to special-status species and habitats from fuel reduction with the potential for long-term benefits is a subject of current discussion and a goal for fuel reduction programs and some species recovery programs (Shaffer and Hedwall 2018, Kelsey 2019). For example, wildfire is a major threat to the recovery of mountain yellow-legged frog (*Rana muscosa*), which is listed as endangered under ESA. Implementation of vegetation management to reduce the risk of wildfire in the range of this species is an essential component in the species' recovery plan (USFWS 2018). Wildfire has historically affected the federally-threatened coastal California gnatcatcher, burning large expanses of coastal sage scrub habitat and killing nesting gnatcatchers (Beyers and Wirtz 1995). Coastal California gnatcatchers do not use recently burned coastal sage scrub habitat unless it is adjacent to unburned patches of habitat, whether the habitat was burned in a wildfire or by prescribed burning activities (Beyers and Wirtz 1995). It is possible that carefully implemented vegetation treatment activities, including prescribed burning, could reduce the likelihood of these catastrophic fires, and be implemented in such a way that habitat is still suitable for sensitive species (e.g., leaving intact habitat in a matrix). The threat of high severity wildfire versus fire suppression on the California spotted owl, as well as the potential effects from fuel treatment, have been considered in multiple studies. Although uncertainty remains, spotted owls generally prefer a larger landscape mosaic of habitats, including unburned refugia and burned open areas, where they can nest and roost in high canopy cover while foraging in recently burned areas with improved prey habitat (Shaffer et al. 2018). Prescribed fire and other fuel treatments may aid in reducing habitat loss by high-severity megafires (Ganey et al. 2017). Wildfire is unpredictable in terms of frequency, location, and severity, and the long-term response of each special-status species to wildfire, fire suppression, and fuel treatment are not well understood for many species. Although fuel treatment is intended to restore ecosystem resiliency under the CalVTP in many areas, the potential benefits to special-status wildlife species are uncertain and therefore not considered in determining the significance of this impact under CEQA. The adverse effects of vegetation treatment activities on special-status wildlife species and habitat are discussed above for each species group and under Impact BIO-3 for sensitive habitat types.

Impact BIO-3: Substantially Affect Riparian Habitat or Other Sensitive Natural Community Through Direct Loss or Degradation that Leads to Loss of Habitat Function

Vegetation treatment activities could result in loss or degradation of sensitive habitats, including designated sensitive natural communities, riparian habitats, and oak woodlands. Implementation of SPRs BIO-1, BIO-2, BIO-3, BIO-4, BIO-5, BIO-6, BIO-8, BIO-9, and HYD-4 require that potential sensitive natural communities and other sensitive habitats be identified and protected prior to implementing treatments. Implementation of SPR BIO-5 would avoid environmental effects of type conversion in chaparral and coastal sage scrub habitats. While SPRs would minimize impacts, treatment activities could still result in a loss of acreage of sensitive natural communities and habitats, eliminate sensitive natural communities or habitats from a treatment area, or reduce the habitat value or function of sensitive natural communities and habitats. Many riparian, chaparral, and coastal sage scrub habitats are also designated sensitive natural communities and are considered ESHAs in the coastal zone. Sensitive natural communities (vegetation alliances with state or global rarity ranks 1, 2, or 3) are also considered ESHAs in the coastal zone. Loss or degradation of sensitive natural communities and sensitive habitats would be a **potentially significant** impact.

SPR BIO-1 requires data review and a reconnaissance-level survey of the proposed treatment site to determine whether there is potential for sensitive natural communities or sensitive habitats to occur or be affected by treatment activities. If they may occur, SPR BIO-1 requires those resources to be avoided if possible. SPR BIO-2 requires crew members and contractors to receive training regarding biological resources from a qualified RPF or biologist so crews are aware of potential sensitive natural communities and sensitive habitats in the treatment area and measures to reduce adverse effects. If treatment in areas that may support sensitive natural communities and sensitive habitats cannot be avoided, SPR BIO-3 requires a protocol-level survey for sensitive natural communities and sensitive habitats to ensure that these are identified prior to treatment so that appropriate avoidance and minimization measures can be implemented. SPR BIO-4 requires that treatments in riparian habitat be designed to avoid loss or degradation of riparian habitat function. SPR BIO-5 requires that chaparral and coastal sage scrub be identified to the alliance level and that treatments be designed to maintain or enhance habitat function of said alliance and avoid environmental effects of type conversion. SPR BIO-6 requires that best management practices be used to avoid spreading plant pathogens, such as *Phytopthora*, that could kill oak trees or other characteristic vegetation that comprises sensitive natural communities and sensitive habitats. SPRs designed to identify sensitive natural communities (SPR BIO-3), retain the habitat function of riparian habitat and limit herbicide use within riparian habitat (SPR BIO-4 and SPR HYD-5, respectively), and limit treatments within ESHAs in the coastal zone (SPR BIO-8) would all work to minimize impacts on sensitive natural communities and sensitive habitats. While SPRs would minimize impacts, treatment activities could still result in direct or indirect adverse effects on sensitive natural communities, riparian habitat, and oak woodlands. These potential residual impacts are discussed for each sensitive natural community/sensitive habitat category in the sections that follow.

Sensitive Natural Communities

Sensitive natural communities are identified at the alliance level using the *Manual of California Vegetation* (Sawyer et al. 2009). Sensitive natural communities are defined by unique assemblages of vegetation that may include, or even be dominated by, relatively common species, but it is the assemblage of species that is rare. For example, Sargent cypress is not a rare plant species, but Sargent cypress woodland is an assemblage of vegetation where Sargent cypress is dominant (comprises greater than 50 percent relative cover) in the tree canopy with McNab cypress, scrub pine, foothill pine, Douglas fir, live oak, and California bay. This particular assemblage of species (alliance) is uncommon, has a state rarity rank of 3 (vulnerable), and is therefore designated by CDFW as a sensitive natural community. The proposed treatment activities could result in loss or degradation of designated sensitive natural communities, if present in treatment areas, through physically removing the dominant and characteristic vegetation that defines the community or through modifications to species composition, growth form, and vegetation structure in a way that causes a transition from a vegetation alliance meeting the parameters that define the sensitive natural community to one meeting the characteristics of a common vegetation type or to one dominated nonnative vegetation. Removal of understory vegetation to create a shaded fuel break could result in a loss of sensitive natural communities if the understory shrub vegetation is characteristic of the vegetation assemblage that defines the sensitive natural community. For example, western azalea patches are a shrub-dominated sensitive natural community that can occur as small patches interspersed within redwood forests. If clearing the shrub layer to create a shaded fuel break within these forests, western azalea patches could be eliminated. In addition, because fuel breaks need to be maintained free of vegetation, or free of understory vegetation in the case of shaded fuel breaks in woodland and forest communities, the vegetation that characterizes these alliances would not be allowed to regenerate and this would result in a permanent loss of sensitive natural communities.

Indirect impacts could occur if ground disturbances during treatment activities alter habitat or site conditions in a manner that later results in the death or lack of regeneration of vegetation that typifies the sensitive natural community at the alliance level. Mechanical treatments and fuel breaks in or adjacent to sensitive natural communities can increase invasion risk by creating bare ground and tilled soil that is ideal for invasive plant species establishment; however, SPR BIO-9 requires actions to prevent the spread of invasive plants. SPR BIO-6 requires BMPs to minimize the spread of plant pathogens from treatment activities, which can kill dominant plant species that characterize sensitive natural communities. For example, Ione chaparral, a sensitive natural community dominated by Ione manzanita (*Arctostaphylos myrtifolia*), is threatened by two fungal pathogens: a branch-canker disease (caused by a species of *Fusicoccum*) and a root and crown rot disease (caused by *Phytophthora cinnamomi*). The spread of these diseases is exacerbated by soil disturbances that mobilize the fungal spores.

Many sensitive natural communities, like other native vegetation types, are currently degraded by fire suppression policies and other vegetation management practices that have altered ecosystem processes and changed species composition. Treatment activities may introduce disturbance regimes that are incompatible with the ecology of the specific sensitive natural communities present in a treatment area. Conversely, indirect beneficial effects from improved habitat conditions could result from implementation of the treatment types that restore ecosystem processes, conditions, and resiliency by moderating uncharacteristic wildland fuel conditions to reflect historic vegetative composition and structure that is characteristic of the sensitive natural community type, which is identified at the alliance level. This is a central tenet of the ecological restoration treatment type that would be implemented under the CalVTP, but WUI fuel reduction and shaded fuel breaks may also integrate fire resiliency and ecosystem restoration goals if compatible with treatment area conditions and treatment objectives.

Some sensitive natural communities are specifically adapted to fire and could benefit substantially from prescribed burning if they are outside of their natural fire regime (i.e., Condition Classes 1 and 2). The responses of plants to fire can be divided into two broad categories – stimulated by fire or not stimulated by fire. Fire-stimulated plants are further divided into fire-dependent and fire-enhanced categories, while plants not stimulated by fire are either fire-neutral or fire-inhibited. Fire dependent responses occur only with fire, such as seed germination requiring heat, smoke, or chemicals from charcoal. Fire-enhanced responses (e.g., sprouting) are those that are increased by fire but that also occur from other types of damage to the plant (Sugihara et al. 2006).

While mechanical treatments can mimic some aspects of fire disturbance in terms of altering vegetation composition and structure and reducing fuel loads, they cannot reproduce all of the ecological benefits of fire in fire-dependent or fire-enhanced communities. For example, mechanical thinning in fire-dependent sensitive natural communities such as Baker cypress stand, Mendocino pygmy cypress woodland, Piute cypress woodland, and Bishop pine-Monterey pine forest will not trigger the opening of serotinous cones that release their seeds in response to fire, or create the favorable seedbed conditions that fire creates for these species to regenerate. Mechanical treatments also will not stimulate germination of fire-following native annuals that respond to chemical cues in ash (Underwood et al. 2018). Therefore, mechanical treatments can reduce regeneration and recruitment in these communities even if implemented within the appropriate fire return interval and would generally not provide an ecological benefit. For fire-dependent closed cone communities, fire return intervals need to be long enough to allow new cone crops to develop but short enough to ensure seed crops are still viable when released (Sawyer et al. 2009). Any fire or other disturbance (e.g., mechanical treatment) outside of the normal fire return interval can have adverse effects on these communities that reduces successful regeneration and recruitment of the characteristic species that define sensitive natural communities.

Sensitive natural communities that have potential to occur in the treatable landscape are listed in the setting description of each ecoregion. Any of the treatment activities have the potential to remove, kill, or damage vegetation that defines sensitive natural communities and each of the treatment activities could be used in every treatment type. Sensitive natural communities often occur in relatively small stands and are therefore easily eliminated. Even if only a portion of the stand is removed, it could reduce the stand size below a self-sustaining level. Additionally, ground disturbances during treatment activities could alter habitat or site conditions in a manner that later results in the death or lack of regeneration of vegetation that typifies the sensitive natural community at the alliance level.

Riparian Habitat

Implementing treatment activities under the CalVTP may result in direct removal of native riparian vegetation resulting in a loss of riparian habitat acreage or function. While treatments in riparian habitats are primarily focused on removal of uncharacteristic fuel loads, it is sometimes necessary to remove native riparian shrubs and even mature native riparian hardwood trees to reduce fire hazard risks to human lives and property. Additionally, when prescribed fire is used, a burn perimeter will be established around the treatment area, including in riparian areas. Removal of native understory vegetation could reduce habitat functions for wildlife species that use the shrub layer or require structural complexity, and removal of woody vegetation could leave stream banks more susceptible to erosion and reduce stormwater filtration. SPR BIO-4 would reduce some of the potential indirect impacts on riparian habitat, such as avoiding removing vegetation that shades streams or contributes large woody debris for salmonids, but indirect impacts would still occur from removal of native riparian vegetation. Not all species benefit from an open understory free of shrubs. Many species that use riparian habitats for cover, nesting, denning, and roosting are dependent on a well-developed shrub layer. Riparian habitats that are diverse in both the composition of vegetation species and physical habitat structure are likely to accommodate a wider variety of wildlife and reducing structural complexity and species diversity can reduce habitat functions for many species. Removal of dead and dying trees, encroaching upland species, invasive plants, and excess understory vegetation growth can also have beneficial effects because it would leave more water and nutrients available for native riparian hardwood trees and can improve riparian habitat health. While both beneficial and adverse impacts could occur, the removal of native riparian vegetation has the potential to substantially reduce habitat functions and there could be a net loss of riparian habitat in treatment areas.

Oak Woodlands

Treatments in oak woodland habitat, under the CalVTP, would primarily be focused on treating the herbaceous understory, but would also include removing uncharacteristic fuel loads in the shrub layer and reducing ladder fuels. To the extent that CalVTP treatment activities mimic natural disturbance patterns in oak woodlands, it is reasonable to expect long-term beneficial effects may result. For example, removal of dead and dying trees, invasive plants, and excess understory vegetation growth can improve oak woodland habitat quality by removing vegetation that competes with oak seedlings and saplings for light, water, and nutrients. Removal of mature native oak trees is not an objective of the CalVTP. Nonetheless, oak woodland vegetation could be removed to create fuel breaks and oak tree roots could be damaged during mechanical treatments resulting in ultimate tree mortality. Other detrimental effects on ecological processes could result from soil compaction and erosion and introduction of invasive plants. SPR BIO-6 requires BMPs to minimize the spread of oak pathogens from treatment activities into currently uninfected areas, which could result in loss of oak woodland acreage and habitat function. SPR BIO-9 requires BMPs to minimize the spread of invasive plants and noxious weeds into currently uninfested areas to avoid habitat degradation. Removal of native understory vegetation could reduce habitat functions for wildlife species that utilize the shrub layer or require structural complexity.

<u>Chaparral and Coastal Sage Scrub</u>

Shortened fire return interval has been identified as a primary driver of type conversion from chaparral and coastal sage scrub vegetation types to vegetation types dominated by nonnative herbaceous vegetation in Southern California (Syphard et al. 2019, Cox et al. 2014, Talluto and Suding 2008, Underwood et al. 2018). Even though chaparral vegetation is fire adapted, and some chaparral species are even fire dependent (e.g., have seeds that are stimulated to germinate by fire), most chaparral types require a minimum of 10 years to recover from fire and chaparral types dominated by obligate seeder shrubs that are fire-stimulated generally require a minimum of 15 years to accumulate enough seed in the soil seedbank to recover (Syphard et al. 2019). Chaparral vegetation types that are characterized by facultative seeders (i.e., regenerate by resprouting and from seed) are more resilient to fire than those characterized primarily by obligate seeders, but these too can be degraded by repeated short-interval fires. Therefore, vegetation treatment activities implemented under the CalVTP, including prescribed burning, could potentially result in type conversion of chaparral vegetation if the treatment does not replicate the natural fire regime of the vegetation type present. SPR BIO-5 avoids environmental effects of type conversion of chaparral and coastal sage scrub by designing treatment activities to replicate the natural fire regime, return the vegetation type to its natural condition class, and maintain or improve the natural habitat function of those alliances.

<u>Summary of Impacts by Treatment Activity</u>

The following sections describe impact mechanisms that are unique to each treatment activity. Most treatment activities would be implemented in combination with other treatment activities to achieve the objectives of a treatment type (i.e., WUI fuel reduction, fuel breaks, ecological restoration). For example, mechanical and manual treatments could be used together to remove vegetation, which could then be piled and burned. Broadcast burning also involves establishing a containment line around the burn perimeter, typically using mechanical and manual treatment activities prior to burning. Prescribed herbivory or herbicide application may be used in combination with manual or mechanical treatments.

Prescribed Burning

Prescribed burning could result in directly burning up vegetation that characterizes sensitive natural communities or sensitive habitats. Prescribed burns could consume vegetation completely or could reduce the viability of seedbanks of dominant vegetation if they are not adapted to fire or if the fire burns too hot. Prescribed burning has potential to reduce regeneration of sensitive natural communities and sensitive habitats that are not adapted to fire.

Mechanical Treatment

Mechanical treatments such as masticating, tilling, grubbing, and raking can disturb soil several inches below the surface affecting roots, rhizomes, bulbs and other underground parts of non-target vegetation, as well as the seedbed, and affecting soil stability. In addition, the removal of vegetation using mechanical treatments is less precise (in comparison to manual treatments); therefore, this treatment activity is used at sites where precision removal is not necessary. This treatment type could adversely modify habitat in a way that reduces survivorship, growth, and reestablishment of dominant or characteristic plant species or directly remove, crush, break, or otherwise destroy plants that make up sensitive natural communities and sensitive habitat. As noted previously, mechanical treatments cannot reproduce all of the ecological benefits of prescribed burning in fire-dependent or fire-enhanced communities, such as opening serotinous cones and facilitating germination of fire-stimulated seeds.

Manual Treatment

Manual treatments typically result in less ground disturbance than mechanical treatments; nonetheless, there is still a risk of trampling, breaking, cutting nontarget vegetation, including species that characterize sensitive natural communities or habitats. Temporary ground disturbance could occur during treatment implementation, including turning soil where roots of invasive plants are pulled out; driving motorized vehicles, such as ATVs and mowers, to access treatment sites and haul treated material off-site; and ground crews walking over vegetation. However, because manual treatments are implemented on a relatively small scale by trained individuals selectively treating targeted vegetation by hand, there is limited risk of removing non-targeted vegetation and this treatment type would generally not substantially alter sensitive habitat or result in a loss of sensitive natural communities unless designed to do so.

Prescribed Herbivory

Sensitive vegetation can be consumed or trampled by grazing livestock resulting in death or reduced reproduction and growth. Prescribed herbivory is typically used on a relatively small scale to reduce a target plant population, such as an invasive plant infestation, thereby reducing fire fuels or competition with desirable plant species.

Herbicides

Application of herbicides during treatment could damage or kill non-target vegetation through inadvertent direct application or through herbicide drift. Therefore, herbicide treatment has potential to kill vegetation that comprises sensitive natural communities and sensitive habitats. Downward boom spray application and spot spraying methods have a greater risk of affecting nontarget species than stem injection or paint-on stem application. The CalVTP does not include aerial spray application as an herbicide application method.

Conclusion

SPR BIO-1 requires data review and reconnaissance surveys to identify potential riparian or other sensitive habitats and sensitive natural communities and SPR BIO-2 requires biological resource training for workers so they would learn to recognize sensitive natural communities and habitats and the SPRs, mitigation measures, BMPs, and laws and regulations that protect these resources. SPR BIO-3 requires site-specific surveys to identify and map the limits of sensitive natural communities and other sensitive habitats using standard field protocols. SPR BIO-4 requires treatments be designed to avoid loss or degradation of riparian habitat functions and values. SPR BIO-5 requires treatments be designed to avoid environmental effects of type conversion of chaparral and coastal sage scrub habitats. SPR BIO-6 requires BMPs be implemented to prevent the spread of plant pathogens. SPR BIO-8 requires that ESHAs be identified for treatment activities in the coastal zone and that treatments be designed to minimize impacts to ESHAs. SPR BIO-9 requires BMPs be implemented to prevent the spread of invasive plants and noxious weeds that could degrade the quality of sensitive habitats and sensitive natural communities. SPR HYD-4 requires identification and protection of WLPZs. These SPRs would substantially reduce potential direct and indirect impacts to sensitive habitats and sensitive natural communities; however, there would still be potential for direct removal of sensitive vegetation or habitat modifications that degrade the quality of sensitive habitats or sensitive natural communities and that lead to a loss of acreage of these habitat types, eliminate sensitive natural communities or habitat from a treatment area, or reduce the habitat value or function of these habitats. Loss or substantial degradation of sensitive natural communities and sensitive habitats would be a **potentially significant** impact.

Mitigation Measures

Mitigation Measure BIO-3a: Design Treatments to Avoid Loss of Sensitive Natural Communities and Oak Woodlands

Mitigation Measure BIO-3b: Compensate for Loss of Sensitive Natural Communities and Oak Woodlands

Mitigation Measure BIO-3c: Compensate for Unavoidable Loss of Riparian Habitat

Significance after Mitigation

Implementing Mitigation Measure BIO-3a would reduce potentially significant impacts on sensitive natural communities and oak woodlands by requiring treatment activities be designed to avoid loss of sensitive natural communities, to the extent feasible, by identifying vegetation type to the alliance level and determining their rarity rank, designing treatments to restore the natural fire regime and return vegetation composition and structure to their natural condition to maintain or improve habitat function of the affected sensitive natural community or oak woodland, prohibiting fuel breaks in sensitive natural communities with rarity ranks S1 and S2, avoiding non-shaded fuels breaks in oak woodlands or sensitive natural communities with rarity rank S3 and requiring that no more than 20 percent of the stand be removed, using prescribed burning as the primary treatment activity in fire-dependent sensitive natural communities to the extent feasible, timing prescribed herbivory to occur when non-target vegetation is not susceptible to damage, and requiring that unavoidable losses of sensitive natural communities or oak woodlands be offset by restoring oak woodlands or sensitive natural communities onsite, restoring degraded oak woodlands or sensitive natural communities offsite, or preserving, through a conservation easement, existing oak woodlands or sensitive natural communities of equal or better value to those lost at a sufficient ratio to offset losses of acreage and habitat function.

Measure BIO-3c would minimize impacts to riparian vegetation by requiring that unavoidable losses of riparian habitat be offset by restoring riparian habitat values onsite, restoring degraded riparian habitat offsite, purchasing riparian habitat credits at a CDFW-approved mitigation bank, preserving existing riparian habitat of equal or better value to the riparian habitat lost through a conservation easement at a sufficient ratio to offset the loss of riparian habitat function and value in the treatment area.

As described above, implementation of mitigation measures would reduce impacts of treatments such that loss or degradation of Riparian Habitat or Other Sensitive Natural Community would be avoided or compensated at an adequate ratio to offset the loss of riparian habitat functions. This impact would be **less than significant**.

Impact BIO-4: Substantially Affect State or Federally Protected Wetlands

Treatment activities proposed under the CalVTP could occur on lands that contain state or federally protected wetlands; these activities could remove wetland vegetation and alter wetland hydrology or topography resulting in loss or degradation of wetland function. Implementation of SPRs BIO-1 and HYD-4 require that potential wetlands be identified and protected prior to implementing treatments. While implementation of SPRs would minimize impacts, treatment activities could inadvertently destroy or adversely modify protected wetlands resulting in loss of these resources. Additionally, prescribed burning would result in direct removal of wetland vegetation that could adversely modify wetland functions and reduce wetland values. If this occurred, it would be a **potentially significant** impact.

The CalVTP does not propose treatment activities, except prescribed burning, in state and federally protected wetlands, or other aquatic habitats, and wetland and aquatic habitats that have been mapped at a statewide level and are included in the FRAP vegetation data were excluded from the treatable landscape. However, many wetlands are defined at a finer scale than is available in the FRAP vegetation layer or in the NWI. Wetland habitats that may occur within the treatable landscape of each ecoregion but would not necessarily have been included in the FRAP vegetation data are discussed in the setting section of this PEIR for each ecoregion. Furthermore, prescribed burning may be implemented in wetland habitats under this program. SPR BIO-1 requires data review and reconnaissance surveys to identify potential sensitive biological resources, SPRs HYD-1 and HYD-3 require water quality protections, and SPR HYD-4 requires identification and protection of WLPZs. These SPRs would substantially reduce potential direct and indirect impacts to wetlands and aquatic habitats; however, some treatment activities could inadvertently destroy or adversely modify protected wetlands resulting in loss of wetland habitat functions and values from ground disturbance or upland vegetation removal that alters hydrology, direct removal of wetland vegetation, or fill of wetlands or dredging through wetlands (e.g., for containment line construction). If this occurred, it would be a **potentially significant** impact.

Mitigation Measures

Mitigation Measure BIO-4: Avoid State and Federally Protected Wetlands

Significance after Mitigation

Implementing Mitigation Measure BIO-4 would reduce potentially significant impacts on state and federally protected wetlands because it would require delineation and avoidance of these wetlands with no-disturbance buffers clearly marked so that no inadvertent damage or destruction to these habits would occur during treatment activities or would require that prescribed burns be designed to avoid loss of wetland functions and values. With implementation of mitigation, adverse effects to wetlands would not be substantial. This impact would be **less than significant**.

Impact BIO-5: Interfere Substantially with Wildlife Movement Corridors or Impede Use of Nurseries

Vegetation treatment activities implemented under the CalVTP could be located in areas used as wildlife movement corridors or nurseries. Treatment-related noise and disturbance could lead to temporary changes in migration or movement patterns, and fencing for prescribed herbivory could potentially injure or impede moving wildlife. Wildlife nursery sites could be disturbed or essential nursery habitat components could be degraded by vegetation treatment activities. SPRs BIO-1, BIO-4, BIO-5, BIO-10, BIO-11, HYD-1, and HYD-4 require identification of nursery sites prior to treatment activities, actions to prevent degradation of aquatic and riparian corridors, and installation of wildlife-friendly fencing to avoid entanglement during wildlife movement. Temporary shifts in wildlife movements to avoid or navigate around active treatment sites and associated disturbances would not substantially interfere with movement requirements or migration patterns; and project implementation would not create long-term barriers to local or landscape-level movements. While implementation of SPRs would minimize impacts, nursery sites could still be removed, degraded, or disturbed during treatment activities. This would be a **potentially significant** impact.

Fish passage in rivers and tributaries occurs within the treatable landscape. Many anadromous fish species, including steelhead, Coho salmon, and Chinook salmon, have runs within river systems in California. The function of these movement corridors throughout the state is threatened by sedimentation due to inadvertent fill as a result of activities including urban development, agricultural development, and timber harvest.

Terrestrial wildlife movement corridors in California, or essential connectivity areas, include much of the relatively intact natural landscape blocks in wildland areas and some developed areas of the state. Several ungulate species occur within the treatable landscape and these species exhibit several different movement and migration strategies. Elk, including Roosevelt elk (*Cervus canadensis roosevelti*) and tule elk (*Cervus canadensis nannodes*), are largely resident, and do not undergo large migrations. Elk movements are typically related to search for foraging opportunities. Bighorn sheep also do not undergo large migrations but rather migrate seasonally between high mountain slopes in the summer to foothill slopes in winter when high elevation areas are inundated with snow. Pronghorn can exhibit long distance migration behavior or resident behavior (Yoakum et al. 2014). Mule deer, the most common ungulate species in California, occurs throughout most of California including large portions of the treatable landscape. One of the objectives of the CDFW California Deer Conservation and Management Plan is to update and maintain range maps for this species including migration routes in order to better manage the species (CDFW 2015b). Additionally, resident mountain lions range includes most of the wildland areas of the treatable landscape. Mountain lions occupy a variety of habitats but are most abundant in riparian habitats. Habitat use is typically associated with prey availability. Mule deer make up a large percentage of mountain lion diet. Mountain lion home ranges can be greater than 200 square miles, though home ranges typically range from 5 to 100 square miles (Allen et al. 2015). The treatable landscape overlaps with migratory deer winter ranges and thus also overlap with mountain lion home ranges. Deer migration areas, and thus mountain lion occurrences, are largely associated with waterways and riparian areas within the treatable landscape.

While smaller wildlife species typically do not migrate distances as large as ungulates and mountain lions, these species exhibit movement patterns throughout their habitats in search of foraging opportunities, mates, aquatic breeding sites (e.g., reptiles, amphibians) or cover (e.g., nests, dens), as well as in response to stressors (e.g., weather, predators, other disturbance). Forest species such as fisher and marten require large contiguous blocks of forest habitat with a high degree of canopy cover, large structural features (e.g., logs, rock piles, snags), and a dense shrub layer (Sauder and Rachlow 2014 and Zielinski et al. 2001). Martens will avoid forest habitats without complex understory structure, which can result in decreased foraging success and increased vulnerability to predation (Moriarty 2016). Other smaller wildlife species (e.g., rodents, amphibians, reptiles) migrate much smaller distances than larger wildlife species. Amphibians typically migrate no more than 1 mile; some only several feet (Russell et al. 2005) although distances greater than 2 miles have been recorded (Bulger et al. 2003).

Prescribed fire, mechanical treatment, manual treatment, herbicide application, and prescribed herbivory could occur within areas used by wildlife for movement corridors or nurseries. The following discussion considers the potential for short-term disturbance to wildlife movement and nurseries during vegetation treatment activities and for longer-term effects following treatment due to habitat modification and reduced habitat function. This analysis primarily considers impacts on native species that do not meet the definition of special-status species (refer to Impact BIO-2 for further discussion of impacts on special-status wildlife species).

<u>Short-Term Effects during Treatment Activities</u>

Noise or visual disturbance due to the presence of equipment, personnel, or fire could cause resident or migratory wildlife to temporarily avoid or move out of the areas immediately surrounding treatment areas. These disturbances could temporarily disrupt the movement patterns of some wildlife species that may use treatment areas or adjacent lands for regular movements locally or for seasonal migrations. Additionally, access or use of any wildlife nursery sites (e.g., bird nesting colonies, bat maternity roosts, fawning areas) present within or adjacent to active treatment areas could be disturbed or impeded temporarily by treatment activities, as explained further below. Implementation of treatment activities would typically occur over 1 day and up to 1 week for a controlled burn to several months for some manual treatments. Various heavy equipment (e.g., engines, dozers, masticators, water trucks, chippers) could be used and up to approximately 20-45 personnel could be present in a treatment area from dawn to dusk, depending on the treatment activity being implemented.

Some treatment activities would occur in close proximity to human development, such as the creation of fuel breaks adjacent to existing roads. The general types and levels of disturbances (e.g., equipment noise, visual disturbance, human activity) from treatment activities near developed areas (e.g., communities, existing structures, and public roads with consistent traffic) would likely be similar to existing disturbance levels in these areas. Wildlife near human development is likely accustomed to human presence and motorized vehicles (e.g., mule deer); therefore, any temporary incremental increases in noise and human disturbances from treatment activities in these areas are unlikely to disrupt current movement patterns substantially above existing levels.

In areas further from human development, such as locations where ecological restoration treatments outside the WUI and fuel breaks along ridgelines may be implemented, the treatment areas would typically be surrounded by natural open space accessible to terrestrial wildlife; and, individuals would likely move out of active treatment areas and into adjacent habitats temporarily to avoid fire, noise, and personnel (Monteith et al. 2018, Shaffer et al. 2018). Treatment sites containing historic migratory corridors (i.e., routes established long ago that continue to be used by each new generation) or other important movement routes (e.g., for mule deer, bighorn sheep, pronghorn) would likely not span entire core areas available for movement, thereby allowing migratory or mobile species to move around areas of treatment activities through adjacent open space temporarily. Additionally, treatment activities would not create any temporary barriers to movement that would redirect migration during non-working hours (or for more than a few days in the case of prescribed herbivory, see next paragraph). Therefore, treatment-related disturbances to local or regional wildlife movements would be temporary and relatively minor.

Prescribed herbivory treatments may use fencing, typically low-voltage temporary electric fencing, for containing herbivores (e.g., sheep and goats). Electric fencing systems typically consist of two or three horizontal strands of electric wire or electric netting, posts staked in the ground, a solar panel, and a battery. Prescribed herbivory typically consists of fencing small areas (e.g., fewer than 5 acres) and moving fencing to a new area frequently (e.g., every few days), instead of fencing larger areas for longer periods. Most wildlife is likely to circumvent the fenced areas which could temporarily displace wildlife from the area and cause minor shifts in movement patterns while navigating around the treatment area. Migrating ungulates could attempt to jump over fences while moving (e.g., adult deer and elk) (Paige 2012). SPR BIO-11 requires use of "wildlife-friendly" fencing during prescribed herbivory which would avoid potential injury or mortality to wildlife moving in the area and allow wildlife to safely move around or over fencing, thereby minimizing potential impediments to migration or seasonal movement. SPR BIO-11 requires that fencing avoids materials that could impale or entangle wildlife (e.g., barbed, loose, or broken wires); remains electrified at all times, if it is the electric netting-type, to deter wildlife from attempting to push through the netting; and is a height that allows ungulates to easily jump over such that ungulates could identify the fence and avoid snaring their legs or antlers and resultant injury or death. This SPR would also avoid collision or entanglement by migrating birds during foraging or other movements near the ground by requiring that the fencing is marked with materials that are visible to birds, such as flagging or high-visibility tape. Smaller wildlife would be able to move through or around the fencing.

Treatments would not occur within aquatic habitat types (refer to Chapter 2, "Program Description"), but treatment could occur adjacent to aquatic wildlife movement corridors and nursery sites. Treatments could occur within riparian corridors and other terrestrial movement corridors, such as ridgelines or valleys. SPR HYD-1 requires compliance with water quality regulations and SPR HYD-4 requires WLPZs to be established on each side of watercourses which would: minimize disturbance to wildlife movement and nursery sites within aquatic and riparian habitat by limiting treatment activities within WLPZs; and protect aquatic and riparian habitat by avoiding erosion and associated sedimentation that could degrade aquatic nursery sites or sensitive riparian habitat. In addition, SPR BIO-4 would prevent riparian vegetation removal that could reduce stream shading and result in increased temperatures that could be harmful to some nurseries (e.g., developing salmonid eggs). SPR BIO-1 requires data review and a reconnaissance-level survey of the proposed treatment site to determine whether there is potential for wildlife nurseries to occur. If it is determined that wildlife nurseries may occur, then SPR BIO-10 would require surveys for nursery sites. SPR BIO-10 would minimize impacts to nursery sites by ensuring they are identified before treatment activities are implemented so they can be avoided under further measures. If nursery sites identified in surveys conducted pursuant to SPR BIO-10 occur within areas or habitats that are not avoided or protected in implementation of the SPRs, treatment of vegetation containing an active nursery site could potentially cause the removal or abandonment of a wildlife nursery. For example, treatment activities could remove or burn trees containing a bat maternity roost or a bird nesting colony. In addition, treatment-related noise and human disturbance near nursery sites could result in temporary avoidance, changes in behavior, separation of adults and young, or, if the disturbance is severe, abandonment of the nursery site. These disturbances and behavioral responses could decrease the reproductive success of the affected population.

<u>Long-Term Effects of Treatment Types</u>

Treatments would remove vegetation and change habitat structure (e.g., cover, size-class distribution) locally but would not cause substantial permanent habitat loss or degradation that would interfere substantially with movement corridors over the long term. Although the long-term effects of fuel reduction treatments on wildlife species and habitat are not fully understood (Collins et al. 2014), a large experimental study designed to evaluate how fuel treatments influenced a multitude of ecological variables in numerous forests found that wildlife and wildlife habitats were not substantially affected several years post-treatment and included variables such as species abundance, community structure, and diversity (McIver et al. 2013). Furthermore, for some species, habitat quality is likely to improve with treatment (e.g., treatment for ecological restoration purposes).

Fuel breaks, which will serve primarily as staging areas and ingress/egress areas, will be located predominately in habitats that are already fragmented or low in fuels, such as adjacent to roads, habitat edges, rocky outcrops, transition areas (e.g., from forest to shrub communities), and ridgelines. In areas such as forested environments, fuel breaks would be shaded and large trees and some other vegetation available for wildlife foraging and cover would remain. Additionally, vegetation changes resulting from non-shaded treatments would generally have minor effects on wildlife movement over the long term because non-shaded fuel breaks would be limited to a few hundred feet wide or less, which is a distance many migratory wildlife could cross without adverse effects. Predation risk for small wildlife, including reptiles, amphibians, and small mammals (e.g., rodents) may increase in fuel breaks due to reduced cover. However, this increased risk is not expected to be substantial and would not result in significant adverse effects to these wildlife species. Moreover, species like snakes and lizards are expected to favor an open understory which would facilitate in movement and basking opportunities (McIver et al. 2013).

Vegetation treatments, including fuel breaks, would not create substantial barriers to the movement of resident or migrating wildlife that utilize native habitats because treated areas would remain permeable to wildlife. Additionally, although treatment could result in some gaps in vegetation, treated areas would generally retain some of the pre-treatment vegetation that provides protection and foraging during movement. During prescribed fire treatments some existing vegetation would be retained in a mosaic pattern in forest or shrub communities (refer to Chapter 2, "Program Description"). Overall, treated areas would typically be small compared to migration corridors and likely span only a portion of a corridor or movement area such that wildlife could move through or near treated areas without substantially changing migration patterns. Although individual responses to vegetation treatment would vary, some species could benefit from treatment; for example, openings in post-fire forests were found to allow pronghorn different routes to foraging areas (Franke 2000, Shaffer et al. 2018). For example, ungulates including mule deer and bighorn sheep would be expected to benefit from a mosaic of burned and unburned habitat due to increased foraging opportunities, easier movement, and enhanced ability to detect predators within these environments (CDFW 2015b, Holl et al. 2012). SPR BIO-4 would require that treatments are designed to avoid loss or degradation of riparian habitat function, such as preventing the removal of trees and large woody debris that provide stream shading, cover, and bank stability. SPR BIO-5 requires that vegetation treatment does not result in environmental effects of type conversion from chaparral and coastal sage scrub and requires the retention of some mature native shrubs. Through these requirements, SPR BIO-4 would avoid long-term increases in stream temperature and minimize loss of riparian vegetation cover, erosion, and sedimentation that could degrade movement corridors or nursery sites within aquatic and riparian habitat. SPR BIO-5 would avoid environmental effects of type conversion of chaparral and coastal sage scrub habitats and therefore would avoid long-term loss of these habitats, which may be used for movement or nursery sites.

Treatment activities could modify, degrade, or remove important habitat features of a nursery site. Examples of important habitat requirements for nursery sites that could be affected include large trees for heron and egret rookeries, hollow trees for bat maternity roosts, and meadow and riparian areas that provide hiding cover and forage for mule deer fawning. Some wildlife populations return to the same nursery site every year (e.g., some bats, egrets) and degradation or loss of important habitat features at these locations could impede the use of the nursery site for multiple breeding seasons.

<u>Conclusion</u>

SPR HYD-1 would require compliance with water quality regulations and SPR HYD-4 would require WLPZs to be established on each side of watercourses. In addition, SPR BIO-4 would prevent vegetation removal that could reduce stream shading and require that treatments are designed to avoid loss of riparian habitat function. SPR BIO-1 would require data review and a reconnaissance-level survey of the proposed treatment site to determine whether there is potential for wildlife nurseries to occur. If it is determined that wildlife nurseries may occur, then SPR BIO-10 would require surveys for nursery sites. For prescribed herbivory treatments, SPR BIO-11 would require wildlife-friendly fencing to prevent wildlife from becoming entangled during movement. With the implementation of SPRs, treatment activities would not substantially interfere with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors. However, while implementation of SPRs would minimize impacts, treatment activities could still result in adverse effects on wildlife nurseries if these sites occur within areas or habitats that are not avoided or retained in implementation of the SPRs. Important nursery sites could be removed, degraded, or disturbed by treatment activities. Some nursery sites contain a large number of individuals and disturbance or loss of these nurseries could have a substantial effect on reproductive success and the local or regional population. This would be a **potentially significant** impact.

Mitigation Measures

Mitigation Measure BIO-5: Retain Nursery Habitat and Implement Buffers to Avoid Nursery Sites

The project proponent will implement the following measures while working in treatment areas that contain nursery sites identified in surveys conducted pursuant to SPR BIO-10:

- **Retain Known Nursery Sites.** A qualified RPF or biologist will identify the important habitat features of the wildlife nursery and, prior to treatment activities, will mark these features for avoidance and retention during treatment.
- **Establish Avoidance Buffers.** The project proponent will establish a non-disturbance buffer around the nursery site if activities are required while the nursery site is active/occupied. The appropriate size and shape of the buffer will be determined by a qualified RPF or biologist, based on potential effects of project-related habitat disturbance, noise, visual disturbance, and other factors. No treatment activity will commence within the buffer area until a qualified RPF or biologist confirms that the nursery site is no longer active/occupied. Monitoring of the nursery site by a qualified RPF or biological technician during and after treatment activities will be required. If treatment activities cause agitated behavior of the individual(s), the buffer distance will be increased, or treatment activities modified until the agitated behavior stops.

Significance after Mitigation

Implementation of Mitigation Measure BIO-5 would reduce potentially significant impacts to wildlife nursery sites because it would avoid removal of important habitat features and avoid or minimize disturbance from noise and human presence. This would retain the value and function of the nursery site such that its use by native wildlife would not be substantially impeded, thereby reducing this impact to **less than significant**.

Impact BIO-6: Substantially Reduce Habitat or Abundance of Common Wildlife, Including Nesting Birds

Vegetation treatments conducted under the CalVTP would occur in habitats that support common native bird, mammal, reptile, amphibian, and invertebrate species. Treatment activities could disturb breeding; remove or damage active nests, dens, and other breeding sites; kill or injure individuals; and temporarily reduce breeding productivity of these species. Because treatments would be implemented within relatively small proportions of the extensive ranges of common species, and suitable habitat would remain available to these species across the broader landscape surrounding treatment areas, the magnitude of these potential losses would not substantially reduce the overall abundance of any common wildlife species. Additionally, implementation of SPRs BIO-1, BIO-2, BIO-3, BIO-4, and BIO-5 would limit the loss or degradation of some high-quality breeding habitats for special-status wildlife that would also benefit common species. Therefore, treatment activities would not substantially reduce the population size of or availability of suitable breeding habitat for any common wildlife species, including nesting birds. This impact would be **less than significant**.

Suitable foraging, breeding, and sheltering habitat for common native bird, mammal, amphibian, reptile, and other animal species is ubiquitous throughout the treatable landscape. These common species do not meet the criteria for special-status species as defined in this PEIR; however, mandatory findings of significance pursuant to the CEQA Guidelines require consideration of whether a project would "substantially degrade the quality of the environment, reduce habitat of wildlife species, cause wildlife populations to drop below self-sustaining levels, or threaten to eliminate a plant or animal community." Because of the large geographic scope of the treatable landscape and numerous common wildlife species distributed throughout the state, vegetation treatments implemented under the program could disturb or otherwise affect many common native species.

The impact mechanisms, effects on individual animals, and short- and long-term effects on habitat composition, function, and structure associated with prescribed burning, mechanical treatment, manual treatment, prescribed herbivory, and herbicides described previously for Impact BIO-2 (for special-status wildlife) and Impact BIO-5 (for wildlife movement and nursery sites of common species) would also generally apply to common wildlife species. Temporary disturbances to foraging patterns, local movements, and reproductive activities of common bird, mammal, reptile, and amphibian species resulting from treatment activities would occur in some locations. However, common wildlife species are generally well-distributed, abundant, and adapted to varying levels of natural and anthropogenic disturbances. Temporary disturbances and displacement of animals associated with treatment activities would occur locally (and, in some cases, over short periods of time in a given area) and are not expected to affect significant portions of an individual's foraging or breeding range, or the overall distribution of a common species.

If treatments are implemented during the breeding season (which varies by species), active nests, dens, or other breeding sites present in the treatable landscape could be removed or damaged during manual and mechanical treatment activities, or burned directly or otherwise damaged by prescribed burning (e.g., heat scorch, smoke). These disturbances could result in reproductive failure and the direct mortality or injury of adults or young, if present. For example, common birds use essentially all terrestrial habitats and a wide variety of substrates for nesting in the treatable landscape, including trees, tree and snag cavities, shrubs, burrows, ground substrate, and grasses/herbaceous vegetation. Treatment activities that occur outside the nesting season for common birds and raptors would not remove or disturb active nests. Additionally, some common wildlife species are subject to state or federal regulatory protections. For example, native nesting birds are protected under California Fish and Game Code sections 3503 and 3503.5 and the federal MBTA. As discussed in Section 3.6.2, "Regulatory Setting", compliance these statutes is typically achieved by implementing avoidance and minimization measures to prevent project-related loss of active nests (e.g., conducting activities outside of the nesting bird season; identifying and avoiding disturbance by limiting project activities near an active nest; or monitoring active nests and delaying project activities near the nest until after young have fledged or the nest otherwise becomes inactive). If implementation of prescribed burning or other treatment activities during the nesting season resulted in the removal, damage, and disturbance of nests such that nest abandonment and injury or mortality of adults, young, or eggs occurred, the magnitude of potential treatment-related reproductive failure or mortality of common birds and other wildlife taxa would depend on several factors. These factors include the types and quality of habitats affected, the timing of vegetation removal relative to the most sensitive or vulnerable periods of a species breeding chronology (e.g., when fidelity to a breeding site is highest due to the presence of developing or immobile young), and the density of common species breeding within a treatment site.

As discussed previously, treatment activities would remove vegetation and alter habitat structure (e.g., amount of cover, size-class distribution) locally, but would not cause permanent habitat degradation or conversion to a different habitat type that would substantially reduce habitat for common wildlife species over the long term. During prescribed burning treatments, some existing vegetation would be retained in a mosaic pattern in forest or shrub communities (refer to Chapter 2, "Program Description"). In many cases, habitat quality, particularly within ecological restoration treatment areas, may improve over the long term with treatment. Although responses to vegetation changes are likely to vary and some changes to species composition could occur locally, overall abundance and diversity of common birds and other wildlife are not expected to substantially change post-treatment, based on several large experimental studies and meta-analyses (Verschuyl et al. 2011, Stephens et al. 2012, McIver et al. 2013, Newman et al. 2018). Furthermore, suitable breeding and foraging habitats for common wildlife species in the treatable landscape are generally abundant, widely distributed, and would remain available to these species across the broader landscape surrounding treatment areas.

Implementation of SPRs would reduce potential treatment-related disturbances or loss of common wildlife and would limit the loss or degradation of some high-quality habitats. SPR BIO-2 would require crew members and contractors to receive training regarding minimizing disturbances to wildlife. Additionally, SPRs designed to identify special-status species habitat (SPR BIO-1) and sensitive natural communities (SPR BIO-3), retain the habitat function and value of riparian habitat (SPR BIO-4), and avoid environmental effects of type conversion of chaparral and coastal sage scrub (SPR BIO-5), as well as compliance with protective statutes (e.g., California Fish and Game Code sections 3503 and 3503.5 and the federal MBTA), would reduce the likelihood of impacts to common species using these important habitats.

Conclusion

Common wildlife species in the treatable landscape are relatively abundant locally and regionally, and habitat subject to vegetation treatments is not considered critical or limiting to the presence or viability of common wildlife populations. Vegetation treatments implemented during the breeding season could cause reproductive failure and the direct mortality or injury of adults or young present within active treatment areas. However, because treatments would be implemented within relatively small proportions of the extensive ranges of common species, and suitable habitat would remain available to these species across the broader landscape surrounding treatment areas, the magnitude of these potential losses is not expected to substantially reduce the overall abundance of any common wildlife species. Therefore, implementation of the CalVTP would not substantially reduce the habitat, population abundance, or viability of common wildlife species, including nesting birds. This impact would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

Impact BIO-7: Conflict with Local Policies or Ordinances Protecting Biological Resources

Vegetation treatment projects implemented under the CalVTP that are subject to local policies or ordinances would be required to comply with any applicable county, city, or other local policies, ordinances, and permitting procedures related to protection of biological resources. Additionally, SPR AD-3 (Consistency with Local Plans, Policies, and Ordinances) requires that the project proponent design and implement the treatment in a manner that is consistent with applicable local plans (e.g., general plans), policies, and ordinances to the extent the project is subject to them. Therefore, the CalVTP would result in **no impact** related to potential conflict with local policies or ordinances protecting biological resources.

Most counties and cities within the treatable landscape have adopted local ordinances and policies that protect various biological resources including native trees, wetland habitats, open space corridors, and other locally significant natural resources. These ordinances and policies vary in their definitions of protected trees (e.g., certain species, minimum diameter at breast height [dbh], trees that form riparian corridors) and other resources, and in the requirements for ordinance or policy compliance.

All treatment projects implemented under the CalVTP that are subject to local policies or ordinances would be required to comply with any applicable county, city, or other local policies, ordinances, and permitting procedures related to protection of biological resources. Additionally, SPR AD-3 (Consistency with Local Plans, Policies, and Ordinances) specifically requires that the project proponent design and implement the treatment in a manner that is consistent with applicable local plans (e.g., general plans), policies, and ordinances to the extent the project is subject to them. Therefore, the CalVTP would result in **no impact** related to potential conflict with local policies or ordinances protecting biological resources.

Mitigation Measures

No mitigation is required for this impact.

Impact BIO-8: Conflict with the Provisions of an Adopted Natural Community Conservation Plan, Habitat Conservation Plan, or Other Approved Habitat Plan

Several HCPs and NCCPs have been adopted or are being planned for areas within the treatable landscape. Consistency of discretionary projects with an adopted HCP, NCCP, or other conservation plan is a legal requirement; and, the design, approval, and permitting of vegetation treatment projects under the CalVTP within an area covered by an adopted conservation plan would comply with that requirement. Therefore, approved treatment activities would result in **no impact** related to potential conflict with the provisions of adopted HCPs, NCCPs, or other approved local, regional, or state habitat conservation plans.

Nearly 100 HCPs and NCCPs (or joint HCPs/NCCPs) have been adopted or are being planned for areas within the treatable landscape across 15 ecoregions. HCPs and NCCPs provide the basis for issuance of long-term species "take" permits under Section 10 of ESA and the NCCPA, respectively. The purpose of developing an HCP or NCCP is to facilitate a permittee or project applicant in obtaining an ITP from the USFWS and/or an NCCPA permit from CDFW, and to develop a long-term conservation plan to protect and contribute to the conservation of covered species and natural communities in a plan area while allowing for covered activities that are compatible with other local policies and regulations.

For projects within the plan area of an adopted HCP or NCCP that covers multiple projects and permittees (e.g., a regional or countywide multi-species HCP/NCCP), and for activities specifically covered by the plan (i.e., covered activities) that may result in take of a species covered by the plan (i.e., covered species), an eligible applicant may obtain an ITP through voluntary participation in the HCP or NCCP if plan coverage/permit issuance is available. For activities that may result in take of a listed species but are not covered under an adopted HCP or NCCP, an applicant would pursue individual project permitting. Under the CalVTP, project-related take of any state or federally listed species would be minimized and avoided through implementation of applicable SPRs and mitigation measures (see Impacts BIO-1 and BIO-2); and, any potential instances of unavoidable take of a listed species and associated permit triggers are expected to be rare. For treatment projects that may result in take of a listed species within the plan area of an adopted HCP or NCCP available for permit coverage, whether the proposed treatments would qualify as covered activities under that plan and whether voluntary participation by the proponent would be pursued are unknown. If permitting through the plan is pursued, the eligible proponent would be required to meet the permit conditions and other requirements established in the plan's Implementing Agreement, which often includes (depending on the plan) submitting a complete application package, paying required fees, fulfilling any appropriate survey requirements, and complying with all applicable conservation measures.

Regardless of whether take of a listed species may occur and permitting is needed, treatment activities implemented within plan areas of adopted HCPs or NCCPs will be consistent with the plans. Because consistency with an adopted HCP, NCCP, or other conservation plan is a legal requirement, and because the design, approval, and permitting of vegetation treatment projects are intended and reasonably expected to comply with that requirement where applicable, approved treatment activities under the CalVTP would result in **no impact** related to potential conflict with the provisions of adopted HCPs, NCCPs, or other approved local, regional, or state habitat conservation plans.

Mitigation Measures

No mitigation is required for this impact.

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3.7 GEOLOGY, SOILS, PALEONTOLOGY, AND MINERAL RESOURCES

This section evaluates the potential for implementation of the proposed CalVTP to affect geology, soils, paleontology, and mineral resources. It summarizes the existing regulatory setting and environmental conditions within the treatable landscape using geomorphic provinces delineated by the California Geological Society (CGS). Potential impacts due the implementation of the proposed CalVTP are analyzed, and mitigation measures are provided if those impacts are determined to be significant or potentially significant.

Information used in this section includes the Natural Resources Conservation Service (NRCS) soil survey data, the U.S. Geological Survey maps and reports, scientific studies, CAL FIRE reports, and other technical reports.

Comments on the Notice of Preparation related to geology, soils, paleontology, and mineral resources included concerns about erosion and general soil stability (see Appendix A). These are addressed in the Soil Hazard section of 3.7.1, "Environmental Setting," and in Impacts GEO-1 and GEO-2.

3.7.1 Environmental Setting

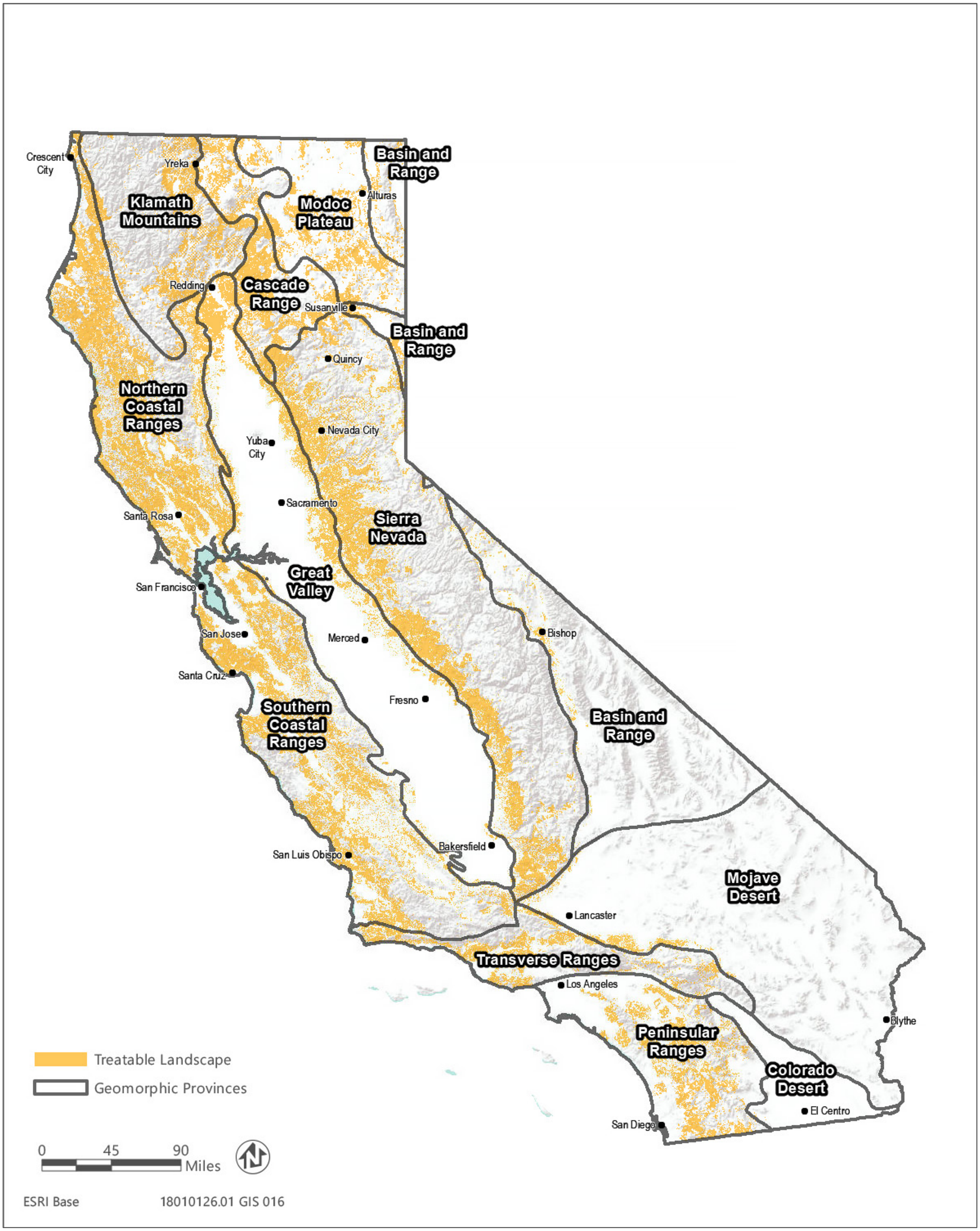
The potentially affected area with respect to geology, soils, paleontology, and minerals is the geophysical subsurface of the treatable landscape. Geology and soils influence the types of vegetation that can grow in an area which affects the type of vegetation treatments that could occur. Additionally, geology determines topography and the location of rock outcrops to which fuel breaks are often tailored. The environmental setting is described in terms of California's geomorphic provinces, tectonic setting, topography, soils, and geologic and soil hazards. For the reasons explained below under Issues Not Evaluated Further, mineral and paleontological resources, and some soil hazards (lateral spreading, subsidence, liquefaction, collapse, or expansion) are not described in detail in the environmental setting.

Treatments occur within the treatable landscape and sometimes may result in geologic hazards, such as erosion. Treatment activities currently occur within the treatable landscape and are occasionally visible to public viewers. As described in Chapter 1, "Introduction," and Section 2.3.1, "Past and Current Treatments," vegetation treatment currently occurs around the state under several other wildfire risk reduction programs implemented by various federal, state, and local agencies. In 2017–2018, CAL FIRE treated approximately 33,000 acres in California using the same treatment activities as proposed under the CalVTP.

GEOMORPHIC PROVINCES

Organizing the environmental setting into discrete regions that share general geologic and topographic characteristics aids in understanding California's diverse geology and soils within the treatable landscape. A close association exists between physiographic areas and geology in many parts of California, and in general, large contiguous areas of the state have distinctive features not shared by the adjacent terrain. These large physiographic-geologic areas have been designated "geomorphic provinces" by the CGS and are based on geology, faults, topographic relief, and climate (CGS 2002). California is divided into eleven geomorphic provinces: Great Valley, Sierra Nevada, Cascade Range, Modoc Plateau, Klamath Mountains, Transverse Ranges, Coast Ranges, Peninsula Ranges, Basin and Range, Mojave Desert, and the Colorado Desert (Figure 3.7-1).

The following section and Table 3.7-1 provide general information on the specific characteristics pertaining to each geomorphic province, including characteristic rock types, tectonic setting, topography, and treatable landscape. Geology and topography are closely linked by relationships between rock uplift rates, rock erodibility, and landscape form over geologic time. Rocks, which are the parent material for soil, also affect soil characteristics through variability in infiltration capacity and soil hydraulic conductivity due to differing proportions of sand, silt, and clay (Montgomery and Bolton 2003).



Source: Data downloaded from the California Geological Survey in 2019

Figure 3.7-1 Geomorphic Provinces

Table 3.7-1 Geomorphic Provinces of California and Their Active Faults, Topographic Setting, and Dominant Rock Type

Geomorphic Provinces	Active Faults (Tectonic Setting)	Topographic Relief	Dominant Rock Type	Treatable Landscape area (acres)[1]
Basin and Range	Death Valley Deep Springs Fort Sage Garlock Hilton Creek and related Honey Lake Little Lake Northern Death Valley Owens Valley Panamint Valley Sierra Nevada fault zone Surprise Valley White Mountains (Moderate to High)	Rugged desert country with high topographic relief. Extension and crustal spreading produce characteristic north-south trending down dropped basins and uplifted ranges. (Low to High)	Sedimentary igneous	WUI: 153,169 Fuel Break: 102,257 Ecological Restoration: 270,736 Total Area[2]: 467,111 (4.6% of province)
Colorado Desert	Brawley Imperial San Andreas Superstition Hills (High)	Depressed low-lying basin. (Low)	Sedimentary	WUI: 334 Fuel Break: 3,477 Ecological Restoration: 3,399 Total Area[2]: 6,174 (0.3% of province)
Cascade Range	Cedar Mountain Hat Creek McArthur (High)	Volcanic peaks with deeply incised rivers. (High)	Volcanic	WUI: 412,332 Fuel Break: 251,101 Ecological Restoration: 1,033,048 Total Area[2]: 1,486,889 (42% of province)
Coast Range	Bartlett Springs Buena Vista Calaveras Concord Green Valley Greenville Hayward Hunting Creek Little Salmon Hayward Hunting Creek Little Salmon Los Alamos Los Osos Nunez Ortigalita Plieto Rodgers Ck-Healdsburg San Andreas San Gregorio San Simeon Wheeler Ridge (Moderate to High)	Northwest trending rugged mountainous ranges and valleys; coastal. (Moderate to High)	Partially metamorphosed and fractured volcanic and sedimentary rocks	WUI: 3,795,098 Fuel Break: 1,213,764 Ecological Restoration: 3,623,269 Total Area[2]: 7,913,153 (41% of province)
Modoc Plateau	Cedar Mountain Hat Creek McArthur (Low)	Low relief plateau (Low to Moderate)	Basalt	WUI: 105,156 Fuel Break: 144,814 Ecological Restoration: 973,701

Table 3.7-1 Geomorphic Provinces of California and Their Active Faults, Topographic Setting, and Dominant Rock Type

Geomorphic Provinces	Active Faults (Tectonic Setting)	Topographic Relief	Dominant Rock Type	Treatable Landscape area (acres)[1]
				Total Area[2]: 1,091,522 (25% of province)
Great Valley	Buena Vista Kern Front Plieto Wheeler Ridge White Wolf **(Low)**	Nearly flat alluvial plain (Low)	Sedimentary	WUI: 1,096,970 Fuel Break: 308,903 Ecological Restoration: 241,260 Total Area[2]: 1,478,270 (11% of province)
Klamath Mountains	No Major Faults (numerous Quaternary and pre-Quaternary faults) **(Moderate)**	Rugged steep slopes **(High)**	Low to high grade metamorphosed sedimentary rocks with intrusive plutonic rocks	WUI: 328,879 Fuel Break: 137,550 Ecological Restoration: 911,453 Total Area[2]: 1,259,635 (22% of province)
Mojave Desert	Burnt Mountain Calico Eureka Peak Garlock Helendale Kickapoo Lenwood Manix Mesquite Lake Newberry fracture zone North Frontal Pinto Mountain Pisgah-Bullion Johnson Valley **(High)**	Isolated mountains with large expanses of desert plains. **(Low to Moderate)**	Sedimentary Volcanic	WUI: 147,599 Fuel Break: 75,365 Ecological Restoration: 20,785 Total Area[2]: 217,114 (1.4% of province)
Peninsular Ranges	Elsinore Newport-Inglewood Rose Canyon San Jacinto Whittier **(Moderate to High)**	Higher mountains and long valleys, often hilly in nature. **(High)**	Igneous (granite)	WUI: 891,802 Fuel Break: 251,370 Ecological Restoration: 277,595 Total Area[2]: 1,240,826 (22% of province)
Sierra Nevada	Cleveland Hill Fort Sage Garlock Hilton Creek Honey Lake Kern front Little Lake Owens Valley Sierra Nevada fault zone White Wolf **(Moderate)**	Tilted fault block with high rugged scarps. In many areas shaped by tectonic uplift (mountain building) and glacial processes (erosion). **(High)**	Igneous (granite)	WUI: 2,483,905 Fuel Break: 470,263 Ecological Restoration: 1,634,619 Total Area[2]: 4,217,450 (26% of province)
Transverse Ranges	Cucamonga Los Alamos Malibu North Frontal Pinto Mountain Raymond Hill	High rugged mountains, with long narrow valleys. **(High)**	Sedimentary Igneous	WUI: 638,713 Fuel Break: 169,894 Ecological Restoration: 204,268 Total Area[2]: 880,169 (24% of province)

Table 3.7-1 Geomorphic Provinces of California and Their Active Faults, Topographic Setting, and Dominant Rock Type

Geomorphic Provinces	Active Faults (Tectonic Setting)	Topographic Relief	Dominant Rock Type	Treatable Landscape area (acres)[1]
	Red Mountain San Andreas San Cayentano San Fernando San Gabriel Ventura (Moderate to High)			

[1] Wildland Urban Interface (WUI), Fuel break, and Ecological Restoration are described in Chapter 2, "Program Description"

[2] Total area is not the sum of the three treatment types because there is overlap between the modeled treatment types. Total area is extent of the treatable landscape and does not account for overlap of treatment types.

Sources: CGS 2002, Sutch and Dirth 2003

Basin and Range

The Basin and Range geomorphic province is characterized by roughly parallel, fault-bounded mountain ranges separated by down-dropped basins formed in response to crustal thinning and extension (CGS and CSP 2015). The Basin and Range province is a large region of alternating north-south trending faulted mountains and valley floors that encompasses the majority of the western U.S, including portions of southern Oregon, eastern California, southern portions of Arizona and New Mexico, western Texas, and the majority of Nevada. Death Valley, the lowest area in the United States (280 feet below sea level), is one of these basins (CGS 2002). Within California, the lowest point is 282 feet below sea level in Death Valley and the highest elevation is 14,252 feet above sea level at White Mountain Peak (CGS 2002). California's portion of the Basin and Range province includes three separate physiographic areas. The northernmost portion of the province is bounded by the Modoc Plateau province and the Nevada border. The middle portion of the province is bounded to the north by the Modoc Plateau province and to the south by the Sierra Nevada province. The largest and southernmost portion of the province is bounded on the west by the Sierra Nevada province, to the south by the Mojave Desert province, and to the east by the Nevada border. The Basin and Range province is cut off abruptly by the Garlock fault to the south. The treatable landscape of the Basin and Range consists of only 4.6 percent of the province. In the southern portion, the treatable landscape mostly includes area on the west side of the province near Bishop and in the Owens River Gorge. The treatable landscape in the central portion of the province includes mostly the mountain ranges south and east of Susanville and the mountainous area near the state line. The northern portion includes mostly the lower basin areas.

Cascade Range

The Cascade Range, a chain of volcanic cones, extends through Washington and Oregon into California. In California, the range is dominated by Mt. Shasta, a glacier-mantled volcanic cone, rising 14,162 feet above sea level. The Cascade Range is part of the Pacific Ring of Fire, a nearly continuous arc of intense seismicity and volcanoes around the Pacific Ocean. The southern termination of the Cascade Range is Lassen Peak, which last erupted in the early 1900s (CGS 2002). The Cascade Range is transected by deep canyons of the Pit River. The river flows through the Range between these two major volcanic cones, after winding across interior Modoc Plateau on its way to the Sacramento River (CGS 2002). The California portion of the Cascade Range province is located between the Klamath Mountains province to the west and the Modoc Plateau province to the east, and extends south from the Oregon border to the Great Valley and Sierra Nevada provinces. The northern part of the Cascade Range in California is divided into the Western Cascade Range and the High Cascade Range. The Western Cascades are composed of eroded Oligocene to Pliocene volcanic and volcaniclastic rocks overlying older Upper Cretaceous and Eocene sedimentary rocks. The volcanic rocks of the Western Cascade were faulted and tilted eastward and northeastward in the Late Miocene (du Bray et al. 2006). Erosion of the steep volcanic landforms of the Western Cascade Range reduced the region to gentle rolling hills before renewed volcanism built the High Cascade Range. All of the volcanoes of the Cascade Range and Modoc Plateau region are geologically young, and it is likely that there will be future eruptions in the region (DeCourten 2009). The Cascade Range contains the most treatable landscape area of any geomorphic province (42 percent). The treatable landscape includes both mountainous and lower lying areas. The major volcanoes (Shasta and Lassen) are excluded from the treatable landscape.

Coastal Ranges

The Coastal Ranges physiographic province extends more than 370 miles from the Transverse Ranges in the south to beyond the Oregon border in the north (DeCourten 2009). The coastal mountains in this province are all aligned in a consistent northwest trend. The Coast Ranges are generally oriented parallel to the Great Valley and Sierra Nevada provinces to the east and have a similar extent. The relatively recent emergence of the Coast Ranges was strongly affected by the evolution of the San Andreas fault system and the development of the modern transform boundary between the Pacific and North American plates (DeCourten 2009). The California Coast Ranges have traditionally been divided into northern and southern portions with the San Francisco Bay dividing the two. However, it is more meaningful to divide the Coast Ranges into northern and southern portions separated by the San Andreas fault system. The California Coast Ranges are primarily composed of Jurassic- to Cretaceous-age (about 65-150 million years old) marine sedimentary and volcanic rocks of the Franciscan assemblage. The Franciscan assemblage consists of partially metamorphosed greenstone, basalt, chert, and graywacke that originated as sea floor sediments. The coastline along this province is uplifted, wave-cut, and terraced. The eastern border of the Coast Ranges province is characterized by ridges and valleys in Mesozoic strata (CGS 2002). The Coastal Ranges contain the second largest treatable landscape of the geomorphic provinces (41 percent). The treatable landscape consists of a wide range of topography and the only larger excluded areas are populated areas and National Forest lands.

Colorado Desert

The Colorado Desert province is located to the east of the Peninsular Ranges province and west of the Mojave Desert province. Part of the boundary on the north is formed by the eastern Transverse Ranges. The eastern boundary runs along the Little San Bernardino, Orocopia, and Chocolate Mountains. The Colorado River runs through the extreme southeast corner of the province. Elevations throughout the province are low and extend below sea level in the valley bottoms. The province is a depressed block between active branches of alluvium-covered San Andreas Fault with the southern extension of the Mojave Desert on the east (CGS 2002). The Salton Trough, a northwest trending basin located completely within the province, is the largest area below sea level in the Western Hemisphere. The trough is being created due to crustal spreading. The Salton Sea, the largest lake in California, is located within the Salton trough and receives drainage from the Coachella Valley to the north and the Imperial Valley to the south. The crust beneath the Salton Sea is 10.5 miles thick, about 6 miles thinner than continental crust in other areas and is seismically active (Han et al. 2016). The Salton Trough was filled intermittently with the large ancient Cahuilla Lake during the Pleistocene. The treatable area within the Colorado Desert is the smallest of any geomorphic province (0.3 percent) and includes only small area near the western border near Ocotillo.

Great Valley

The Great Valley of California, also called the Central Valley of California or the San Joaquin-Sacramento Valley, is a nearly flat alluvial plain extending from the Tehachapi Mountains on the south to the Klamath Mountains to the north, and from the Sierra Nevada to the east to the Coast Ranges to the west. Elevations of the alluvial plain are nearly 300 feet above sea level, with extremes ranging from a few feet below sea level to about 1,000 feet above sea level (CGS 2002). The only prominent topographic feature within the central part of the valley is the Marysville (Sutter) buttes, a Pliocene volcanic plug that abruptly rises 2,000 feet above the surrounding valley floor. Geologically, the Great Valley is a large elongate northwest-trending asymmetric structural trough that has been filled with tremendously thick sequences of sediments ranging in age from Jurassic to Recent (CGS 2002). The northern part of the Valley is drained by the Sacramento River and its southern part is drained by the San Joaquin River. The basin has a regional southward tilt and is cut by two significant cross-valley faults. The northernmost fault, the Stockton fault, is the boundary used by most geologists to separate the Great Valley Basin into the Sacramento and San Joaquin River basins. The other great cross-fault lies near the southern end of the basin and is named the White Wolf fault. Only 11 percent of this province is treatable landscape and all of this area is located near the borders of other geomorphic provinces. This includes the foothills of the Sierra Nevada and Coastal Ranges.

Klamath Mountains

The Klamath Mountains province is considered to be a northern extension of the Sierra Nevada (CGS 2002). The Klamath Mountains shares with the Sierra Nevada a long history of subduction where one tectonic plate slides under another plate. As this occurs, land forms on the subducting plate are scraped off the top of the plate and get attached to the overriding plate. This process began in the Paleozoic Era during which numerous oceanic terranes collided with the western edge of North America (DeCourten 2009). The oceanic rocks and serpentinite of the Klamath Mountains represent land forms that were attached to the overriding plate during subduction. The land forms have had magma flow into them where there are areas of weakness between rocks. Studies that dated rocks in the province show the terranes are progressively younger from east to west, ranging from Devonian to Late Jurassic Periods (416 to 190 million years ago) (CGS 2015). Unlike most other geologic provinces in northern California, the Klamath Mountains lack a prominent northwest orientation. They have rugged topography with prominent peaks and ridges reaching 6,000–8,000 feet above sea level. This elevated terrain is deeply incised by the Klamath River and its tributaries (DeCourten 2009). The treatable landscape includes 22 percent of this province mostly on the east side in mountainous terrain.

Modoc Plateau

The Modoc Plateau consists of a thick accumulation of lava flows and tuff beds along with many small volcanic cones. Occasional lakes, marshes, and streams meander across the plateau. The plateau is cut by many north south faults. The province is bound indefinitely by the Cascade Range on the west and the Basin and Range on the east and south. The Modoc Plateau consists of a series of northwest to north-trending block-faulted ranges, with intervening basins filled with broad-spreading "plateau" basalt flows, or with small shield volcanoes, steeper sided lava or composite cones, cinder cones, and lake deposits resulting from disruption of the drainage by faulting or volcanism (MacDonald 1966). The Modoc Plateau contains an expanse of lava flows at an altitude of 4,000 to 6,000 feet and is considered a part of the western extent of the Great Basin that was flooded by volcanics related to the Cascade Range volcanics (MacDonald 1966). The Modoc Plateau treatable landscape consists of 25 percent of the province mostly in areas of higher elevation.

Mojave Desert

The Mojave Desert Province is a broad interior region isolated by mountain ranges separated by expanses of desert plain (CGS 2002). Valley bottoms range in elevation from 2,000-4,000 above sea level and mountains range between 3,500 and 5,000 feet. The highest elevation in the province is 7,929 feet at Clark Mountain (Sutch and Dirth 2003). The province is situated in the southeastern corner of California and bordered by the Basin and Range province and the Sierra Nevada province to the north, and the Transverse Ranges province and the Colorado Desert provinces to the southwest (Sutch and Dirth 2003). In relation to tectonics, the Mojave Desert is bordered by the Garlock fault to the north, the San Andreas Fault to the southwest, and the southern extension of the Death Valley fault zone to the east (CGS 2002). Rocks of Precambrian to late Cenozoic age are exposed across the greater Mojave Desert Province region. The area forms the southeastern extent of the Precambrian continental North America (Martin and Walker 1992). There is very little treatable landscape (1.4 percent) within the Mojave Desert province. The treatable landscape is located on the western side of the province on alluvial fans draining the Transverse Ranges and the southern Sierra Nevada.

Peninsular Ranges

The Peninsular Ranges province consists of southeast-northwest trending ranges separated by long valleys that run sub-parallel to faults branching from the San Andreas Fault (CGS 2002). The trend of topography is similar to the Coast Ranges, but the geology is more like the Sierra Nevada (CGS 2002). The Peninsular Ranges merge northward into the Los Angeles Basin, where their northwest trend eventually terminates against the east-west trending Transverse Ranges Province. The Peninsular Ranges province is bounded by the Transverse Ranges province to the north, the Colorado Desert province to the east, and the Mexico border to the south. Westward, the province does not end at the Pacific shore, but continues far out under the ocean as a broad submerged continental shelf. The treatable landscape in the Peninsular Ranges includes 22 percent of the province. The treatable area is mostly located within mountainous areas set back from the coast with two exceptions near Laguna Beach and Encinitas.

Sierra Nevada

The Sierra Nevada is a strongly asymmetric mountain range with a long gentle western slope, and a high and steep eastern escarpment. It is 50 to 80 miles wide and runs northward through eastern California for more than 400 miles, from the Mojave Desert in the south to the Cascade Range in the north. The topography of the Sierra Nevada is shaped by uplift and glacial action. The Sierra Nevada is a huge block of the earth's crust that has broken free on the east along the Sierra Nevada fault system and been tilted westward. It is overlapped on the west by sedimentary rocks of the Great Valley and on the north by volcanic sheets extending south from the Cascade Range. A blanket of volcanic material caps large areas in the northern part of the range. Most of the south half of the Sierra Nevada and the eastern part of the northern half are composed of plutonic (chiefly granitic) rocks of the Mesozoic age (DeCourten 2009). These rocks comprise the Sierra Nevada batholith, a part of an early continuous belt of plutonic rocks that extend from Baja California northward through the Peninsular Ranges and the Mojave Desert. The Sierra Nevada batholith represents the deep roots of a Mesozoic volcanic arc that developed along the western margin of North America above the Farallon subduction zone. Eroded material from the Sierra Nevada helps sustain the fertility of California's rich agricultural soils (DeCourten 2009). The treatable landscape includes 26 percent of the Sierra Nevada geomorphic province. This area is mostly located on the western slope in the foothills but also includes mountainous areas to the east in the northern portion of the province.

Transverse Ranges

The Transverse Ranges province averages 30 miles long and is nearly 300 miles wide, extending from Point Arguello eastward to the Eagle Mountains in the Colorado Desert (Sharp 1994). Mountains in the Transverse Ranges province are composed of progressively older rocks from the west to the east (Sutch and Dirth 2003). The east-west trending landscape defines the Transverse Ranges province, so named because structurally, the geologic features of this province are crosswise to the usual north-westerly trend of California topography. This characteristic is established by faults and folds that control the trend and shape of the mountains, valleys and coastline. Intense north-south compression is squeezing the Transverse Ranges (CGS 2002). As a result, this is one of the most rapidly rising regions on earth (CGS 2002). Sedimentary rocks predominate in the west and older igneous and metamorphic rocks predominate in the east (Sharp 1994). One of the largest pre-historic landslides in the nation, the Blackhawk landslide, is found within this province. This landslide is located on the north side of the San Bernardino Mountains and is five miles long and two miles wide and up to 100 feet thick. The volume of the landslide is estimated to be 370 million cubic yards in size (Sutch and Dirth 2003). The treatable landscape area includes 24 percent of the province and includes mostly mountainous terrain that is located near populated areas.

TECTONIC SETTING (FAULTING AND SEISMICITY)

The large-scale processes that move and deform the earth's crust are referred to as plate tectonics. The earth's outer layers consist of a number of rigid plates that are mobile, and the boundaries of the plates cause many of earth's deformation events (Harden 1997). California has been at an active plate boundary for 230 million years and this has been the dominant factor in California geologic history (Harden 1997). Tectonic deformation causes fractures in the upper crust and fragments bedrock into debris that is more easily weathered by surface processes (Molnar et al. 2007). Table 3.7 1 below characterizes the tectonic setting for the various geomorphic provinces. A designation of "low" indicates that tectonic activity is relatively infrequent in that province, whereas "high" indicates that tectonic activity has resulted in seismic activity, relatively high relief, and/or large scale weakening of earth materials. Provinces with active faults generally have high tectonic activity.

The lowest tectonic activity in California is associated with the Great Valley and Modoc Plateau geomorphic provinces. The tectonic setting of the Great Valley is one of a forearc basin situated between the Sierran arc and the Mesozoic subduction zone, whereas the Modoc Plateau has been subject to crustal extension (Harden 1997). The Sierra Nevada and Klamath Mountains geomorphic provinces display moderate tectonic activity. The Sierra Nevada is the recently uplifted remains of an ancient volcanic arc formed by Mesozoic subduction and accretion. The Klamath Mountains province is a result of Mesozoic subduction, accretion, and intrusion of granitic plutons (Harden 1997). Moderate to high levels of tectonic activity are present in the Transverse Ranges, Basin and Range, Peninsular Ranges, and Coast Ranges geomorphic provinces. The Transverse Ranges are presently subjected to transform plate motion and strikeslip shearing. The left-stepping bend in the San Andreas Fault has resulted in compressional forces causing some of the highest rates of uplift in the world (Harden 1997). The Basin and Range province has been subjected to crustal extension for the past 22 million years (Harden 1997) and has been subject to strong earthquakes. The Peninsular Ranges are currently subject to transform faulting and are also subject to uplift (Lewis et al. 2001). The Coast Ranges have a complex tectonic history of Mesozoic subduction and accretion, as well as Cenozoic transform plate motion associated with the San Andreas Fault. Some of highest levels of tectonic activity are associated with crustal extension in the Colorado Desert geomorphic province. This tectonic activity has resulted in features such as the Salton Trough, a pull-apart sedimentary basin that has also experienced relatively recent volcanism. The Mojave Desert province is bounded on the west by the San Andreas Fault and the north by the Garlock Fault, and has also been subjected to stretching of the crust and recent volcanism. The Cascade Range geomorphic province is associated with active subduction along the Cascadia subduction zone. Active subduction has resulted in volcanic cone formation, with the elevation of Mount Shasta exceeding 14,000 feet. High levels of tectonic activity are also associated with portions of the Coast Ranges proximal to the Mendocino Triple Junction. This portion of the Coast Ranges has been subjected to extensive deformation, crustal thickening, and relief production (Furlong and Govers 1999).

TOPOGRAPHY

The topography of California is highly varied from 282 feet below sea level in Death Valley to 14,494 feet at the peak of Mount Whitney. The mean elevation of California is approximately 2,900 feet. Topography has an important influence on geomorphic processes due to its effect on slope, which controls the hydraulic gradient of water flow, the energy of erosive runoff, as well as the driving forces for landsliding (Istanbulluoglu and Bras 2005). Topography is strongly controlled by an area’s tectonic setting (Harden 1997). In Table 3.7-1, a designation of “low” topographic relief means that the geomorphic province has relatively gentle slopes and a province with a characterization of “high” topographic relief has relatively steep slopes.

Geomorphic provinces with low topographic relief include the Colorado Desert and the Great Valley geomorphic provinces. Low to moderate topographic relief exists for the Modoc Plateau and the Mojave Desert geomorphic provinces. Low to high relief is a characteristic of the Basin and Range province, whereas the Coast Ranges province displays moderate to high topographic relief. The highest topographic relief occurs in the Klamath Mountains, Sierra Nevada, and Cascade Ranges geomorphic provinces, where maximum elevations exceed 9,000 to 14,000 feet. The topography of the treatable landscape throughout California is highly varied and includes low lying valleys, foothills, and mountainous regions.

SOILS

Soil refers to the unconsolidated, thin, variable layer of mineral and organic material, usually biologically active, that covers most of the earths land surface (Singer and Munns 1999). Soils have structural and biological properties that distinguish them from the rocks and sediment from which they normally originate (Singer and Munns 1999). Soil conditions in California reflect a diversity of geologic, topographic, climatic, temporal, and vegetative conditions that influence soil formation and composition (Jenny 1994). Instead of specific properties that define a regional soil, there is a general gradational transition between the properties of one soil compared to another often resulting in many soil types in a relatively small area. As a result, a regional evaluation of soils beyond inventory data is not informative or useful in the context of the CalVTP PEIR. Rather, a general discussion of soil properties and soil hazards that could affected the CalVTP follows.

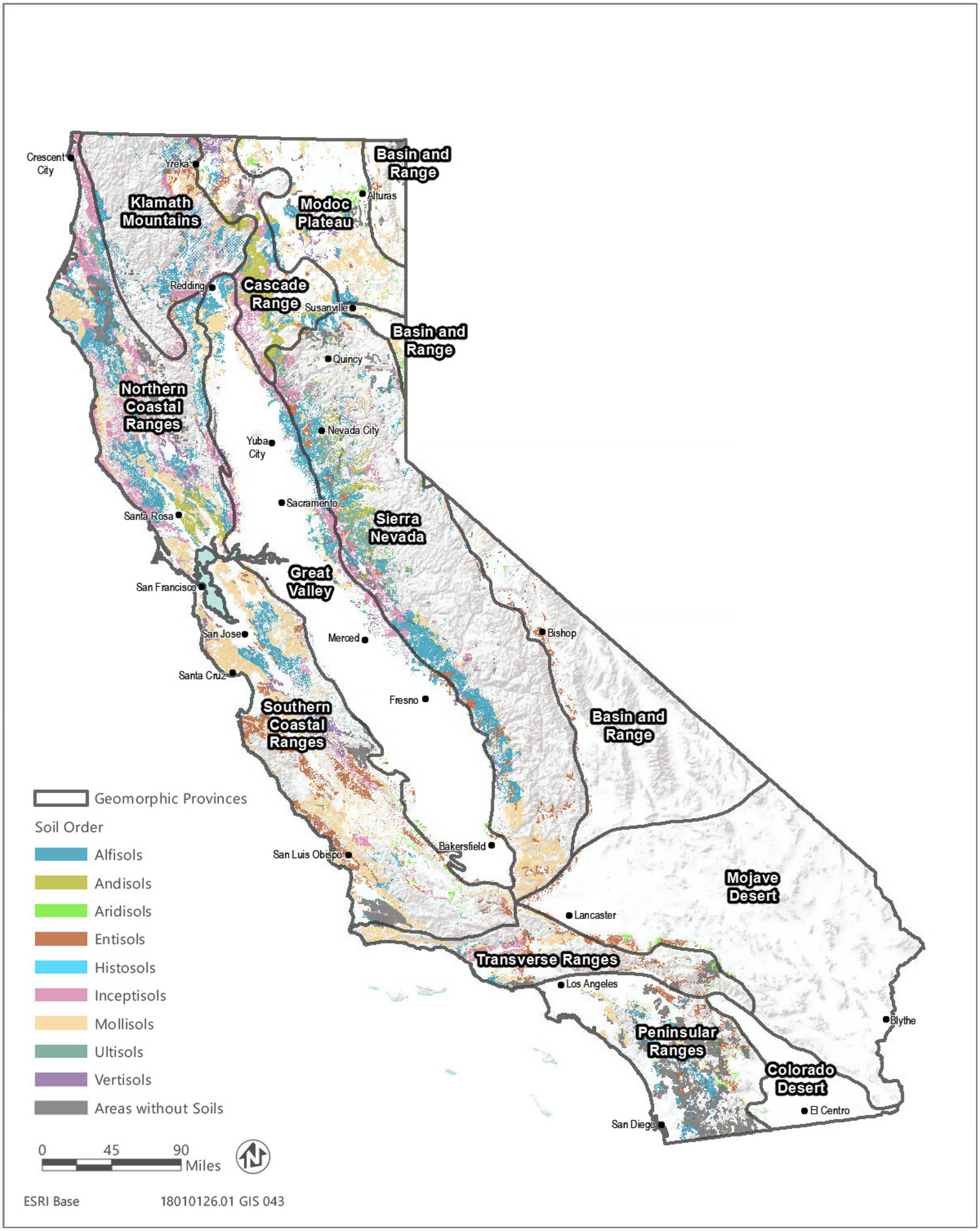
Soils can be classified using a variety of methods depending on the application of the information. Soil scientists typically use classification methods that group soils by their intrinsic properties, geologic origin, and soil behavior in different conditions. The U.S. Department of Agriculture (USDA) NRCS utilizes the USDA soil taxonomy system for the classification of soils. This classification is based on chemical, biological, and physical characteristics of soils, including soil color, texture, structure, mineralogy, salt content, and depth. For this reason, it is the most relevant method to use in classify soils for the CalVTP, especially the soil hazard rating for erosion, mudflow, and landslide potential (see “General Soil Order Descriptions,” below).

General Soil Order Descriptions

Soil Order represents the broadest category of soils using the USDA "Soil Taxonomy." Soil taxonomy is a basic system of soil classification. There are 12 soil orders, differentiated by the presence or absence of diagnostic horizons or layers; these are listed as follows and described below: Alfisols, Andisols, Aridisols, Entisols, Gelisols, Histosols, Inceptisols, Mollisols, Oxisols, Spodosols, Ultisols, and Vertisols. Orders are divided into Suborders and the Suborders are farther divided into Great Groups. Ten of the twelve soil orders can be found in California because conditions necessary for the formation of gelisols (only occur in Alaska (NRCS 2019a) or oxisols (only found on tropical and subtropical islands (NRCS 2019a) do not exist in California; these are briefly described below. As indicated below, more productive soils are more likely to support a robust vegetation community which reduces susceptibility to erosion. Figure 3.7-2 shows where each soil order occurs within the treatable landscape.

- Entisols: Entisols have little or no evidence of soil development other than presence of an identifiable topsoil horizon (Soil Science Society 2018). These are considered newly formed soils.
- Inceptisols: Inceptisols exhibit a moderate degree of soil development and lack significant clay accumulation in the subsoil. They occur over a wide range of parent materials and climatic conditions, and thus have a wide range of characteristics (Soil Science Society 2018).
- Vertisols: Vertisols have a high content of clay that shrink when drying and swell when wet which forms deep wide cracks (Singer and Munns 1999). Vertisols are considered a more productive order of soils.
- Aridisols: Aridisols form in very dry regions and are the only order that places climate as the highest level factor for classification (Singer and Munns 1999).
- Alfisols: Alfisols are moderately weathered and have accumulations of translocated clay in the subsoil which can hold and supply moisture and nutrients to plants. They are formed primarily under hardwood forest or mixed vegetative cover and are productive for most crops (Soil Science Society 2018). Alfisols are considered a more productive order of soils.
- Mollisols: Mollisols are soils with a high surface accumulation of organic matter (Singer and Munns 1999). Mollisols are considered deep and fertile and are a more productive order of soils.
- Spodosols: Spodosols are sandy and acidic. They are amorphous mixtures of organic matter and aluminum, with or without iron, have accumulated (Singer and Munns 1999). These soils are usually found in cool humid regions and on coarse textured parent material.
- Histosols: Histosols are dominantly decaying plant material in their upper portions (Singer and Munns 1999). They are mostly soils that are commonly called bogs, moors, or peats and mucks.
- Andisols: Andisols typically form from the weathering of volcanic materials such as ash, resulting in minerals in the soil with poor crystal structure. These minerals have an unusually high capacity to hold both nutrients and water, making these soils very productive and fertile (Soils Science Society 2018).
- Ultisols: Ultisols are weathered soils of warm, wet climates that are highly leached and generally infertile. They contain a subsoil accumulation of clay. Most of these soils supported mixed coniferous and hardwood forest vegetation at the time of settlement. Some are now used as cropland or pasture (NRCS 2019a).

Table 3.7-2 shows the amount (acres or percentage) of each soil order by modeled treatment area for each geomorphic province in the treatable landscape. As stated above, more productive soils are more likely to support a robust vegetation community which reduces susceptibility to erosion. The more productive soil orders (i.e., Alfisols, Andisols, Mollisols, and Vertisols) make up over 30 percent of the treatable landscape within the Basin and Range, Cascade Range, Great Valley (WUI only), Klamath Mountains, Coast Ranges, and Modoc Plateau, Sierra Nevada, and Transverse Ranges (see bolded entries in Table 3.7-2). The arid Colorado Desert (Entisol), Mojave Desert (Entisol), Peninsular Ranges (just under 30 percent in Alfisol), are the geomorphic provinces with the least treatable landscape area in productive orders.



Source: Data downloaded from NRCS in 2019; adapted by Ascent Environmental in 2019

Figure 3.7-2 Soil Orders within the Treatable Landscape

Table 3.7-2 Soil Orders by Treatable Landscape in Each Geomorphic Province

Geomorphic Provinces	Alfisols (% of treatable area)	Andisols (% of treatable area)	Aridisols (% of treatable area)	Entisols (% of treatable area)	Histosols (% of treatable area)	Inceptisols (% of treatable area)	Mollisols (% of treatable area)	Ultisols (% of treatable area)	Vertisols (% of treatable area)	Total by Province (acres)
Basin and Range	WUI: 8.1% Fuel Break: 4.8% Eco: 4.4%	WUI: 0.1% Fuel Break: 0.01% Eco: 0	WUI: 9.4% Fuel Break: 10.2% Eco: 13.3%	**WUI: 37.9%** **Fuel Break: 43.1%** Eco: 16.4%	WUI: 0 Fuel Break: 0 Eco: 0	WUI: 0.5% Fuel Break: 2.8% Eco: 0.9%	**WUI: 43.5%** **Fuel Break: 34.6%** **Eco: 55.3%**	WUI: 0 Fuel Break: 0 Eco: 0	WUI: 0 Fuel Break: 0.5% Eco: 2.6%	WUI: 153,169 (465 blank) Fuel Break: 102,257 (3,881 blank) Eco: 270,736 (19,497 blank)
Cascade Range	WUI: 15.4% Fuel Break: 16.0% Eco: 16.9%	**WUI: 36.8%** **Fuel Break: 36.9%** **Eco: 33.9%**	WUI: 0.7% Fuel Break: 0.4% Eco: 0.3%	WUI: 4.9% Fuel Break: 3.8% Eco: 4.5%	WUI: 0 Fuel Break: 0 Eco: 0	WUI: 21.9% Fuel Break: 22.2% Eco: 20.6%	WUI: 7.1% Fuel Break: 10.8% Eco: 15%	WUI: 3.9% Fuel Break: 1.6% Eco: 0.9%	WUI: 7.1% Fuel Break: 5.1% Eco: 5.2%	WUI: 412,332 (9,352 blank) Fuel Break: 251,096 (8,272 blank) Eco: 1,033,028 (28,321 blank
Colorado Desert	WUI: 0 Fuel Break: 0 Eco: 0	WUI: 0 Fuel Break: 0 Eco: 0	WUI: 0.5% Fuel Break: 43.5% Eco: 0	**WUI: 99.5%** **Fuel Break: 48.9%** **Eco: 100%**	WUI: 0 Fuel Break: 0 Eco: 0	WUI: 0 Fuel Break: 0 Eco: 0	WUI: 0 Fuel Break: 0 Eco: 0	WUI: 0 Fuel Break: 0 Eco: 0	WUI: 0 Fuel Break: 0 Eco: 0	WUI: 334 Fuel Break: 3,477 (262 blank) Eco: 3,399
Great Valley	**WUI: 42.9%** Fuel Break: 29.5% Eco: 14.9%	WUI: 0.3% Fuel Break: 0.2% Eco: 0.2%	WUI: 0.9% Fuel Break: 4.8% Eco: 0.5%	WUI: 5.8% Fuel Break: 14.6% Eco: 3.4%	WUI: 0 Fuel Break: 0 Eco: 0	WUI: 21.4% Fuel Break: 20.5% **Eco: 44.4%**	WUI: 22.2% Fuel Break: 22.3% Eco: 25.6%	WUI: 2.9% Fuel Break: 0.9% Eco: 0.5%	WUI: 2.6% Fuel Break: 6.4% Eco: 10.1%	WUI: 1,096,970 (11,304 blank) Fuel Break: 308,903 (2,922 blank) Eco: 241,260 (1,152 blank)
Klamath Mountains	**WUI: 43.3%** **Fuel Break: 38.4%** **Eco: 45.5%**	WUI: 2.3% Fuel Break: 5.1% Eco: 5.2%	WUI: 0 Fuel Break: 0 Eco: 0	WUI: 13.2% Fuel Break: 11.4% Eco: 7.6%	WUI: 0 Fuel Break: 0 Eco: 0	WUI: 19.3% Fuel Break: 26.1% Eco: 28.5%	WUI: 20.2% Fuel Break: 16.9% Eco: 10.4%	WUI: 0 Fuel Break: 0 Eco: 0	WUI: 0.3% Fuel Break: 0.1% Eco: 0.02%	WUI: 328,879 (5,048 blank) Fuel Break: 137,550 (2,868 blank) Eco: 911,448 (25,408 blank)
Modoc Plateau	WUI: 12.9% Fuel Break: 19.4% Eco: 18%	WUI: 4.5% Fuel Break: 5.8% Eco: 5.2%	WUI: 20.9% Fuel Break: 5.5% Eco: 6.4%	WUI: 1.6% Fuel Break: 1.2% Eco: 1.2%	WUI: 0 Fuel Break: 0 Eco: 0	WUI: 0.04% Fuel Break: 1.0% Eco: 0.8%	**WUI: 34.3%** **Fuel Break: 55.6%** **Eco: 57.9%**	WUI: 0 Fuel Break: 0 Eco: 0	WUI: 23.0% Fuel Break: 8.9% Eco: 6.5%	WUI: 105,156 (2,908 blank) Fuel Break: 144,814 (3,883 blank) Eco: 973,701 (38,474 blank)

Table 3.7-2 Soil Orders by Treatable Landscape in Each Geomorphic Province

Geomorphic Provinces	Alfisols (% of treatable area)	Andisols (% of treatable area)	Aridisols (% of treatable area)	Entisols (% of treatable area)	Histosols (% of treatable area)	Inceptisols (% of treatable area)	Mollisols (% of treatable area)	Ultisols (% of treatable area)	Vertisols (% of treatable area)	Total by Province (acres)
Mojave Desert	WUI: 0 Fuel Break: 0 Eco: 0	WUI: 0 Fuel Break: 0 Eco: 0	WUI: 18.2% Fuel Break: 13.9% Eco: 0.5%	**WUI: 67.7%** **Fuel Break: 75.6%** **Eco: 83.1%**	WUI: 0 Fuel Break: 0 Eco: 0	WUI: 0 Fuel Break: 0 Eco: 0	WUI: 12.7% Fuel Break: 8.2% Eco: 15.0%	WUI: 0 Fuel Break: 0 Eco: 0	WUI: 0 Fuel Break: 0 Eco: 0	WUI: 147,599 (1,889 blank) Fuel Break: 75,365 (1,680 blank) Eco: 20,785 (289 blank)
Coastal Ranges	WUI: 20.1% Fuel Break: 19.6% Eco: 26.0%	WUI: 4.1% Fuel Break: 4.0% Eco: 0.3%	WUI: 0.4% Fuel Break: 0 Eco: 0.5%	WUI: 9.6% Fuel Break: 15.0% Eco: 12.0%	WUI: 0.01% Fuel Break: 0.004% Eco: 0	**WUI: 18.2%** Fuel Break: 14.5% Eco: 20.4%	WUI: 36.7% Fuel Break: 35.7% Eco: 28.5%	WUI: 2.9% Fuel Break: 1.6% Eco: 2.1%	WUI: 4.2% Fuel Break: 5.0% Eco: 4.2%	WUI:3,792,162 (148,763 blank) Fuel Break: 1,213,572 (56,574 blank) Eco: 3,622,321 (212,431 blank)
Peninsular Ranges	WUI: 24.7% Fuel Break: 21.5% Eco: 22.4%	WUI: 0 Fuel Break: 0 Eco: 0	WUI: 1.2% Fuel Break: 4.7% Eco: 3.7%	WUI: 11.1% Fuel Break: 17.9% Eco: 25.4%	WUI: 0 Fuel Break: 0 Eco: 0	WUI: 0 Fuel Break: 0 Eco: 0	WUI: 15.7% Fuel Break: 16.3% Eco: 13.4%	WUI: 0 Fuel Break: 0 Eco: 0	WUI: 0 Fuel Break: 0 Eco: 0	WUI: 891,801 (422,146 blank) Fuel Break: 251,365 (99,337 blank) Eco: 277,595 (97,243 blank)
Sierra Nevada	**WUI: 37.8%** **Fuel Break: 33.1%** **Eco: 30.2%**	WUI: 5.1% Fuel Break: 8.7% Eco: 10.2%	WUI: 0.3% Fuel Break: 1.2% Eco: 0.4%	WUI: 11.1% Fuel Break: 10.6% Eco: 7.1%	WUI: 0 Fuel Break: 0 Eco: 0	WUI: 11.7% Fuel Break: 12.3% Eco: 15.7%	WUI: 12.3% Fuel Break: 19.7% Eco: 23.1%	WUI: 18.3% Fuel Break: 11.2% Eco: 10.2%	WUI: 0.5% Fuel Break: 0.7% Eco: 0.1%	WUI: 2,483,903 (73.518 blank) Fuel Break: 470,263 (12,163 blank) Eco: 1,634,618 (51,057 blank)
Transverse Ranges	WUI: 6.6% Fuel Break: 7.2% Eco: 7.1%	WUI: 0 Fuel Break: 0 Eco: 0	WUI: 1.6% Fuel Break: 1.5% Eco: 0.8%	WUI: 28.1% **Fuel Break: 32.4%** Eco: 20.5%	WUI: 0 Fuel Break: 0 Eco: 0	WUI: 14.8% Fuel Break: 12.9% Eco: 20.9%	**WUI: 41.2%** **Fuel Break: 38.1%** **Eco: 43.3%**	WUI: 0 Fuel Break: 0 Eco: 0	WUI: 0 Fuel Break: 0 Eco: 0	WUI: 638,513 (49,111 blank) Fuel Break: 169,821 (13,238 blank) Eco: 204,253 (14,982 blank)

Sources: Compiled by Ascent Environmental in 2019 from data downloaded from NRCS in 2019

GEOLOGIC AND SOIL HAZARDS

The CalVTP does not propose any development that would be affected by lateral spreading, subsidence, liquefaction, collapse, or expansion. For this reason, these soil hazards are not discussed further in the document.

Landslides

Unstable hillslopes are areas susceptible to landsliding. Landslides consist of the downslope movement of soil and rock under the influence of gravity. The geologic and topographic features of the landscape are the primary determinants of the shear strength of the hillslope materials (i.e., resistance to landslides) and hillslope shear stress (i.e., propensity for landsliding). Landslides occur when the shear stress exceeds the shear strength of the materials forming the slope (Highland and Bobrowsky 2008). Factors contributing to high shear stress on hillslopes include steep slopes, high mass loading (e.g., through high soil moisture levels or placement of fill material), slope undercutting (e.g., through erosion or excavation), and soils that vary in volume (shrink and swell) in relation to moisture content. Factors contributing to low shear strength of hillslope materials include bedding planes that dip in the same direction as the slope at the same or a lesser degree of steepness, high water pressure in soil pores (e.g., saturated soil underlain by a restrictive layer), presence of faults or joints, and weak materials (e.g., soft soils or rock, unconsolidated materials, fine grain size) (Highland and Bobrowsky 2008). Climate and vegetative cover also affect landslide hazard because of their influence on soil root support, which resists landsliding, and hillslope moisture, which drives landsliding (Istanbulluoglu and Bras 2005).

The best indicator of high landslide potential is evidence of previous landsliding (Highland and Bobrowsky 2008). Landslides can be classified as active or dormant, based on how recently they have moved. Active landslides typically display cracks or sharp, bare scarps. Vegetation is usually sparser on active landslides than on adjacent stable ground; if trees are present, they are usually "jackstrawed" (i.e., leaning), indicating that ground movement has occurred since they became established. Dormant landslide features have typically been modified by weathering, erosion, and vegetative growth and succession. Active landslides are generally more unstable than dormant landslides and may require mitigation measures to avoid mobilization. Excavation, the use of heavy equipment, soil saturation, or the removal of root support can mobilize active landslides. Although dormant landslides are less likely to be mobilized by human activities, portions of dormant landslides (e.g., their steep headwalls and margins) are often unstable.

Several types of landslides and associated landforms can be associated with vegetation management in California and are described below. These landforms have distinct hazard indicators and require special management practices to reduce the hazard.

- Translational and rotational landslides are moderate or slow, relatively deep-seated movements of typically cohesive rock masses. Translational slides consist of downward displacements of material parallel to the ground surface; they commonly occur along bedding planes, faults, and contacts between bedrock and overlying deposits. Rotational slides (or "slumps") occur along a well-defined curved surface and are likely to occur in incompetent, clayey bedrock material under saturated soil conditions. Most translational and rotational slides feature a nearly vertical scarp near their head or sides. Slide deposits are typically hummocky. The presence of sag ponds or water loving vegetation may indicate the impaired drainage that is characteristic of slide deposits.
- Earth flows consist of the slow movement of saturated soil and debris, often following a slump. They are composed of clay-rich materials that swell when wet, thus reducing intergranular friction and shear strength. They usually occur in areas where low soil permeability restricts groundwater movement. They often feature hummocky, highly erodible surfaces.
- Debris slides refer to the movement of unconsolidated material along a shallow, flat failure plane. They usually occur on slopes exceeding 65 percent where shallow bedrock forms an impervious layer that concentrates water near the surface. Debris slides often occur during intense storms in response to excessive pore water pressure within the saturated surface layer. As with other landslides, the presence of bedding planes aligned parallel to the slope is an indicator of high debris slide hazard.

- Debris slides are characterized by unconsolidated rock, colluvium, and soil that has moved downslope along a relatively shallow translational failure plane (Highland and Bobrowsky 2008). Although areas within these landforms are typically well-vegetated, they usually also feature debris slide scars, incised depressions, areas of active debris sliding, and exposed bedrock.
- Debris flows are often initiated by the discharge of material into a stream channel from debris slides on adjacent hillslopes or by failure of fill materials at stream crossings caused by high flows. Debris flows are commonly caused by debris sliding or the failure of fill materials along stream crossings in the upper part of a drainage during high intensity storms (Highland and Bobrowsky 2008). Post-fire debris flows are well noted in the Transverse and Peninsular Ranges provinces (Oakley et al. 2017).
- Inner gorges are over steepened stream banks extending from the stream channel to the first break in the slope above the channel. The slope generally exceeds 65 percent and is formed by debris sliding and erosion caused primarily by the down cutting of the stream channel and undercutting of landslide toes by stream erosion (CGS 2013).

Landslide susceptibility is the relative likelihood that landsliding will occur. For the purposes of demonstrating landslide susceptibility for the affected area, landsliding can be broken into two categories; shallow-seated and deep-seated landsliding. Shallow-seated landsliding occurs in the regolith – the unconsolidated earth material and soil overlying bedrock. Deep-seated landsliding occurs below the regolith and includes failure into bedrock. Shallow landsliding typically occurs on slopes greater than 65 percent (CGS 2013), and in steep, convergent areas. Deep-seated landsliding is primarily a function of rock strength and slope, but it is also affected by precipitation and earthquake potential (CGS 2013). Shallow-landsliding occurrence is most likely to occur in the mountainous portions of the Coast Ranges, Klamath Mountains, Transverse Ranges, and the Sierra Nevada. Figure 3.7-3 shows the modeled susceptibility for deep-seated landsliding performed by the California Geological Survey (2013). Figure 3.7-3 indicates that the highest susceptibility for deep-seated landsliding is in the Coast Ranges, Klamath Mountains, and Transverse Ranges provinces. The treatable landscape in the Coast Ranges and Transverse Ranges provinces include overlap with areas susceptible for deep-seated landsliding. The majority of the Klamath Mountains treatable area is located in the east of the province where landslide susceptibility is more moderate.

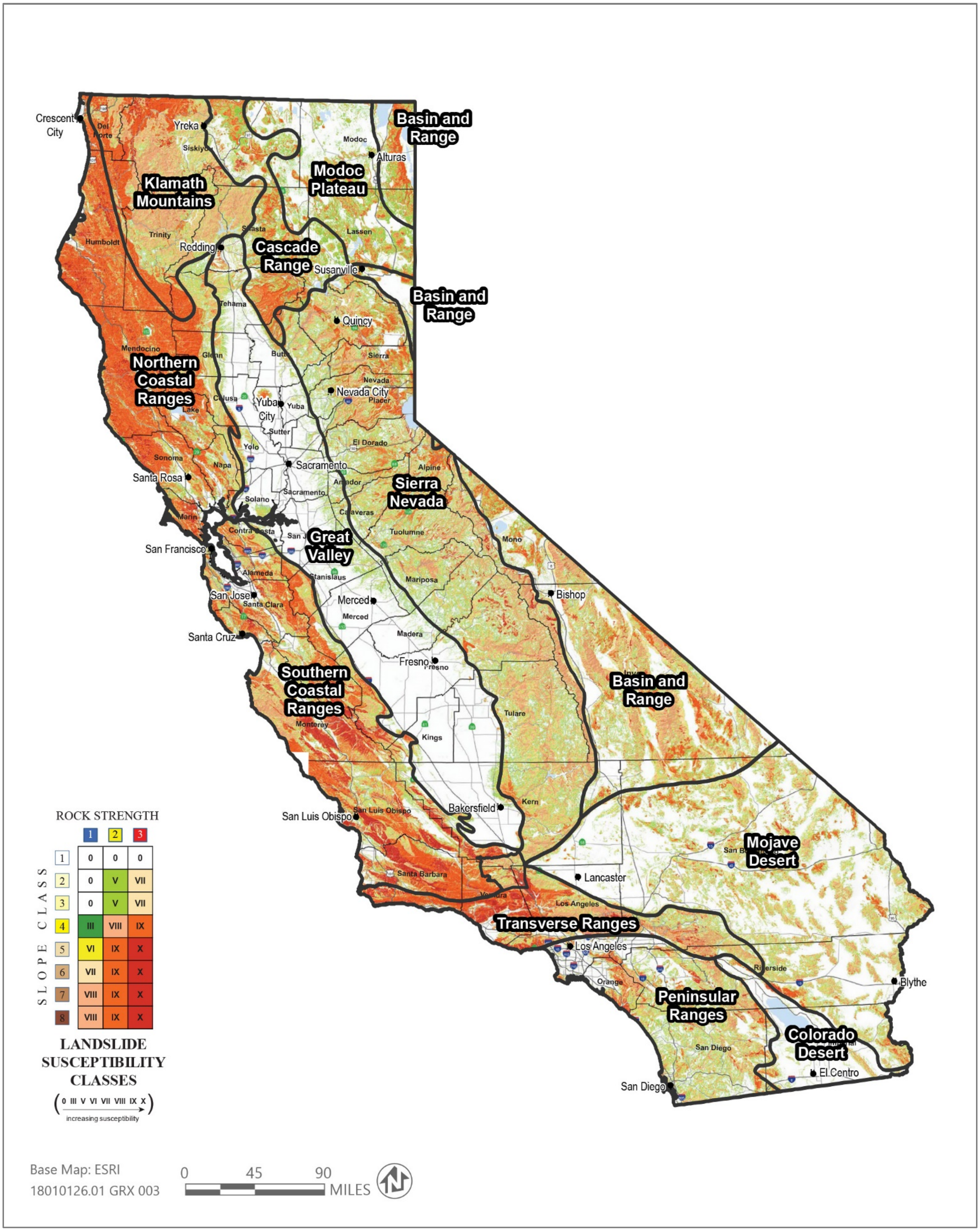
Wildfire and Landslide Risk

Moderate to high severity wildfire can greatly increase the likelihood of debris sliding and debris flows (Haas et al 2017). Wildfire can significantly alter the hydrologic response of a watershed to the extent that even modest rainstorms can produce dangerous flash floods and debris flows. The joint probability of a wildland fire event followed by a debris flow is driven by many factors. The debris-flow potential after a fire is a function of the percent of area that burned at a moderate to high severity (Haas et al. 2017). In existing models, the primary variable connecting a wildfire and a subsequent debris flow is the amount of a watershed that burns with moderate to high severity (Haas et al. 2017).

Fires that burn with low severity can maintain soil cover, mineralize important nutrients from plant matter stored on the soil surface, reduce fuel loads leading to possible future high burn severity, and stimulate herbaceous vegetation helping to facilitate nutrient cycling. Moderate to high-severity fires can cause a loss of soil hydrologic function by sealing pores and degrading soil structure; it can cause a loss of soil productivity by processes of erosion, mass-wasting, and nutrient volatization and allow exotic plants to establish which can affect soil productivity.

Soil Erosion

Soil erosion is caused by the detachment and entrainment of soil particles through the action of water and wind and can be classified into four general types: rain splash, sheet, rill, and gully erosion. Sheet erosion is the removal of soil of a generally uniform depth across a slope and is caused by non-concentrated runoff. Rill erosion refers to the removal of soil in shallow (i.e., less than approximately 6 inches deep), usually parallel, channels from a slope and is caused by concentrated runoff. Gully erosion consists of removal of soil from deeper channels and is also caused by concentrated runoff. Although usually less conspicuous than rill and gully erosion, sheet erosion tends to result in



Source: Willis et al. 2011

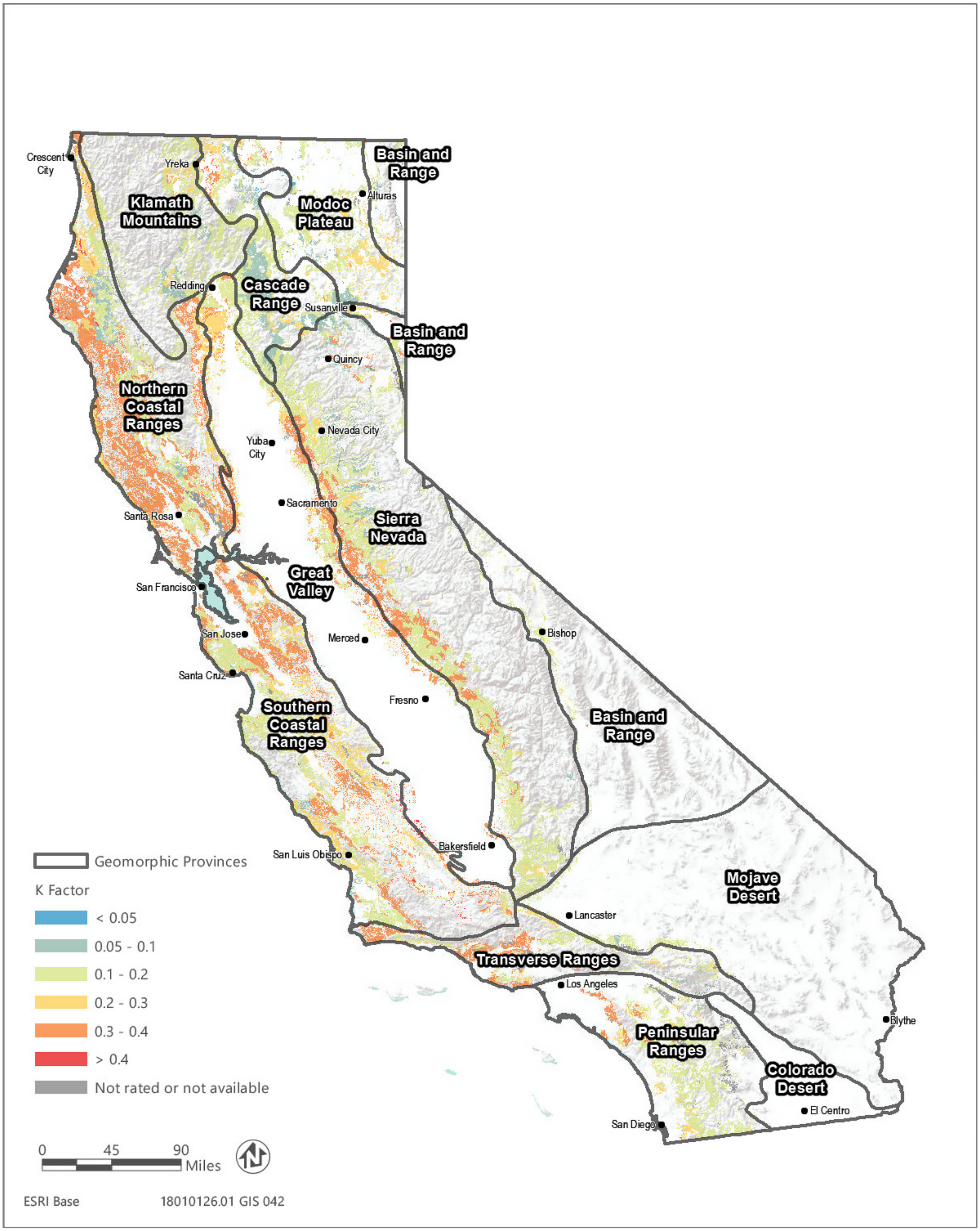
Figure 3.7-3 Landslide Susceptibility

greater soil loss over a wide area. Soils most susceptible to erosion are those high in coarse silt- and fine sand-sized particles (Balasubramanian 2017), particularly when organic matter content is low and soil structure is weak or nonexistent. The likelihood of erosion is greater when the vegetative cover is removed or reduced, the soil is otherwise disturbed, or when both of these conditions exist. Soil erosion by water is more aggressive on steep slopes than on shallow slopes (e.g., 10 percent gradient or less), because at lower slope gradients surface runoff cannot reach peak velocities necessary to erode the soil. In general, areas with less vegetative cover are more prone to soil erosion than heavily vegetated areas, because surface cover and additional soil structure from plant roots can reduce soil erosion potential. Soil erosion can also be caused by wind in areas with a combination of high winds, removed or disturbed vegetation, fine sandy or silty textures, and low organic matter content. The erosion rate of a particular soil in the absence of human activities is referred to as the natural (background) or geologic erosion rate. Soil erosion in excess of the natural erosion rate is called accelerated soil erosion and is usually caused by human activities such as cultivation, grazing, timber harvesting, poor road construction practices, grading, and other land-disturbing activities. Additionally, surface erosion from high severity wildfire can increase runoff and erosion rates by two or more orders of magnitude relative to unburned conditions (Robichaud et al. 2010).

Erodibility by water is calculated using the K factor, an index which quantifies the relative susceptibility of the soil to sheet and rill erosion. Soil properties affecting the K factor include texture, organic matter content, structure, and saturated hydraulic conductivity, and values range from 0.02 for the least erodible soils to 0.64 for the most erodible (NRCS 2019b). In California the Transverse Ranges, Peninsular Ranges, Sierra Nevada, Coastal Ranges, Klamath Mountains, and Cascade Range geomorphic provinces are the most susceptible to erosion (Figure 3.7-4). The treatable landscape within the Transverse Ranges overlaps with the areas most susceptible to erosion throughout the province, with the exception of the area with very high erodibility risk in the north central part of the province which is not in the treatable area. In the Peninsular Ranges, the high erodibility risk areas in the central portion of the province overlaps with the treatable area. The high erodibility risk of the western slope of the Sierra Nevada overlaps the treatable area. In the northern portion of the Coastal Ranges, the high erodibility risk area overlaps with the treatable landscape. In the southern portion of the Coastal Ranges, the areas of highest erodibility risk are not in the treatable landscape, but there are some areas of overlap. The Klamath Mountains have high erodibility risk throughout the province with slightly higher risk of erosion in the east which includes the treatable landscape. The Cascade Range has a high erodibility risk in the central and southern portions of the province which include the treatable landscape.

Wildfire and Erosion Risk

The Forest and Range 2003 Assessment (FRAP 2003) used a modified form of the universal soil loss equation to predict soil loss as a result of wildfire throughout California. The inputs into this model include steepness, soil friability, expected fire intensity, and expected storm intensity. Most mountainous areas of the State are likely to result in High or Very High levels of post-wildfire erosion (FRAP 2003). The South Coast chaparral region has the highest risk of the erosion Statewide along with the highest expected frequencies of wildfire (FRAP 2003).



Source: Data downloaded from NRCS in 2019; adapted by Ascent Environmental in 2019

Figure 3.7-4 Erosion Susceptibility within the Treatment Landscape

3.7.2 Regulatory Setting

FEDERAL

Paleontological Resources Preservation Act (16 U.S.C. Section 470aaa)

Enacted as part of the Omnibus Public Land Management Act (2009), the Paleontological Resources Preservation Act (PRPA) requires the Secretaries of the Interior and Agriculture to manage and protect paleontological resources on federal land using scientific principles and expertise. The PRPA includes specific provisions addressing management of these resources by the Bureau of Land Management, the National Park Service, the Bureau of Reclamation, the U.S. Fish and Wildlife Service, and the U.S. Forest Service of the Department of Agriculture. The PRPA affirms the authority for many of the policies the federal land managing agencies already have in place for the management of paleontological resources, such as issuing permits for collecting paleontological resources, curation of paleontological resources, and confidentiality of locality data.

Earthquake Hazards Reduction Act (Public Law 95-124, 42 U.S.C. 7701 et. Seq)

The purpose of this Act to reduce the risks of life and property from future earthquakes in the United States through the establishment and maintenance of an effective earthquake hazards reduction program. The objectives of the program include: (1) the education of the public; (2) the development of technologically and economically feasible design and construction methods and procedures; (3) the implementation of a system for predicting damaging earthquakes and for identifying seismic hazards; (4) the development of model building codes; (5) the development of methods of mitigating the risks from earthquakes; (6) increase the use of existing scientific and engineering knowledge to mitigate earthquake hazards; and (7) the development of ways to assure the availability of affordable earthquake insurance.

Clean Water Act (33 USC Section 1251 Et Seq.)

The Federal Water Pollution Control Act of 1948 was the first major U.S. law to address water pollution. Growing public awareness and concern for controlling water pollution led to sweeping amendments in 1972. As amended in 1972, the law became commonly known as the Clean Water Act (CWA). The CWA serves as the primary federal law protecting the quality of the nation's surface waters, including wetlands. The CWA provides standard regulations for the discharge of pollutants to the waters of the United States (U.S.) in order to maintain their chemical, physical, and biological integrity and protect their beneficial uses. In addition, the CWA provides the statutory basis for the National Pollutant Discharge Elimination System (NPDES). The CWA requires states to adopt water quality standards that must be approved by the U.S. Environmental Protection Agency (EPA) and requires NPDES permits for the discharge of pollutants in U.S. waters. In addition, the CWA gives authority to the EPA to (1) implement pollution control programs, including setting waste water standards and effluent limits on an industry-wide basis; and (2) authorize the NPDES Permit Program permitting, administration, and enforcement to state governments with oversight by the EPA.

Federal Antidegradation Policy (Code of Federal Regulations – Title 40: Protection of Environment 40 CFR 131.12)

The Federal Antidegradation Policy was issued in 1968 by the U.S. Department of the Interior to (1) ensure that activities will not lower the water quality of existing use, and (2) restore and maintain "high quality water." The federal policy maintains that states shall adopt a statewide antidegradation policy that includes the following conditions:

- Existing instream water uses and a level of water quality necessary to maintain those uses shall be maintained and protected.
- Water quality will be maintained and protected in waters that exceed water quality levels necessary for supporting fish, wildlife, and recreational activities, and water quality, unless the State deems that water quality levels can be lowered to accommodate important economic or social development. In these cases, water quality levels can only be lowered to levels that support all existing uses.

- Where high quality waters constitute an outstanding National resource, such as waters of National and State parks and wildlife refuges and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected.

STATE

Alquist-Priolo Earthquake Fault Zoning Act (Cal. Public Res. Code, Section 2621 et seq.)

This act provides policies and criteria to assist cities, counties, and state agencies in the exercise of their responsibilities to prohibit the location of developments and structures for human occupancy across the trace of active faults. The act also requires site-specific studies by licensed professionals for some types of proposed construction within delineated earthquake fault zones.

Porter-Cologne Water Quality Act (Cal. Water Code Div. 7)

The Porter-Cologne Water Quality Act is a key element of California water quality control legislation. Under the act, the State Water Resources Control Board (SWRCB) is given authority over state water rights and water quality policy and it established the State's nine regional water quality control boards (RWQCBs) to regulate and oversee regional and local water quality issues. The RWQCB is also responsible for developing and updating Basin Plans targeted toward (1) protecting waters designated with beneficial uses, (2) establishing water quality objectives for surface water and groundwater, and (3) determining actions necessary to maintain water quality standards and control point- and nonpoint-sources of pollution into the State's waters. Under the Act, proposed waste dischargers are required to file Reports of Waste Discharge to the RWQCB and the SWRCB and RWQCB are granted jurisdiction over the issuance and enforcement of Waste Discharge Requirements, NPDES permits, and Section 401 water quality certifications.

California State Antidegradation Policy (SWRCB Resolution No. 68-16, "Policy with Respect to Maintaining higher quality waters in California")

In 1968, the State of California adopted an antidegradation policy in response to directives under the Federal Antidegradation Policy. The antidegradation policy applies to high quality waters of the State, including surface waters and groundwater, and all existing and potential uses. The policy requires that high quality waters be maintained to the maximum extent possible and any proposed activities that can adversely affect high quality surface water and groundwater must (1) be consistent with the maximum benefit to the people of the State, (2) not unreasonably affect present and anticipated beneficial use of the water, and (3) not result in water quality less than that prescribed in water quality plans and policies.

California Coastal Act

The California Coastal Commission's coastal zone generally extends 1,000 yards inland from the mean high tide line. In significant coastal estuarine habitat and recreational areas, it extends inland to the first major ridgeline or five miles from the mean high tide line, whichever is less. In developed urban areas, the boundary is generally less than 1,000 yards.

The Coastal Commission's coastal program uses a variety of planning, permitting, and nonregulatory mechanisms to manage its coastal resources. The Coastal Commission implements a well-established permitting and planning program, including issuing CDPs, reviewing local governments' Local Coastal Programs, reviewing appeals of locally permitted CDPs, and, under the Coastal Zone Management Act, federal consistency reviews of federal agency, federally permitted, and federally funded (to state and local government) activities.

Z'berg-Nejedly Forest Practice Act

Although the proposed CalVTP excludes timber removal for commercial purposes, the Z'berg -Nejedly Forest Practice Act (Forest Practice Act) may be pertinent as it relates to identifying operating methods and procedures that seek to protect fish, wildlife, forests, and streams within timber harvesting areas where qualifying CalVTP treatments may also be implemented. The Forest Practice Act is intended to achieve "maximum sustained production of high-quality timber products…while giving consideration to values relating to recreation, watershed, wildlife, range and forage, fisheries, regional economic vitality, employment and aesthetic enjoyment" (PRC Section 4513[b]). The regulations created by the Forest Practice Act define factors such as the: size and location of harvest areas, include measures to prevent unreasonable damage to residual trees, and address the protection of riparian areas, water courses and lakes, wildlife, and habitat areas.

LOCAL

When state agencies, including CAL FIRE, are conducting governmental activities under the authority of state law or the State Constitution, in this case, treatments implemented under the CalVTP, they are not subject to local government plans, policies, and ordinances (unless a constitutional provision or statute directs otherwise). Nonetheless, CAL FIRE voluntarily seeks to operate consistently with local governance to the maximum extent feasible. Given its statewide extent and the possible number of local and regional responsible agencies, this PEIR does not identify potentially applicable local government plans, policies, and ordinances. Types of local regulations relevant to geology, soils, paleontology, and mineral resources include general plans, city and county codes, and other local ordinances. This PEIR assumes that any vegetation treatments proposed by local or regional agencies under the CalVTP would be consistent with local plans, policies, and ordinances to the extent the project is subject to them, as required by SPR AD-3.

3.7.3 Impact Analysis and Mitigation Measures

ANALYSIS METHODOLOGY

With regard to geology and soils, the impact analysis focuses on the changes to the existing or baseline geologic and soil conditions in the context of the thresholds of significance listed below. Impacts are assessed by evaluating potential impacts from unstable geology and soils, earthquakes, and landslides associated with the implementation of the CalVTP.

This analysis considers impacts of vegetation treatment under the proposed program on geologic and soil resources. Significance determinations assume that project proponents implementing qualifying treatments under the CalVTP would comply with relevant federal, state, and local ordinances and regulations to the extent the project is subject to them. Significance determinations also account for the influence of relevant SPRs, which are incorporated into treatment design.

- SPR AD-3 Consistency with Local Plans, Policies, and Ordinances: The project proponent will design and implement the treatment in a manner that is consistent with applicable local plans (e.g., general plans), policies, and ordinances to the extent the project is subject to them. This SPR applies to all treatment activities and treatment types.
- SPR AQ-3 Create Burn Plan: The project proponent will create a burn plan using the CAL FIRE burn plan template for all prescribed burns. The burn plan will include a fire behavior model output of First Order Fire Effects Model and BEHAVE or other fire behavior modeling simulation and that is performed by a qualified fire behavior technical specialist that predicts fire behavior, calculates consumption of fuels, tree mortality, predicted emissions, greenhouse gas emissions, and soil heating. The project proponent will minimize soil burn severity from broadcast burning to reduce the potential for runoff and soil erosion. The burn plan will be created with input from a qualified technician or certified State burn boss. This SPR applies only to prescribed burning treatment activities and all treatment types.
- SPR AQ-4 Minimize Dust: To minimize dust during treatment activities, the project proponent will implement the following measures:
  - Limit the speed of vehicles and equipment traveling on unpaved areas to 15 miles per hour to reduce fugitive dust emissions, in accordance with the California Air Resources Board (CARB) Fugitive Dust protocol.

- If road use creates excessive dust, the project proponent will wet appurtenant, unpaved, dirt roads using water trucks or treat roads with a non-toxic chemical dust suppressant (e.g., emulsion polymers, organic material) during dry, dusty conditions. Any dust suppressant product used will be environmentally benign (i.e., non-toxic to plants and will not negatively impact water quality) and its use will not be prohibited by CARB, EPA, or the State Water Resources Control Board (SWRCB). The project proponent will not over-water exposed areas such that the water results in runoff. The type of dust suppression method will be selected by the project proponent based on soil, traffic, site-specific conditions, and air quality regulations.
- Remove visible dust, silt, or mud tracked-out on to public paved roadways where sufficient water supplies and access to water is available. The project proponent will remove dust, silt, and mud from vehicles at the conclusion of each workday, or at a minimum of every 24 hours for continuous treatment activities, in accordance with Vehicle Code Section 23113.
- Suspend ground-disturbing treatment activities, including land clearing and bulldozer lines, when there is visible dust transport (particulate pollution) outside the treatment boundary, if the particulate emissions may "cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or that endanger the comfort, repose, health, or safety of any of those persons or the public, or that cause, or have a natural tendency to cause, injury or damage to business or property," per Health and Safety Code Section 41700.

This SPR applies to all treatment activities and treatment types.

- SPR GEO-1 Suspend Disturbance during Heavy Precipitation: The project proponent will suspend mechanical, prescribed herbivory, and herbicide treatments if the National Weather Service forecast is a "chance" (30 percent or more) of rain within the next 24 hours. Activities that cause mechanical soil disturbance may resume when precipitation stops and soils are no longer saturated (i.e., when soil and/or surface material pore spaces are filled with water to such an extent that runoff is likely to occur). Indicators of saturated soil conditions may include, but are not limited to: (1) areas of ponded water, (2) pumping of fines from the soil or road surfacing, (3) loss of bearing strength resulting in the deflection of soil or road surfaces under a load, such as the creation of wheel ruts, (4) spinning or churning of wheels or tracks that produces a wet slurry, or (5) inadequate traction without blading wet soil or surfacing materials. This SPR applies only to mechanical, prescribed herbivory, and herbicide treatment activities and all treatment types.
- SPR GEO-2 Limit High Ground Pressure Vehicles: The project proponent will limit heavy equipment that could cause soil disturbance or compaction to be driven through treatment areas when soils are wet and saturated to avoid compaction and/or damage to soil structure. Saturated soil means that soil and/or surface material pore spaces are filled with water to such an extent that runoff is likely to occur. If use of heavy equipment is required in saturated areas, other measures such as operating on organic debris, using low ground pressure vehicles, or operating on frozen soils/snow covered soils will be implemented to minimize soil compaction. Existing compacted road surfaces are exempted as they are already compacted from use. This SPR applies only to mechanical treatment activities and all treatment types.
- SPR GEO-3 Stabilize Disturbed Soil Areas: The project proponent will stabilize soil disturbed during mechanical and prescribed herbivory treatments with mulch or equivalent immediately after treatment activities, to the maximum extent practicable, to minimize the potential for substantial sediment discharge. If mechanical or prescribed herbivory treatment activities could result in substantial sediment discharge from soil disturbed by machinery or animal hooves, organic material from mastication or mulch will be incorporated onto at least 75 percent of the disturbed soil surface where the soil erosion hazard is moderate or high, and 50 percent of the disturbed soil surface where soil erosion hazard is low to help prevent erosion. Where slash mulch is used, it will be packed into the ground surface with heavy equipment so that it is sufficiently in contact with the soil surface. This SPR only applies to mechanical and prescribed herbivory treatment activities and all treatment types.
- SPR GEO-4 Erosion Monitoring: The project proponent will inspect treatment areas for the proper implementation of erosion control SPRs and mitigations prior to the rainy season. Additionally, the project proponent will inspect for evidence of erosion after the first large storm or rainfall event (i.e., ≥ 1.5 inches in 24

hours) as soon as is feasible after the event. Any area of erosion that will result in substantial sediment discharge will be remediated. This SPR applies only to mechanical and prescribed burning treatment activities and all treatment types.

- **SPR GEO-5 Drain Stormwater via Water Breaks:** The project proponent will drain compacted and/or bare linear treatment areas capable of generating storm runoff via water breaks using the spacing and erosion control guidelines contained in Sections 914.6, 934.6, and 954.6(c) of the California Forest Practice Rules. Where waterbreaks cannot effectively disperse surface runoff, including where waterbreaks cause surface run-off to be concentrated on downslopes, other erosion controls will be installed as needed to comply with 14 CCR 914 [934, 954]. This SPR applies only to mechanical, manual, and prescribed burn treatment activities and all treatment types.
- **SPR GEO-6 Minimize Burn Pile Size:** The project proponent will not create burn piles that exceed 20 feet in length, width, or diameter, except when on landings, road surfaces, or on contour to minimize the spatial extent of soil damage. In addition, burn piles will not occupy more than 15 percent of the total treatment area (Busse et al. 2014). The project proponent will not locate burn piles in a Watercourse and Lake Protection Zone as defined in 14 CCR Section 916.5 of the California Forest Practice Rules. This SPR applies to mechanical, manual, and prescribed burning treatment activities and all treatment types.
- **SPR GEO-7 Minimize Erosion:** To minimize erosion, the project proponent will:

  (1) Prohibit use of heavy equipment where any of the following conditions are present:

  (i) Slopes steeper than 65 percent.

  (ii) Slopes steeper than 50 percent where the erosion hazard rating is high or extreme.

  (iii) Slopes steeper than 50 percent that lead without flattening to sufficiently dissipate water flow and trap sediment before it reaches a watercourse or lake.

  (2) On slopes between 50 percent and 65 percent where the erosion hazard rating is moderate, and all slope percentages are for average slope steepness based on sample areas that are 20 acres, or less, heavy equipment will be limited to:

  (i) Existing tractor roads that do not require reconstruction, or

  (ii) New tractor roads flagged by the project proponent prior to the treatment activity.

  This SPR applies to all treatment activities and all treatment types.
- **SPR GEO-8 Steep Slopes**: The project proponent will require a Registered Professional Forester (RPF) or licensed geologist to evaluate treatment areas with slopes greater than 50 percent for unstable areas and unstable soils. If unstable areas or soils are identified within the treatment area, are unavoidable, and will be potentially directly or indirectly affected by the treatment, a licensed geologist (P.G. or C.E.G.) will determine the potential for landslide, erosion, of other issue related to unstable soils and identity measures (e.g., those in SPR GEO-7) that will be implemented by the project proponent such that substantial erosion or loss of topsoil would not occur. This SPR applies only to mechanical treatment activities and WUI fuel reduction, non-shaded fuel breaks, and ecological restoration treatment types.
- **SPR HYD-3 Water Quality Protections for Prescribed Herbivory:** The project proponent will include the following water quality protections for all prescribed herbivory treatments:
  - Environmentally sensitive areas such as waterbodies, wetlands, or riparian areas will be identified and excluded from prescribed herbivory project areas using temporary fencing or active herding. A buffer of approximately 50 feet will be maintained between sensitive and actively grazed areas.
  - Water will be provided for grazing animals in the form of an on-site stock pond or a portable water source located outside of environmentally sensitive areas.
  - Grazing animals will be herded out of an area if accelerated soil erosion is observed.

This SPR applies to prescribed herbivory treatment activities and all treatment types.

- **SPR HYD-4 Identify and Protect Watercourse and Lake Protection Zones:** The project proponent will establish Watercourse and Lake Protection Zones (WLPZs) as defined in 14 CCR Section 916 .5 of the California Forest Practice Rules on either side of watercourses. WLPZ's are classified based on the uses of the stream and the presence of aquatic life. Wider WLPZs are required for steep slopes.
- The following WLPZ protections will be applied for all treatments:
  - Treatment activities with WLPZs will meet the overstory and understory vegetation retention guidelines and ground disturbance limitations described in 14 CCR Section 916.4 [936.4, 956.4] Subsection (b) and Section 916.5, including retention of at least 75 percent surface cover and undisturbed area.
  - Equipment, including tractors and vehicles, must not be driven in wet areas or WLPZs, except over existing roads or watercourse crossings where vehicle tires or tracks remain dry.
  - Equipment used in vegetation removal operations will not be serviced in WLPZs, within wet meadows or other wet areas, or in locations that would allow grease, oil, or fuel to pass into lakes, watercourses, or wet areas
  - WLPZs will be kept free of slash, debris, and other material that harm the beneficial uses of water. Accidental deposits will be removed immediately.
  - Burn piles will be located outside of WLPZs.
  - No fire ignition will occur within WLPZs however low intensity backing fires may be allowed to enter or spread into WLPZs.
  - Large areas of bare soil within WLPZs that are exposed by treatment activities will be stabilized with mulching, rip-rap, grass seeding, or soil stabilizers prior to the beginning of the rainy season, as described in 14 CCR 916.7.
  - Equipment limitation zones (ELZs) will be designated adjacent to Class III and Class IV watercourses with minimum widths of 25 feet where side-slope is less than 30 percent and 50 feet where side-slope is 30 percent or greater. An RPF will describe the limitations of heavy equipment within the ELZ and, where appropriate, will include additional measures to protect the beneficial uses of water.

  This SPR applies to all treatment activities and treatment types.

THRESHOLDS OF SIGNIFICANCE

Thresholds of significance are based on Appendix G of the State CEQA Guidelines. A treatment implemented under the proposed CalVTP would result in a significant impact on geology, soils, paleontology, and mineral resources if it would:

- Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:
  - Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault (Refer to California Geological Survey Special Publication 42.)
  - Strong seismic ground shaking
  - Seismic-related ground failure, including liquefaction
  - Landslides
- Result in substantial soil erosion or the loss of topsoil

- Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse
- Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994, as updated), creating substantial direct or indirect risks to life or property
- Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water
- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature
- Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state
- Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan

ISSUES NOT EVALUATED FURTHER

Because the CalVTP does not propose any excavation or development, the following issues are not evaluated further:

- **Seismic or secondary seismic hazards.** The CalVTP would not directly or indirectly cause substantial adverse effects involving rupture of a known earthquake fault or strong seismic ground shaking; therefore, this issue is not evaluated further. The CalVTP would not include construction of structures that could be affected by seismic or secondary seismic hazards.
- **Lateral spreading, subsidence, liquefaction, or collapse due to unstable or expansive soil.** The CalVTP does not include the construction of any structures such as earthen embankments or dams that would be adversely affected by unstable or expansive soils that would jeopardize structural integrity; therefore, there would be no risk to life and property from operation on unstable or expansive soils. This issue is not discussed further. The potential for landslides and erosion are evaluated in Impacts GEO-1 and GEO-2.
- **Soils incapable of supporting septic tanks or alternative waste water disposal.** The CalVTP does not include the construction of septic tanks or wastewater treatment systems therefore this issue is not discussed further.
- **Destruction of unique paleontological resource or site or unique geologic feature.** The fossil yielding potential of a particular area is highly dependent on the geologic age and origin of the underlying rocks, which vary in distribution and surface exposure throughout the state. All sedimentary rocks, some volcanic rocks, and some metamorphic rocks have potential for the presence of scientifically significant, nonrenewable paleontological resources. Because treatment activities under the proposed CalVTP would not include excavation beyond the potential disturbance of the top inches of soil during some manual treatments (e.g., mastication), there is no potential to disturb paleontological or unique geologic features. Therefore, implementation of the CalVTP would not directly or indirectly destroy a unique paleontological resource or site or unique geologic feature. This issue is not evaluated further.
- **Loss of availability of a known mineral resource or locally important mineral resource recovery site.** Treatment activities under the CalVTP would not include mineral extraction. Treatments would be short-term and would not obstruct access to any mineral resources so it will have no impact on the availability of mineral resources or on the loss of availability of a known mineral resource or locally important mineral resource recovery site.

IMPACT ANALYSIS

Impact GEO-1: Result in Substantial Erosion or Loss of Topsoil

Treatment activities implemented under the proposed CalVTP may involve the disturbance of soils as well as the reduction in vegetative cover, which has the potential to substantially increase rates of erosion and loss of topsoil. Mechanical treatments using heavy machinery are the most likely to cause soil disturbance which could lead to substantial erosion or loss of topsoil especially in areas of steep slopes. In general, it is highly likely that mechanical treatments (relative to other treatment activities) would be utilized for all treatment types in tree fuel types as well as for WUI fuel reduction treatments in shrub fuel types. Additionally, prescribed burning can increase risk of water repellency (Robichaud et al. 2010) and breakdown of soil structure, which can lead to significant increases in erosion. There is a high likelihood that prescribed burning would be utilized most for ecological restoration treatments in grass fuel types, a moderate likelihood it would be utilized to implement fuel break and ecological restoration treatments in tree fuel types, and a moderate likelihood it would be utilized for fuel break treatments in shrub fuel types. The CalVTP would reduce the amount of vegetation in all treated areas, which has the potential to expose soil to wind and water erosion. Implementation of SPRs GEO-1 through GEO-8 will avoid and minimize the risk of substantial erosion and loss of topsoil. This impact would be **less than significant**.

The effects of treatment activities on erosion and sediment yields depend on techniques used, site characteristics, storm events following treatments, and skills of the equipment operators (Robichaud et al 2010). Implementation of treatments under the CalVTP has the potential to increase rates of soil erosion and loss of topsoil. Different vegetation treatment activities result in different potential impacts to geologic and soil resources. The impacts from prescribed burning, mechanical, manual, prescribed herbivory, and herbicides are described in detail in Tables 3.7-3 through 3.7-4. Risk of erosion is also analyzed in Impacts HYD-1, HYD-2, and HYD-3 in Section 3.11.

Table 3.7-3 Potential Impacts to Geologic and Soil Resources from Prescribed Burning

Activity	Impact Type	Potential Impacts to Geologic and Soil Resources
Prescribed Burning		
Pile Burn	Soil disturbance	Pile burning can completely consume the duff and organic layer under high soil burn severity (USDA 2005). Removing the organic layer can expose mineral soil to rain splash and overland flow. Combustion of organic matter within the mineral soil can cause soil disaggregation, further increasing soil erodibility (Robichaud et al. 2010). Heating from the burn pile may create a water repellent layer in the soil.
	Increased runoff	Water repellency, lack of cover, and the increased likelihood of soil sealing can lead to overland flow generation in the areas where piles were burned (Larsen et al. 2009, Robichaud et al. 2010).
	Increased fluvial erosion	Increased overland flow and exposure of mineral soil can lead to rain splash, sheetwash, and rill erosion within the footprint of the burn pile (Reid 2010, Robichaud et al. 2010).
Broadcast Burn	Soil disturbance	Broadcast burning can remove litter and surface fuels under low soil burn severity or can completely consume the duff and organic layer under high burn severity. Removing the organic cover layer can expose mineral soil to rain splash and overland flow. Combustion of organic matter within the mineral soil can cause soil disaggregation, further increasing soil erodibility. Increased water repellency and the breakdown of soil structure will reduce the infiltration rate, and thereby increase erosion potential (Robichaud et al. 2010).
	Increased runoff	If soil burn severity is high, post-fire reduction of infiltration capacity and the increased likelihood of soil sealing will lead to overland flow generation. Burning large areas can result in the excess surface flow being routed to convergent areas and low order streams (Robichaud et al. 2010).
	Increased fluvial erosion	If burn severity is high, increased overland flow and exposure of mineral soil can lead to rain splash, sheetwash, and rill erosion (Robichaud et al., 2010). Runoff concentration in convergent areas may lead to gully erosion, and excess runoff routed into low order streams may potentially lead to bank erosion (Reid 2010). Fire may burn large woody debris in channel, resulting in the release of stored sediment (Reid 2010).

Table 3.7-3 Potential Impacts to Geologic and Soil Resources from Prescribed Burning

Activity	Impact Type	Potential Impacts to Geologic and Soil Resources
Prescribed Burning		
	Increased mass wasting	Decreased evapotranspiration will increase soil moisture, potentially increase pore pressure, thereby reducing the resistance to landsliding. Increased surface runoff may initiate debris flows in steep convergent areas. Stream adjacent hillslopes may be undercut by increased flow, thereby triggering shallow debris slides (Reid 2010).

Table 3.7-4 Impacts to Geology and Soil Resources from Mechanical, Manual, Herbivory, and Herbicides

Activity	Impact Type	Potential Impacts to Geologic and Soil Resources
Mechanical, Manual, Prescribed Herbivory, and Herbicides		
Mechanical	Soil disturbance	Use of mechanical equipment can compact soils or cause rutting (Page-Dumroese et al. 2010), especially during saturated soil conditions. Mechanical equipment can decrease soil cover and the churning forces of tread or tire traffic can break down soil structure and increase the erodibility of the soil. Heavy equipment on steep slopes can cause extensive soil disturbance. Potential impacts will be greatest in shrub and grass-dominated areas due to complete removal of the fuels/soil cover.
	Increased runoff	Compacted soil will reduce infiltration capacity and generate overland flow (Robichaud et al. 2010). Bare soils are prone to producing overland flow through soil sealing. Equipment tracks can concentrate runoff.
	Increased fluvial erosion	Increased surface runoff and the availability of easily transportable soil increases the likelihood of rain splash, sheetwash, rill, and gully erosion (Reid 2010, Robichaud et al. 2010).
	Increased mass wasting	Compaction from trails and soil disturbance may generate overland flow that is routed to an unstable area. Removal of vegetation may result in increased soil moisture which can reduce the resisting forces to landsliding (Reid 2010).
Manual/Hand	Soil Disturbance	Soil disturbance from hand treatments is considered negligible (Robichaud et al. 2010).
Prescribed herbivory	Soil disturbance	Mechanical force from the animal's hoof can compact soil on gentler slopes, and shear and move soil in the downslope direction. When soils have high moisture content, hoof deformation can be even deeper. Animals can form trails or paths through repeated trampling and can induce bank erosion through hoof sheer. Combination of grazing and trampling can reduce soil cover (Trimble and Mendel 1995).
	Increased runoff	Compaction through trampling lowers the infiltration rate and increases the likelihood of overland flow. Trails and/or paths created by the animals can concentrate runoff and alter drainage patterns (Trimble and Mendel 1995).
	Increased fluvial erosion	Increased runoff and bare erodible soil increase the likelihood of rain splash, sheetwash, and rill erosion. Animal trails/paths can concentrate runoff and initiate gullying (Trimble and Mendel 1995, Stednick 2010).
Herbicides	See Water Quality Section	See Water Quality Section 3.11

One causal mechanism for erosion is the risk of soil disturbance during mechanical fuel treatment activities. This is due to compaction caused by mechanical equipment, loss of soil cover, and the churning and breakdown of soil structure by mechanical equipment (Page-Dumroese et al. 2010). To address this risk, SPR GEO-1 which requires suspension of mechanical soil disturbance during precipitation, SPR GEO-2 which limits high ground pressure vehicles, SPR GEO-3 which requires stabilization of mechanically disturbed soil areas, SPR GEO-4 which requires inspection prior to the rainy season and immediately following the first large rainfall event, and SPR AQ-4 which requires wetting of unpaved, dirt roads to control dust would be implemented. Soil disturbance and erosion from heavy equipment is typically greater on steeper slopes (Grigal 2000) which would be addressed by SPR GEO-7 which minimizes erosion from use of heavy equipment on slopes and SPR GEO-8 which requires evaluation of treatment areas with slopes greater than 50 percent for unstable areas. Herbivory can also lead to erosion of stream banks and can create linear erosion features on animal trails (Trimble and Mendel 1995). However, herds would be moved often, and reducing the likelihood of causing substantial erosion. In addition, SPRs HYD-3 HYD-4 will require that environmentally sensitive areas such as waterbodies, wetlands, or riparian areas be identified and excluded from prescribed herbivory project areas, grazing animals will be herded out of an area if accelerated soil erosion is observed, and treatments would avoid impacts to WLPZs. Another causal mechanism for impacts is the risk of soil disturbance during prescribed burning activities (i.e., pile burning and broadcast burning). Depending on the severity of the fire, prescribed burning could cause loss of soil cover (Larsen et al. 2009), increased risk of water repellency (Robichaud et al. 2010), and breakdown of soil structure (Robichaud et al. 2010). High severity wildfires increase runoff and erosion rates by two or more orders of magnitude, while low and moderate severity burns have much smaller effects on runoff and sediment yields (Robichaud et al. 2010). Fire induced vegetation and litter removal and post-fire soil exposure significantly reduce surface roughness and overland flow resistance, increasing the risk and erodibility of overland flow (Stoof 2011). SPR GEO-6 addresses this impact by minimizing burn pile size and SPR AQ-3 minimizes soil burn severity. The potential for erosion to occur at non-shaded fuel breaks is addressed in SPR GEO-5 requires stormwater to be drained via water breaks which would decrease the potential for channelized erosion down the fuel break.

There are certain treatment activities proposed under the CalVTP that are more likely to take place in certain areas based on vegetation (fuel) type. Table 2-4 in Chapter 2, "Program Description," summarizes the relative likelihood of using a treatment activity based on the treatment and fuel type. In general, it is highly likely that mechanical treatments (relative to other treatment activities) would be utilized for all treatment types in tree fuel types as well as for WUI fuel reduction treatments in shrub fuel types. There is a moderate likelihood that mechanical treatments would be utilized to implement ecological restoration treatments in shrub fuel types, and to implement WUI fuel reducing treatments and fuel breaks in grass fuel types. There is a high likelihood that prescribed burning would most be utilized for ecological restoration treatments in grass fuel types, a moderate likelihood it would be utilized to implement fuel break and ecological restoration treatments in tree fuel types, and a moderate likelihood it would be utilized for fuel break treatments in shrub fuel types. Because erosion is more likely to occur in areas treated using mechanical treatment activities and prescribed burns, all treatment types implemented in grass fuel types, fuel breaks implemented in shrub fuel types, and fuel break and ecological restoration treatments implemented in tree fuel types are the most likely to be treated using treatment activities that could cause erosion.

Erosion and loss of topsoil could occur in geomorphic provinces dominated by shrub vegetation types (i.e., Southern Coast Range, Transverse Ranges, and Peninsular Ranges) because prescribed burning has the potential to result in high burn severity in shrub-dominated vegetation. This is addressed with SPR AQ-3 which minimizes soil burn severity. Mechanical treatments in shrub-dominated vegetation and in forested areas of the Coast Ranges, Sierra Nevada, Klamath Mountains and Cascade Range provinces would generally remove the majority of the vegetation in discrete areas to reduce fuels. Potential erosion would be minimized with implementation of SPR GEO-3 which requires stabilization of mechanically disturbed soil areas and SPR GEO-4 which requires erosion inspections.

In an area that is treated by prescribed burning, typically 70 percent of the vegetation remains which helps minimize erosion (CAL FIRE 2019). Additionally, vegetation usually regrows within a year (CAL FIRE 2019). Following a prescribed burn, CAL FIRE would minimize erosion around the perimeter of the burn or from installation of waterbars (SPR GEO-5).

Implementation of SPRs as described above would avoid and minimize any substantial soil erosion or loss of topsoil during treatment activities. This impact would be **less than significant**.

As described in Section 2, "Program Description," one of the primary purposes of the CalVTP is to reduce wildfire risk in California. Catastrophic wildfires may occur if the vegetation in an area is not treated. If burn severity is high, increased overland flow and exposure of mineral soil can lead to rain splash, sheetwash, and rill erosion (Robichaud et al. 2010). While implementation of the CalVTP may result some erosion and loss of topsoil during treatments, the CalVTP is anticipated to reduce the occurrence and severity of wildfires that can result in substantial erosion and loss of topsoil. An analysis performed after the Clearwater fire in Idaho found that the "increase in sediment delivery associated with the proposed activities will likely be offset by the reduced risk of fire, the reduced severity of a fire should it occur, and the reduction in hillslope sediment delivery following a wildfire" (Lake Tahoe West Science Group 2018). Given the unpredictability of wildfire severity and the possible variability in acreage treated under the CalVTP, evaluating the effect of the CalVTP on wildfire-caused erosion is not possible, nor is it pertinent to determining the significance of this impact under CEQA. However, it is anticipated that the CalVTP would decrease the risk of erosion in areas that could otherwise be at substantial risk of erosion after burning in a high-severity wildfire.

Mitigation Measures

No mitigation is required for this impact.

Impact GEO-2: Increase Risk of Landslide

Removal of vegetation during treatments activities implemented under the CalVTP could affect the root structure in treated areas such that the stability of slopes and soils could decrease, which would increase the risk of landslide. Additionally, by removing vegetation, the soil water content could increase due to lack of uptake and transpiration by the vegetation. Higher soil water content could potentially destabilize slopes and increase the risk of landslide. Landslide risk would increase in areas with steeper slopes and where previous landslide has occurred. Implementation of SPRs GEO-3, GEO-4, GEO-7, and GEO-8 would avoid or minimize the risk of landslide resulting from CalVTP treatments. This impact would be **less than significant**.

Shallow-landsliding occurrence is more likely to occur in the mountainous portions of the Coast Ranges, Klamath Mountains, Transverse Ranges, and the Sierra Nevada relative to other geomorphic provinces mostly because the soil types and slope in these areas are more conductive to landsliding under certain circumstances in comparison to other areas. The highest susceptibility in the treatable landscape for deep-seated landsliding is in the Coast Ranges, Klamath Mountains, and Transverse Ranges provinces based on rock strength and slope (Willis et al. 2011) (Figure 3.7-3).

Removing vegetation during treatments implemented under the CalVTP could potentially increase the risk of landslide by removing root systems that stabilize slopes. This risk is addressed with SPR GEO-3 which requires stabilization of mechanically disturbed soil, SPR GEO-4 which requires erosion inspections, SPR AQ-3 which minimizes soil burn severity resulting in some vegetation remaining which retains root structures, SPR GEO-7 which minimizes erosion by prohibiting mechanical treatment on steep slopes, and SPR GEO-8 which requires that a RPF or licensed geologist to evaluate treatment areas with slopes greater than 50 percent for unstable areas. Removing vegetation could also potentially increase the risk of landslide by removing vegetation which no longer uptakes ground water thereby increasing water content of the soil and making soils more prone to sliding. The removal of forest cover decreases interception and transpiration, and in wetter areas, this generally increases annual water yields (Robichaud et al 2010). A rising groundwater table ("bottom up" saturation) within the saturated zone leads to a gradual growth of porewater pressure in the soil which leads to destabilization of slopes and can lead to failure of slopes (Bronnimann 2011). This risk is also addressed with the SPRs mentioned above.

Moderate to high severity wildfire can greatly increase the likelihood of debris sliding and debris flows (Haas et al. 2017) as well as loss of soil hydrologic function by sealing pores, degradation of soil structure and productivity. Wildfire can significantly alter the hydrologic response of a watershed to the extent that even modest rainstorms can produce dangerous flash floods and debris flows. In existing models, the primary variable connecting a wildfire and a subsequent debris flow is the amount of a watershed that burns with moderate to high severity (Haas et al. 2017). Fires that burn with low severity, including prescribed burns implemented under the CalVTP, can maintain soil cover, mineralize important nutrients from plant matter stored on the soil surface, reduce fuel loads leading to possible future high burn severity, and stimulate herbaceous vegetation helping to facilitate nutrient cycling. Prescribed burns implemented under the CalVTP would, under most circumstances, retain 70 percent of the vegetation in a treatment area.

Implementation of SPRs as described above would avoid and minimize the risk of landslide from treatments implemented under the CalVTP. Therefore, this impact would be **less than significant**.

As described above, moderate to high severity wildfire can greatly increase the risk of landslides, including the likelihood of debris sliding and debris flows. One of the primary purposes of the CalVTP is to reduce wildfire risk in California. Given the unpredictability of wildfire severity and the possible variability in acreage treated under the CalVTP, evaluating the effect of the CalVTP on wildfire-caused landsliding is not possible, nor is it pertinent to determining the significance of this impact under CEQA. However, it is anticipated that the CalVTP would decrease the risk of landslide in areas that could otherwise be at substantial risk of landslide after burning in a high-severity wildfire.

Mitigation Measures

No mitigation is required for this impact.

3.8 GREENHOUSE GAS EMISSIONS

This section presents a summary of regulations and policies applicable to greenhouse gas (GHG) emissions; a review of climate change science and GHG sources in California; quantification of GHG emissions associated with treatment activities implemented under the CalVTP; and a discussion about the CalVTP's contribution to global climate change. In addition, mitigation measures are included to reduce the CalVTP's contribution to climate change.

Comments on the Notice of Preparation related to GHG emissions included concerns about GHG emissions from prescribed burning, consistency with statewide GHG reduction goals specified in AB 32 (Statutes of 2006), accounting for loss of below-ground carbon sequestration in chaparral communities, and a request for discussion of the net impacts of treatment activities on long-term GHG emissions (see Appendix A). These are addressed in Section 3.4.3, "Environmental Impacts and Mitigation Measures."

3.8.1 Regulatory Setting

GHG emissions in California, including within the treatable landscape, are regulated by federal, state, regional, and local government agencies. These agencies aim to reduce GHG emissions to lessen the impact of global climate change through legislation, planning, policy-making, education, and a variety of programs. The regulations and the agencies responsible for improving regulating GHGs within the treatable landscape are discussed below.

FEDERAL

In *Massachusetts et al. v. Environmental Protection Agency et al.*, 549 U.S. 497 (2007), the Supreme Court of the United States ruled that carbon dioxide (CO_2) fit within the definition of "air pollutant" under the federal Clean Air Act and that the U.S. Environmental Protection Agency (EPA) has the statutory authority to regulate GHG emissions. Treatment activities under the CalVTP have the potential to generate GHG emissions through use of off-road equipment, machine-powered hand tools, helicopters, vehicles for worker commute, trucks for materials delivery and hauling, and prescribed burning.

In October 2012, EPA and the National Highway Traffic Safety Administration, issued final rules to further reduce GHG emissions and improve corporate average fuel economy (CAFE) standards for light-duty vehicles for model years 2017 and beyond (77 Federal Register [FR] 62624). These rules would increase fuel economy to the equivalent of 54.5 miles per gallon, limiting vehicle emissions to 163 grams of CO_2 per mile for the fleet of cars and light-duty trucks by model year 2025 (77 FR 62630). However, on April 2, 2018, the EPA administrator announced a final determination that the current standards are not appropriate and should be revised. On August 2, 2018, the U.S. Department of Transportation and EPA proposed the Safer Affordable Fuel-Efficient Vehicles Rule, which would amend existing CAFE and tailpipe CO_2 emissions standards for passenger cars and light trucks and establish new standards covering model years 2021 through 2026. The proposal would retain the model year 2020 standards for both programs through model year 2026 (NHTSA 2018). Vehicles used for worker commute and hauling equipment for treatments implemented under the CalVTP would be subject to CAFE standards.

STATE

Statewide GHG Emission Targets and the Climate Change Scoping Plan

Reducing GHG emissions in California has been the focus of state government policy for approximately two decades (State of California 2018). GHG emission targets established by the state legislature include reducing statewide GHG emissions to 1990 levels by 2020 (Assembly Bill [AB] 32, Statutes of 2006) and to 40 percent below 1990 levels by 2030 (Senate Bill [SB] 32, Statutes of 2016). Executive Order S-3-05 calls for statewide GHG emissions to be reduced to 80 percent below 1990 levels by 2050. Executive Order B-55-18 calls for California to achieve carbon neutrality by 2045 and achieve and maintain net negative GHG emissions thereafter. These targets are in line with the scientifically established levels needed in the U.S. to limit the rise in global temperature to no more than 2 degrees Celsius, the warming threshold at which major climate disruptions, such as super droughts and rising sea levels, are projected. These targets also are consistent with efforts to further limit the temperature increase to 1.5 degrees Celsius (United Nations 2015:3).

California's 2017 Climate Change Scoping Plan (2017 Scoping Plan), prepared by the California Air Resources Board (CARB), outlines the main strategies California will implement to achieve the legislated GHG emission target for 2030 and "substantially advance toward our 2050 climate goals" (CARB 2017a:1, 3, 5, 20, 25–26). It identifies the reductions needed by each GHG emission sector (e.g., transportation, industry, electricity generation, agriculture, commercial and residential, pollutants with high global warming potential, and recycling and waste). Statewide GHG emission reduction targets and the 2017 Scoping Plan are applicable to the CalVTP because GHG emissions would be generated by treatment activity implemented under the CalVTP. Furthermore, an objective of the CalVTP is to contribute to meeting California's GHG emission goals by managing forests and other natural and working lands as a net carbon sink, consistent with the 2017 Scoping Plan.

The 2017 Scoping Plan identifies a 15–20 million metric tons of carbon dioxide equivalent ($MMTCO_2e$) reduction from business-as-usual emissions from the natural and working lands sector to meet the state's 2030 target. This section includes lands used for agriculture, grazing, and forestry. This reduction would be achieved through carbon sequestration in trees, other vegetation, soils, and aquatic sediment (CARB 2017a:14). Recent trends indicate that from 2001 to 2010, approximately 120 million metric tons of carbon was lost through wildland fire. California's climate objective for natural and working lands is to maintain them as a carbon sink (i.e., net zero or negative GHG emissions) and, where appropriate, minimize the net GHG and black carbon emissions associated with management, biomass utilization, and wildfire events. To achieve this objective, the *2017 Scoping Plan* focuses on continued research and development to advance the state of science on carbon dynamics, develop a natural and working lands inventory, and directs the California Natural Resources Agency (CNRA) and other state agencies to complete a Natural and Working Lands Climate Change Implementation Plan consistent with the carbon neutrality goal of Executive Order B-55-18. Specifically, the *2017 Scoping Plan* acknowledges the role of fuel reduction treatments and prescribed burns in managing natural and working lands to reduce GHG emissions (CARB 2017a:87). Development of the Natural and Working Lands Climate Change Implementation Plan is discussed in greater detail below.

Draft 2030 Natural and Working Lands Implementation Plan

In a joint, interagency effort, the California Environmental Protection Agency (CalEPA), California Department of Food and Agriculture (CDFA), CNRA, CARB, and California Strategic Growth Council (SGC) released the *Draft California 2030 Natural and Working Lands Climate Change Implementation Plan* in January 2019. The draft plan is specific to the natural and working lands sector, which includes farmland, rangeland, forests, grasslands, wetlands, riparian areas, seagrass, and urban green space. The draft plan addresses the carbon flux from this sector, including the ever-dynamic changes in both GHG emissions and carbon sequestration associated with the management of these lands. It is estimated that California's natural and working lands lost approximately 170 MMT of carbon between 2001 and 2014. Most of these losses were due to wildfire. This loss of carbon is equivalent to cumulative emissions of 630 $MMTCO_2e$ of previously sequestered carbon removed from the land over the same period (applying the atomic weight ratio of 3.67 for carbon to CO_2). However, not all the carbon lost was emitted to the atmosphere as CO_2. Some carbon leaves the land but persists in durable wood products. Other carbon losses are part of normal ecosystem function (CalEPA et al. 2019:9). The draft plan serves as a multi-disciplinary approach to conserve and maintain a resilient natural and working lands sector that will gradually shift the natural and working lands sector from being a net carbon emitter to being a net carbon sink, while also improving air quality, water quality, wildlife habitat, recreation, and providing other benefits. The draft plan sets goals for, at a minimum, increasing the rate of state-funded soil conservation practices fivefold, doubling the rate of state-funded forest management and restoration efforts, tripling the rate of state-funded oak woodland and riparian reforestation, and doubling the rate of state-funded wetland and seagrass restoration (CalEPA et al. 2019:13). The measures included in the draft plan are projected to result in cumulative emissions of 21.6 to 56.8 $MMTCO_2e$ by 2030 and cumulative emissions reduction of -36.6 to -11.7 $MMTCO_2e$ by 2045 (CalEPA et al. 2019:13-14).

The draft plan indicates that these GHG reductions will be met through a variety of practices under four broad pathways: conservation, forestry, restoration, and agriculture. One suite of practices is called, "Forestry – Improved forest health and reduced wildfire severity." This suite of practices includes prescribed fire, mechanical thinning, and understory treatment. It aims to "restore health and resilience to overstocked forests and prevent carbon losses from severe wildfire, disease, and pests."

The implementation goals for this practice includes 23,800–73,300 acres of prescribed fire per year, 59,000–73,000 acres of thinning per year, and 23,500–25,300 acres of understory treatment per year (CalEPA et al. 2019:18). CAL FIRE is identified as one of the implementing agencies of this practice. The draft plan notes that, although fuel reduction treatments involve near-term carbon costs, they result in long-term net carbon benefits in California. Fuel reduction activities, such as mechanical thinning and prescribed fire, reduce stand densities and fuel loads, restore the structure and composition of forest ecosystems, and lower the potential for damaging, high-severity fire, which is currently the primary cause of GHG emissions and carbon loss from the land sector. In the long-term, these activities are expected to result in climate benefits and healthier, more stable, and more resilient forests (CalEPA et al. 2019:14) An objective of the CalVTP is to contribute to meeting California's GHG emission goals by managing forests and other natural and working lands as a net carbon sink, which would be consistent with the *Draft California 2030 Natural and Working Lands Climate Change Implementation Plan*.

California Forest Carbon Plan

In January 2017, CAL FIRE, in coordination with CNRA and CalEPA, released the *California Forest Carbon Plan*. The plan serves to implement policies to meet the forest carbon goals embodied in the *2017 Scoping Plan* and is relevant to the CalVTP because some treatment activities would be implemented in forests and because an objective of the CalVTP is to contribute to meeting California's GHG emission goals by managing forests and other natural and working lands as a net carbon sink, consistent with the *California Forest Carbon Plan*. Currently, much of California's forests are unhealthy, supporting unnatural density that lack resilience to drought, disease, insect and parasite infestation, and large, severe wildfire. The plan describes forest conditions across California; provides a projection of future conditions in consideration of climate change; and describes goals and related specific actions that may be taken to improve forest health, including resilient carbon sequestration; and provides principles and policies to guide and support these actions (CAL FIRE, CNRA, and CalEPA 2017). Specifically, the plan identifies the following targets for forest restoration and treatment activities on non-federal forest lands:

- by 2020, double the current rate of forest restoration and fuels reduction treatments, including prescribed fire, through the CAL FIRE Vegetation Treatment Program from the recent average of 17,500 acres per year to 35,000 acres per year;
- by 2030, increase forest restoration and fuels treatments, including mechanical thinning and prescribed burning, from the current rate of approximately 17,500 acres per year to 60,000 acres per year. This target is based on CAL FIRE's determination of an operationally feasible increase in activity through its Vegetation Treatment Program;
- through CAL FIRE's Forest Practice Program and the Timber Regulation and Forest Restoration Program, ensure that timber operations conducted under the Forest Practice Act and Rules contribute to the achievement of healthy and resilient forests that are net sinks of carbon, with due consideration given to all forest carbon pools;
- promote increasing the acreage of forest carbon projects and remove barriers to their implementation; and
- to address forest health and resiliency needs identified statewide on nonfederal lands, CAL FIRE has estimated that the rate of treatment of all types would need to be increased to approximately 500,000 acres per year to make an ecologically meaningful difference at a landscape scale. This estimate is based on consideration of ecological need and predictions of capacity to implement treatments. It should be considered an aspirational target to work toward. This goal is achievable with increased resources and expanded markets for woody materials. These treatments include those that generate revenue from harvest materials, such as commercial thinning and regeneration harvests.

Forest Management Task Force

California's Forest Management Task Force is an entity organized to protect the environmental quality, public health, and economic benefits provided by healthy forests. Its goals include, but are not limited to, implementing Executive

Order B-52-18, improve and enhance forest health and resiliency, minimize regulatory barriers for prescribed fire and fuels reduction projects, and improve public education regarding the benefits of a healthy forest (Forest Management Task Force 2019). The Forest Management Task Force is relevant to the CalVTP because objectives of the CalVTP include increasing the use of prescribed burning as a vegetation treatment tool and improving ecosystem health in fire-adapted habitats.

Assembly Bill 1504 Forest Carbon Inventory

AB 1504 (Statutes of 2010) emphasizes the critical role California's forests play in carbon sequestration and formalizes the Board of Forestry and Fire Protection's (Board) responsibility in meeting or exceeding the statewide GHG emission reduction targets for the forest sector. AB 1504 requires the Board to ensure that its rules and regulations that govern the harvesting of commercial forest tree species consider the capacity of forest resources to sequester carbon sufficient to meet or exceed the state's GHG reduction requirements for the forestry sector by 2020. The initial AB 32 Scoping Plan adopted by CARB in 2008 set a goal of maintaining the forest carbon sink with a net annual sequestration rate of 5 $MMTCO_2e$/year (CARB 2008:64), a rate that was reiterated in the *2017 Scoping Plan* (CARB 2017:3).

CAL FIRE's Fire and Resource Assessment Program (FRAP) develops an annual Forest Ecosystem and Harvested Wood Product Carbon Inventory (Forest Carbon Inventory) in collaboration with the U.S. Forest Service's (USFS) Forest Inventory and Analysis Program (FIA), USFS Pacific Northwest Research Station (PNW), and the University of Montana Bureau of Business and Economic Research (BBER). This annual Forest Carbon Inventory report assists the Board in assessing whether the goal of sequestering 5 $MMTCO_2e$/year of forest carbon is being met. This report also informs the goals identified in the *California Forest Carbon Plan*, discussed above. The annual Forest Carbon Inventory has been produced for 2015, 2016, and 2017.

Forest ecosystem carbon estimates for California are based on plot re-measurement of the same trees over time. This method captures and quantifies growth, tree removal, and tree mortality. Harvested wood product carbon estimates are based on a model created by BBER and the USFS, which follows annual harvest volumes through their timber product class allocation (e.g., softwood sawlogs, softwood pulpwood) and primary product allocation (e.g., softwood lumber, softwood plywood). Among other things, the model estimates how much carbon remains stored in durable wood products in use and at solid waste disposal sites. According to the most recent Forest Carbon Inventory (Christensen et al. 2018), California's forests are sequestering 27.9 $MMTCO_2e$/year, which exceeds the net annual sequestration target of 5 $MMTCO_2e$.

Transportation-Related Standards and Regulations

The state has also passed legislation addressing GHG emissions associated with industrial sources, transportation, electricity generation, and energy consumption, as summarized below. Treatment activities under the CalVTP would involve fuel consumption and the use of on-road and off-road vehicles, which are subject to transportation-related standards and regulations.

As part of its Advanced Clean Cars program, CARB established more stringent GHG emission standards and fuel efficiency standards for fossil fuel–powered on-road vehicles. In addition, the program's zero-emission vehicle (ZEV) regulation requires battery, fuel cell, and plug-in hybrid electric vehicles to account for up to 15 percent of California's new vehicle sales by 2025 (CARB 2016a:15). By 2025, when the rules will be fully implemented, GHG emissions from the statewide fleet of new cars and light-duty trucks will be reduced by 34 percent and cars will emit 75 percent less smog-forming pollution than the statewide fleet in 2016 (CARB 2016b:1).

Executive Order B-48-18, signed into law in January 2018, requires all state entities to work with the private sector to have at least 5 million ZEVs on the road by 2030, as well as 200 hydrogen fueling stations and 250,000 electric vehicle–charging stations installed by 2025. It specifies that 10,000 of these charging stations must be direct-current fast chargers.

CARB adopted the Low Carbon Fuel Standard (LCFS) in 2007 to reduce the carbon intensity of California's transportation fuels. The LCFS applies to fuels used by on-road motor vehicles and by off-road vehicles, including construction equipment (Wade, pers. comm., 2017). In September 2018, CARB approved amendments to the LCFS to require a 20 percent reduction in carbon intensity by 2030 to further the state towards the 2030 GHG reduction target. The staff report that accompanied the amendments estimated that from January to March 2018, biomass-based diesel averaged 14 percent of every gallon of diesel sold in the state and renewable natural gas (e.g., biogas) was 68 percent of all fuel used in natural gas vehicles (CARB 2018a:EX-1).

California's Climate Adaptation Strategy

California's overall plan for climate adaptation is expressed in *Safeguarding California Plan: 2018 Update* (CNRA 2018). The plan provides policy guidance for state decision-makers and is part of continuing efforts to reduce impacts and prepare for climate risks. The plan includes 76 policy recommendations across 11 policy sectors. One of the key sectors is forestry, which includes: restoring and protecting forest ecosystem function by reintroducing fire and improving management, protecting California's forest base, and enhancing watershed health; supporting community resilience by rebuilding California's forest management workforce, expanding the extent and health of California's urban tree canopy, and advancing fire preparedness; and fostering creative solutions to sustainably use biomass from fuels reduction activities and to better understand climate trends in forests via research and monitoring. Goal F-1 of the plan is to restore fire as a core ecological process, complemented by fuels reduction, working forests, and thinning to enhance forest health, resilience, and long-term carbon stability (CNRA 2018:4, 116–117, 127). The plan is relevant to the CalVTP because objectives of the CalVTP include increasing the use of prescribed burning as a vegetation treatment tool, improving ecosystem health in fire-adapted habitats, and contributing to meeting California's GHG emission goals by managing forests and other natural and working lands as a net carbon sink.

LOCAL

When state agencies, including CAL FIRE, are conducting governmental activities under the authority of state law or the State Constitution, in this case, treatments implemented under the proposed CalVTP, they are exempt from local government plans, policies, and ordinances (unless a constitutional provision or statute directs otherwise). Nonetheless, CAL FIRE voluntarily seeks to operate consistently with local governance to the extent the project is subject to them. This is reflected in SPR AD-3.

Given its statewide extent and the possible number of local and regional responsible agencies, this Program EIR does not identify potentially applicable local government plans, policies, and ordinances. Types of local regulations relevant to GHGs may include climate action plans. Climate action plans (CAPs) are comprehensive roadmaps that outline the specific activities that a city, county, or agency will undertake to reduce its GHG emissions. CAPs build upon the information gathered by GHG inventories and focus on those activities that can achieve the greatest emissions reductions in the most cost-effective manner. CAPs in California are designed to align with the statewide targets mandated by AB 32 and SB 32 (discussed above). CAL FIRE has not prepared a CAP that addresses the GHG emissions associated with its operations. This Program EIR assumes that any vegetation treatments proposed by local or regional agencies under the CalVTP would be consistent with local plans, policies, and ordinances, as required by SPR AD-3.

3.8.2 Environmental Setting

PHYSICAL SCIENTIFIC BASIS OF GREENHOUSE GAS AND CLIMATE CHANGE

Certain gases in the earth's atmosphere, classified as GHGs, play a critical role in determining the earth's surface temperature. Solar radiation enters the atmosphere from space. A portion of the radiation is absorbed by the earth's surface, and a smaller portion of this radiation is reflected toward space. The absorbed radiation is then emitted from the earth as low-frequency infrared radiation. The frequencies at which bodies emit radiation are proportional to temperature. The earth has a much lower temperature than the sun; therefore, the earth emits lower frequency radiation. Most solar radiation passes through GHGs; however, infrared radiation is absorbed by these gases. As a result, radiation that otherwise would have escaped back into space is instead "trapped," resulting in a warming of the atmosphere. This phenomenon, known as the greenhouse effect, is responsible for maintaining a habitable climate on earth.

Prominent GHGs contributing to the greenhouse effect are CO_2, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Human-generated emissions of these GHGs in excess of natural ambient concentrations are found to be responsible for intensifying the greenhouse effect and leading to a trend of unnatural warming of the earth's climate, known as global climate change or global warming. It is "extremely likely" that more than half of the observed increase in global average surface temperature from 1951 to 2010 was caused by the anthropomorphic increase in GHG concentrations and other anthropomorphic forcing (IPCC 2014:5). This warming is observable considering the 20 hottest years ever recorded occurred within the past thirty years (McKibben 2018).

Climate change is a global problem. GHGs are global pollutants, unlike criteria air pollutants and toxic air contaminants, which are pollutants of regional and local concern. Whereas most pollutants with localized air quality effects have relatively short atmospheric lifetimes (approximately 1 day), GHGs have long atmospheric lifetimes (1 year to several thousand years). GHGs persist in the atmosphere long enough to be dispersed around the globe. Although the lifetime of any GHG molecule depends on multiple variables and cannot be determined with perfect certainty, it is understood that more CO_2 is emitted into the atmosphere than is sequestered by ocean uptake, vegetation, and other forms of sequestration. Of the total annual human-caused CO_2 emissions, approximately 55 percent are estimated to be sequestered through ocean and land uptake every year, averaged over the last 50 years, whereas the remaining 45 percent of human-caused CO_2 emissions remain stored in the atmosphere (IPCC 2013:467).

The quantity of GHGs in the atmosphere responsible for climate change is not precisely known, but it is enormous. No single project alone would measurably contribute to an incremental change in the global average temperature or to global or local climates or microclimates. From the standpoint of CEQA, GHG impacts relative to global climate change are inherently cumulative.

GREENHOUSE GAS EMISSION SOURCES AND SINKS

As discussed previously, GHG emissions are attributable in large part to human activities. Emissions of CO_2 are byproducts of fossil fuel combustion. Methane, a highly potent GHG, primarily results from off-gassing (the release of chemicals from nonmetallic substances under ambient or greater pressure conditions) and is largely associated with agricultural practices, organic material decomposition in landfills, and the burning of forest fires (Black et al. 2017). Nitrous oxide emissions are largely attributable to agricultural practices and soil management. CO_2 sinks, or reservoirs, include vegetation and the ocean, which absorb CO_2 through sequestration and dissolution (CO_2 dissolving into the water), respectively, two of the most common processes for removing CO_2 from the atmosphere.

Because the treatable landscape under the CalVTP spans across the state, the state's GHG inventory is provided for context. The total GHG inventory for California in 2016 was 429 $MMTCO_2e$ (CARB 2018b). This is less than the 2020 target of 431 $MMTCO_2e$ equal to the inventory for 1990 (CARB 2018c:1). Table 3.8-1 summarizes the statewide GHG inventory for California.

Table 3.8-1 Statewide GHG Emissions by Economic Sector[1]

Sector	Percent
Transportation	41
Industrial	23
Electricity generation (in state)	10
Electricity generation (imports)	6
Agriculture	8
Residential	7
Commercial	5
Not specified	<1

Source: CARB 2018b

[1] The inventory provides estimates of anthropogenic GHG emissions within California, as well as emissions associated with imported electricity; natural sources are not included in the inventory.

Existing Levels of Emissions Generated by Wildfires

As shown in Table 3.8-1, transportation, industry, and electricity generation are the largest sectors of anthropogenic GHG emissions. These estimates do not account for GHGs emitted from wildfire or any other sources of GHGs on natural and working lands (besides those generated by agricultural activities). Wildfire has been a pervasive, natural, environmental factor throughout most of the state since before Euro-American settlement of California. It is estimated that approximately 1.8 million hectares (4.4 million acres) burned annually, pre-historically, resulting in high levels of wildfire emissions (Stephens et al. 2007). Table 3.8-2 summarizes CARB's estimation of GHG emissions associated with wildfire between 2007 and 2017 (CARB 2019a).

Table 3.8-2 Annual GHG Emission Estimates from Wildfire, 2007–2017[1]

Year	$MMTCO_2e$[2]	Aces Burned (million)
2007	22.8	1.04
2008	45.7	1.35
2009	9.6	0.43
2010	1.4	0.09
2011	3.5	0.20
2012	15.9	0.75
2013	19.2	0.56
2014	21.2	0.53
2015	22.9	0.79
2016	14.4	0.55
2017	36.7	1.34

Notes: $MMTCO_2e$ = million metric tons carbon dioxide equivalent

[1] There are large uncertainties associated with mapped vegetation types, fuel loading, fuel moisture, burned area, modeled fuel consumption in flaming and smoldering phases, and emission factors. The emission estimates may have an uncertainty of between a factor of 2 to 3 (CARB 2019b:1). The latest estimates from CARB are for 2017.

[2] Emissions estimates only account for the emissions of carbon dioxide and do not include emissions of nitrous oxide or methane. Emissions estimates also do not include those GHG emissions associated with firefighting activity (e.g., combustion of fossil fuels by equipment, trucks, and aircraft).

Source: CARB 2019a

As shown in Table 3.8-2, the level of GHGs emitted by wildfires across the state varies from year to year with a statewide average of 19.39 $MMTCO_2e$ per year during the 2007–2017 period. Data are not yet available for the state's 2018 wildfires, which were the largest and most damaging on record. Though CARB has not yet finalized the emissions estimate for 2018, the 2018 wildfires will likely be comparable to other peak years, like 2008. The potential continues for future wildfires of similar or greater intensity and destruction.

Existing Levels of Emissions Generated by Vegetation Treatments

As described in Chapter 1, "Introduction" and Section 2.3.1, "Past and Current Treatments," vegetation treatment currently occurs around the state under several other wildfire risk reduction programs implemented by various federal, state, and local agencies. In 2017–2018, CAL FIRE treated approximately 33,000 acres in California using the same treatment activities as proposed under the CalVTP.

GHG emissions are generated by existing treatment activities. Emissions are generated by mechanical equipment, hand tools, worker commute and haul trips, and from prescribed burning.

EFFECTS OF CLIMATE CHANGE ON WILDFIRE RISK

According to the Intergovernmental Panel on Climate Change (IPCC), which was established in 1988 by the World Meteorological Organization and the United Nations Environment Programme, global average temperature will increase by 1.5 degrees Celsius (°C) (2.7 degrees Fahrenheit [°F]) by 2040. This 1.5 °C warming represents a global average indicating that some portions of the earth will experience more dramatic warming than others, and thus the extent of climate change effects on individual regions will vary. Long-term effects of climate change include rising temperatures; changes in precipitation patterns; increased severe weather events such as droughts, heath waves, and hurricanes; and sea-level rise. These effects have the potential to threaten transportation and energy infrastructure, crop production, forests and rangelands, and public health (CNRA 2018:64, 116–117, 127; OPR, CEC, and CNRA 2018:7–14). The effects of climate change will also have an indirect adverse impact on the economy as more severe natural disasters such as frequent and catastrophic wildfires cause expensive, physical damage to communities.

According to California's Fourth Climate Change Assessment, if global GHGs are reduced at a moderate rate, California will experience average daily high temperatures that are warmer than the historic average by 2.5 °F from 2006 to 2039, by 4.4 °F from 2040 to 2069, and by 5.6 °F from 2070 to 2100. If GHG emissions continue at current rates, then California will experience average daily high temperatures that are warmer than the historic average by 2.7 °F from 2006 to 2039, by 5.8 °F from 2040 to 2069, and by 8.8 °F from 2070 to 2100 (OPR, CEC, and CNRA 2018:5). The potential effects of this warming in California are well documented. Since its previous climate change assessment in 2012, California has experienced several of the most extreme natural events in its recorded history: a severe drought from 2012-2016, an almost non-existent Sierra Nevada winter snowpack in 2014-2015, back-to-back years of the warmest average temperatures, and increasingly large and severe wildfires (OPR, CEC, and CNRA 2018:3).

As discussed in Section 3.17, "Wildfire," climate change has led to the exacerbation of wildfire conditions in two major ways: earlier spring snowmelt and reduced winter precipitation has resulted in a longer wildfire season, and cycles of heavy precipitation followed by drought conditions increase fuel loading in wet years and reduce moisture-content during droughts. One study estimates that the western U.S. has experienced a doubling of area burned by wildfire due to anthropogenic climate change (Abatzoglou and Williams 2016). These conditions have resulted in the largest, most destructive, and deadliest wildfires on record in California history. Nine of the state's 10 deadliest wildfires have occurred since 2003 and are listed in Table 3.17-1, "Top 10 California Wildfires." According to California's Fourth Climate Change Assessment, *Statewide Summary Report* (2018), if GHG emissions continue to rise, the frequency of extreme wildfires burning over 25,000 acres could increase by 50 percent by 2100 and the average area burned statewide could increase by 77 percent by the end of the century (OPR, CEC, and CNRA 2018). The CalVTP would substantially increase the pace and scale of vegetation treatments in response to increased wildfire risk.

3.8.3 Impact Analysis and Mitigation Measures

ANALYSIS METHODOLOGY

State CEQA Guidelines Section 15064 and Appendix G direct a lead agency to consider the following factors when assessing the significance of GHG emissions:

- The extent to which the project may increase or reduce GHG emissions as compared to the existing environmental setting;
- Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project; and
- The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions.

This analysis estimates annual GHG emissions directly generated by treatment activities implemented under the CalVTP. Emissions generated by off-road equipment were estimated using emission factors derived from CARB's web-based OFFROAD2017 model (CARB 2017b). Emissions generated by on-road vehicle trips were estimated using emission factors from the Emission Factor 2014 model (EMFAC2017, Version 1.0.2) (CARB 2017b). Emissions from prescribed burns were estimated using emission factors from published research (Urbanski 2014) and fuel loading consumption rates from NWCG's *National Wildfire Coordinating Group Smoke Management Guide for Prescribed Fire* (NWCG 2018). Emissions from livestock used in prescribed herbivory treatments were estimated using emission rates for enteric fermentation published in the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (IPCC 2006). All detailed calculations and assumptions are provided in Appendix AQ-1. The emissions intensity of treatment activities can vary widely according to multiple factors including, but not limited to, the amount of vegetation removed or treated per acre, the maturity of the vegetation, the number of workers and equipment needed for each treatment project, and the types of equipment available. For these reasons, all assumptions involved in the emissions calculations are included in Appendix AQ-1 and all emissions estimates are approximations. In addition to short-term treatment-related emissions, the analysis also acknowledges that treatment activities under the CalVTP are intended to decrease the severity of wildfires over the long-term, resulting in the potential for reduced GHG emissions and increased levels of sequestered carbon; however, the state of the science makes it infeasible to include reliable quantified estimates of potential long-term changes in GHG emissions or carbon sequestration that may indirectly result from these treatments over time.

Although several air districts have established thresholds of significance for GHG emissions, these thresholds are meant for evaluating GHGs associated with land use development projects, including residential, commercial, industrial, and public land uses and facilities. Thus, they are not applicable to evaluation of treatment activities under the proposed CalVTP, which would generate short-term GHG emissions but are expected to result in long-term benefits. No thresholds of significance have been established by an air district, CAL FIRE, or any other government agencies that is aligned with the 2030 statewide GHG target mandated by SB 32 of 2016 and is suitable for the types of GHG-emitting treatment activities proposed under the CalVTP. Thus, this analysis qualitatively evaluates whether the annual GHG emissions generated by treatment activities implemented under the CalVTP would be substantial.

Additionally, this analysis assesses the CalVTP's consistency with State regulatory programs designed to reduce GHG emissions, especially in regard to the statewide GHG goals mandated by AB 32 of 2006 and SB 32 of 2016. This approach is consistent with one of the pathways to compliance presented in the California Supreme Court ruling, *Center for Biological Diversity v. California Department of Fish and Wildlife (2015) 62 Cal.4th 204, 229-231*. The CalVTP is evaluated for its consistency with adopted regulations, plans, and policies aimed at reducing GHG emissions, including the *2017 Scoping Plan* (CARB 2017a), *Draft California 2030 Natural and Working Lands Climate Change Implementation Plan* (CalEPA et al. 2019), and the *California Forest Carbon Plan* (CAL FIRE, CNRA, and CalEPA 2017).

Significance determinations account for the influence of relevant SPRs, which are incorporated into treatment design and listed below.

- **SPR AD-3 Consistency with Local Plans, Policies, and Ordinances**: The project proponent will design and implement the treatment in a manner that is consistent with applicable local plans (e.g., general plans), policies, and ordinances to the extent the project is subject to them. This SPR applies to all treatment activities and treatment types.
- **SPR AQ-3 Create Burn Plan**: The project proponent will create a burn plan using the CAL FIRE burn plan template for all prescribed burns. The burn plan will include a fire behavior model output of First Order Fire Effects Model and BEHAVE or other fire behavior modeling simulation and that is performed by a qualified fire behavior technical specialist that predicts fire behavior, calculates consumption of fuels, tree mortality, predicted emissions, greenhouse gas emissions, and soil heating. The project proponent will minimize soil burn severity from broadcast burning to reduce the potential for runoff and soil erosion. The burn plan will be created with input from a qualified technician or certified State burn boss. This SPR applies only to prescribed burning treatment activities and all treatment types.
- **SPR GHG-1 Contribute to the AB 1504 Carbon Inventory Process**: The project proponent of treatment projects subject to the AB 1504 process will provide all necessary data about the treatment that is needed by the U.S. Forest Service and FRAP to fulfill requirements of the AB 1504 carbon inventory, and to aid in the ongoing research about the long-term net change in carbon sequestration resulting from treatment activity.

THRESHOLDS OF SIGNIFICANCE

Global climate change is inherently a cumulative issue. GHG emissions occurring in any location can contribute to global concentrations in the atmosphere in combination with cumulative emissions. Any individual project alone would not substantially change global GHG concentrations. Thresholds of significance are based on Appendix G and Section 15064 of the State CEQA Guidelines, professional judgment, and CEQA case law.

Implementation of the proposed CalVTP would result in a cumulatively considerable contribution to climate change if it would:

- conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of GHGs; or
- generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.

ISSUES NOT EVALUATED FURTHER

All issues identified in State CEQA Guidelines Appendix G and listed above under Thresholds of Significance are evaluated below.

IMPACT ANALYSIS

Impact GHG-1: Conflict with Applicable Plan, Policy, or Regulation of an Agency Adopted for the Purpose of Reducing the Emissions of GHGs

The CalVTP would be consistent with applicable plans, policies, and regulations aimed at reducing GHG emissions, including *California's 2017 Climate Change Scoping Plan*, the *California Forest Carbon Plan*, and *California 2030 Natural and Working Lands Climate Change Implementation Plan*. The purpose of the CalVTP is to reduce wildfire risk, which could reduce GHG emissions and increase carbon sequestration over the long term. This impact would be **less than significant**.

Regulations, plans, and policies aimed at reducing GHG emissions from the natural lands in the treatable landscape of the CalVTP include the *2017 Scoping Plan, Draft California 2030 Natural and Working Lands Climate Change Implementation Plan*, and the *California Forest Carbon Plan*.

As described in Section 3.8.1, "Regulatory Setting," the *2017 Scoping Plan* lays out the framework for achieving compliance with statewide GHG targets mandated by SB 32 of 2016 (i.e., 40 percent below 1990 levels by 2030). To help meet the statewide target for 2030 the *2017 Scoping Plan* prescribed a 15–20 $MMTCO_2e$ reduction from business-as-usual emissions from the natural and working lands sector and determined that this reduction should be achieved through increased carbon sequestration and the reduction of wildfire emissions. The treatment activities implemented under the CalVTP would be consistent with the types of treatments called for in the *2017 Scoping Plan*, acknowledging the important role of fuel reduction treatments and prescribed burns in managing natural and working lands to reduce GHG emissions. For the tree-dominated landscape, SPR GHG-1 requires CAL FIRE to provide annual information to support continued understanding of the role of forests in carbon sequestration.

The *Draft California 2030 Natural and Working Lands Climate Change Implementation Plan* has set a goal for, at a minimum, doubling the rate of state-funded forest management and restoration efforts, which include prescribed burns, mechanical treatments, and understory treatments. Implementation goals are 23,800–73,300 acres of prescribed burns per year, 59,000–73,000 acres of thinning per year, and 23,500–25,300 acres of understory treatment per year. The plan identifies CAL FIRE as one of the implementing agencies of these treatments. The CalVTP aims to substantially increase the pace and scale of vegetation treatments and has set a target of 250,000 acres per year, a pace that it aims to reach by 2024. As stated in Section 2.5.3, "Distribution of Treatment Activities," the relative distribution of treatment activities is reasonably expected to be 50 percent prescribed burning, 10 percent manual treatments, 20 percent mechanical treatments, 10 percent herbicide treatments, and 10 percent prescribed herbivory, which meets and exceeds the targets set forth in the *Draft California 2030 Natural and Working Lands Climate Change Implementation Plan*. Similarly, the CalVTP would meet the acreage targets for forest restoration and treatment activity levels for nonfederal forest lands set forth in the *California Forest Carbon Plan*.

While the CALAND model is informed by a growing body of literature on the effects of fuels treatment activities on carbon sequestration, the technical documentation supporting the CALAND model acknowledges uncertainty in net carbon effects of vegetation treatments in various landscapes. The model's technical documentation suggests that more detailed research about wildfire and regeneration of vegetation in tree-, shrub-, and grass-dominated lands is needed to adequately characterize the conditions for reforestation and non-regeneration in the model (Di Vittorio and Simmonds 2018:24).

As stated in Section 2.2, "Objectives of the CalVTP," one of the objectives of the CalVTP is to be consistent with the *California Forest Carbon Plan*, the *2017 Scoping Plan*, and *Draft California 2030 Natural and Working Lands Climate Change Implementation Plan*. Given that the CalVTP is aligned with the specific goals and strategies called out in these plans, as discussed above, the CalVTP would be consistent with state plans and policies for carbon management in natural and working landscapes. This impact would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

Impact GHG-2: Generate GHG Emissions through Treatment Activities

Direct GHG emissions from the proposed increase in annual treatment activities conducted under the CalVTP would be substantial, recognizing planned levels of treatment would increase from 33,000 acres to 250,000 acres per year. At the full target rate of 250,000 acres per year, GHG emissions from treatments would amount to an estimated 4,051 $MMTCO_2e$ annually. Consistent with the goals of the proposed fuel treatments to decrease the occurrence of high-severity wildfires and increase the potential rates of carbon sequestration, implementation of the CalVTP could result in a cumulative net carbon benefit over the long term, which is the most relevant timeframe and global context of GHG-caused, climate change–related environmental effects. However, there is uncertainty in predicting future wildfire occurrence and carbon sequestration rates, which are highly variable depending on many factors. Future wildfire intensities and carbon sequestration in treated areas are the subjects of continued scientific research and debate. To meet CEQA's mandate of good faith disclosure and acknowledge potential future impacts in light of uncertainties, this GHG impact is classified as **potentially significant**, recognizing the reliability of estimates for direct GHG emissions and the uncertainty of the intended net carbon benefits of reduced wildfire intensity and increased carbon sequestration in treated areas.

Treatment activities implemented under the CalVTP would result in GHG emissions directly generated by off-road equipment, on-road vehicles, machine-powered hand tools, and helicopters; and from the combustion of vegetation. Worker commute trips and hauling of equipment and materials associated with all treatment activities would also directly generate GHG emissions.

Mechanical treatments would be performed with heavy-duty off-road equipment such as wheeled tractors, crawler-type tractors, excavators, feller/bunchers, skidders, chippers, masticators or other specially designed tractors with attached implements designed to selectively cut, uproot, crush/compact, or chop target vegetation.

Manual treatments would typically be conducted by one or two hand crews (i.e., 20–40 crew members) using four to eight chainsaws. Masticators and chippers may also be used at some manual treatment sites to assist with biomass disposition during manual treatments.

The vegetative debris produced by mechanical or manual treatments may be processed into several products: electricity, soil additives and amendments, engineered/composite wood, firewood, paper, densified wood, and potentially biofuels. This could result in additional haul truck trips to processing facilities, which would generate additional GHG emissions. Indirect emissions would also be generated through energy use at the facilities that process the raw vegetative debris.

Prescribed herbivory may require intermittent use of an all-terrain vehicle or utility vehicle for herding livestock or transporting temporary fencing. On-road trucks would be used to haul livestock to and from sites where prescribed herbivory would be conducted.

Herbicide application may require all-terrain vehicles or tractors with sprayers. However, few pieces of GHG emission-generating equipment would be required, because herbicides would most frequently be applied by hand.

Prior to implementing a prescribed burn, heavy-duty off-road equipment such as bulldozers, bulldozer transports, and masticators or track chippers may be used to create a fire containment (fuel break) perimeter. Fire engines and water trucks would be stationed on-site as a precautionary measure. Hand tools to ignite the prescribed burn could include drip torches and Terra torches, which run on a blend of diesel fuel and gasoline. A helicopter with a helitorch may be used when a large area needs to be burned or in an area with terrain that has limited accessibility. Combustion of vegetation from prescribed burning would directly produce substantial GHG emissions immediately during treatment. The combustion of vegetation produces smoke, which is composed of a complex mixture of compounds, including CO_2 and methane.

As discussed in Chapter 2, "Program Description," treatment activities would be selected based on several parameters including site-specific characteristics (e.g., types and maturity of vegetation, soil characteristics, terrain, proximity to sensitive areas, topography, accessibility), weather conditions, treatment objectives, cost and available funding, and input from communities. Furthermore, the treatable landscape encompasses many different vegetation types, which can be grouped into three broad categories: grass, shrub, and tree. Given this wide variability over an expansive geographic area, there is no set of "typical" treatment characteristics that can be used to represent each type of treatment activity under the CalVTP. For instance, mechanical treatments conducted in a grass fuel type environment may use mowers, whereas mechanical treatments conducted in a tree fuel type environment may use feller/bunchers. Even the same treatment activity in the same fuel type could also vary. For instance, a mechanical treatment for a WUI fuel reduction treatment in a tree fuel type environment where biomass may be masticated and left in place may use chippers and masticators, whereas a mechanical treatment to establish a fuel break in a tree fuel type environment may use feller/bunchers, skidders, or cut-to-length systems to fell and remove trees.

To provide a general sense of the scale of emissions that may be associated with treatment activities, the rates of GHG emissions associated with each treatment activity (i.e., mechanical treatment, manual treatment, prescribed herbivory, herbicide application, and prescribed burning) in each fuel type (i.e., grass, shrub, tree) are estimated on a per-acre basis using assumptions about the types and number of equipment that would be used by a treatment crew, as well as the number of workers per treatment crew. Treatment activities are subdivided by type because the types of equipment that would be used within each fuel type are distinct. These GHG emission rates are summarized in Table 3.8-3. See Appendix AQ-1 for detailed input parameters and assumptions. Exact GHG emissions for treatment activities conducted under the CalVTP may differ from the hypothetical rates presented in Table 3.8-3 because equipment, crew size, and total acreage for each type of treatment activity could vary widely. However, these rates provide a reasonable approximation of the emissions such activities would generate.

The emission rates presented in Table 3.8-3 do not include emissions generated by trucks hauling equipment or livestock to and from treatment sites at the beginning and end of each treatment because the emissions associated with the transport of equipment and livestock would vary considerably depending on the size of a treatment site and the number of crews working at each site. The emission rates presented in Table 3.8-3 also do not include emissions associated with any hauling or processing of biomass, which may occur as part of some manual and mechanical treatment activities as conditions warrant. As discussed in Section 2.5.2, "Description of Treatment Activities," the percentage of vegetation hauled to biomass facilities for energy generation is expected to increase over time. These emissions are not quantified due to the high level of uncertainty about what types of processing-related activities would occur and the distances feedstock would be hauled. Additionally, new biomass processing facilities that would require a discretionary decision made by a lead agency would be subject to its own CEQA review.

Table 3.8-3 Greenhouse Gas Emissions Directly Associated with Treatment Activity

	Direct GHG Emissions per Acre Treated ($MTCO_2e$/acre)
Prescribed Burning	
Tree Fuel Type	63.15
Shrub Fuel Type	16.15
Grass Fuel Type	7.90
Mechanical Treatment	
Tree Fuel Type	0.92
Shrub Fuel Type	0.29
Grass Fuel Type	0.07
Manual Treatment	
Tree Fuel Type	0.69
Shrub Fuel Type	0.40
Grass Fuel Type	<0.01
Prescribed Herbivory	
Tree Fuel Type	0.08
Shrub Fuel Type	0.55
Grass Fuel Type	0.55
Herbicide Application	
Tree Fuel Type	0.02
Shrub Fuel Type	0.01
Grass Fuel Type	<0.01

Notes: $MTCO_2e$/acre = metric tons of carbon dioxide-equivalent per acre

[1] Emissions estimates do not include emissions generated by trucks hauling equipment and livestock to and from treatment sites at the beginning and end of each treatment.

[2] More than one type of treatment may be performed on the same land in the same year. For example, manual treatment or herbicide application may be conducted prior to a prescribed burn.

[3] These emission estimates do not account for any emissions associated with the removal of vegetative biomass from treatments sites and any processing activity that may occur thereafter, including potential use as feed stock for a biomass power facility, composting, or chipping and mulching applications.

Source: See Appendix AQ-1 for detailed calculations and assumptions.

As shown in Table 3.8-3, prescribed burning would be the most GHG-intensive treatment activity on a per-ace basis. This is because most of the carbon contained in fuels subject to prescribed burns is directly emitted into the air as either CO_2 or particulate matter, rather than staying in a sequestered state for an extended period after it is piled, chipped, masticated, killed with herbicide, digested by livestock, spread across the ground, and/or hauled offsite to be used as mulch, a soil amendment, or fuel at a biomass energy facility. The values in Table 3.8-3, however, do not reflect any re-treatment or maintenance to achieve the objectives of the CalVTP. The values also don't reflect secondary emissions that may result from treatments other than prescribed burning; secondary emissions may result from haul treated vegetation offsite and potential use as feed stock for a biomass facility, composting, chipping and mulching, or other disposition methods.

An estimate of the annual level of direct GHG emissions for 250,000 acres per year would be approximately 4,051 $MMTCO_2e$, based on the expected relative distribution of treatment activities (i.e., 50 percent prescribed burning, 10 percent manual treatments, 20 percent mechanical treatments, 10 percent herbicide treatments, and 10 percent prescribed herbivory) and the assumption that the distribution of treated fuel types would be proportional to their presence in the treatable landscape (as displayed in Figure 2-2, "Fuel Types in the Treatable Landscape"). Applying these parameters and assumptions, the level of GHG emissions generated by each treatment activity is summarized in Table 3.8-4. See Appendix AQ-1 for detailed input parameters and assumptions. The annual emissions from fuel treatments would increase substantially with the CalVTP, because of the expansion in the volume of treatment planned in the state/

Table 3.8-4 Annual Greenhouse Gas Emissions Generated by Treatment Activity

	Direct GHG Emissions ($MTCO_2e$/year)
Prescribed Burning	4,020,672
Mechanical Treatment	11,603
Manual Treatment	9,245
Prescribed Herbivory	8,989
Herbicide Application	546
Total	**4,051,054**

Notes: $MTCO_2e$/year = metric tons of carbon dioxide-equivalent per year

Source: See Appendix AQ-1 for detailed calculations and assumptions.

As shown in Table 3.8-4, the level of GHG emissions generated by treatment activities under the CalVTP would total approximately 4,051,054 $MTCO_2e$ per year (or 4,051 $MMTCO_2e$/year). This amount is equivalent to 0.9 percent of the statewide target for 2020 of 431 $MMTCO_2e$/year and 1.6 percent of the statewide target for 2030 of 258.6 $MMTCO_2e$/year. In the context of legislated statewide GHG targets, the level of treatment-related GHG emissions would be considerable.

The effect of vegetation treatment on the carbon content of the landscape over the long term—by reducing occurrences of high-severity wildfires and/or by increasing the carbon sequestration potential of vegetated landscapes—continues to be the focus of scientific research and model development, particularly in tree-dominated landscapes. The current body of research presents various and inconsistent findings regarding the effects of treatments on the long-term carbon emission or sequestration of vegetated lands. A review of the scientific literature in the *Draft California 2030 Natural and Working Lands Climate Change Implementation Plan* indicates that, in a broader context, treatment activities reduce vegetation densities and fuel loads, restore the structure and composition of ecosystems, and may lower the potential for damaging, high-severity fire, which is currently the primary source of GHG emissions and carbon loss from the natural and working lands sector (Stephens et al. 2009; Campbell et al. 2007; Hurteau et al. 2008; Hurteau and North 2009; and North et al. 2009—all cited in CalEPA et al. 2019:14). Additionally, it finds that future vegetative growth on treated acres would result in carbon sequestration over time. The *Draft California 2030 Natural and Working Lands Climate Change Implementation Plan*, which includes treatment activities, relied on the California Natural and Working Lands Carbon and Greenhouse Gas Model (CALAND model) to evaluate the long-term effects of the draft plan.

The CALAND model is an empirically based landscape-scale carbon accounting model that assesses the projected GHG benefits of certain conservation, restoration, and management activities on California's natural and working lands. CALAND is designed to quantify the level of GHG emissions associated with treatments of different types of vegetation as well as the net change in carbon sequestration in vegetation and soils resulting from different types of treatments (Di Vittorio and Simmonds 2018:3). The technical documentation that supports the CALAND model suggests that strategies to enhance resilience to pest and disease and reduce stand density in degraded forests, including prescribed burning and thinning, are likely to benefit regional forest health and help prevent large losses of carbon (Di Vittorio and Simmonds 2018:52), although more research is warranted to be able to definitively estimate carbon sequestration. It also suggests that, while fuel reduction treatment activities require direct carbon emissions, they could also result in long-term carbon sequestration benefits and can affect vegetation carbon accumulation rates for a 20-year post-management period (Di Vittorio and Simmonds 2018). However, some key assumptions of CALAND about the carbon dynamics associated with the utilization of harvested and collected biomass carbon for wood products and energy would not apply to CalVTP. Notably, CALAND assumes some treatments of forested lands would include the harvest of merchantable timber for the manufacture of wood products that continue to hold sequestered carbon over their useful life and then the eventual CO_2 and methane emissions associated with the decay of discarded wood products. This assumption would not be applicable to CalVTP treatments in tree fuel types, because the CalVTP does not include harvest of merchantable timber. CALAND also assumes removal of 20 percent of live and dead standing trees for wood products and bioenergy resulting from "clearing of ladder fuels and debris through thinning" in forests (Di Vittorio and Simmonds 2018:12, 14, 20). Disposition of biomass created by the CalVTP treatments would likely differ from the CALAND assumptions (see Section 2.5.2 in Chapter 2, "Program Description".

Other studies address the reduction of GHG emissions from wildfire in treated areas, based on the expectation that fires would be less intense in those locations. Wildfires are especially emission-intensive because they are uncontrolled, can burn for a long duration (weeks or months), and can result in crown fires that burn entire trees. Wildfires on untreated lands are more difficult to control and suppress than wildfires on lands that have undergone vegetation treatments. One study determined that, in some forest classes that historically had relatively frequent fire intervals, wide-scale prescribed burn application can reduce GHG emissions from wildfires by 18–25 percent in the western U.S., and by as much as 60 percent in specific forest systems as compared to a wildfire on untreated lands (Wiedinmyer and Hurteau 2010). The classes of forests in which this relationship was found include mixed conifer, Douglas-fir/ponderosa pine, and ponderosa/Jeffrey pine. As discussed in Section 3.16, "Wildfire," there is a scientific consensus that there is a correlation between certain types of forest fuel treatments and reduced wildfire severity. Other studies suggest that reducing fuels through mechanical treatments and prescribed burning is effective at reducing fire severity and annual area burned when applied at the landscape scale over an extended period (Kim et al. 2013, Prichard and Kennedy 2014). Another study found that when moderate- and high-severity wildfires encountered a previously treated area, fire severity was substantially reduced in the treated area relative to the adjacent untreated area (Lydersen et al. 2017). The findings of these studies indicate that vegetation treatments may result in a net carbon benefit in the long term, particularly in the context of avoided GHG emissions from wildfire, the severity and extent of which would be less in treated areas, and/or the potential for treated areas to sequester more carbon.

Other published studies indicate that the carbon sequestration potential for an area is highly dependent on many variables, and in some cases may not result in a net carbon benefit over the long term. For instance, a study by Campbell et al. (2011), which focused on forests in southern Oregon and northern California, did not find evidence that thinning trees and other fuel-reduction practices aimed at reducing the probability of high-severity forest fire have the added benefit of increasing terrestrial carbon stocks. This study found that reductions in carbon sequestration resulting from vegetation treatment (i.e., removal of fuels) generally exceed the level of emissions avoided should the treated area be burned in a wildfire; and that only when treatments change the equilibrium between growth and mortality can they alter the level of carbon sequestration over the long term. In addition, a modeling study by Hurteau and North (2009) suggests that the potential for treatments of a forest to result in a long-term increase in carbon sequestration is most affected by the stand structure, which generally refers to the distribution of trees by species and size, resulting from the fuel treatments (Hurteau and North 2009). Another modeling study, by Reinhardt and Holsinger (2010), determined that vegetation treatments in forests in the northern Rocky Mountains decreased fire severity and crown fire occurrence and reduced subsequent wildfire emissions, but did not increase post-wildfire carbon stored on-site. It also found, conversely, that untreated stands had greater wildfire emissions but stored more carbon. There is limited research regarding the effects of fuel treatments on carbon emission and sequestration within shrub- and grass-dominated lands.

In summary, there is uncertainty in predicting future wildfire occurrence, severity, and carbon sequestration rates that will continue to be evaluated in ongoing research and factored into future state-level planning for management of natural and working lands and in future iterations of the CALAND model and other models. As stated in the *2017 Scoping Plan*, continued research and development to advance the state of science on carbon dynamics is needed (CARB 2017a:82–83). The current scientific understanding of the carbon-related effects of vegetative treatments is limited, in part, because the long timescale in which these carbon cycles need to be considered. For forests especially, an appropriate timescale is on the order of 20, 50, or 100 years, or longer. This is acknowledged in the *2017 Climate Change Scoping Plan 2017 Scoping Plan*, the *California Forest Carbon Plan*, and *California 2030 Natural and Working Lands Climate Change Implementation Plan*, and is also acknowledged in the AB 1504 Carbon Inventory Process.

The potential exists for long-term, cumulative net carbon benefits and there is research that indicates that in some cases, immediate GHG emissions from treatment activities and the loss of carbon from removal of vegetation are greater than the positive carbon effects of reduced wildfire severity and size. To meet CEQA's mandate of good faith disclosure (*California Native Plant Society v. City of Santa Cruz, supra*, 177 Cal.App.4th at p. 979) by acknowledging potential future impacts in light of the uncertainties, this PEIR classifies this GHG impact as **potentially significant**, recognizing the reliability of estimates of direct GHG emissions and the uncertainty of the intended net carbon benefits of reduced wildfire intensity and increased carbon sequestration in treated areas. Even though the predicted long-term outcome may be beneficial, the "potentially significant" determination is intentional as an expression of the Board's commitment to continued support of ongoing research and adjustment of carbon management approaches as the science evolves.

Mitigation Measure GHG-2. Implement GHG Emission Reduction Techniques During Prescribed Burns

When planning for and conducting a prescribed burn, project proponents implementing a prescribed burn will incorporate feasible methods for reducing GHG emissions, including the following, which are identified in the *National Wildfire Coordinating Group Smoke Management Guide for Prescribed Fire* (NWCG 2018):

- reduce the total area burned by isolating and leaving large fuels (e.g., large logs, snags) unburned;
- reduce the total area burned through mosaic burning;
- burn when fuels have a higher fuel moisture content;
- reduce fuel loading by removing fuels before ignition. Methods to remove fuels include mechanical treatments, manual treatments, prescribed herbivory, and biomass utilization; and
- schedule burns before new fuels appear.

The project proponent will document in the Burn Plan required pursuant to SPR AQ-3 which methods for reducing GHG emissions can feasibly be integrated into the treatment design.

Significance after Mitigation

Implementation of Mitigation Measure GHG-2 would require project proponents conducting prescribed burns to implement GHG emission reduction techniques, as feasible. Given the potential infeasibility of implementing specific emission reduction techniques and the uncertainties associated with all the parameters and objectives of prescribed burning, it is not feasible to precisely quantify the GHG reductions that would be achieved by implementation of Mitigation Measure GHG-2 in this programmatic evaluation. For instance, these measures may not always be feasible when the objective of a prescribed burn is to consume coarse woody debris in areas of high tree mortality. Also, the feasibility of conducting mosaic burning can depend on the size of a burn, and mosaic burning may not meet the objectives of CAL FIRE or the landowner. Moreover, burning fuels with a higher fuel moisture content can generate more smoke and result in less consumption, potentially reducing the longevity or effectiveness of a prescribed burn treatment. Thus, acknowledging the need for a balance between achieving treatment rate objectives and minimizing immediate GHG or smoke impacts, the levels of GHGs emitted by prescribed burns could still be considerable. Implementation of Mitigation Measure GHG-2 would support the development and implementation of refined treatment strategies in compliance with the *California 2030 Natural and Working Lands Climate Change Implementation Plan* to heighten the GHG benefit of this plan. With the continued evolution of the body of scientific knowledge about the long-term carbon sequestration effects of vegetation treatments and application of research-backed guidance to treatment implementation, the likelihood of net GHG benefits would be reasonably expected to grow over time. Other measures could include the purchase and retirement of carbon credits to offset the one-time GHG emissions directly associated with treatment activity; however, this approach would consume financial resources needed to achieve the wildfire risk reduction objectives of the proposed CalVTP, so offset purchase could detract from and would not contribute to feasibly meeting the key objective of increasing the pace and scale of treated acreage.

Similar to the reasons for the pre-mitigation significance determination, to meet CEQA's mandate of good faith disclosure and acknowledge potential future impacts in light of uncertainties, this PEIR classifies this GHG impact as **potentially significant and unavoidable** after implementation of mitigation. Even though the long-term outcome may yet become beneficial, the "potentially significant and unavoidable" determination alerts the public to the potential that net positive emissions may persist over time.

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3.9 ENERGY RESOURCES

This section evaluates energy-related impacts from the proposed CalVTP. The analysis considers whether implementation of the CalVTP would result in inefficient, wasteful, or unnecessary consumption of energy or if it would obstruct the deployment or use of renewable energy resources. The CalVTP would not include the construction or operation of any land use types that would require grid-sourced energy. Treatments conducted under the CalVTP would require the use of petroleum fuels to power passenger vehicles, trucks, and heavy-duty equipment, but would not involve the consumption of electricity from the grid.

Comments on the Notice of Preparation related to energy resources included recommendations that CAL FIRE retrofit existing stations to be more energy efficient and supportive of solar photovoltaic systems (see Appendix A). The primary purpose of the proposed CalVTP is to reduce wildfire risk by treating vegetation and does not include physical alternations to existing fire stations. Therefore, this issue not addressed in this PEIR.

3.9.1 Regulatory Setting

FEDERAL

Energy Policy and Conservation Act, and CAFE Standards

The Energy Policy and Conservation Act of 1975 established nationwide fuel economy standards to conserve oil. Pursuant to this Act, the National Highway Traffic and Safety Administration (NHTSA), part of the U.S. Department of Transportation (DOT), is responsible for revising existing fuel economy standards and establishing new vehicle economy standards.

The Corporate Average Fuel Economy (CAFE) program was established to determine vehicle manufacturer compliance with the government’s fuel economy standards. Compliance with the CAFE standards is determined based on each manufacturer’s average fuel economy for the portion of their vehicles produced for sale in the country. The U. S. Environmental Protection Agency (EPA) calculates a CAFE value for each manufacturer based on the city and highway fuel economy test results and vehicle sales. The CAFE values are a weighted harmonic average of the EPA city and highway fuel economy test results. Based on information generated under the CAFE program, DOT is authorized to assess penalties for noncompliance. The Energy Independence and Security Act of 2007 (described below) identifies the current CAFE standards.

Energy Policy Act of 1992 and 2005

The Energy Policy Act of 1992 (EPAct) was passed to reduce the country’s dependence on foreign petroleum and improve air quality. EPAct includes several parts intended to build an inventory of alternative fuel vehicles (AFVs) in large, centrally-fueled fleets in metropolitan areas. EPAct requires certain federal, state, and local government and private fleets to purchase a percentage of light-duty AFVs capable of running on alternative fuels each year. In addition, financial incentives are also included in EPAct. Federal tax deductions are allowed for businesses and individuals to cover the incremental cost of AFVs. States are also required by the act to consider a variety of incentive programs to help promote AFVs. The Energy Policy Act of 2005 does the following: provides renewed and expanded tax credits for electricity generated by qualified energy sources, such as landfill gas; provides bond financing, tax incentives, grants, and loan guarantees for clean renewable energy and rural community electrification; and establishes a federal purchase requirement for renewable energy.

Energy Independence and Security Act of 2007

The Energy Independence and Security Act of 2007 was designed to improve vehicle fuel economy and help reduce U.S. dependence on oil. The Energy Independence and Security Act of 2007 increases the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard requiring fuel producers to use at least 36 billion gallons of biofuel in 2022, which represents a nearly five-fold increase over current levels; and reduces U.S. demand for oil by originally setting a CAFE standard of 35 miles per gallon (mpg) by 2020—an increase in fuel economy standards of 40 percent. In 2012, the NHTSA amended the CAFE standard to achieve 54.5 mpg by 2025.

By addressing renewable fuels and the CAFE standards, the Energy Independence and Security Act of 2007 builds upon progress made by the Energy Policy Act of 2005 in setting out a comprehensive national energy strategy for the 21st century; however, in August of 2018, the NHTSA and EPA proposed the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021–2026 Passenger Cars and Light Trucks, which, if adopted, would decrease the stringency of CAFE standards. The Proposed Rule would maintain the existing standards until 2020 with a zero percent increase in fuel efficiency until 2026. The Proposed Rule is undergoing public and environmental review and has not been formally adopted (EPA 2018).

STATE

Warren-Alquist Act

The 1974 Warren-Alquist Act (Act) established the California Energy Resources Conservation and Development Commission, now known as the California Energy Commission (CEC). The Act was created in response to the state legislature's review of studies that projected an increase in statewide energy demand, which could result in the development of power plants in environmentally sensitive areas. The Act introduced state policy for siting power plants to reduce potential environmental impacts, and additionally sought to reduce demand for new generation by directing CEC to develop statewide energy conservation "measures to reduce wasteful, uneconomic, inefficient, and unnecessary uses of energy" (Public Resources Code Section 25400). Conservation measures recommended establishing design standards for energy conservation in buildings. This ultimately resulted in the creation of the Title 24 Building Energy Efficiency Standards (California Energy Code), which have been updated regularly and remain in effect today. The Act additionally directed CEC to cooperate with the Office of Planning and Research, the California Natural Resources Agency (CNRA), and other interested parties in developing procedures to ensure that measures intended to minimize wasteful, inefficient, and unnecessary consumption of energy are included in all environmental impact reports required pursuant to CEQA.

Assembly Bill 2076: Reducing Dependence on Petroleum

Pursuant to Assembly Bill (AB) 2076 (Chapter 936, Statutes of 2000), CEC and the California Air Resources Board (CARB) prepared and adopted a joint agency report in 2003, *Reducing California's Petroleum Dependence*. Included in this report are recommendations to increase the use of alternative fuels to 20 percent of on-road transportation fuel use by 2020 and 30 percent by 2030, significantly increase the efficiency of motor vehicles, and reduce per capita VMT (CEC and CARB 2003). Further, in response to the CEC's 2003 and 2005 *Integrated Energy Policy Reports*, Governor Davis directed CEC to take the lead in developing a long-term plan to increase alternative fuel use. A performance-based goal of AB 2076 was to reduce petroleum demand to 15 percent below 2003 demand by 2030.

Integrated Energy Policy Report

Senate Bill (SB) 1389 (Chapter 568, Statutes of 2002) required CEC to: "conduct assessments and forecasts of all aspects of energy industry supply, production, transportation, delivery and distribution, demand, and prices. The Energy Commission shall use these assessments and forecasts to develop energy policies that conserve resources, protect the environment, ensure energy reliability, enhance the state's economy, and protect public health and safety" (Public Resources Code Section 25301(a)). This work culminated in the Integrated Energy Policy Report (IEPR).

CEC adopts an IEPR every 2 years and an update every other year. The 2017 IEPR is the most recent IEPR, which was adopted March 16, 2018. The 2017 IEPR provides a summary of priority energy issues currently facing the state, outlining strategies and recommendations to further the state's goal of ensuring reliable, affordable, and environmentally-responsible energy sources. Energy topics covered in the report include progress toward statewide renewable energy targets and issues facing future renewable development; efforts to increase energy efficiency in existing and new buildings; progress by utilities in achieving energy efficiency targets and potential; improving coordination among the state's energy agencies; streamlining power plant licensing processes; results of preliminary forecasts of electricity, natural gas, and transportation fuel supply and demand; future energy infrastructure needs; the need for research and development efforts to statewide energy policies; and issues facing California's nuclear power plants.

Assembly Bill 1007: State Alternative Fuels Plan

AB 1007 (Chapter 371, Statues of 2005) required CEC to prepare a state plan to increase the use of alternative fuels in California. CEC prepared the State Alternative Fuels Plan (SAF Plan) in partnership with CARB and in consultation with other state, federal, and local agencies. The SAF Plan presents strategies and actions California must take to increase the use of alternative non-petroleum fuels in a manner that minimizes the costs to California and maximizes the economic benefits of in-state production. The SAF Plan assessed various alternative fuels and developed fuel portfolios to meet California's goals to reduce petroleum consumption, increase alternative fuel use, reduce greenhouse gas (GHG) emissions, and increase in-state production of biofuels without causing a significant degradation of public health and environmental quality.

Executive Order S-06-06

Executive Order S-06-06, signed on April 25, 2006, establishes targets for the use and production of biofuels and biopower, and directs state agencies to work together to advance biomass programs in California while providing environmental protection and mitigation. The Executive Order establishes numerical targets to increase the production and use of bioenergy within California, including ethanol and biodiesel fuels made from renewable resources. These targets entail the in-state production of a minimum of 20 percent of total biofuels consumed within California by 2010, 40 percent by 2020, and 75 percent by 2050. The Executive Order also calls for the state to meet a target for use of biomass electricity. The 2011 Bioenergy Action Plan identifies those barriers and recommends actions to address them so that the state can meet its clean energy, waste reduction, and climate protection goals. The 2012 Bioenergy Action Plan updates the 2011 plan and provides a more detailed action plan to achieve the following goals:

- increase environmentally- and economically-sustainable energy production from organic waste;
- encourage development of diverse bioenergy technologies that increase local electricity generation, combined heat and power facilities, renewable natural gas, and renewable liquid fuels for transportation and fuel cell applications;
- create jobs and stimulate economic development, especially in rural regions of the state; and
- reduce fire danger, improve air and water quality, and reduce waste.

As of 2017, 2.99 percent of the total electricity system power in California was derived from biomass (CEC 2018). There are about 30 biomass plants in California with a total capacity of almost 640 megawatts. These plants typically combust biomass from forest (43 percent), urban wood (29 percent), agricultural or food waste (21 percent), and municipal solid waste (7 percent) sources (CEC 2019a).

Assembly Bill 32, Senate Bill 32, and Climate Change Scoping Plan and Update

California's 2017 Climate Change Scoping Plan (2017 Scoping Plan), prepared by CARB, outlines the main strategies California will implement to achieve the legislated GHG emission target for 2030 (i.e., 40 percent below 1990 levels) and "substantially advance toward our 2050 climate goals" (i.e., 80 percent below 1990 levels) (CARB 2017:1, 3, 5, 20, 25–26). The 2017 Scoping Plan identifies the reductions needed by each GHG emission sector (e.g., transportation, industry, electricity generation, agriculture, commercial and residential, pollutants with high global warming potential, and recycling and waste). Many of the regulations contained in the 2017 Scoping Plan such as the Advanced Clean Cars, Low Carbon Fuel Standard, and Renewable Portfolio Standard will reduce GHGs while simultaneously making the state as whole more energy efficient.

More details about the statewide GHG reduction goals and 2017 Scoping Plan measures are provided in the regulatory setting of Section 3.8, "Greenhouse Gas Emissions."

2030 Natural and Working Lands Climate Change Implementation Plan

In a joint, inter-agency effort, the California Environmental Protection Agency (CalEPA), California Department of Food and Agriculture (CDFA), CNRA, CARB, and California Strategic Growth Council (SGC) released the 2019 Draft California 2030 Natural and Working Lands Climate Change Implementation Plan (Plan) in January 2019. The Plan serves as a multi-disciplinary approach to conserve and maintain a resilient natural and working lands sector to provide the state with a natural carbon sink and improve air and water quality, wildlife habitat, recreation, and other benefits. The Plan sets goals for, at a minimum, increasing the rate of state-funded soil conservation practices by fivefold, doubling the rate of state-funded forest management and restoration efforts, tripling the rate of state-funded oak woodland and riparian reforestation, and doubling the rate of state-funded wetland and seagrass restoration above current practices (CalEPA, CNRA, CDFA, CARB, and SGC 2019).

Health and Safety Code Section 43870

Health and Safety Code (HSC) Section 43870 requires by January 1, 2024 that 10 percent of transportation fuels purchased by state agencies be very low carbon transportation fuels, which includes renewable diesel fuels. HSC Section 43870(b) defines "very low carbon transportation fuel" to mean a liquid or gaseous transportation fuel having no greater than 40 percent of the carbon intensity of the closest comparable petroleum fuel for that year as measured by the methodology in the Low Carbon Fuel Standard Regulation.

Senate Bill 100: California Renewables Portfolio Standard Program

SB 100 accelerated targets set by previously-enacted Renewable Portfolio Standard (RPS)-related legislation to require that all California utilities, including independently-owned utilities, energy service providers, and community choice aggregators, supply 44 percent of retail sales from renewable resources by December 31, 2024, 50 percent by December 31, 2026, 52 percent by December 31, 2027, and 60 percent by December 31, 2030. The law requires that eligible renewable energy resources and zero-carbon resources supply 100 percent of retail sales of electricity to California end-use customers and 100 percent of electricity procured to serve all state agencies by December 31, 2045. Biomass is indicated as an eligible renewable energy source under the state's RPS guidelines.

2016 Mobile Source Strategy

In 2016, CARB released the updated Mobile Source Strategy, which addresses exhaust emissions from on-road light-duty and heavy-duty vehicles, off-road federal and international sources (i.e., aircraft, locomotives, and ocean-going vessels), and off-road equipment. The strategy demonstrates how the state can simultaneously meet air quality standards, achieve greenhouse gas emission reduction targets, decrease health risk from transportation-related emissions, and reduce petroleum consumption over the next 15 years. The strategy identifies the mobile-source reductions necessary to reduce transportation-related petroleum use by up to 50 percent statewide by 2030.

Short-Lived Climate Pollutant Strategy

Short-lived climate pollutants (SLCPs) are powerful GHGs that remain in the atmosphere for a much shorter period of time than longer-lived pollutants such as carbon dioxide. They include methane, fluorinated gases, and black carbon (particulates). Their potency, as compared to carbon dioxide, can be tens, hundreds, and thousands of times greater. SB 605 directed CARB to develop a comprehensive SLCP strategy. In coordination with other state agencies and local air districts, CARB adopted the SLCP Strategy in March 2017. The strategy identified the use of anaerobic digesters to convert organic waste such as mulch or wood chips to renewable electricity, biogas, clean transportation fuels, and others.

3.9.2 Environmental Setting

ENERGY CONSUMPTION FOR TRANSPORTATION

Gasoline and diesel fuel constitute 83 and 17 percent of petroleum-based fuels sold in California, respectively. According to the state Board of Equalization, 15.58 billion gallons of gasoline and 3.12 billion gallons of diesel were sold in 2017 (CEC 2019b). Passenger cars and light-duty trucks operated by CAL FIRE in 2016 consumed 1.59 million gallons of gasoline and 1.63 million gallons of petroleum-based diesel fuel. This segment of the agency's vehicle fleet additionally consumed 148,573 gallons of renewable diesel fuel in response to goals established in the state's Green Fleet alternative fuels program (DGS 2019).

Fuel Types

<u>Petroleum</u>

Gasoline and diesel fuel sold in California for motor vehicles and equipment is refined in California to meet specific formulations required by CARB.

<u>Alternative Fuels</u>

A variety of alternative fuels are used to reduce demand for petroleum-based fuel. The use of these fuels is encouraged through various statewide regulations and plans, including the Low Carbon Fuel Standard and 2017 Scoping Plan. Conventional gasoline and diesel can be replaced (depending on the capability of the vehicle) with many transportation fuels, including:

- biodiesel,
- electricity,
- ethanol (E-10 and E-85),
- hydrogen,
- natural gas (methane in the form of compressed and liquefied natural gas),
- propane,
- renewable diesel (including biomass-to-liquid),
- synthetic fuels, and
- gas-to-liquid and coal-to-liquid fuels.

California has a growing number of alternative fuel vehicles due to the joint efforts of CEC, CARB, local air districts, federal government, transit agencies, utilities, and other public and private entities. As of March 2019, California contained over 20,000 alternative fueling stations (Alternative Fuels Data Center 2019).

Vehicle Miles Traveled and Gasoline Consumption

According to Caltrans, total gasoline purchased in 2015 totaled 6.5 million gallons (Caltrans 2018). Fuel consumption per capita in California decreased by nearly 11 percent from 2008 to 2011 (Bureau of Transportation Statistics 2015). Despite the progress in reducing per capita VMT and per capita fuel consumption, the continued projected increases in total fuel consumption and VMT can be attributed to the overall increase in population.

ENERGY CONSUMPTION FOR CURRENT VEGETATION TREATMENTS AND WILDFIRE

Treatments currently occur within the treatable landscape and energy is consumed during ongoing vegetation treatments when gasoline and diesel fuel are combusted during operation of vehicles and equipment (e.g., chainsaws and masticators). As described in Chapter 1, “Introduction” and Section 2.3.1, “Past and Current Treatments,” vegetation treatment currently occurs around the state under several other wildfire risk reduction programs implemented by various federal, state, and local agencies. In 2017–2018, CAL FIRE treated approximately 33,000 acres in California using the same treatment activities as proposed under the CalVTP.

Wildfire can occur throughout the state and require emergency response in the form of personnel and equipment. In cases where a wildfire exceeds the capacity of a local CAL FIRE unit, emergency resources may be diverted to a wildfire from elsewhere in the state requiring the consumption of fuels to transport personnel and equipment. At the peak of the Carr Fire in 2018, for instance, as many as 4,766 personnel worked to contain the fire, including 50 firefighters dispatched from Australia and New Zealand. During the peak of the Camp Fire in 2018, nearly 6,000 firefighters, 622 engines, 75 water tenders, 103 bulldozers, and 24 helicopters from all over the Western United States were deployed (InciWeb 2018). Although these catastrophic fires are atypical, emergency response to more “typical” wildfires also results in deployment of substantial human and equipment resources from distant locations. During catastrophic wildfire events, the main goal is containment and reducing impacts to human life and property. Efficient use of energy and fuels is not prioritized, and energy resources are used as a means to reach that goal. Energy is also consumed to evacuate residents, fire suppression, and move personnel.

Additionally, wildfires can damage or destroy electrical transmission and distribution facilities and infrastructure. In some cases, when meteorological conditions are conducive to supporting wildfire, utilities may opt to cut electricity to consumers within their service areas as a preventative measure against ignition of wildfires.

3.9.3 Impact Analysis and Mitigation Measures

ANALYSIS METHODOLOGY

The analysis of environmental impacts associated with energy consumption focuses on the potential to result in the wasteful, inefficient, or unnecessary consumption of energy or conflict with or obstruct a state or local plan for energy efficiency. As discussed in Section 3.9.1, "Regulatory Setting," the Warren-Alquist Act of 1974 directed CEC to develop statewide energy conservation measures to minimize environmental impacts caused by "…growth in demand which is caused by wasteful, uneconomic, inefficient, and unnecessary uses of power" (Priolo 1973). Reducing the growth in energy demand under this legislation was intended to limit the proliferation of power plants in environmentally sensitive areas of the state. The act also involved the establishment of parameters for the siting of power plants. This language from the act is represented in Appendix G of the State CEQA Guidelines and can be intuited to primarily apply to environmental impacts related to energy demand requiring increased generation capacity and appurtenant transmission infrastructure.

Significance determinations account for the influence of SPRs, which are incorporated into treatment design. The analysis herein discusses energy consumption under the CalVTP qualitatively in consideration of whether such consumption would be wasteful, uneconomic, inefficient, and unnecessary, consistent with the intentions of the Warren-Alquist Act.

THRESHOLDS OF SIGNIFICANCE

Thresholds of significance are based on Appendix G of the 2019 State CEQA Guidelines. A treatment implemented under the proposed CalVTP would result in a significant impact on energy resources if it would:

- result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation; and/or
- conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

ISSUES NOT EVALUATED FURTHER

Regarding whether the CalVTP would conflict with or obstruct a state or local plan for renewable energy or energy efficiency, CAL FIRE's participation in the state's Green Fleet Program would enable the ongoing incorporation of alternative fuels, including renewable diesel fuels into the agency's statewide operations. Additionally, the treatment activities occurring under the CalVTP would result in the availability of organic materials that could potentially be used for renewable energy generation. Biomass is indicated as an eligible renewable energy source under the state's RPS guidelines. The RPS was recently updated to require statewide zero-carbon electricity projection by 2045, which would require a diverse mix of renewable energy generation sources. The organic material produced by CalVTP could also be converted into renewable electricity, biogas, and biodiesel for use as a renewable transportation fuel in anaerobic digestion facilities throughout the state, as has been proposed and is currently being implemented under CARB's SLCP strategy. For these reasons, implementation of the CalVTP would not conflict with state or local plans for renewable energy or energy efficiency. Therefore, this impact is not evaluated further.

IMPACT ANALYSIS

Impact ENG-1: Result in Wasteful, Inefficient, or Unnecessary Consumption of Energy

Energy would be consumed under the proposed CalVTP in the form of fossil fuel (e.g., diesel and other petroleum fuels) combustion in the engines of vehicles and equipment, which would be used by workers accessing treatment areas and during implementation of treatment activities. Consistent with the CalVTP's purpose of reducing wildfire risk and to the extent it would decrease intensity of wildfires, implementation of treatment activities would also reduce the intensity of fire response. With less intense wildfire response and its relatively inefficient consumption of energy, fuel and energy consumption for wildfire response would decrease, as well. Thus, impacts related to consumption of energy resources would be **less than significant**.

Energy would be consumed from the combustion of diesel and other petroleum-based fuels to operate heavy-duty equipment and trucks during implementation of treatment activities in the treatable landscape, as well as from gasoline and diesel consumption associated with the movement of workers to and from treatment areas. Gasoline and diesel would be consumed during transport of workers, equipment and livestock (for prescribed herbivory) to and from treatment areas.

Diesel fuel would also be used to power heavy-duty equipment (e.g., bulldozers), other mechanical treatment equipment (e.g., masticators, chainsaws), and water trucks. Manual vegetation treatment would require the use of hand-operated power tools which typically run on blended two-cycle engine fuel (i.e., gasoline and oil mixed together). In some cases, jet fuel would be required to operate helicopters, if used in prescribed burning.

Under existing conditions, vegetation treatments are implemented within the treatable landscape by CAL FIRE and other land management agencies and agencies with land ownership responsibilities. As described in Section 2.3.1 of Chapter 2, "Program Description," CAL FIRE currently treats approximately 33,000 acres annually and other agencies currently treat additional acres in the treatable landscape. Under the proposed CalVTP these treatment activities would continue to occur and substantially increase in pace and scale to achieve the annual treatment target of approximately 250,000 acres. With this increase in treatment acreage, total fuel consumption related to vegetation treatments in comparison to existing conditions would greatly increase. Assuming that the same distribution of treatment activities would continue to occur under the CalVTP as existing conditions, petroleum fuel consumption could increase by approximately tenfold. However, the actual combination of treatment activities cannot be accurately predicted (refer to Section 2.5.2 in Chapter 2, "Program Description").

A primary objective of the CalVTP is to reduce wildfire risk. Land management practices focusing on fire suppression combined with changing meteorological conditions due to climate change (e.g., higher temperatures, drought conditions) has contributed to increased and prolonged wildfires throughout the treatable landscape. Higher temperatures in particular have extended the fire season to nearly year-around.

Wildfires require an immediate response from emergency personnel and mobilization of equipment. During wildfires that exceed the containment capacity of local resources, personnel from throughout the state (and occasionally nationally and internationally) are dispatched to assist in firefighting. Refer to Energy Consumption for Current Vegetation Treatments and Wildfire in Section 3.9.2 for examples. Efficient energy consumption is not a primary consideration during wildfires. Rather, protecting human life and property is prioritized.

Additionally, containment and cleanup of wildfires require a joint effort by local, state, and federal agencies. CalEPA and its departments assist local, state, and federal agencies during and after major wildfires. CARB provides emergency air monitoring, the California Department of Toxic Substances Control identifies and removes hazardous materials following containment, and the California Department of Resources Recycling and Recovery removes ash. This movement of personnel results in a surge of consumption of fossil fuels associated with vehicle and aerial travel, as well as an increase in grid-sourced electricity and propane and natural gas consumption associated with lodging personnel. While implementation of treatment activities under the CalVTP cannot ensure that catastrophic fires would not occur due to unforeseen factors (e.g., future climate conditions, availability of resources), implementation of the proposed CalVTP would reduce wildfire risk and the comparatively inefficient fossil fuel consumption associated with such events would also be reduced.

As described under Analysis Methodology above, a project that could introduce substantial energy demand such that additional energy-related infrastructure and facilities (e.g., power plant) would need to be built and would result in physical environmental effects, would be considered a significant energy impact. Energy consumption under the CalVTP would be from the combustion of fuels to implement vegetation treatment activities. Therefore, the CalVTP would not generate energy demand from the electrical grid to warrant the construction or operation of additional energy infrastructure that could result in physical environmental effects.

The existing conditions within the treatable landscape currently support landscapes conducive to largescale, highly damaging wildfire which, while active, require immediate and inefficient energy consumption to respond. Efficient energy use is not a primary consideration during wildfires. Rather, protecting human life and property is prioritized. By reducing wildfire risk the inefficient allocation of energy resources during catastrophic wildfire events could also be reduced.

For the reasons described above, energy consumption under the CalVTP would not be “wasteful, inefficient, or unnecessary.” This impact would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

3.10 HAZARDOUS MATERIALS, PUBLIC HEALTH AND SAFETY

This section evaluates potential health, safety, and environmental impacts related to hazardous materials that could result from implementation of the CalVTP. It describes the existing hazards and safety concerns within the treatable landscape and the nature of potential impacts that could occur as a result of the vegetation treatment activities.

Comments on the Notice of Preparation related to hazardous materials, public health, and safety included concern over the use of herbicides and prescribed fire accelerants and related health effects (see Appendix A). No accelerants are proposed for use under the CalVTP and the health effects of fuels, herbicides, and other potentially hazardous materials proposed for use are addressed in Section 3.10.3, "Impact Analysis and Mitigation Measures."

3.10.1 Environmental Setting

Hazards include conditions that could potentially affect health and safety. Examples include exposure to hazardous materials, such as chemicals or hazardous waste, or to physically hazardous situations, such as those that may occur in areas of high wildfire potential or in proximity to airports. Hazardous materials are defined, and potential hazards are summarized below.

HAZARDOUS MATERIALS

Definitions

California Health and Safety Code Section 25501 defines *hazardous materials* as any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. *Hazardous materials* include, but are not limited to, hazardous substances, hazardous waste, and any material that a handler or the administering agency has a reasonable basis for believing would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment.

A *hazardous chemical* is any chemical whose presence or use poses a physical or health hazard. The Federal Occupational Safety and Health Administration (OSHA) Laboratory Standard defines it as a chemical for which there is significant evidence, based on at least one study conducted in accordance with established scientific principles, that it may cause acute or chronic health effects to exposed employees. The term *health hazard* includes chemicals that are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins (affecting the liver), nephrotoxins (affecting kidneys), neurotoxins (affecting brain and nervous system), agents that affect the hematopoietic (blood) system, and agents that damage lungs, skin, eyes, or mucous membranes.

Potential Existing Hazards and Contamination

Hazardous materials, if present in soils, can be disturbed and dispersed by vegetation treatment activities, particularly those using heavy equipment. Soil contamination generally occurs in areas that are or have been previously developed, especially with industrial-type uses. Soil contamination can also occur in areas where pesticides have been historically applied, as well as in areas that have historically been mined or used for defense activities (e.g., an air force base). Contamination can also be associated with leaking utilities (e.g., leaking petroleum or gas pipelines, or leaking transformers on utility poles), or accidental spills. The treatable landscape is in tree, shrub, and grass fuel types, sometimes near developed areas. Some of the treatable landscape may contain limited remnant contamination from previous defense, agricultural, or pesticide use; contamination from nearby urban areas; or may have been exposed to leaks from pipelines, transformers, or utility poles.

As described in Chapter 1, "Introduction" and Section 2.3.1, "Past and Current Treatments," vegetation treatment currently occurs around the state under several other wildfire risk reduction programs implemented by various federal, state, and local agencies. In 2017–2018, CAL FIRE treated approximately 33,000 acres in California using the same treatment activities as proposed under the CalVTP. Therefore, transportation, use, and storage of hazardous materials associated with vegetation treatments occurs in the treatable landscape under existing conditions. These include common household hazardous materials such as fuels, oils, lubricants, solvents, and detergents for equipment and vehicle use and maintenance.

Additionally, naturally occurring asbestos (NOA) may exist in serpentine rock units within the treatable landscape. NOA is further addressed in Section 3.4, "Air Quality."

Pesticides/Herbicides

Background Information

A pesticide is any substance intended to control, destroy, repel, or attract a pest. Herbicides are a common type of pesticide that target weeds and other unwanted plants (DPR 2014). The terms pesticide and herbicide are used interchangeably herein.

Herbicides can be used selectively to control specific types of vegetation or non-selectively to clear all vegetation on a particular area. The process of registering a pesticide is a scientific, legal, and administrative procedure through which the U.S. Environmental Protection Agency (EPA) examines:

- the ingredients of a pesticide;
- the particular site or crop where it is to be used;
- the amount, frequency, and timing of its use; and
- storage and disposal practices.

In evaluating a pesticide registration application, EPA assesses a wide variety of potential human health and environmental effects associated with use of the product. The company that is seeking EPA-registration for the pesticide must provide data from studies that comply with EPA testing guidelines. EPA then develops risk assessments that evaluate the potential for (1) harm to humans, wildlife, fish, and plants, including endangered species and non-target organisms, and (2) contamination of surface or ground water from leaching, runoff, and spray drift (EPA 2018a). Risk assessment is crucial to the process of making decisions about pesticides, both new and existing. New pesticides must be evaluated before they can be used, and existing pesticides must be re-evaluated periodically to check that they continue to meet the appropriate safety standards (EPA 2017). The EPA also evaluates and approves the language that appears on each pesticide label to ensure the directions for use and safety measures are appropriate to address potential risks. Following label directions is required by law and is necessary to ensure safe use (EPA 2018a).

The EPA and individual states register and license pesticides in the U.S. under the authority of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). California state laws that regulate pesticide use, which are enforced by the California Department of Pesticide Regulation (DPR), are more restrictive than federal regulations and most other states. For example, pre-registration and registration requirements in California are more stringent than in other parts of the U.S. DPR reviews the studies submitted to the EPA and evaluates their findings, as well as state laws, to determine if additional label requirements or studies are needed.

Current Pesticide Use

Under CAL FIRE's current vegetation management practices, herbicides are used in select locations in the SRA and are applied on the ground from equipment on vehicles (including all-terrain vehicles and tractors equipped with booms for downward spray application) or by manual application devices. Herbicides are applied at the direction of a licensed Pesticide Control Advisor (PCA), and applied to green leaves with a backpack applicator or spray bottle, wick (wiped on), or wand (sprayed on) or applied as pellets to the ground surface. Herbicides are also applied to trees around the circumference of the trunk on the intact bark (basal bark), to cuts in the trunk or stem (frill, or "hack and squirt"), to cut stems and stumps (cut stump), or injected into the inner bark with a hypo-hatchet. The following is a list of herbicides currently used by CAL FIRE in the SRA:

- Borax (tetraborate decahydrate);
- Clopyralid (monoethanolamine salt);

- Glyphosate (isopropylamine salt, potassium salt, dimethylamine salt & diammonium salt);
- Hexazinone;
- Imazapyr (isopropylamine salt);
- Sulfometuron Methyl;
- Triclopyr (butoxyethyl ester & triethylamine salt);
- Nonylphenol 9 Ethoxylates (NP9E);
- Cleantraxx (penoxsulam & oxyfluorfen);
- Velpar (hexazinone); and
- Indaziflam.

As described in Chapter 2, "Program Description," CAL FIRE complies with all EPA and DPR pesticide label directions. Restricted use herbicides are applied per written recommendations from a licensed PCA and by an herbicide applicator certified by DPR. CAL FIRE obtains a permit from the applicable County Agricultural Commissioner (CAC) prior to applying restricted herbicides, as required by DPR. CAL FIRE complies with all federal and state laws regarding the transport, storage, and disposal of herbicides, and recommendations provided on the herbicide label and by the licensed PCA. More information on federal and state regulations related to pesticides and herbicides is provided below in Section 3.10.2, "Regulatory Setting."

Human Health Risks and Toxicity

As with all potentially toxic substances, whether exposure to a pesticide causes harm depends on the dose, how someone is exposed, how sensitive an individual may be to the toxin, and the toxicity of the pesticide involved. People can be exposed to pesticides in three ways: breathing (inhalation exposure), getting it in the mouth or digestive tract (oral exposure), and contact with the skin or eyes (dermal exposure). Inhalation exposure can happen if someone breathes air containing pesticide as a vapor, as an aerosol, or on small particles like dust. Oral exposure happens when someone eats food or drinks water containing pesticides. Dermal exposure happens when someone's skin is exposed to pesticides. This can cause irritation or burns. In more serious cases, skin can absorb the pesticide into the body, causing other health effects. Some pesticides evaporate more easily than others, so they are more likely to be inhaled. Some break down quickly on surfaces; others last longer. A pesticide applied as a liquid spray may drift more easily than dry granules, depending on meteorological conditions. A dry pesticide plowed into the soil can encounter groundwater but is not as likely to drift through the air. All these factors affect the potential risk of human exposure and are considered when DPR makes rules for pesticide use (DPR 2014).

Sensitive Receptors

Pesticides affect different people differently. Children may be more sensitive to some pesticides than adults. Compared to adults, they breathe in more air and eat more food relative to their body size, increasing their exposure. Also, their developing bodies may not break down some chemicals as effectively as adults. People of any age with asthma or other chronic diseases may be more likely than healthy individuals to get sick after pesticide exposure. Some individuals are also more sensitive to the odor or other irritant effects of certain pesticides. However, people in the greatest danger of pesticide exposure are those whose exposure is highest, such as workers who mix or apply pesticides (DPR 2014).

WILDFIRE HAZARDS

Wildland fires are seasonally common in certain forests, woodlands, grasslands, chaparral, and other high-fuel areas. The treatable landscape is located in many areas considered to have high wildland fire risk. CAL FIRE designates the SRA according to fire hazard severity zones: moderate, high, and very high. These zones are based on local vegetation type (fuel loading), slope, and weather. CAL FIRE implements fire fuel management practices in the SRA, where wildfire hazards are present, to minimize and manage the potential risk. CAL FIRE also has the primary responsibility for wildland fire response in many State Park units, reserves, and wildlife areas owned by CDFW, and lands owned and managed by other state, regional, and local agencies as well as private entities. In areas closer to communities, mutual aid agreements also exist with local fire protection agencies. Fire hazard severity zones throughout the SRA are depicted in Figure 1-2 of Chapter 1, "Introduction."

3.10.2 Regulatory Setting

FEDERAL

The EPA is the agency primarily responsible for enforcement and implementation of federal laws and regulations pertaining to hazardous materials. Relevant federal regulations pertaining to hazardous materials are contained mainly in Code of Federal Regulations (CFR) Titles 29, 40, and 49. Hazardous materials, as defined in the CFR, are listed in 49 CFR Section 172.101. Management of hazardous materials is governed by the following laws:

- Resource Conservation and Recovery Act (RCRA) of 1976 (42 U.S. Code [USC] Section 6901 et seq.);
- Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA, also called the Superfund Act) (42 USC Section 9601 et seq.); and
- Superfund Amendments and Reauthorization Act (SARA) of 1986 (Public Law 99-499).

These laws and associated regulations include specific requirements for facilities that generate, use, store, treat, and/or dispose of hazardous materials, which are applicable primarily to the program's use of herbicides. The EPA provides oversight and supervision for federal Superfund investigation/remediation projects, evaluates remediation technologies, and develops hazardous materials disposal restrictions and treatment standards.

Resource Conservation and Recovery Act

RCRA establishes a framework for national programs to achieve environmentally sound management of both hazardous and non-hazardous wastes. RCRA was designed to protect human health and the environment, reduce/eliminate the generation of hazardous waste, and conserve energy and natural resources. RCRA also promotes resource recovery techniques. A waste would legally be considered hazardous if it is classified as ignitable, corrosive, reactive, or toxic. Under RCRA, the EPA regulates hazardous waste from the time that the waste is generated until its final disposal ("cradle to grave"). The Hazardous and Solid Waste Amendments of 1984 both expanded the scope of RCRA and increased the level of detail in many of its provisions. The Hazardous Waste Management subchapter of the RCRA deals with a variety of issues regarding the management of hazardous materials, including the export of hazardous waste, state programs, inspections of hazardous waste disposal facilities, enforcement, and the identification and listing of hazardous waste. Under RCRA regulations, commercial chemical products such as pesticides and herbicides would become "solid wastes" (and thus, potentially, hazardous wastes) at the point where the project proponent decides to discard them, if the pesticide product is listed in 40 CFR 261.31 or 261.33, or exhibits a hazardous waste characteristic identified in 40 CFR 261.21 through 261.24 (Cornell University 2017).

Comprehensive Environmental Response, Compensation, and Liability Act and Superfund Amendments and Reauthorization Act

Hazardous substances are a subclass of hazardous materials. They are regulated under the CERCLA and SARA. Under CERCLA, the EPA has authority to seek out the parties responsible for releases of hazardous substances and ensure their cooperation in site remediation. CERCLA also provides federal funding (the "Superfund") for remediation. SARA Title III, the Emergency Planning and Community Right-to-Know Act (EPCRA), requires companies to declare potential toxic hazards to ensure that local communities plan ahead for chemical emergencies. The EPA maintains a National Priority List of uncontrolled or abandoned hazardous waste sites identified for priority remediation under the Superfund program. The EPA also maintains the Comprehensive Environmental Response, Compensation, and Liability Information System database that contains information on hazardous waste sites, potentially hazardous waste sites, and remedial activities across the nation.

For releases of hazardous substances, the federal government has established Superfund Reportable Quantities (RQs). CERCLA would apply to the CalVTP if a hazardous materials release were to occur during treatment activities above an established RQ for the substance.

Emergency Planning Community Right-To-Know Act

EPCRA was included under the SARA law and is commonly referred to as SARA Title III. EPCRA was passed in response to concerns regarding the environmental and safety hazards posed by the storage and handling of toxic chemicals. EPCRA establishes requirements for federal, state and local governments, Indian tribes, and industry regarding emergency planning and "Community Right-to-Know" reporting on hazardous and toxic chemicals. SARA Title III requires states and local emergency planning groups to develop community emergency response plans for protection from a list of extremely hazardous substances (40 CFR Section 355 Appendix A). The Community Right-to-Know provisions help increase the public's knowledge and access to information on chemicals at individual facilities, their uses, and releases into the environment. In California, SARA Title III is implemented through the California Accidental Release Prevention Program.

Some commonly used pesticides are included in the SARA Title III List of Extremely Hazardous Substances. This list identifies Threshold Planning Quantities (TPQs) and RQs for reach extremely hazardous substance. The TPQ is the amount of a substance in pounds in your possession at any one time that is at or above the listed quantity of active ingredients. Once this amount or more is in a person's possession, it must be reported within 60 days according to Sara Title III requirements (University of Missouri 2019). EPCRA would apply to the CalVTP if any extremely hazardous materials are proposed for use at or above their established TPQs, or are released above the established RQ for the substance.

Occupational Health and Safety Administration

Enacted in 1970, the Occupational Safety and Health Act established this agency in order to ensure healthy working conditions in the U.S. There are approximately 2,100 OSHA inspectors, who, along with other experts and support staff, establish and enforce protective standards in the workplace. California, under an agreement with OSHA, operates an occupational safety and health program in accordance with Section 18 of the Occupational Safety and Health Act of 1970. The program applies to all public and private sector places of employment in the State, with the exception of federal employees, the U.S. Postal Service, private sector employers on Native American lands, maritime activities on the navigable waterways of the U.S., private contractors working on land designated as exclusive Federal jurisdiction, and employers that require Federal security clearances.

The OSHA Hazard Communication Standard (29 CFR Section 1910.1200) requires that workers be informed of the hazards associated with the materials they handle. For instance, manufacturers must appropriately label containers, Material Safety Data Sheets must be available in the workplace, and employers must properly train workers. Workers at hazardous waste sites must receive specialized training and medical supervision according to the Hazardous Waste Operations and Emergency Response (HAZWOPER) regulations (29 CFR Section 1910.120).

Implementation of treatments under the CalVTP would require compliance with these federal and State safety standards and practices regarding workplace safety and providing a safe and healthy environment for workers.

Federal Insecticide, Fungicide, and Rodenticides Act

FIFRA provides the basis for regulation, sale, distribution, and use of pesticides in the United States. FIFRA authorizes the EPA to review and register pesticides for specified uses. The EPA also has the authority to suspend or cancel the registration of a pesticide if subsequent information shows that continued use would pose unreasonable risks. FIFRA has been amended by the Pesticide Registration Improvement Act of 2003, which provides for the enhanced review of covered pesticide products, to authorize fees for certain pesticide products, and to extend and improve the collection of maintenance fees.

As a part of the federal registration process, the EPA classifies each pesticide product as a "general use pesticide" or "restricted use pesticide" (RUP) based on the potential for the product to cause unreasonable adverse effects on human health or the environment. Only certified pesticide applicators or those under the supervision of a certified pesticide applicator may use a RUP. Certification is a statement by the certifying agency that the applicator is competent and authorized to use or supervise the use of restricted pesticides (EPA 2018b).

Individuals applying any type of pesticide must do so consistent with this federal law as well as state and tribal laws and regulations. In general, states have the primary authority within the state for compliance monitoring and enforcement for the use of pesticides in violation of labeling requirements. The equivalent regulations at the state level are described below in under "State." FIFRA requirements, as enforced by the state (such as adhering to herbicide labels and application instructions), would apply to the use of herbicides under the CalVTP.

Worker Protection Standard

The EPA oversees pesticide use through the Worker Protection Standard (WPS). The WPS is a regulation for agricultural pesticides which is aimed at reducing the risk of pesticide poisonings and injuries among agricultural workers and pesticide handlers. WPS protects employees on farms, forests, nurseries, and greenhouses from occupational exposure to agricultural pesticides. The WPS contains requirements for pesticide safety training, notification of pesticide applications, use of personal protective equipment, restricted-entry intervals after pesticide application, decontamination supplies, and emergency medical assistance. The regulation covers two types of workers:

- Pesticide handlers: those who mix, load, or apply agricultural pesticides; clean or repair pesticide application equipment; or assist with the application of pesticides in any way.
- Agricultural workers: those who perform tasks related to the cultivation and harvesting of plants on farms or in greenhouses, nurseries, or forests.

The WPS requirements would apply to herbicide use proposed under the CalVTP to protect the health and welfare of pesticide handlers and appliers.

U.S Department of Transportation

The U.S. Department of Transportation (DOT), in conjunction with the EPA, is responsible for enforcement and implementation of federal laws and regulations pertaining to the transportation of hazardous materials. The Hazardous Materials Transportation Act of 1974 (49 U.S. Code 5101 et seq.) directs the DOT to establish criteria and regulations regarding safe storage and transportation of hazardous materials. Hazardous materials regulations are contained in 49 CFR 171–180, and address transportation of hazardous materials, types of materials defined as hazardous, and the marking of vehicles transporting hazardous materials. In particular, 49 CFR 173, titled "Shippers' General Requirements for Shipments and Packaging," defines hazardous materials for transportation purposes; within this portion of the code, 49 CFR 173.3 provides specific packaging requirements for shipment of hazardous materials, and 49 CFR 173.21 lists categories of materials and packages that are forbidden for shipping. 49 CFR 177, titled "Carriage by Public Highway," defines unacceptable hazardous materials shipments.

The DOT Pipeline and Hazardous Materials Safety Administration has designated many chemical compounds, including some pesticides, as hazardous materials. If transport of one or more of these hazardous pesticides is required under the CalVTP, compliance with DOT Regulation 49 CFR 100-185 would be required.

STATE

The Safe Drinking Water and Toxic Enforcement Act

This Safe Drinking Water and Toxic Enforcement Act (Proposition 65), passed as a ballot initiative in 1986, requires the state to annually publish a list of chemicals known to the state to cause cancer or reproductive toxicity so that the public and workers are informed about exposures to potentially harmful compounds. California EPA's Office of Environmental Health Hazard Assessment administers the act and evaluates additions of new substances to the list. Proposition 65 requires companies to notify the public about chemicals in the products they sell or release into the environment, such as through warning labels on products or signs in affected areas and prohibits them from knowingly releasing significant amounts of listed chemicals into drinking water sources. For pesticide use in a workplace setting, Proposition 65 requirements are met through compliance with DPR regulations, further described below under "California Pesticide Regulatory Program."

California Hazardous Waste Control Act

The California Hazardous Waste Control Act (HWCA) regulates the generation, treatment, storage, and disposal of hazardous waste (California Health and Safety Code Section 2510 et seq.). Hazardous waste is any material or substance that is discarded, relinquished, disposed of, or burned, or for which there is no intended use or reuse, and the material or substance causes or significantly contributes to an increase in mortality or illness; or the material or substance poses a substantial present or potential hazard to human health or the environment. These materials or substances include spent solvents and paints (oil and latex), used oil, used oil filters, used acids and corrosives, and unwanted or expired products (e.g., pesticides, aerosol cans, cleaners). If the original material or substance is labeled Danger, Warning, Toxic, Caution, Poison, Flammable, Corrosive or Reactive, the waste is very likely to be hazardous. The HWCA would apply to any CalVTP activities that require storage or disposal of hazardous waste (primarily pesticide use under the program).

California Pesticide Regulatory Program

DPR regulates the sale and use of pesticides in California. DPR is responsible for reviewing the toxic effects of pesticide formulations and determining whether a pesticide is suitable for use in California through a registration process. Although DPR cannot require manufacturers to make changes in labels, it can refuse to register products in California unless manufacturers address unmitigated hazards by amending the pesticide label. Consequently, many pesticide labels that are already approved by the EPA also contain California-specific requirements. Pesticide labels defining the registered applications and uses of a chemical are mandated by the EPA as a condition of registration. The label includes instructions telling users how to make sure the product is applied only to intended target pests and includes precautions the applicator should take to protect human health and the environment. For example, product labels may contain such measures as restrictions in certain land uses and weather (i.e., wind speed) parameters.

DPR also designates pesticides that can impair human health or pose hazards to the environment as "restricted materials" (similar to RUPs classification by EPA). Pesticides designated as restricted materials (state or federal) have additional use requirements which may include some or all of the following: (1) applicator certification from DPR or the applicable CAC, (2) enhanced supervision requirements for uncertified applicators, (3) a restricted materials permit from the CAC, and (4) additional requirements established by regulation. DPR usually designates restricted materials on the basis of active ingredient, concentration, container size, or use patterns on the labeling. The goal is to allow determination of the status by examining the product container and its labeling (DPR 2018).

Title 3, CCR section 6450, et. seq. further restricts the use of certain pesticides or active ingredients. These restrictions apply to all pesticide applications approved through the restricted materials permit process (through the applicable CAC). Regulatory restrictions may include the amount of pesticide that can be applied; methods of application; where the pesticide can be applied; or additional personal protective equipment that must be worn or used. The permit application process provides CACs with the opportunity to discuss the additional use restrictions with the property operator or pest control business well in advance of the actual application. Unlike permit conditions that are established by the CAC, regulatory use requirements are state regulations and are not attached to the permit (DPR 2018).

All herbicide use under the CalVTP would be required to comply with DPR regulations, such as adhering to pesticide labels and application directions, wearing personal protective equipment, and obtaining a restricted material permit if herbicides designated as 'restricted materials' are proposed for use.

California Department of Toxic Substances Control

The California Department of Toxic Substances Control (DTSC), a division of the California EPA, has primary regulatory responsibility over hazardous materials in California, working in conjunction with the EPA to enforce and implement hazardous materials laws and regulations. DTSC can delegate enforcement responsibilities to local jurisdictions.

The hazardous waste management program enforced by DTSC was created by the HWCA (California Health and Safety Code Section 25100 et seq.), which is implemented by regulations described in the CCR Title 26. The state program is similar to, but more stringent than, the federal program under RCRA. The regulations list materials that may be hazardous and establish criteria for their identification, packaging, and disposal.

Environmental health standards for management of hazardous waste are contained in CCR Title 22, Division 4.5. In addition, as required by California Government Code Section 65962.5, DTSC maintains a Hazardous Waste and Substances Site List for the state, commonly called the Cortese List.

California's Secretary for Environmental Protection has established a unified hazardous waste and hazardous materials management regulatory program (Unified Program) as required by Senate Bill 1082 (1993). The Unified Program consolidates, coordinates, and makes consistent the administrative requirements, permits, inspections, and enforcement activities for the following environmental programs:

- hazardous waste generator and hazardous waste onsite treatment programs;
- Underground Storage Tank program;
- hazardous materials release response plans and inventories;
- California Accidental Release Prevention Program;
- Aboveground Petroleum Storage Act requirements for spill prevention, control, and countermeasure plans; and
- California Uniform Fire Code hazardous material management plans and inventories.

The six environmental programs within the Unified Program are implemented at the local level by local agencies—Certified Unified Program Agencies (CUPAs). CUPAs carry out the responsibilities previously handled by approximately 1,300 State and local agencies, providing a central permitting and regulatory agency for permits, reporting, and compliance enforcement.

DTSC regulations would be applicable to the CalVTP if herbicides or other substances proposed for use qualify as a hazardous substance (some pesticides and herbicides become hazardous waste when discarded and, accordingly, must be disposed of as a hazardous waste).

California Division of Occupational Health and Safety Administration

The California, Division of Occupational Safety and Health Administration (Cal/OSHA), assumes primary responsibility for developing and enforcing workplace safety regulations within the state. Cal/OSHA standards are more stringent than federal OSHA regulations and are presented in CCR Title 8. Standards for workers dealing with hazardous materials include practices for all industries (General Industry Safety Orders); specific practices are described for construction, and hazardous waste operations and emergency response. Cal/OSHA conducts on-site evaluations and issues notices of violation to enforce necessary improvements to health and safety practices. Among other requirements, Cal/OSHA requires many entities to prepare Injury and Illness Prevention Plans and Chemical Hygiene Plans and provides specific regulation to limit exposure of construction workers to lead.

Implementation of treatments under the CalVTP would require compliance with the Cal/OSHA safety standards and practices regarding workplace safety and providing a safe and healthy environment for workers.

California Air Resources Board

The California Air Resources Board (CARB) oversees California's Smoke Management Program, which addresses potentially harmful smoke impacts from agricultural, forest, and range land management burning operations. The legal basis of the program is found in the *Title 17 Smoke Management Guidelines for Agricultural and Prescribed Burning*, adopted by CARB on March 23, 2000 (CARB 2011). The Guidelines state that each air district or region shall adopt, implement, and enforce a smoke management program, in coordination with CARB and other appropriate stakeholders. Elements of the program include permitting requirements for agricultural and prescribed burns, meteorological and smoke management forecasting, and a daily burn authorization system (CARB 2000). The *California Wildfire Smoke Response Coordination*, prepared under the auspices of CARB's California Air Response Planning Agency (CARPA) and the California Interagency and Smoke Council, provides useful information and resources seeking assistance in protecting the public's health from the impacts of smoke during wildfires (CARPA 2014). This program is discussed in more detail in Section 3.4, "Air Quality" and would be applicable to prescribed burning under the CalVTP.

State Water Resources Control Board and Regional Water Quality Control Boards

The State Water Resource Control Board (SWRCB) and nine regional water quality control boards (RWQCBs) are responsible for ensuring implementation and compliance with the provisions of the federal Clean Water Act and the State Porter-Cologne Act. The Porter-Cologne Act of 1969 is California's statutory authority for the protection of water quality. Along with the SWRCB and RWQCBs, water quality protection is the responsibility of numerous water supply and wastewater management agencies, as well as city and county governments, and requires the coordinated efforts of these various entities. These entities and water quality protection are discussed in more detail in Section 3.11, "Hydrology and Water Quality," and would be applicable to any treatment activities under the CalVTP that could directly or indirectly affect water quality.

California Department of Forestry and Fire Protection

Public Resources Code 4201-4204 directs CAL FIRE to map fire hazards within SRAs based on relevant factors such as fuels, terrain, and weather. These statutes were passed after significant WUI fires occurred; consequently, these hazards are described according to their potential for causing ignitions to buildings. These zones, referred to as Fire Hazard Severity Zones, provide the basis for application of various mitigation strategies to reduce risks to buildings associated with wildland fires (Board and CAL FIRE 2018). Additionally, the Public Resources Code, beginning with Section 4427, includes fire safety regulations that restrict the use of equipment that may produce a spark, flame, or fire; require the use of spark arrestors on construction equipment with internal combustion engines; specify requirements for the safe use of gasoline-powered tools in fire hazard areas; and specify fire suppression equipment that must be provided on site for various types of work in fire-prone areas. These requirements would apply to CalVTP activities within a Very High Fire Hazard Severity Zone.

LOCAL

When state agencies, including CAL FIRE, are conducting governmental activities under the authority of state law or the State Constitution, in this case, treatments implemented under the proposed CalVTP, they are exempt from local government plans, policies, and ordinances (unless a constitutional provision or statute directs otherwise). Nonetheless, CAL FIRE voluntarily seeks to operate consistently with local governance to the extent feasible. Given its statewide extent and the possible number of local and regional responsible agencies, this PEIR does not identify potentially applicable local government plans, policies, and ordinances. Types of local regulations relevant to hazardous materials, public health, and safety include general plan policies, local emergency operations plans, and zoning requirements. This PEIR assumes that any vegetation treatments proposed by local or regional agencies under the CalVTP would be consistent with local plans, policies, and ordinances, as required by SPR AD-3.

3.10.3 Impact Analysis and Mitigation Measures

ANALYSIS METHODOLOGY

The analysis of impacts related to hazardous materials and public health and safety focuses on the potential for the creation of significant hazards to the public or environment through the routine use of hazardous materials or reasonably foreseeable upset and accident conditions involving hazardous materials, emissions of hazardous materials within one quarter mile of a school, activities to be located on a hazardous materials site or near an airport, interference with an adopted emergency response plan, or exposure of persons to significant injury, loss, or death due to wildfire. Significance determinations account for the influence of relevant SPRs, which are incorporated into treatment design and listed below.

- SPR AD-3 Consistency with Local Plans, Policies, and Ordinances: The project proponent will design and implement the treatment in a manner that is consistent with applicable local plans (e.g., general plans), policies, and ordinances to the extent the project is subject to them. This SPR applies to all treatment activities and treatment types.

- **SPR HAZ-1 Maintain All Equipment:** The project proponent will maintain all diesel- and gasoline-powered equipment per manufacturer's specifications, and in compliance with all state and federal emissions requirements. Maintenance records will be available for verification. Prior to the start of treatment activities, the project proponent will inspect all equipment for leaks and inspect everyday thereafter until equipment is removed from the site. Any equipment found leaking will be promptly removed. This SPR applies to all treatment activities and treatment types.
- **SPR HAZ-2 Require Spark Arrestors**: The project proponent will require mechanized hand tools to have federal- or state-approved spark arrestors. This SPR applies only to manual treatment activities and all treatment types.
- **SPR HAZ-3 Require Fire Extinguishers:** The project proponent will require tree cutting crews to carry one fire extinguisher per chainsaw. Each vehicle would be equipped with one long-handled shovel and one axe or Pulaski consistent with PRC Section 4428. This SPR applies only to manual treatment activities and all treatment types.
- **SPR HAZ-4 Prohibit Smoking in Vegetated Areas:** The project proponent will require that smoking is only permitted in designated smoking areas barren or cleared to mineral soil at least 3 feet in diameter (PRC Section 4423.4). This SPR applies to all treatment activities and treatment types.
- **SPR HAZ-5 Spill Prevention and Response Plan:** The project proponent or licensed Pest Control Advisor (PCA) will prepare a Spill Prevention and Response Plan (SPRP) prior to beginning any herbicide treatment activities to provide protection to onsite workers, the public, and the environment from accidental leaks or spills of herbicides, adjuvants, or other potential contaminants. The SPRP will include (but not be limited to):
  - a map that delineates staging areas, and storage, loading, and mixing areas for herbicides;
  - a list of items required in an onsite spill kit that will be maintained throughout the life of the activity;
  - procedures for the proper storage, use, and disposal of any herbicides, adjuvants, or other chemicals used in vegetation treatment.

  This SPR applies only to herbicide treatment activities and all treatment types.
- **SPR HAZ-6 Comply with Herbicide Application Regulations:** The project proponent will coordinate pesticide use with the applicable County Agricultural Commissioner(s), and all required licenses and permits will be obtained prior to herbicide application. The project proponent will prepare all herbicide applications to do the following:
  - Be implemented consistent with recommendations prepared annually by a licensed PCA.
  - Comply with all appropriate laws and regulations pertaining to the use of pesticides and safety standards for employees and the public, as governed by the EPA, DPR, and applicable local jurisdictions.
  - Adhere to label directions for application rates and methods, storage, transportation, mixing, container disposal, and weather limitations to application such as wind speed, humidity, temperature, and precipitation.
  - Be applied by an applicator appropriately licensed by the State.

  This SPR applies only to herbicide treatment activities and all treatment types.
- **SPR HAZ-7 Triple Rinse Herbicide Containers:** The project proponent will triple rinse all herbicide and adjuvant containers with clean water at an approved site, and dispose of rinsate by placing it in the batch tank for application per 3 CCR Section 6684. The project proponent will puncture used containers on the top and bottom to render them unusable, unless said containers are part of a manufacturer's container recycling program, in which case the manufacturer's instructions will be followed. Disposal of non-recyclable containers will be at legal dumpsites. Equipment will not be cleaned, and personnel will not be washed in a manner that would allow contaminated water to directly enter any body of water within the treatment area or adjacent watersheds. Disposal of all herbicides will follow label requirements and waste disposal regulations.

  This SPR applies only to herbicide treatment activities and all treatment types.

- **SPR HAZ-8 Minimize Herbicide Drift to Public Areas:** The project proponent will employ the following herbicide application parameters during herbicide application to minimize drift into public areas:
  - application will cease when weather parameters exceed label specifications or when sustained winds at the site of application exceeds 7 miles per hour (whichever is more conservative);
  - spray nozzles will be configured to produce the largest appropriate droplet size to minimize drift;
  - low nozzle pressures (30-70 pounds per square inch) will be utilized to minimize drift; and
  - spray nozzles will be kept within 24 inches of vegetation during spraying.

  This SPR applies only to herbicide treatment activities and all treatment types.

- **SPR HAZ-9 Notification of Herbicide Use in the Vicinity of Public Areas:** For herbicide applications occurring within or adjacent to public recreation areas, residential areas, schools, or any other public areas within 500 feet, the project proponent will post signs at each end of herbicide treatment areas and any intersecting trails notifying the public of the use of herbicides. The signs will include the signal word (i.e., Danger, Warning or Caution), product name, and manufacturer; active ingredient; EPA registration number; target pest; treatment location; date and time of application; restricted entry interval, if applicable per the label requirements; date which notification sign may be removed; and a contact person with a telephone number. Signs will be posted prior to the start of treatment and notification will remain in place for at least 72 hours after treatment ceases.

  This SPR applies only to herbicide treatment activities and all treatment types.

THRESHOLDS OF SIGNIFICANCE

Thresholds of significance are based on Appendix G of the State CEQA Guidelines. A treatment implemented under the proposed CalVTP would result in a significant impact related to hazardous materials and public health and safety if it would:

- create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;
- create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;
- emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school;
- be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, create a significant hazard to the public or the environment;
- for a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, result in a safety hazard or excessive noise for people residing or working in the project area;
- impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; or
- expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires.

ISSUES NOT EVALUATED FURTHER

While it is conceivable that some CalVTP treatment activities may occur within 2 miles of an airport, activities proposed under the CalVTP do not include the development of new structures or facilities. Therefore, the CalVTP would not violate any structural height standards that could interfere with aircraft flight patterns or air traffic control communications. Prescribed burning is maintained at low intensities that would not generate sufficient smoke to affect air traffic. Furthermore, the CalVTP would not pose a significant safety hazard for people residing or working within 2 miles of an airport because no new residents would result from CalVTP implementation, and teams of workers would be small and only present within a given project area temporarily. This issue is not discussed further in this PEIR.

Implementation of the CalVTP would not alter potential emergency evacuation routes or impair an adopted emergency plan, as no alterations to roadways would occur and treatment activities would be temporary and occur off road and in remote areas. While there may be disruptions to some rural access points when vegetation treatment activities are being implemented, these disruptions would be temporary and implemented for the protection of the public during treatments (e.g., when prescribed burning is occurring) and access would be return to existing conditions once the activity is complete. Thus, the CalVTP would not have any significant impacts on adopted emergency response or emergency evacuation plans. This issue is not discussed further in this PEIR.

The exposure of people to smoke-related hazards, including potential respiratory effects of smoke resulting from prescribed burns, are analyzed in Section 3.4, “Air Quality.” The exposure of people or structures to risks from wildland fires is addressed in Section 3.17, “Wildfire.” Potential impacts to the environment, including to special-status species and watercourses, from the transportation, use, and storage of hazardous materials are addressed in Section 3.6, “Biological Resources” and Section 3.11, “Hydrology and Water Quality.”

Given that the treatable landscape covers a large geographic area, it is conceivable that schools would be located within one-quarter mile of treatment activities. While children are considered to be of greater sensitivity to hazards and hazardous materials than adults, the relative effects of implementing treatments under the CalVTP are addressed in the impact analysis below. No substantial differences between the effects on schools compared to the general public are anticipated. Thus, impacts specifically associated with schools are not discussed further.

IMPACT ANALYSIS

Impact HAZ-1: Create a Significant Health Hazard from the Use of Hazardous Materials

Treatment activities proposed under the CalVTP would require the use of various types of equipment and vehicles, which need fuels, oils, and lubricants to operate. The use, transport, and disposal of these substances could result in an accidental upset or health hazard if released into the environment. SPR HAZ-1 would be implemented during treatment activities under the CalVTP; it requires that all equipment be properly maintained per manufacturer’s specifications, requires regular inspection of all equipment for leaks, and requires that any equipment found leaking is required to be promptly removed from a treatment site. This SPR would minimize leaks and the potential for resultant contamination to enter the environment. Furthermore, several federal and state laws regulate the use, transport, storage, and disposal of hazardous materials, including the HWCA, DTSC’s Unified Program, and OSHA and EPA regulations, which all project proponents would be required to comply with. Although implementation of the CalVTP would increase the pace and scale of treatments and thus increase the use of hazardous materials in the treatable landscape, no new or more severe significant hazards to the public would be created from implementation of the CalVTP. This impact would be **less than significant**.

Implementation of prescribed burning, manual treatments, and mechanical treatments associated with the CalVTP would require the transportation, use, and storage of common household hazardous materials such as fuels, oils, and lubricants. Prescribed herbivory would utilize livestock and thus would not use hazardous materials, except in transport. Herbicide application is discussed under Impact HAZ-2.

Treatment activities under the CalVTP would utilize mechanical equipment and vehicles, such as chainsaws, large tractors, and large trucks, which need fuels, oils, and lubricants to operate. These types of substances are considered household hazardous materials and can adversely impact human health or the environment if released in large quantities. Equipment and vehicles are likely to be fueled, lubricated, and serviced as needed on-site during multi-day treatments. Fuels would also be used during prescribed burns for fire ignition. The use of these substances could result in an accidental release of these hazardous substances into the environment should any leaks or spills occur. SPR HAZ-1 would be implemented which requires that all equipment be properly maintained per manufacturer's specifications and requires inspection of all equipment for leaks prior to the start of a project and every day until the project is complete; any equipment found leaking is required to be promptly removed from a given project site. This SPR would minimize leaks and the risk of resultant contamination from entering the environment. Although fuels would be used during prescribed burns for ignition, no accelerants or any other substances would be used, and fuels used for prescribed burning would be completely consumed during the burning process such that no hazardous materials would persist. Furthermore, several federal and state laws described in Section 3.10.2, "Regulatory Setting," regulate the use, transport, storage, and disposal of hazardous materials to minimize potential health risks, including the HWCA, DTSC's Unified Program, and OSHA and EPA regulations; all project proponents implementing qualifying treatments under the CalVTP would be required to comply with these regulatory requirements. In addition, these types of household hazardous materials proposed for use under the CalVTP are currently in use under existing conditions within the treatable landscape. Although implementation of the CalVTP would increase the pace and scale of treatments and thus increase the use of household hazardous materials in the treatable landscape, with implementation of SPRs and adherence to relevant regulations, no new or more severe significant hazards would be created from the use of common household hazardous materials under the CalVTP. This impact would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

Impact HAZ-2: Create a Significant Health Hazard from the Use of Herbicides

Herbicide application under the CalVTP would require increased transportation, use, storage, and disposal of various herbicides, which could result in risks related to human exposure when applied in areas in close proximity to the public. Under normal conditions, compliance with all laws, regulations, and herbicide label instructions, along with proper personal protective equipment (PPE), would prevent significant risks related to human exposure to herbicides. However, potentially adverse effects could occur if a large spill were to occur or should spraying from equipment on vehicles occur in close proximity to public areas. Several SPRs have been incorporated into the program to minimize the potential for significant health risks (SPR HAZ-5 through 9). These SPRs require project proponents to prepare a SPRP prior to beginning herbicide treatment activities to provide protection to onsite workers, the public, and the environment from accidental leaks or spills of herbicides, adjuvants, or other potential contaminants (SPR HAZ-5); comply with all herbicide application regulations to protect the safety of workers and the public during the transport, use, storage, and disposal of herbicides (SPR HAZ-6); triple rinse herbicide containers with clean water at an approved site and dispose of rinsate per 3 CCR Section 6684 and dispose of all herbicides following label requirements and waste disposal regulations to avoid direct contamination to a water body or watershed (SPR HAZ-7); employ techniques during herbicide application to minimize drift (SPR HAZ-8); and include signage indicating that herbicide application is occurring or has occurred where members of the public could be present within 500 feet of areas receiving herbicide treatments (SPR HAZ-9). Although implementation of the CalVTP would increase the pace and scale of treatments and thus increase the use of herbicides in the treatable landscape, no new or more severe significant hazards to the public would be created from implementation of the CalVTP. This impact would be **less than significant**.

Herbicides would be applied to remove target vegetation in the treatable landscape, and targeted application of herbicides would comprise approximately ten percent of treatment activities under the CalVTP. The herbicides proposed for use under the program are the same as those currently used by CAL FIRE under existing conditions; however, herbicide application associated with the CalVTP would result in an increase in application that would require increased transportation, use, storage, and disposal of various herbicides. Human exposure could occur to workers or the public through handling of herbicides or from herbicide drift from target areas due to wind, respectively.

As described in Appendix HAZ-1 of this PEIR, the toxicity of a pesticide (i.e., herbicides and fungicides) is determined by the documented adverse laboratory and field effects to target and non-target organisms that occur after an exposure to that compound. The key to potential adverse (toxic) effects is the nature of the exposure to the compound, which is based on the specific amount of the compound that reaches an organism's tissues (i.e., the dose). Several other factors are involved in an exposure, such as the duration of time over which the dose is received, the target tissue or physiological function affected, and the sensitivity of the organism of interest to the compound. Table 3.10-1 provides an overview of the herbicides proposed for use, the formulation and common name of each, and potential for significant human toxicity. Refer to Appendices HAZ-1 and HAZ-2 for detailed evaluations of each compound proposed for use under the CalVTP, including methods of transport and their potential to cause significant harm to humans and ecological resources.

Table 3.10-1 Human Toxicity of Chemicals Proposed for Use under the CalVTP

Chemical	Formulation	Human Toxicity
Glyphosate (Roundup) (Roundup Pro) (RoundupProMax)	Isopropylamine salt, potassium salt, dimethylamine salt & diammonium salt	Overall low toxicity. Skin and eye irritation possible. No evidence of neurotoxicity, immunotoxicity, or acute toxicity. Reproductive toxicity at very high doses. Recent claims of carcinogenicity (class 2A) based on animal studies. Unvalidated claims. Very low toxicity via oral and dermal routes. Possible endocrine-disruptor.[1]
Borax	Tetraborate decahydrate	Overall low toxicity. No evidence of carcinogenicity, neurotoxicity, immunotoxicity, or general toxicity. Reproductive and developmental toxicity at very high doses.
Clopyralid (Lontrel T&O) (Cody Clopyralid) (Alligare) (Confront) (Thistledown)	Monoethanolamine salt	Very low toxicity if ingested. Clopyralid is classified by the U.S. EPA as "not likely to be a human carcinogen."19 Clopyralid caused birth defects in laboratory animal studies at doses that were severely toxic to the mother. No birth defects were observed in animals given clopyralid at doses several times greater than those expected during normal exposure. Not mutagenic (capable of changing genetic material [DNA] of an organism).
Hexazinone (Valpar) (Pestanal)	Hexazinone [3-cyclohexyl-6-(dimethylamino)-1-methyl-1,3,5-triazine-2,4(1H,3H)-dione]	Acute (oral and dermal) toxicity is low. Hexazinone can be highly irritating and corrosive to the eye. The U.S. EPA has evaluated the dietary risk associated with hexazinone and has determined that there is a reasonable certainty that no harm to any population subgroup will result from aggregate exposure to hexazinone when considering dietary, drinking water, and residential exposure and all other non-occupational sources of pesticide exposure for which there is reliable information.
Imazapyr (Imazapyr 2SL)	isopropylamine salt	Overall low toxicity. No evidence of carcinogenicity, neurotoxicity, immunotoxicity, or reproductive/developmental toxicity. Slightly toxic via acute oral, dermal, and inhalation routes. No evidence of carcinogenicity or mutagenicity.
Sulfometuron Methyl	Methyl 2-[[[[94,6-dimethyl-2-pyrimidinyl)amino]carbonyl]sulfonylbenzoatee) "Oust" Herbicide	Low toxicity via oral, dermal, and inhalation routes. Classified as ''not likely to be carcinogenic to humans.'' No mutagenicity or genetic toxicity.
Triclopyr (Turflon Ester) (Garlon 3) (Garlon 4)	Butoxyethyl ester & triethylamine salt	Overall low toxicity (moderate toxicity if ingested) (technical triclopyr acid). Slightly toxic via acute oral, dermal, and inhalation routes (TEA and TBEE) slightly toxic by acute oral and dermal routes. Practically nontoxic by inhalation. Not carcinogenic (technical triclopyr acid). Slightly toxic via acute oral, dermal, and inhalation routes (TEA and TBEE) slightly toxic by acute oral and dermal routes. Practically nontoxic by inhalation. Not carcinogenic.
Nonylphenol 9 Ethoxylates (NP9E)	NPEs are surfactants that are part of the broader category of surfactants known as alkyphenol ethoxylates (APEs). NPEs represent approximately 80% to 85% of the volume of APEs.	Acute (oral and dermal) toxicity is low. NP9E can be highly irritating and corrosive to the skin and eye. NP9E does not have significant skin sensitizing potential. NP9E is not mutagenic, or in vivo micronucleus assay. There are no data on its carcinogenic potential.

Table 3.10-1 Human Toxicity of Chemicals Proposed for Use under the CalVTP

Chemical	Formulation	Human Toxicity
Penoxsulam & oxyfluorfen Mix (Cleantraxx)	**Penoxsulam:** 3-(2,2-Difluoroethoxy)-N-(5,8-dimethoxy[l,2,4]triazolo[l,5-c]pyrimidin2-y1)-a,a,a-trifluorotoluene-sulfonamid **Oxyfluorfen:** 2-chloro-1-(3-ethoxy-4-nitrophenoxy) 4-(triftuoromethyl)	Very low toxicity by ingestion or through dermal exposure (low skin irritation). No evidence of carcinogenicity in long term studies with rats. Questionable mutagenicity, no teratogenicity or reproductive effects. Penoxsulam is practically non-toxic to birds and mammals, very toxic to fish, worms and bacteria.
Indaziflam (Specticle)	N-[(1R,2S)-2,3-dihydro-2,6-dimethyl-1H-inden-1-yl]-6-[(1RS)-1 fluoroethyl]-1,3,5-triazine-2,4-diamine	Low acute toxicity via the oral, dermal, and inhalation routes of exposure. It is not irritating to the eye or skin and is not a dermal sensitizer.

Notes: [1] There have been court cases involving Roundup and the juries in these cases have awarded several million dollars to plaintiffs. However, decades of actual laboratory and field testing of glyphosate conclude that glysophate is not likely to be carcinogenic to humans and no other meaningful risks to human health occur when the product is used according to the label. Refer to Appendix HAZ-1 for more detailed information regarding glysophate and human health risks.

Source: Appendix HAZ-1 and HAZ-2 of this PEIR; see citations therein.

As shown in Table 3.10-1, most of the herbicides proposed for increased use under the CalVTP pose low levels of toxicity to humans, although some can result in skin and eye irritation or can be slightly toxic if exposure occurs. As discussed above under Section 3.10.2, "Regulatory Setting," the U.S. DOT, in conjunction with the EPA, is responsible for enforcement and implementation of federal laws and regulations pertaining to the transportation of hazardous materials. The EPA oversees pesticide use and health and safety through the WPS. The WPS is a regulation for pesticides and herbicides which is aimed at reducing the risk of pesticide poisonings and injuries among workers and pesticide handlers. The WPS contains requirements for pesticide safety training, notification of pesticide applications, use of PPE, restricted-entry intervals after pesticide application, decontamination supplies, and emergency medical assistance. In addition, Cal/OSHA has safety standards and practices regarding workplace safety and providing a safe and healthy environment for workers, and the California Pesticide Regulatory Program regulates the sale and use of pesticides in California. DPR is responsible for reviewing the toxic effects of pesticide formulations and determining whether a pesticide is suitable for use in California through a registration process. The label includes instructions telling users how to make sure the product is applied only to intended target pests and includes precautions the applicator should take to protect human health and the environment. These include weather parameters including wind speed to avoid drift and precipitation to minimize unintended runoff. RCRA, HWCA, and the DTSC include regulations applicable to the packaging, storage, and disposal of specific hazardous materials. Some pesticides and herbicides become hazardous waste when discarded and, accordingly, must be disposed of as a hazardous waste. CAL FIRE and other project proponents implementing herbicide use under the CalVTP would adhere to all of the required regulations. Compliance with all laws, regulations, and herbicide label instructions, along with proper PPE, would prevent significant risks related to human exposure to herbicides.

Several SPRs have been incorporated into the program to further minimize the potential for human exposure and potential health risks (SPR HAZ-5 through HAZ-9). These SPRs require that project proponents to prepare a SPRP prior to beginning herbicide treatment activities to provide protection to onsite workers, the public, and the environment from accidental leaks or spills of herbicides, adjuvants, or other potential contaminants (SPR HAZ-5); comply with all herbicide application regulations to protect the safety of workers and the public during the transport, use, storage, and disposal of herbicides (SPR HAZ-6); triple rinse herbicide containers with clean water at an approved site and dispose of rinsate per 3 CCR Section 6684 and dispose of all herbicides following label requirements and waste disposal regulations to avoid direct contamination to a water body or watershed (SPR HAZ-7); employ techniques during herbicide application to minimize drift (SPR HAZ-8); and include signage indicating that herbicide application is occurring or has occurred where members of the public could be present within 500 feet of areas receiving herbicide treatments (SPR HAZ-9).

Per these SPRs and existing laws and regulations, pesticides would be applied under the guidance of licensed and certified personnel and according to label requirements; storage, loading and mixing would be conducted according to specifications that would protect against spills or entry of chemicals into aquatic features; project proponents would prepare a SPRP prior to beginning any herbicide treatment activities to provide protection to onsite workers, the public, and the environment from accidental leaks or spills of herbicides, adjuvants, or other potential contaminants; cleanup of containers would be conducted according to guidelines that prevent contamination; and all appropriate laws and regulations pertaining to the use of pesticides and safety standards for employees and the public, as governed by the EPA and DPR would be followed. Furthermore, the potential for herbicide drift would be minimized by limiting application when winds exceed 7 miles per hour and through the use of specific spray nozzles. These would be especially useful in minimizing drift from herbicides that are sprayed from equipment on an ATV or tractor. Notifying the public prior to and following application of herbicides for a specified period at public areas within 500 feet of an application site would allow the public to avoid areas where treatments are occurring or have recently occurred, if so desired. Together, the SPRs and regulatory requirements provide a foundation for assuring effective, yet relatively safe, use of herbicides when treatment is determined to be needed. Therefore, the impact associated with use of herbicides under the CalVTP would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

Impact HAZ-3: Expose the Public or Environment to Significant Hazards from Disturbance to Known Hazardous Material Sites

Soil disturbance by mechanical treatments and prescribed burning have the potential to expose workers, the public, and the environment to risks associated with existing hazardous materials if present within treatment areas. Treatment activities would typically occur in undeveloped areas, which are unlikely to contain hazardous materials; however, there is a risk that contamination could exist. Disturbance of contaminated sites could result in the exposure of the public and environment to health hazards from existing hazardous materials. This impact is **potentially significant**.

Hazardous materials, if present in soils, can be disturbed and dispersed by vegetation treatment activities that require soil disturbance. Soil contamination generally occurs in areas that are or have been previously developed, especially with industrial-type uses or for defense activities (e.g., an air force base). The treatable landscape is in tree, shrub, and grass fuel types, sometimes near developed areas. Although there could be some hazardous materials sites adjacent to the treatable landscape, such as in urban areas, the treatable landscape itself is unlikely to contain hazardous material sites from previous uses because of its undeveloped nature. However, because of the geographic extent of the treatable landscape, it is conservatively assumed that there is a potential for known hazardous materials sites to be located within the treatable landscape.

Most treatment activities under the CalVTP would not require soil disturbance (i.e., manual treatments, prescribed herbivory, prescribed burning, herbicide application) because activities would be limited to the use of hand crews, livestock, low intensity burning, or herbicides to kill or remove the above-ground portions of vegetation in the treatment area. However, some activities (e.g., mechanical treatments) could result in churning up the surface of the ground during treatment as vegetation is removed, which could accidentally release hazardous materials into the environment if present. If released, hazardous material could enter waterways via runoff or expose the public to harmful effects through inhalation or dermal exposure. Prescribed burning could lead to unexpected ignitions should any ignitable hazardous waste be present, which could expose workers to risks associated with unexpected fire or explosions. Therefore, both mechanical treatments and prescribed burning have the potential to expose people (e.g., workers or the public) or the environment to significant health hazards if hazardous materials sites are inadvertently disturbed in treatment areas; if it occurred, this impact would be **potentially significant**.

Mitigation Measures

Mitigation Measure HAZ-3: Identify and Avoid Known Hazardous Waste Sites

Prior to the start of vegetation treatment activities requiring soil disturbance (i.e., mechanical treatments) or prescribed burning, CAL FIRE and other project proponents will make reasonable efforts to check with the landowner or other entity with jurisdiction (e.g., California Department of Parks and Recreation) to determine if there are any sites known to have previously used, stored, or disposed of hazardous materials. If it is determined that hazardous materials sites could be located within the boundary of a treatment site, the project proponent will conduct a DTSC EnviroStor web search (https://www.envirostor.dtsc.ca.gov/public/) and consult DTSC's Cortese List to identify any known contamination sites within the project site. If a proposed mechanical treatment or prescribed burn is located on a site included on the DTSC Cortese List as containing potential soil contamination that has not been cleaned up and deemed closed by DTSC, the area will be marked and no prescribed burning or soil disturbing treatment activities will occur within 100 feet of the site boundaries. If it is determined through coordination with landowners or after review of the Cortese List that no potential or known contamination is located on a project site, the project may proceed as planned.

Significance after Mitigation

As noted in Section 3.10.2, "Regulatory Setting" above, the DTSC maintains a database of sites with known hazardous waste contamination, commonly referred to as the Cortese List. Many of these sites occur in industrial environments outside of the treatable landscape, but some instances of past industrial and defense-related land uses may exist in what are now considered wildlands where CalVTP treatments could occur. Mitigation Measure HAZ-3 is designed to identify and avoid these sites where they occur, if present in the treatable landscape.

Specifically, Mitigation Measure HAZ-3 requires that proponents coordinate with landowners to determine previous land uses and the potential for hazardous wastes to be present. If a potential for hazardous waste is identified within a project site (treatment area) through landowner coordination, Mitigation Measure HAZ-3 further requires project proponents to review DTSC's Cortese List to determine whether a known hazardous waste site is present within the boundary of a project site. If hazardous waste is present, the project proponent would mark the areas and no prescribed burning or soil disturbing treatment activities would occur within 100 feet of its boundaries. Because any hazardous waste sites that could be affected by mechanical treatment or prescribed burning activities would be identified and avoided, no exposure-related risks associated with the disturbance of a hazardous waste site to the public or environment would occur. With implementation of Mitigation Measure HAZ-3, this impact would be reduced to **less than significant**.

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3.11 HYDROLOGY AND WATER QUALITY

This section characterizes existing hydrologic resources in the treatable landscape. Hydrologic resources include surface waters and groundwater. This section describes the impacts to hydrologic resources through the degradation of water quality and increased sedimentation that are known or have the potential to occur in the study area. Federal, state, and local regulations related to hydrology and water quality are summarized. Potential impacts of the proposed CalVTP implementation are analyzed, and mitigation measures are provided for those impacts determined to be significant.

Comments on the Notice of Preparation (see Appendix A) related to hydrology and water quality requested that the analysis consider: the potential for sedimentation and water quality effects from program activities; potential water temperature increases from vegetation removal; water quality effects to surface waters adjacent to treatment areas; and runoff implications to downstream communities. These issues are addressed in Section 3.11.3, "Impact Analysis and Mitigation Measures."

3.11.1 Environmental Setting

TOPOGRAPHY AND CLIMATE

The study area encompasses the treatable landscape and adjacent areas in California. The State's topography is highly varied and includes 1,340 miles of seacoast, as well as high mountains, inland flat valleys, and deserts. Elevations in California range from 282 feet below sea level in Death Valley to 14,494 feet at the peak of Mount Whitney. The mean elevation of California is approximately 2,900 feet. The climate of California is as highly varied as its topography. Depending on elevation, proximity to the coast, and altitude, climate types include temperate oceanic, highland, sub-arctic, Mediterranean, steppe, and desert (CGS 1995). The average annual precipitation across all California climate types is approximately 23 inches and approximately 75 percent of the State's annual precipitation falls between November and March, primarily in the form of rain, with the exception of high mountain elevations (DWR 2003:pg. 20). Average annual precipitation ranges from more than 100 inches in the mountainous areas within the Smith River in Del Norte County to less than 2 inches in Death Valley, illustrating the extreme differences in precipitation levels within the State (Mount 1995). Overall, northern California is wetter than southern California and the majority of the State's annual precipitation occurs in the northern coastal region.

HYDROLOGIC RESOURCES

Surface Waters

For the purposes of the PEIR, surface waters occur as streams, lakes, ponds, coastal waters, lagoons, and estuaries, or are found in floodplains, dry lakes, desert washes, wetlands and other collection sites. Water bodies modified or developed by man, including reservoirs and aqueducts, are also considered surface waters. Surface water resources are very diverse due to the high variance in tectonics, topography, geology/soils, climate, precipitation, and hydrologic conditions. Overall, California has a diverse range of watershed conditions with varied climatic regimes ranging from Mediterranean climates with temperate rainforests in the north coast region to desert climates containing dry desert washes and dry lakes in the southern central region.

The average annual runoff for the State is 71 million acre-feet (DWR 1998). The State has more than sixty major stream drainages and more than 1,000 smaller, but significant drainages that drain coastal mountains and inland mountainous areas. High snowpack levels and resultant spring snowmelt yield high surface runoff and peak discharge in the Sierra Nevada and Cascade Mountains that feed surface flows, fill reservoirs and recharge groundwater. Federal, state and local engineered water projects, aqueducts, canals, and reservoirs serve as the primary conduits of surface water sources to areas that have limited surface water resources. Most of the surface water storage is transported for agricultural, urban, and rural residential needs to the San Francisco Bay Area and to cities and areas extending to southern coastal California. Surface water is also transported to southern inland areas, including Owens Valley, Imperial Valley, and Central Valley areas.

Groundwater

The majority of runoff from snowmelt and rainfall flows down mountain streams into low gradient valleys and either percolates into the ground or is discharged to the sea. This percolating flow is stored in alluvial groundwater basins that cover approximately 40 percent of the geographic extent of the State (DWR 2003: 20). Groundwater recharge occurs more readily in areas underlain by coarse sediments, primarily in mountain base alluvial fan settings. As a result, the majority of California's groundwater basins are located in broad alluvial valleys flanking mountain ranges, such as the Cascade Range, Coast Ranges, Transverse Ranges, and the Sierra Nevada.

There are 250 major groundwater basins that serve approximately 30 percent of California's urban, agricultural and industrial water needs, especially in southern portion of San Francisco Bay, the Central Valley, greater Los Angeles area, and inland desert areas where surface water is limited. On average, more than 15 million acre-feet of groundwater are extracted each year in the State, of which more than 50 percent is extracted from 36 groundwater basins in the Central Valley.

WATER QUALITY

Land uses have a substantial effect on surface water and groundwater water quality in California. Water quality degradation of surface waters occurs through nonpoint- and point- source discharges of pollutants. Nonpoint source pollution is defined as not having a discrete or discernible source and is generated from land runoff, precipitation, atmospheric deposition, seepage, and hydrologic modification (EPA 1993). Nonpoint-source pollution includes runoff containing pesticides, insecticides, and herbicides from agricultural areas and residential areas; acid drainage from inactive mines; bacteria and nutrients from septic systems and livestock; volatile organic compounds (VOCs) and toxic chemicals from urban runoff and industrial discharges; sediment from poor road construction, improperly managed construction sites, and agricultural areas; and deposition of pollutants from the atmosphere and modification of hydrologic flow patterns. In comparison, point-source pollution is generated from identifiable, confined, and discrete sources, such as a smokestack, sewer, pipe or culvert, or ditch. These pollutant sources are regulated by the U.S. Environmental Protection Agency (EPA) and State Water Resources Control Board (SWRCB) through the California regional water quality control boards (RWQCB). Many of the pollutants discharged from point-sources are the same as for nonpoint-sources, including municipal (bacteria and nutrients), agricultural (pesticides, herbicides, and insecticides), and industrial pollutants (VOCs and other toxic effluent).

Groundwater pollution or contamination is caused by (1) naturally occurring or synthesized chemicals that are discharged onto the land surface and percolate through to groundwater resources below, (2) flow into groundwater reservoirs through improperly sealed well casings, (3) leaking underground storage tanks, and (4) failed underground pipelines. Unintended backflow into wells can also occur when plumbing and pumping systems are not properly protected against backflow. Many of the sources of pollution and their toxic constituents are similar to those associated with surface water pollution. The most common groundwater pollutants are generated from nonpoint sources of salt, nitrite, pesticides, industrial effluent, and pathogens. Salt and nitrite contamination is the most common groundwater pollution and affects 10 to 15 percent of California's wells, mostly through various agricultural activities (Harter 2003). Recent long drought periods in the State have resulted in overdraft of groundwater aquifers as needs for water increase in areas with limited surface water flow. Over pumping results in the concentration of mineral salts in the depleted aquifer and could make the groundwater source unusable for drinking water and other beneficial uses.

Sediment is considered a major pollutant according to the EPA and the SWRCB and is a key total maximum daily load (TMDL) constituent that determines impairment and 303(d) listing of impaired water bodies in a number of watersheds and river basins. High sediment loads are detrimental to beneficial water uses and aquatic habitat used by plant, amphibian and fish communities. Erosion is influenced by a variety of factors including geology and soil characteristics, topography, climate, and land use practices, among others. Sedimentation is a result of erosion and the transport of eroded fine materials to a watercourse or waterbody and could result in increased turbidity, elevated levels of total dissolved solids and total suspended solids. Erosion and sedimentation are natural phenomena but are greatly influenced by land management practices and land disturbance activities.

In general, naturally occurring erosion and sedimentation occurs from weathering of bedrock or saturation of soils in erosion prone areas causing landslides, earthflows, debris flows, and other mass wasting-related processes; lateral channel migration resulting in bank erosion; channel downcutting and incision; and surface erosion cause by precipitation, runoff and wind on bare soil surfaces. Sporadically occurring natural events such as flooding caused by heavy and prolonged precipitation and rain events following soon after wildfire can generate high levels of sedimentation and erosion. In addition, heavy precipitation in a recently burned area can quickly lead to oversaturated and unstable soils, increasing the risk of landslide, earthflows, and debris flows. Some human activities that result in erosion and sedimentation include road building, construction activities, agriculture (including some timber harvesting) and grazing, and recreation. Agriculture, mining, and other land disturbing activities often result create bare soil areas, which are prone to higher levels of surface runoff. Increased runoff can result in sheet, rill, and gully erosion, and landslides.

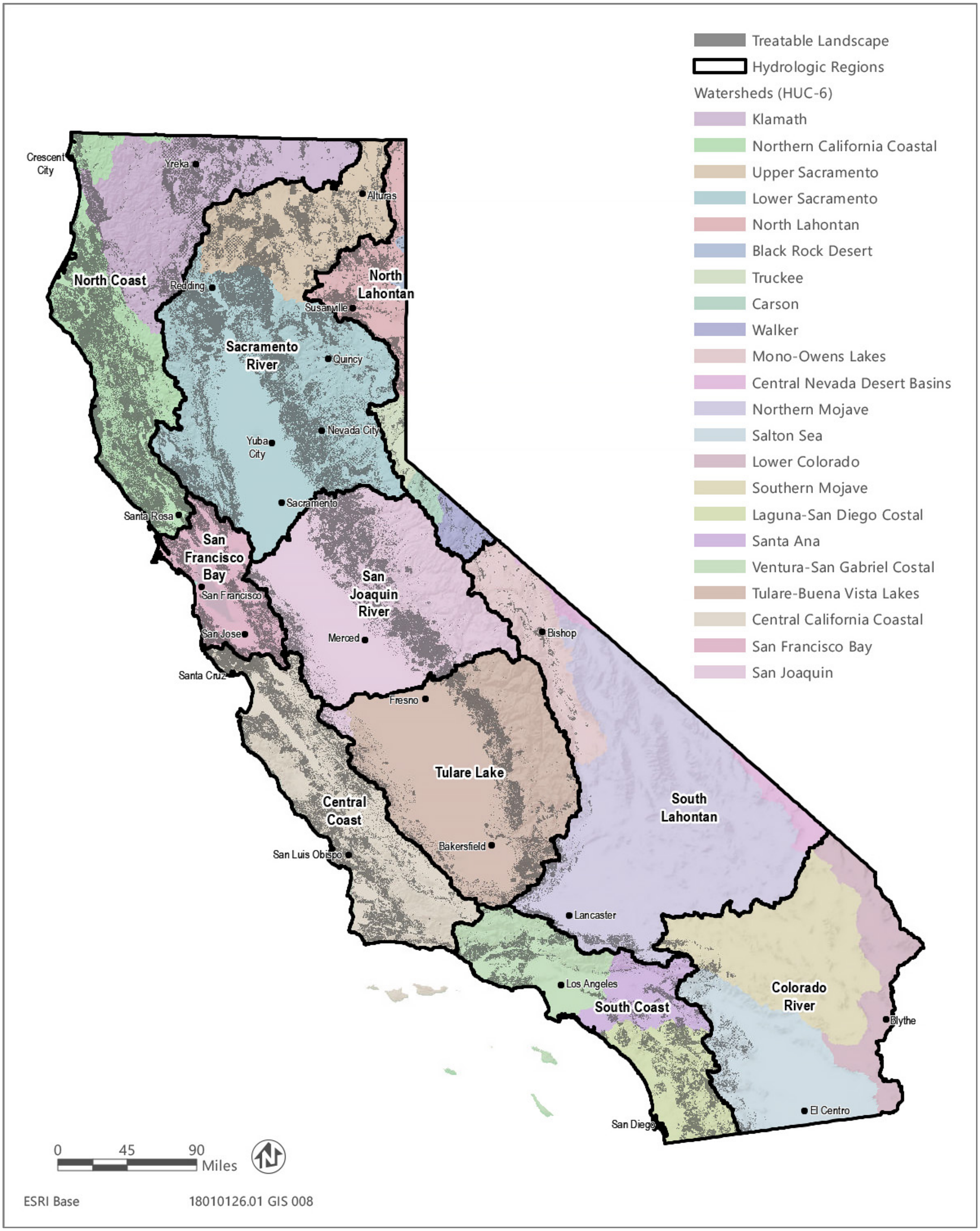
FLOOD HAZARDS

Floods are naturally occurring phenomena in California, although their occurrence and effects can be exacerbated by human activities and land management practices. Floods keep erosion and sedimentation in natural balance, replenish soils, recharge groundwater, and support a variety of riverine and costal floodplain habitats. Flooding in California can be divided into eight categories, with all hydrologic regions subject to at least one type of flooding:

- Flash Flooding – quickly formed floods with high velocity flows that are often caused by stationary or slow-moving storms. Flash floods typically occur on steep slopes and impermeable surfaces, and in areas adjacent to streams and creek.
- Slow-Rise Flooding – Gradual inundation as waterways or lakes overflow their banks. Slow-rise flooding in California typically occurs over a matter of days and is caused by heavy precipitation or rapid snowmelt.
- Debris-Flow Flooding- Flows made up of water, liquefied mud, and debris can form and accelerate quickly, reach high velocities, and travel great distances. Debris flows are commonly caused by heavy localized rainfall on burned hillsides devoid of vegetation.
- Alluvial Fan Flooding- Shallow, high velocity, sediment laden flows with uncertain flow paths on the surface and at the toe of alluvial fans. These floods are typically caused by localized rainstorms and snowmelt.
- Coastal Flooding – Inundation at locations normally above the level of high tide, often caused by storm surges during high tide.
- Tsunami Flooding – High speed seismic sea waves triggered by underwater earthquakes or landslides that displace large volumes of water.
- Stormwater Flooding – Localized flooding that occurs in urban areas during or after a storm event.
- Engineered Structure Failure Flooding – Flooding as a result of dam failure or levee failure. This type of flooding presents the potential for catastrophic impact, depending on the amount of water impounded and the location of populated areas downstream.

HYDROLOGIC REGIONS

Organizing the environmental setting by discrete regions that share general hydrologic-, basin-, and climate-related characteristics aids in understanding California's diverse hydrologic conditions and resources within the treatable landscape. The California Department of Water Resources (DWR) divided the State into 10 hydrologic regions: Central Coast, Colorado River, North Coast, North Lahontan, Sacramento River, San Francisco Bay, San Joaquin River, South Coast, South Lahontan, and Tulare Lake (Figure 3.11-1). The hydrologic region designations are based on major



Source: Data downloaded from CAL FIRE in 2019

Figure 3.11-1 Hydrologic Regions

drainage basins, and similar topographic and hydrologic characteristics, and provide a systematic framework for evaluating hydrologic resources and water quality at the statewide scale. The general regional, topographic, and climate characteristics of each hydrologic region in the treatable landscape is discussed below. For each DWR hydrologic region, Table 3.11-1 identifies specific characteristics pertaining to hydrology, water quality, and sedimentation and quantifies the area of treatable landscape therein.

Central Coast

The Central Coast Hydrologic Region is located in central California, extending from Monterey Bay to Santa Barbara. The region covers nearly 11,300 square miles, primarily within the southern Coast Range. This region includes Monterey, Santa Barbara, Santa Cruz, and San Luis Obispo counties and portions of Kern, San Benito, Santa Clara, San Mateo, and Ventura counties. The temperate Mediterranean climate of the Central Coast is characterized by mild, wet winters and warm, dry summers. Due to marine influences, the coastal climate in this region is typically cooler with smaller daily and seasonal temperature changes. Further inland, the climate is more continental resulting in warmer summers, colder winters, and greater daily and seasonal temperature variation. Pockets of redwood and Douglas fir forests can be found in wet and foggy microclimates. Other vegetation communities include coastal live oak forests, montane chaparral, and annual grasslands. Elevations within the region range from sea level to mountain peak elevations up to 7,000 feet. Major mountain ranges include: Santa Cruz, Sierra Madre, San Rafael, and Santa Ynez mountains; Caliente, Diablo, Gabilan, La Panza, and Temblor ranges, and the coastal Santa Lucia Range. The treatable landscape is evenly distributed within this hydrologic region and covers roughly 3,926 square miles (approximately 35 percent of the region).

Colorado River

The Colorado River hydrologic region is located in southeastern California encompassing nearly 20,000 square miles. This region includes Imperial County and portions of Riverside, San Bernardino, and San Diego counties. The regional climate is primarily subtropical-desert with hot summers and short, mild winters. Milder temperatures are typical in mountainous areas in the north and west. Vegetation in the western mountain consists of montane chaparral, western hardwood forest, ponderosa pine, and fir-spuce cover types. Colorado, Sonora, and Mojave desert shrub vegetation types dominate the remainder of the region. Elevations within the region range from 230 feet below sea level (surface of the Salton Sea) to mountain peak elevations up to 10,000 feet. Major mountain ranges include the San Bernardino and San Jacinto mountains. The treatable landscape within this hydrologic region is located in the western mountains and covers approximately 560 square miles (roughly 3 percent of the region).

North Coast

The North Coast hydrologic region is located in northern California encompassing nearly 19,500 square miles. The boundary of the region extends north from Tomales Bay to the Oregon Border and to the east to the Goose Lake Basin. The North Coast region includes all or portions of Del Norte, Glenn, Humboldt, Marin, Siskiyou, Sonoma, and Trinity counties. This region encompasses coastal redwood forests, mountains, inland valley, and semi-desert conditions, and as a result the regional climate is highly variable. The western coastal areas are typically cooler with temperatures ranging from 80s in the summer to 30s in winter months. In comparison, inland areas experience greater extremes in temperature with summer highs in the 100s and winter lows below freezing. Vegetation in the coastal areas includes redwood and Douglas fir forest, western hardwoods, and annual grassland. Coastal vegetation types give way to mixed conifers, oak forest, and mountain chaparral in the inland mountains and valleys. Elevations within the region range from sea level to mountain peak elevations over 8,000 feet. Major mountain ranges include the California Coast Range and the Klamath Mountains. The treatable landscape within this hydrologic region is predominantly located in the Coast Range and in the arid lands east of the Klamath range, and covers roughly 6,839 square miles (approximately 35 percent of the region).

Table 3.11-1 General Characteristics of Hydrologic Regions

California DWR Hydrologic Region[1]	Hydrology			Water Quality	Sedimentation	Treatment Area within Hydrologic Region
	Precipitation	Runoff and Flood Hazard	Major Surface Water Features			
Central Coast	Primarily rainfall, insignificant snowfall. Average precipitation ranges between 12 and 42 inches per year. Interior southern valleys: 5-10 inches. Mountain areas: >50 inches.	All rivers in the region are prone to winter storm produced flooding. Small, steep watersheds that are subject to short, intense floods. Limited seasonal base flow and no significant snowmelt runoff.	Big Sur River Carmel River Naciemento River Salinas River San Antonio River San Benito River Santa Maria River Santa Ynez River	Surface water issues: Erosion and sedimentation, wildlife and fisheries degradation, bacteria, eutrophication, and metals from nonpoint surface runoff, and agricultural runoff. Groundwater issues: Drinking water impairment, nitrates, toxic pollutants, and saltwater intrusion caused by nonpoint surface runoff and groundwater overdraft.	Steep upland areas with unstable geologies are prone to erosion during large storm events and could deposit sediment in rivers and on floodplains. Wildfires could result in sedimentation of rivers from increased surface erosion, rilling, gullying and subsequent debris flows.	2,512,900 acres/ 3,926 square miles
Colorado River	Lowest annual precipitation of the 10 DWR hydrologic regions. Average annual rainfall ranges from 3 to 6 inches.	Characterized by low annual rainfall and runoff, and sparse vegetation. Streams are typically low gradient and braided in valley areas and steep gradient in mountainous areas. Storms are generally of short duration and high intensity, and could result in flash floods in lowland alluvial fan areas. Ephemeral streams are prone to flooding during heavy rainfall events.	Alamo River Colorado River New River Salton Sea Whitewater River	Surface water issues: Sedimentation, salinity, drinking water impairment, bacteria, pesticides, herbicides from agricultural runoff, wastewater, erosion, and diversions. Groundwater issues: Drinking water impairment and VOCs caused by groundwater overdraft and fuel tank leaks.	Erosion and sedimentation primarily from ravel, surface erosion, wind erosion, and as freeze-thaw. Short duration and high intensity storms could result in debris flows generated in steep mountainous areas. In comparison, lowland and valley areas tend to have lower erosion and sediment yields.	358,591 acres/ 560 square miles
North Coast	Highest precipitation in the State with average annual of 50 inches. High intensity and long duration rainfall events are common during the winter period. Annual precipitation ranges from 15 inches in Modoc County to nearly 200 inches in northern Del Norte County. Heavy snowfall is limited to the higher elevations of the	Highest peak discharge values in the State Smaller, coastal watersheds tend to exhibit rapid hydrograph response, with lower base flows and little snowmelt. In comparison, larger inland rivers experience slower hydrograph response, with higher base flows and significant snowmelt runoff.	Albion River Bear River Big River Bodega Harbor Eel River Garcia River Gualala River Humboldt Bay Klamath River Mad River Mattole River Navarro River Noyo River	Surface water issues: Erosion and sedimentation from timber harvesting, roads, and grazing; nonpoint source pollution from storm water runoff; channel modification, gravel mining and dairies; and MTBE, PCE, and dioxin contamination. Groundwater issues: Leaking underground tanks.	High rainfall, in combination with steep mountainous areas underlain in places by unstable geologies/soils, high uplift rates, and poor land use practices (e.g. timber harvesting, grazing, and poor road/trail construction) could result in high peak discharge, erosion and sediment yields during large storm events.	4,377,003 acres/ 6,839 square miles

Table 3.11-1 General Characteristics of Hydrologic Regions

California DWR Hydrologic Region[1]	Hydrology			Water Quality	Sedimentation	Treatment Area within Hydrologic Region
	Precipitation	Runoff and Flood Hazard	Major Surface Water Features			
	Klamath Mountains and Trinity Alps.		Redwood Creek Russian River Salmon Creek Scott River Shasta River Smith River Tenmile River Trinity River Van Duzen River			
North Lahontan	Average precipitation for the region is approximately 23 inches, primarily snowfall. Annual precipitation ranges from less than 5 inches in the valley areas of Lassen and Mono counties to more than 60 inches in the Sierra Nevada.	Lowland valley areas could experience high peak runoff in short and steep ephemeral drainages. Most watersheds are small and steep. Prolonged spring runoff and high base flow is typical of drainages in the Sierra Nevada. Many drainages are ephemeral and could experience rapid hydrograph response and resultant flooding.	Carson River Surprise Valley Susan River Truckee River Walker River	Surface water issues: Erosion and sedimentation from agriculture, roads, and grazing; nonpoint source pollution from storm water runoff; acid drainage from inactive mines, and individual waste water systems. Groundwater issues: Drinking water, salinity, and VOCs from mining drainage, overdraft, and fuel tank leaks.	Flashy storm flows with high peak discharge, lack of vegetation, poorly consolidated geology, and steep channel morphology could result in debris flows, erosion and sediment yield. Wildfires could result in sedimentation of rivers from increased surface erosion, rilling, and gullying.	776,008 acres/ 1,212 square miles
Sacramento River	Average precipitation for the region is approximately 37 inches with annual precipitation increasing from south to north and from west to east.	Major rivers receive high spring runoff from snowmelt from adjacent mountain streams and rivers. Flooding in the lowland areas is a result of elevated and prolonged spring runoff coupled with year round elevated base flows.	Sacramento River Major tributaries: American River Bear River Butte Creek Cache Creek Clear Lake Feather River McCloud River Pitt River Putah Creek Yuba River	Surface water issues: Erosion and sedimentation from roads, dairies and agriculture; and nonpoint source pollution from storm water runoff. Groundwater issues: Drinking water impairment, salinity, VOCs from irrigated agriculture and dairy nonpoint sources, overdraft, and fuel tank leaks.	Erosion and sediment yields are generally low due to stable geologies and abundant vegetative cover. Although heavy storm rainfall and saturated soil conditions, coupled with land use practices (e.g. timber harvesting, grazing, agriculture, and poor road construction) could result in high erosion and sediment yields.	5,349,357 acres/8,358 square miles
San Francisco Bay	Average precipitation for the region is approximately 25 inches. Because of	Small, steep watersheds that are subject to high rainfall from short, intense storms. All rivers are prone	Alameda Creek Corte Madera Creek Coyote Creek	Surface water issues: Erosion and sedimentation from agriculture, roads; agricultural runoff; nonpoint source	Steep upland areas with unstable geologies are prone to erosion during large storm events and	1,047,981 acres/ 1,637 square miles

Table 3.11-1 General Characteristics of Hydrologic Regions

California DWR Hydrologic Region[1]	Hydrology			Water Quality	Sedimentation	Treatment Area within Hydrologic Region
	Precipitation	Runoff and Flood Hazard	Major Surface Water Features			
	marine influences and rain shadows, the annual precipitation is 20-25 inches in the North Bay, 15-20 inches in the South Bay (east of the Santa Cruz mountains), and more than 40 inches in the higher elevation west facing mountainous areas.	to intense flooding during major storm events.	Green Valley Creek Guadalupe River Napa River Novato Creek Petaluma River San Leandro Creek San Lorenzo Creek San Mateo Creek San Pablo Creek Sonoma Creek Suisun Creek Tomales Bay Walnut Creek Wildcat Creek	pollution from storm water runoff; trace metals; toxic pollutants; habitat and wildlife degradation. Sources from irrigated agricultural runoff, sewage discharge, and industrial manufacturing. Groundwater issues: Drinking water impairment, salt water intrusion, and synthetic organics from irrigated agriculture and other nonpoint sources, overdraft, and industrial discharge.	could deposit sediment in rivers and floodplains. Wildfires could result in sedimentation of rivers from increased surface erosion, rilling and gullying.	
San Joaquin River	Average precipitation is approximately 26 inches. Annual precipitation ranges from less than 11inches in the south and southwest area to approximately 35 inches of snowfall in the Sierra Nevada.	Prolonged high runoff, erosion, sedimentation and flooding are primarily a result of snowmelt from the Sierra Nevada.	San Joaquin River Major tributaries: Chowchilla River Cosumnes River Del Puerto Creek Fresno River Merced River Mokelumne River Orestimba Creek Panoche Creek	Surface water issues: Erosion and sedimentation from roads, dairies and agriculture; and nonpoint source pollution from storm water runoff. Groundwater issues: Drinking water impairment, salinity, VOCs from irrigated agriculture and dairy nonpoint sources, overdraft, and fuel tank leaks.	Erosion and sediment yields are generally low due to stable geology and abundant vegetative cover. Heavy storm rainfall and saturated soil conditions, coupled poor land use practices (e.g. timber harvesting, grazing, agriculture, and poor road construction) could result locally in high erosion and sediment yield. Wildfires could result in sedimentation of rivers from increased surface erosion.	2,183,511 acres/ 3,412 square miles
South Coast	Average annual precipitation is approximately 18 inches. Annual precipitation ranges from 10 inches in the valley areas to approximately 40 inches in the mountains.	Most rivers and creeks are intermittent or ephemeral with minor runoff from snowmelt. Short duration, intense winter storms in steep upland watersheds are the primary cause for, and flooding in this region. Urbanization has	Carlsbad Los Angeles River Otay River San Dieguito River San Diego River San Gabriel River San Juan Creek	Surface water issues: Erosion and sedimentation from agriculture, roads, ranching, and urban development; nonpoint source pollution from storm water runoff; erosion from inactive mines; agricultural runoff; mineral and	Typically low erosion and sediment yield due to urbanization. Steep channels and unstable geology, coupled with short duration, intense winter storms in steep upland watersheds can cause localized erosion and	1,564,805 acres/ 2,445 square miles

Table 3.11-1 General Characteristics of Hydrologic Regions

California DWR Hydrologic Region[1]	Hydrology			Water Quality	Sedimentation	Treatment Area within Hydrologic Region
	Precipitation	Runoff and Flood Hazard	Major Surface Water Features			
		resulted in drainages with high peak discharges and short lag times.	San Luis Rey River Santa Ana River Santa Clara River Santa Margarita River Santa Monica Bay Sweetwater River Tijuana River Ventura River	gravel mining; nutrients; pathogens; heavy metals; hydromodification; and individual waste water systems. Groundwater issues: Drinking water impairment, salt water intrusion, toxic pollutants, and VOCs from industrial and agricultural runoff, overdraft, and underground storage and fuel tank leaks.	sediment yield from debris flows and mud flows. Wildfires could result in sedimentation of rivers from increased surface erosion, rilling, and gullying.	
South Lahontan	Average annual precipitation for the region is approximately 8 inches. Annual precipitation ranges from less than 2 inches in Death Valley to approximately 25-50 inches in the mountains.	Lowland valley areas could experience high peak runoff in short and steep ephemeral drainages. Most watersheds are small and steep. Prolonged spring runoff and high base flow is typical of drainages in the Sierra Nevada. Most drainages are ephemeral and could experience rapid hydrograph response and resultant flooding.	Amargosa River Antelope Valley Mojave River Mono Basin Owens River	Surface water issues: Erosion and sedimentation from agriculture, roads, and grazing; nonpoint source pollution from storm water runoff; acid drainage from inactive mines; and individual waste water systems. Groundwater issues: Drinking water, salinity, and VOCs from mining drainage, overdraft, and fuel tank leaks.	Flashy storm flows with high peak discharge, lack of vegetation, poorly consolidated geology, and steep channel morphology could result in debris flows, erosion and sediment yield. Wildfires could result in sedimentation of rivers from increased surface erosion, rilling, and gullying.	556,482 acres/ 870 square miles
Tulare Lake	Average annual precipitation is approximately 15 inches. Annual precipitation ranges from 13-14 inches for the Tulare Lake region to 25-50 inches in the mountains.	Prolonged spring runoff from rainfall and snowfall from mountainous areas and rising waters within typically dry lakes results in potential flooding.	Kaweah River Kern River Kings River San Joaquin River Tulare Lake Tule River	Surface water issues: Erosion and sedimentation from agriculture, roads, rural development, and grazing; nonpoint source pollution from storm water runoff; and individual waste water systems. Groundwater issues: Drinking water, salinity, toxic pollutants, and VOCs from waste water systems and septic tanks, overdraft, and agricultural and industrial runoff.	Overall erosion and sedimentation is low due to extensive vegetation and stable geology and soils, although poor land use practices have resulted in localized high erosion and sediment yields.	1,536,646 acres/ 2,401 square miles

[1]Sources: Central Coast RWQCB 2002; North Coast RWQCB 2003; DWR 2003, 2009; Lahontan RWQCB 2016; Mount 1995; North Coast RWQCB 2003

North Lahontan

The North Lahontan hydrologic region is located in northern to eastern central California and encompasses more than 6,100 square miles. The boundary extends north from the southern boundary of the Walker River in Mono County to the Oregon border and east to the Nevada border. This region includes portions of Alpine, El Dorado, Lassen, Modoc, Mono, Nevada, Placer, and Sierra counties. The northern area of the hydrologic region is characterized by flat valleys and arid high desert conditions where sagebrush and pinyon-juniper forests are dominant. The central and southern portions of the region are located along the eastern slopes of the Sierra Nevada, where mixed conifer forests are more common. The regional climate is characterized by dry, warm summer months with occasional thunderstorms; and cold, wet (snow or rain) winters. Elevations within the region range from 4,000 feet in northern flat valley areas to mountain peak elevations over 12,800 feet. Major mountain ranges include the Cascade Range and the Sierra Nevada mountains. The treatable landscape within this hydrologic region is chiefly located in mixed conifer forest and covers roughly 1,212 square miles (approximately 20 percent of the region).

Sacramento River

The Sacramento River hydrologic region is located in northern to central California and encompasses over 27,200 square miles. The boundary extends north from the Sacramento-San Joaquin Delta to the Oregon border. This region includes portions of Alpine, Amador, Butte, Colusa, Contra Costa, El Dorado, Glenn, Lake, Lassen, Mendocino, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, Shasta, Sierra, Siskiyou, Solano, Sonoma, Sutter, Tehama, Trinity, Yolo, and Yuba counties. The regional climate is characterized by hot, dry summer months; and cold, wet winters (primarily snow in the mountain areas (>5,000 feet) and rain in low lying areas). Vegetation consists of high desert communities in the arid north, inland mixed conifer forests in the mountains, oak and chaparral in the foothills, and grasslands in the central valley. Elevations within the region range from below sea level to mountain peak elevations over 7,000 feet. Major mountain ranges within the region include the California Coast Range and the Sierra Nevada mountains. The treatable landscape within this hydrologic region evenly distributed throughout mountainous areas and covers roughly 8,358 square miles (approximately 31 percent of the region).

San Francisco Bay

The San Francisco Bay hydrologic region is located in northern California and encompasses over 4,500 square miles. The boundary extends north from Southern Santa Clara County to Tomales Bay. The eastern boundary of this region is along the crest of the California Coast Range. This region includes portions of Alameda, Contra Costa, Marin, Napa, Sacramento, San Francisco, San Joaquin, San Mateo, Santa Clara, Santa Cruz, Solano, Sonoma, and Stanislaus counties. Due to marine influences, the coastal climate in this region is typically cool and foggy with smaller daily and seasonal temperature changes. Further inland, the climate is more continental resulting in warmer summers, colder winters, and greater daily and seasonal temperature variation. Vegetation consists of oak woodlands, annual grasslands, and montane chaparral. Elevations within the region range from sea level to mountain peak elevations over 4,000 feet. The major mountain range within the region is the California Coast Range. The treatable landscape within this hydrologic region is evenly distributed and covers roughly 1,637 square miles (approximately 36 percent of the region).

San Joaquin River

The San Joaquin River hydrologic region encompasses over 15,200 square miles and is located in central California between the Sacramento River and Tulare Lake hydrologic regions. The region is bordered to the west by the Diablo Range and to the east by the Sierra Nevada. This region includes portions of Alameda, Alpine, Amador, Calaveras, Contra Costa, El Dorado, Fresno, Inyo, Madera, Mariposa, Merced, Mono, Sacramento, San Benito, San Joaquin, Santa Clara, Stanislaus, and Tuolumne counties. Valley areas experience hot and dry summers, and cool and wet winters. Mountain areas experience mild summer temperatures and cold winters with heavy snowfall in higher elevations. Vegetation varies from mixed conifer forests in the Sierra Nevada mountains, oak and chaparral in the foothills and coast range, and grasslands in the central valley. Elevations within the region range from near sea level to mountain peak elevations of nearly 14,000 feet. The major mountain ranges within the region are the Diablo Range and the Sierra Nevada. The treatable landscape within this hydrologic region is located on the east slope of the Coast Range and the west slope of Sierra Nevada mountains, and covers roughly 3,411 square miles (approximately 22 percent of the region).

South Coast

The South Coast hydrologic region is located in southern coastal California encompassing nearly 11,000 square miles. The boundary of the region extends north from the Mexico border to the Ventura-Santa Barbara county line and to the east to the Transverse and Peninsular ranges. This region includes all or portions of Kern, Los Angeles, Orange, Riverside, San Bernardino, San Diego, Santa Barbara, and Ventura counties. The regional climate is highly variable with a Mediterranean climate with warm, dry summers and mild, wet winters in the coastal and inland valley areas. Mountainous areas in this region have a Mediterranean to subtropical steppe climate, with greater ranges of seasonal maximum and minimum temperatures. Elevations within the region range from sea level to mountain peak elevations of nearly 9,000 feet. Major mountain ranges include the Transverse and Peninsular ranges. The treatable landscape within this hydrologic region is located primarily in mountainous areas outside of urban centers, and covers roughly 2,445 square miles (approximately 22 percent of the region).

South Lahontan

The South Lahontan hydrologic region is located in southeastern California encompassing nearly 26,700 square miles. The boundary of the region extends north from the Sierra Nevada, San Gabriel, San Bernardino, and Tehachapi Mountains to the drainage divide between Mono Lake and East Walker River; and to the east to the Nevada border. This region includes portions of Fresno, Inyo, Kern, Los Angeles, Madera, Mono, San Bernardino, Tulare and Tuolumne counties. The regional climate for areas east of the Sierra Nevada is hot desert to steppe with hot, dry summers and mild dry winters with little precipitation. Vegetation in the eastern foothills consists mostly of sagebrush, desert shrub, and pinyon-juniper forest, with small areas of fir-spruce on high peaks. Foothill communities give way to Mojave desert shrub to the east and south of the Sierra Nevada mountains. Elevations within the region range from 282 feet below sea level in Death Valley to 14,495 feet at the peak of Mount Whitney and the treatable landscape covers elevations between these extremes. Major mountain ranges include the Sierra Nevada, White, and Avawatz mountains; and Argus and Coso. The treatable landscape within this hydrologic region located entirely in the Sierra Nevada foothills and is roughly 870 square miles (approximately 3 percent of the region).

Tulare Lake

The Tulare Lake hydrologic region is located in central California within the southern portion of the Central Valley and encompasses nearly 17,000 square miles. This region is within the southern portion of the San Joaquin River Valley and includes portions of Fresno, Inyo, Kern, Kings, Los Angeles, Madera, Mono, Monterey, San Benito, San Luis Obispo, Tulare and Ventura counties. The regional climate varies for valley and mountainous areas. Valley areas experience hot, dry summers and cool, wet winters. Mountainous areas experience mild summers, with intermittent thunderstorms and cold winters with heavy snowfall above 5,000 feet elevation. Vegetation varies from mixed conifer forests in the Sierra Nevada mountains, oak and chaparral in the foothills and coast range, and grasslands in the central valley. Elevations within the region range from 50 feet above sea level at the Fresno Slough to 14,495 feet at the peak of Mount Whitney. Major mountain ranges include the Coast Range, Sierra Nevada, and the Tehachapi Mountains. The treatable landscape within this hydrologic region is located on the east slope of the Coast Range and the west slope of the Sierra Nevada mountains, and covers roughly 2,400 square miles (approximately 14 percent of the region).

EXISITING VEGETATION TREATMENTS IN THE TREATABLE LANDSCAPE

Treatment activities currently occur within the treatable landscape and sometimes result in effects to hydrology and water quality. As described in Chapter 1, “Introduction” and Section 2.3.1, “Past and Current Treatments,” vegetation treatment currently occurs around the state under several other wildfire risk reduction programs implemented by various federal, state, and local agencies. In 2017–2018, CAL FIRE treated approximately 33,000 acres in California using the same treatment activities as proposed under the CalVTP.

3.11.2 Regulatory Setting

FEDERAL

Clean Water Act

The Clean Water Act (CWA) consists of the Federal Water Pollution Control Act of 1972 and subsequent amendments. The CWA provides for the restoration and maintenance of the physical, chemical, and biological integrity of the nation's waters.

Section 404

Section 404 of the CWA prohibits the discharge of fill material into waters of the United States, including many wetlands, except as permitted under separate regulations by the U.S. Army Corps of Engineers (USACE) and EPA. To discharge dredged or fill material into waters of the United States, including wetlands that come within the definition of that term, Section 404 requires projects to receive authorization from the Secretary of the Army, acting through the USACE. Waters of the U.S. are generally defined as "…waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide; territorial seas and tributaries to such waters."

Section 402

Section 402 of the CWA establishes the National Pollutant Discharge Elimination System (NPDES) permit program to regulate discharges of pollutants into waters of the United States. An NPDES permit sets specific discharge limits for point sources discharging pollutants into waters of the United States and establishes monitoring and reporting requirements, as well as special conditions. Two types of nonpoint source discharges are controlled by the NPDES program: discharges caused by general construction activities and the general quality of stormwater in municipal stormwater systems. The goal of the NPDES nonpoint source regulations is to improve the quality of stormwater discharged to receiving waters to the maximum extent practicable. RWQCBs in California are responsible for implementing the NPDES permit system (see the discussion of state regulations below).

Section 401

Under CWA Section 401, applicants for a federal license or permit to conduct activities that may result in the discharge of a pollutant into waters of the United States must obtain certification for the discharge. The certification must be obtained from the state in which the discharge would originate or, if appropriate, from the interstate water pollution control agency with jurisdiction over the affected waters at the point where the discharge would originate. Therefore, all projects that have a federal component and may affect state water quality (including projects that require federal agency approval, such as issuance of a Section 404 permit) must also comply with CWA Section 401. Water quality certification requires evaluation of potential impacts in light of water quality standards and CWA Section 404 criteria governing discharge of dredged and fill materials into waters of the United States. The federal government delegates water pollution control authority under CWA Section 401 to the states (and in California, ultimately to the RWQCBs).

Section 303

Section 303(d) of the CWA requires states to develop lists of water bodies that do not attain water quality objectives after implementation of required levels of treatment by point source dischargers (municipalities and industries). Section 303(d) requires that the state develop a TMDL for each of the listed pollutants. The TMDL is the amount of the pollutant that the water body can receive and still be in compliance with water quality objectives. The TMDL is also a plan to reduce loading of a specific pollutant from various sources to achieve compliance with water quality objectives. EPA must either approve a TMDL prepared by the state or disapprove the state's TMDL and issue its own. NPDES permit limits for listed pollutants must be consistent with the waste load allocation prescribed in the TMDL. After implementation of the TMDL, it is anticipated that the problems that led to placement of a given pollutant on the Section 303(d) list would be remediated.

Federal Antidegradation Policy

The Federal Antidegradation Policy was enacted to provide protection to high-quality water resources of national importance. It directs states to develop and adopt statewide antidegradation policies that include protecting existing instream water uses and maintaining a level of water quality necessary to protect those existing uses and the water quality of high-quality waters. In EPA's Clean Water Act regulations regarding water quality standards (40 CFR Chapter 1, Section 131.12[a][3]), the criteria for requiring an antidegradation standard includes the following conditions:

- Existing instream water uses and a level of water quality necessary to maintain those uses shall be maintained and protected.
- Water quality will be maintained and protected in waters that exceed water quality levels necessary for supporting fish, wildlife, and recreational activities, and water quality, unless the State deems that water quality levels can be lowered to accommodate important economic or social development. In these cases, water quality levels can only be lowered to levels that support all existing uses.
- Where high quality waters constitute an outstanding National resource, such as waters of National and State parks and wildlife refuges and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected.

STATE

State Water Resources Control Board

In California, SWRCB has broad authority over water quality control issues for the state. SWRCB is responsible for developing statewide water quality policy and exercises the powers delegated to the state by the federal government under the CWA. Other state agencies with jurisdiction over water quality regulation in California include the California Department of Public Health Services (formerly Department of Health Services) (for drinking water regulations), the California Department of Pesticide Regulation, the California Department of Fish and Wildlife (CDFW) (formerly Department of Fish and Game), and the Office of Environmental Health and Hazard Assessment. Regional authority for planning, permitting, and enforcement is delegated to the nine RWQCBs. The regional boards are required to formulate and adopt water quality control plans for all areas in the region and establish water quality objectives in the plans.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act requires that each of the nine RWQCBs prepare and periodically update basin plans for water quality control. Each basin plan sets forth water quality standards for surface water and groundwater and actions to control nonpoint and point sources of pollution to achieve and maintain these standards. Basin plans offer an opportunity to protect wetlands through the establishment of water quality objectives. The RWQCB's jurisdiction includes waters of the United States, as well as areas that meet the definition of "waters of the state." "Waters of the state" is defined as any surface water or groundwater, including saline waters, within the boundaries of the state. The RWQCB has the discretion to take jurisdiction over areas not federally protected under CWA Section 404 provided they meet the definition of waters of the state and the State Water Resources Control Board published a new set of procedures for discharges of dredged or fill material into waters of the state on March 22, 2019. Mitigation requiring no net loss of wetlands functions and values of waters of the state typically is required by the RWQCB.

The State Water Resources Control Board has adopted the following definition of wetlands:

An area is wetland if, under normal circumstances, (1) the area has continuous or recurrent saturation of the upper substrate caused by groundwater or shallow surface water or both; (2) the duration of such saturation is sufficient to cause anaerobic conditions in the upper substrate; and (3) the area's vegetation is dominated by hydrophytes or the area lacks vegetation.

State Nondegradation Policy

In 1968, as required under the federal antidegradation policy described previously, SWRCB adopted a nondegradation policy aimed at maintaining high quality for waters in California. The nondegradation policy states that the disposal of wastes into state waters shall be regulated to achieve the highest water quality consistent with maximum benefit to the people of the state and to promote the peace, health, safety, and welfare of the people of the state. The policy states:

a) Where the existing quality of water is better than required under existing water quality control plans, such quality would be maintained until it has been demonstrated that any change would be consistent with maximum benefit to the people of the state and would not unreasonably affect present and anticipated beneficial uses of such water.

b) Any activity which produces waste or increases the volume or concentration of waste and which discharges to existing high-quality waters would be required to meet waste discharge requirements.

Z'berg-Nejedly Forest Practice Act

Although the proposed CalVTP excludes timber removal for commercial purposes, the Z'berg-Nejedly Forest Practice Act (Forest Practice Act) may be pertinent as it relates to identifying operating methods and procedures that seek to protect fish, wildlife, forests, and streams within timber harvesting areas where qualifying CalVTP treatments may also be implemented. The Forest Practice Act is intended to achieve "maximum sustained production of high-quality timber products…while giving consideration to values relating to recreation, watershed, wildlife, range and forage, fisheries, regional economic vitality, employment and aesthetic enjoyment" (PRC Section 4513[b]). The regulations created by the Forest Practice Act define factors such as the: size and location of harvest areas, include measures to prevent unreasonable damage to residual trees, and address the protection of riparian areas, water courses and lakes, wildlife, and habitat areas.

California Fish and Game Code Section 1602 (Lake and Streambed Alteration)

CDFW is responsible for conserving, protecting, and managing California's fish, wildlife, and native plant resources. Fish and Game Code Section 1602 states that an entity must notify CDFW prior to substantially diverting or obstructing the natural flow of, or substantially changing or using any material from the bed, channel, or bank of, any river, stream, or lake, or depositing or disposing of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake. If CDFW determines that the proposed activity may substantially adversely affect an existing fish or wildlife resource, CDFW will issue a Lake or Streambed Alteration Agreement for that activity, that includes reasonable measures necessary to protect the resource, and the entity must conduct the activity in accordance with the Agreement.

Safe Drinking Water Act

As mandated by the Safe Drinking Water Act (Public Law 93-523), passed in 1974, EPA regulates contaminants of concern to domestic water supply. Such contaminants are defined as those that pose a public health threat or that alter the aesthetic acceptability of the water. These types of contaminants are regulated by EPA primary and secondary maximum contaminant levels (MCLs). MCLs and the process for setting these standards are reviewed triennially. Amendments to the Safe Drinking Water Act enacted in 1986 established an accelerated schedule for setting drinking water MCLs. EPA has delegated to the California Department of Public Health Services the responsibility for California's drinking water program. California Department of Public Health Services is accountable to EPA for program implementation and for adoption of standards and regulations that are at least as stringent as those developed by EPA. Title 22 of the California Code of Regulations (Article 16, Section 64449) defines secondary drinking water standards, which are established primarily for reasons of consumer acceptance (i.e., taste) rather than for health issues.

LOCAL

When state agencies, including CAL FIRE, are conducting governmental activities under the authority of state law or the State Constitution, in this case, treatments implemented under the proposed CalVTP, they are exempt from local government plans, policies, and ordinances (unless a constitutional provision or statute directs otherwise). Nonetheless, CAL FIRE voluntarily seeks to operate consistently with local governance to the extent feasible. Given its statewide extent and the possible number of local and regional responsible agencies, this PEIR does not identify potentially applicable local government plans, policies, and ordinances. Types of local regulations relevant to hydrology and water quality may include city and county general plans and ordinances, grading codes, and water quality protection requirements for Municipal Separate Storm Sewer Systems. This PEIR assumes that any vegetation treatments proposed by local or regional agencies under the CalVTP would be consistent with local plans, policies, and ordinances to the extent the project is subject to them, as required by the SPR AD-3.

3.11.3 Impact Analysis and Mitigation Measures

ANALYSIS METHODOLOGY

Evaluation of potential hydrologic and water quality impacts is based on a review of existing information from documents and studies that address water resources in California. Information obtained from these sources was reviewed and summarized to describe existing conditions and to identify potential environmental impacts, based on the standards of significance presented in this section. Significance determinations assume that the projects implemented under the CalVTP would comply with relevant federal, state, and local ordinances and regulations and account for the influence of relevant SPRs, which are incorporated into treatment design and listed below.

- SPR AD-3 Consistency with Local Plans, Policies, and Ordinances: The project proponent will design and implement the treatment in a manner that is consistent with applicable local plans (e.g., general plans), policies, and ordinances to the extent the project is subject to them. This SPR applies to all treatment activities and treatment types.
- SPR AQ-3 Create Burn Plan: The project proponent will create a burn plan using the CAL FIRE burn plan template for all prescribed burns. The burn plan will include a fire behavior model output of First Order Fire Effects Model and BEHAVE or other fire behavior modeling simulation and that is performed by a qualified fire behavior technical specialist that predicts fire behavior, calculates consumption of fuels, tree mortality, predicted emissions, greenhouse gas emissions, and soil heating. The project proponent will minimize soil burn severity from broadcast burning to reduce the potential for runoff and soil erosion. The burn plan will be created with input from a qualified technician or certified State burn boss. This SPR applies only to prescribed burning treatment activities and all treatment types.
- SPR BIO-1: Review and Survey Project-Specific Biological Resources. The project proponent will require a qualified RPF or biologist to conduct a data review and reconnaissance-level survey prior to treatment. The data reviewed will include the biological resources setting, species and sensitive natural communities tables, and habitat information in this PEIR for the ecoregion(s) where the treatment will occur. It will also include review of the best available, current data for the area, including vegetation mapping data, species distribution/range information, CNDDB, California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants of California, relevant BIOS queries, and relevant general and regional plans. Reconnaissance-level biological surveys will be general surveys that include visual and auditory inspection for biological resources to help determine the project setting present on a project site. The qualified surveyor will 1.) identify and document sensitive resources, such as riparian or other sensitive habitats, sensitive natural community, wetlands, or wildlife nursery site or habitat (including bird nests), and 2.) assess the suitability of habitat for special-status plant and animal species. The surveyor will also record any incidental wildlife observations. Habitat assessments will be completed at a time of year that is appropriate for identifying habitat and no more than one year prior to the submittal of the Project Specific Analysis (Appendix PD-3) for each treatment project, unless it can be demonstrated that habitat assessments

older than one year remain valid. Based on the results of the data review and reconnaissance-level survey, the project proponent, in consultation with a qualified RPF or biologist, will determine which one of the following best characterizes the treatment:

1. **Suitable Habitat Is Present but Adverse Effects Can Be Clearly Avoided**. If, based on the data review and reconnaissance-level survey, the qualified RPF or biologist determines that suitable habitat for sensitive biological resources is present but adverse effects on the suitable habitat can clearly be avoided through one of the following methods, the avoidance mechanism will be implemented prior to initiating treatment and will remain in effect throughout the treatment:

   a. by physically avoiding the suitable habitat, or

   b. by conducting treatment outside of the season when a sensitive resource could be present within the suitable habitat or outside the season of sensitivity (e.g., outside of special-status bird nesting season, during dormant season of sensitive annual or geophytic plant species, or outside of maternity and rearing season at wildlife nursery sites).

   Physical avoidance will include flagging, fencing, stakes, or clear, existing landscape demarcations (e.g., edge of a roadway) to delineate the boundary of the avoidance area around the suitable habitat. For physical avoidance, a buffer may be implemented as determined necessary by the qualified RPF or biologist.

2. **Suitable Habitat is Present and Adverse Effects Cannot Be Clearly Avoided**. Further review and surveys will be conducted to determine presence/absence of sensitive biological resources that may be affected, as described in the SPRs below. Further review may include contacting USFWS, NOAA Fisheries, CDFW, CNPS, or local resource agencies as necessary to determine the potential for special-status species or other sensitive biological resources to be affected by the treatment activity. Focused or protocol-level surveys will be conducted as necessary to determine presence/absence. If protocol surveys are conducted, survey procedures will adhere to methodologies approved by resource agencies and the scientific community, such as those that are available on the CDFW webpage at: https://www.wildlife.ca.gov/Conservation/Survey-Protocols. Specific survey requirements are addressed for each resource type in relevant SPRs (e.g., additional survey requirements are presented for special-status plants in SPR BIO-7).

This SPR applies to all treatment activities and treatment types.

- **SPR BIO-4: Design Treatment to Avoid Loss or Degradation of Riparian Habitat Function**. Project proponents, in consultation with a qualified RPF or qualified biologist, will design treatments in riparian habitats to retain or improve habitat functions by implementing the following within riparian habitats:

  - Retain at least 75 percent of the overstory and 50 percent of the understory canopy of native riparian vegetation within the limits of riparian habitat identified and mapped during surveys conducted pursuant to SPR BIO-3. Native riparian vegetation will be retained in a well distributed multi-storied stand composed of a diversity of species similar to that found before the start of treatment activities.
  - Treatments will be limited to removal of uncharacteristic fuel loads (e.g., removing dead or dying vegetation), trimming/limbing of woody species as necessary to reduce ladder fuels, and select thinning of vegetation to restore densities that are characteristic of healthy stands of the riparian vegetation types characteristic of the region. This includes hand removal (or mechanized removal where topography allows) of dead or dying riparian trees and shrubs, invasive plant removal, selective thinning, and removal of encroaching upland species.
  - Removal of large, native riparian hardwood trees (e.g., willow, ash, maple, oak, alder, sycamore, cottonwood) will be minimized to the extent feasible and 75 percent of the pretreatment native riparian hardwood tree canopy will be retained. Because tree size varies depending on vegetation type present and site conditions, the tree size retention parameter will be determined on a site-specific basis depending on vegetation type present and setting; however, live, healthy, native trees that are considered large for that type of tree and large relative to other trees in that location will be retained.

- Removed trees will be felled away from adjacent streams or waterbodies and piled outside of the riparian vegetation zone (unless there is an ecological reason to do otherwise that is approved by applicable regulatory agencies, such as adding large woody material to a stream to enhance fish habitat, e.g., see *Accelerated Wood Recruitment and Timber Operations: Process Guidance from the California Timber Harvest Review Team Agencies and National Marine Fisheries Service*).
- Vegetation removal that could reduce stream shading and increase stream temperatures will be avoided.
- Ground disturbance within riparian habitats will be limited to the minimum necessary to implement effective treatments.
- Only hand application of herbicides will be allowed and only during low-flow periods or when seasonal streams are dry.
- The project proponent will notify CDFW pursuant to California Fish and Game Code Section 1602 prior to implementing any treatment activities in riparian habitats. Notification will identify the treatment activities, map the vegetation to be removed, identify the impact avoidance identification methods to be used (e.g., flagging), and appropriate protections for the retention of shaded riverine habitat, including buffers and other applicable measures to prevent erosion into the waterway.
- In consideration of spatial variability of riparian vegetation types and condition and consistent with California Forest Practice Rules Section 916.9(v), a different set of vegetation retention standards and protection measures from those specified in the above bullets may be implemented on a site-specific basis if the qualified RPF and the project proponent demonstrate through substantial evidence that alternative design measures provide a more effective means of achieving the treatment goals and would result in effects to the Beneficial Functions of Riparian Zones equal or more favorable than those expected to result from application of the above measures. Deviation from the above design specifications, different protection measures and design standards will only be approved when the treatment plan incorporates an evaluation of beneficial functions of the riparian habitat and with written concurrence from CDFW.

This SPR applies to all treatment activities and treatment types.

- SPR BIO-5: **Avoid Environmental Effects of Type Conversion and Maintain Habitat Function in Chaparral and Coastal Sage Scrub.** The project proponent will design treatment activities to avoid type conversion where native coastal sage scrub and chaparral are present. An ecological definition of type conversion is used in the CalVTP PEIR for assessment of environmental effects: a change from a vegetation type dominated by native shrub species that are characteristic of chaparral and coastal sage scrub vegetation alliances to a vegetation type characterized predominantly by weedy herbaceous cover or annual grasslands. For the PEIR, type conversion is considered in terms of habitat function, which is defined here as the arrangement and capability of habitat features to provide refuge, food source, and reproduction habitat to plants and animals, and thereby contribute to the conservation of biological and genetic diversity and evolutionary processes (de Groot et al. 2002). Some modification of habitat characteristics may occur provided habitat function is maintained (i.e., the location, essential habitat features, and species supported are not substantially changed).

  During the reconnaissance-level survey required in SPR BIO-1, a qualified RPF or biologist will identify chaparral and coastal sage scrub vegetation to the alliance level and determine the condition class and fire return interval departure of the chaparral and/or coastal sage scrub present in each treatment area.

  For all treatment types in chaparral and coastal sage scrub, the project proponent, in consultation with a qualified RPF or qualified biologist will:

  - Develop a treatment design that avoids environmental effects of type conversion in coastal chaparral and coastal sage scrub vegetation alliances, which will include evaluating and determining the appropriate spatial scale at which the proponent would consider type conversion, and substantiating its appropriateness. The project proponent will demonstrate with substantial evidence that the habitat function of chaparral and coastal sage scrub would be at least maintained within the identified spatial scale at which type conversion is evaluated for the specific treatment project.

- The treatment design will seek to maintain a minimum percent cover of mature native shrubs within the treatment area to maintain habitat function; the appropriate percent cover will be identified by the project proponent in the development of treatment design and be specific to the vegetation alliances that are present in the identified spatial scale used to evaluate type conversion. Mature native shrubs that are retained will be distributed contiguously or in patches within the stand. If the stand consists of multiple age classes, patches representing a range of middle to old age classes will be retained to maintain and improve heterogeneity, to the extent needed to avoid type conversion.

These SPR requirements apply to all treatment activities and all treatment types.

Additional measures will be applied to ecological restoration treatment types:

- For ecological restoration treatment types, complete removal of the mature shrub layer will not occur in native coastal chaparral and coastal sage scrub vegetation types.
- Ecological restoration treatments will not be implemented in vegetation types that are within their natural fire return interval (i.e., time since last burn is less than the average time listed as the fire return interval range in Table 3.6-1) unless the project proponent demonstrates with substantial evidence that the habitat function of chaparral and coastal sage scrub would be improved.
- A minimum of 35 percent of existing shrubs and associated native vegetation will be retained at existing densities in patches distributed in a mosaic pattern within the treated area or the shrub canopy will be thinned by no more than 20 percent from baseline density (i.e., if baseline shrub canopy density is 60 percent, post treatment shrub canopy density will be no less than 40 percent). A different percent can be retained if the project proponent demonstrates with substantial evidence that alternative treatment design measures would result effects on the habitat function of chaparral and coastal sage scrub that are equal or more favorable than those expected to result from application of the above measures.
- If the stand within the treatment area consists of multiple age classes, patches representing a range of middle to old age classes will be retained to maintain and improve heterogeneity.

These SPR requirements apply to all treatment activities and only the ecosystem restoration treatment type.

A determination of compliance with the SB 1260 prohibition of type conversion in chaparral and coastal sage scrub is a statutory issue separate from CEQA compliance that may involve factors additional to the ecological definition and habitat functions presented in the PEIR, such as geographic context. It is beyond the legal scope of the PEIR to define SB 1260 type conversion and statutory compliance. The project proponent, acting as lead agency for the proposed later treatment project, will be responsible for defining type conversion in the context of the project and making the finding that type conversion would not occur, as required by SB 1260. The project proponent will determine its criteria for defining and avoiding type conversion and, in making its findings, may draw upon information presented in this PEIR.

- **SPR GEO-1 Suspend Disturbance during Heavy Precipitation:** The project proponent will suspend mechanical, prescribed herbivory, and herbicide treatments if the National Weather Service forecast is a "chance" (30 percent or more) of rain within the next 24 hours. Activities that cause mechanical soil disturbance may resume when precipitation stops and soils are no longer saturated (i.e., when soil and/or surface material pore spaces are filled with water to such an extent that runoff is likely to occur). Indicators of saturated soil conditions may include, but are not limited to: (1) areas of ponded water, (2) pumping of fines from the soil or road surfacing, (3) loss of bearing strength resulting in the deflection of soil or road surfaces under a load, such as the creation of wheel ruts, (4) spinning or churning of wheels or tracks that produces a wet slurry, or (5) inadequate traction without blading wet soil or surfacing materials. This SPR applies only to mechanical, prescribed herbivory, and herbicide treatment activities and all treatment types.
- **SPR GEO-2 Limit High Ground Pressure Vehicles:** The project proponent will limit heavy equipment that could cause soil disturbance or compaction to be driven through treatment areas when soils are wet and saturated to avoid compaction and/or damage to soil structure. Saturated soil means that soil and/or surface material pore

spaces are filled with water to such an extent that runoff is likely to occur. If use of heavy equipment is required in saturated areas, other measures such as operating on organic debris, using low ground pressure vehicles, or operating on frozen soils/snow covered soils will be implemented to minimize soil compaction. Existing compacted road surfaces are exempted as they are already compacted from use. This SPR applies only to mechanical treatment activities and all treatment types.

- SPR GEO-3 Stabilize Disturbed Soil Areas: The project proponent will stabilize soil disturbed during mechanical and prescribed herbivory treatments with mulch or equivalent immediately after treatment activities, to the maximum extent practicable, to minimize the potential for substantial sediment discharge. If mechanical or prescribed herbivory treatment activities could result in substantial sediment discharge from soil disturbed by machinery or animal hooves, organic material from mastication or mulch will be incorporated onto at least 75 percent of the disturbed soil surface where the soil erosion hazard is moderate or high, and 50 percent of the disturbed soil surface where soil erosion hazard is low to help prevent erosion. Where slash mulch is used, it will be packed into the ground surface with heavy equipment so that it is sufficiently in contact with the soil surface. This SPR only applies to mechanical and prescribed herbivory treatment activities and all treatment types.
- SPR GEO-4 Erosion Monitoring: The project proponent will inspect treatment areas for the proper implementation of erosion control SPRs and mitigations prior to the rainy season. Additionally, the project proponent will inspect for evidence of erosion after the first large storm or rainfall event (i.e., ≥ 1.5 inches in 24 hours) as soon as is feasible after the event. Any area of erosion that will result in substantial sediment discharge will be remediated. This SPR applies only to mechanical and prescribed burning treatment activities and all treatment types.
- SPR GEO-5 Drain Stormwater via Water Breaks: The project proponent will drain compacted and/or bare linear treatment areas capable of generating storm runoff via water breaks using the spacing and erosion control guidelines contained in Sections 914.6, 934.6, and 954.6(c) of the California Forest Practice Rules. Where waterbreaks cannot effectively disperse surface runoff, including where waterbreaks cause surface run-off to be concentrated on downslopes, other erosion controls will be installed as needed to comply with 14 CCR 914 [934, 954]. This SPR applies only to mechanical, manual, and prescribed burn treatment activities and all treatment types.
- SPR GEO-6 Minimize Burn Pile Size: The project proponent will not create burn piles that exceed 20 feet in length, width, or diameter, except when on landings, road surfaces, or on contour to minimize the spatial extent of soil damage. In addition, burn piles will not occupy more than 15 percent of the total treatment area (Busse et al. 2014). The project proponent will not locate burn piles in a Watercourse and Lake Protection Zone as defined in 14 CCR Section 916.5 of the California Forest Practice Rules. This SPR applies to mechanical, manual, and prescribed burning treatment activities and all treatment types.
- SPR GEO-7 Minimize Erosion: To minimize erosion, the project proponent will:

(1) Prohibit use of heavy equipment where any of the following conditions are present:

(i) Slopes steeper than 65 percent.

(ii) Slopes steeper than 50 percent where the erosion hazard rating is high or extreme.

(iii) Slopes steeper than 50 percent that lead without flattening to sufficiently dissipate water flow and trap sediment before it reaches a watercourse or lake.

(2) On slopes between 50 percent and 65 percent where the erosion hazard rating is moderate, and all slope percentages are for average slope steepness based on sample areas that are 20 acres, or less, heavy equipment will be limited to:

(i) Existing tractor roads that do not require reconstruction, or

(ii) New tractor roads flagged by the project proponent prior to the treatment activity.

This SPR applies to all treatment activities and all treatment types.

- **SPR GEO-8 Steep Slopes**: The project proponent will require a Registered Professional Forester (RPF) or licensed geologist to evaluate treatment areas with slopes greater than 50 percent for unstable areas and unstable soils. If unstable areas or soils are identified within the treatment area, are unavoidable, and will be potentially directly or indirectly affected by the treatment, a licensed geologist (P.G. or C.E.G.) will determine the potential for landslide, erosion, of other issue related to unstable soils and identity measures (e.g., those in SPR GEO-7) that will be implemented by the project proponent such that substantial erosion or loss of topsoil would not occur. This SPR applies only to mechanical treatment activities and WUI fuel reduction, non-shaded fuel breaks, and ecological restoration treatment types
- **SPR HAZ-1 Maintain All Equipment:** The project proponent will maintain all diesel- and gasoline-powered equipment per manufacturer's specifications, and in compliance with all state and federal emissions requirements. Maintenance records will be available for verification. Prior to the start of treatment activities, the project proponent will inspect all equipment for leaks and inspect everyday thereafter until equipment is removed from the site. Any equipment found leaking will be promptly removed. This SPR applies to all treatment activities and treatment types.
- **SPR HAZ-5 Spill Prevention and Response Plan:** The project proponent or licensed Pest Control Advisor (PCA) will prepare a Spill Prevention and Response Plan (SPRP) prior to beginning any herbicide treatment activities to provide protection to onsite workers, the public, and the environment from accidental leaks or spills of herbicides, adjuvants, or other potential contaminants. The SPRP will include (but not be limited to):
  - a map that delineates staging areas, and storage, loading, and mixing areas for herbicides;
  - a list of items required in an onsite spill kit that will be maintained throughout the life of the activity;
  - procedures for the proper storage, use, and disposal of any herbicides, adjuvants, or other chemicals used in vegetation treatment.

  This SPR applies only to herbicide treatment activities and all treatment types.
- **SPR HAZ-7 Triple Rinse Herbicide Containers:** The project proponent will triple rinse all herbicide and adjuvant containers with clean water at an approved site, and dispose of rinsate by placing it in the batch tank for application per 3 CCR Section 6684. The project proponent will puncture used containers on the top and bottom to render them unusable, unless said containers are part of a manufacturer's container recycling program, in which case the manufacturer's instructions will be followed. Disposal of non-recyclable containers will be at legal dumpsites. Equipment will not be cleaned, and personnel will not be washed in a manner that would allow contaminated water to directly enter any body of water within the treatment area or adjacent watersheds. Disposal of all herbicides will follow label requirements and waste disposal regulations. This SPR applies only to herbicide treatment activities and all treatment types.
- **SPR HYD-1 Comply with Water Quality Regulations:** The project proponent will comply with all applicable water quality requirements adopted by the appropriate Regional Water Quality Control Board and approved by the SWRCB (i.e., Basin Plan). If applicable, this includes compliance with the conditions of general waste discharge requirements (GWDR) and waste discharge requirement waivers for timber or silviculture activities where these waivers are designed to apply to non-commercial fuel reduction and forest health projects. In general, GWDR and Waiver waivers of waste discharge requirements for fuel reduction and forest health activities require that wastes, including but not limited to petroleum products, soil, silt, sand, clay, rock, felled trees, slash, sawdust, bark, ash, and pesticides must not be discharged to surface waters or placed where it may be carried into surface waters; and that Water Board staff must be allowed reasonable access to the property in order to determine compliance with the waiver conditions. The specifications for each GWDR and Waiver vary by region. Regions 2 (San Francisco Bay), 4 (Los Angeles), 8 (Santa Ana), and 7 (Colorado River) are highly urban or minimally forested and do not offer GWDR or Waivers for fuel reduction or vegetation management activities. The current applicable GWDR and Waivers for timber and vegetation management activities are included in Appendix HYD-1. This SPR applies to all treatment activities and treatment types.

- **SPR HYD-2 Avoid Construction of New Roads:** The project proponent will not construct or reconstruct (i.e., cutting or filling involving less than 50 cubic yards/0.25 linear road miles) any new roads (including temporary roads). This SPR applies to all treatment activities and treatment types.
- **SPR HYD-3 Water Quality Protections for Prescribed Herbivory:** The project proponent will include the following water quality protections for all prescribed herbivory treatments:
  - Environmentally sensitive areas such as waterbodies, wetlands, or riparian areas will be identified and excluded from prescribed herbivory project areas using temporary fencing or active herding. A buffer of approximately 50 feet will be maintained between sensitive and actively grazed areas.
  - Water will be provided for grazing animals in the form of an on-site stock pond or a portable water source located outside of environmentally sensitive areas.
  - Grazing animals will be herded out of an area if accelerated soil erosion is observed.

  This SPR applies to prescribed herbivory treatment activities and all treatment types.
- **SPR HYD-4 Identify and Protect Watercourse and Lake Protection Zones:** The project proponent will establish Watercourse and Lake Protection Zones (WLPZs) as defined in 14 CCR Section 916 .5 of the California Forest Practice Rules on either side of watercourses. WLPZ's are classified based on the uses of the stream and the presence of aquatic life. Wider WLPZs are required for steep slopes.

Procedures for Determining Watercourse and Lake Protection Zone (WLPZ) widths

Water Class	Class I	Class II	Class III	Class IV
Water Class Characteristics or Key Indicator Beneficial Use	1) Domestic supplies, including springs, on site and/or within 100 feet downstream of the operations area and/or 2) Fish always or seasonally present onsite, includes habitat to sustain fish migration and spawning.	1) Fish always or seasonally present offsite within 1000 feet downstream and/or 2) Aquatic habitat for nonfish aquatic species. 3) Excludes Class III waters that are tributary to Class I waters.	No aquatic life present, watercourse showing evidence of being capable of sediment transport to Class I and II waters under normal high-water flow conditions after completion of timber operations.	Man-made watercourses, usually downstream, established domestic, agricultural, hydroelectric supply or other beneficial use.
WLPZ Width (ft) – Distance from top of bank to the edge of the protection zone				
< 30 % Slope	75	50	Sufficient to prevent the degradation of downstream beneficial uses of water. Determined on a site-specific basis.	
30-50 % Slope	100	75		
>50 % Slope	150	100		
Source: 14 CCR Section 916.5 [936.5, 956.5]				

- The following WLPZ protections will be applied for all treatments:
  - Treatment activities with WLPZs will meet the overstory and understory vegetation retention guidelines and ground disturbance limitations described in 14 CCR Section 916.4 [936.4, 956.4] Subsection (b) and Section 916.5, including retention of at least 75 percent surface cover and undisturbed area.
  - Equipment, including tractors and vehicles, must not be driven in wet areas or WLPZs, except over existing roads or watercourse crossings where vehicle tires or tracks remain dry.
  - Equipment used in vegetation removal operations will not be serviced in WLPZs, within wet meadows or other wet areas, or in locations that would allow grease, oil, or fuel to pass into lakes, watercourses, or wet areas.

- WLPZs will be kept free of slash, debris, and other material that harm the beneficial uses of water. Accidental deposits will be removed immediately.
- Burn piles will be located outside of WLPZs.
- No fire ignition will occur within WLPZs however low intensity backing fires may be allowed to enter or spread into WLPZs.
- Large areas of bare soil within WLPZs that are exposed by treatment activities will be stabilized with mulching, rip-rap, grass seeding, or soil stabilizers prior to the beginning of the rainy season, as described in 14 CCR 916.7.
- Equipment limitation zones (ELZs) will be designated adjacent to Class III and Class IV watercourses with minimum widths of 25 feet where side-slope is less than 30 percent and 50 feet where side-slope is 30 percent or greater. An RPF will describe the limitations of heavy equipment within the ELZ and, where appropriate, will include additional measures to protect the beneficial uses of water.

This SPR applies to all treatment activities and treatment types.

- **SPR HYD-5 Protect Non-Target Vegetation and Special-status Species from Herbicides:** The project proponent will implement the following measures when applying herbicides:
  - Locate herbicide mixing sites in areas devoid of vegetation and where there is no potential of a spill reaching non-target vegetation or a waterway.
  - Use only herbicides labeled for use in aquatic environments when working in riparian habitats or other areas where there is a possibility the herbicide could come into direct contact with water.
  - No herbicides will be applied within a 50-foot buffer of ESA or CESA listed plant species or within 50 feet of dry vernal pools.
  - For spray applications in and adjacent to habitats suitable for special-status species, use herbicides containing dye (registered for aquatic use by DPR, if warranted) to prevent overspray.
  - Spray application of herbicides will not be carried out when wind speeds are 7 miles per hour or greater.
  - No herbicide will be applied during precipitation events or if precipitation is forecast 24 hours before or after project activities.

  This SPR applies to herbicide treatment activities and all treatment types.
- **SPR HYD-6 Protect Existing Drainage Systems:** If a treatment activity is adjacent to a roadway with stormwater drainage infrastructure, the existing stormwater drainage infrastructure will be marked prior to ground disturbing activities. If a drainage structure or infiltration system is inadvertently disturbed or modified during project activities, the project proponent will coordinate with owner of the system or feature to repair any damage and ensure that pre-project drainage conditions are restored. This SPR applies to all treatment activities and treatment types.

THRESHOLDS OF SIGNIFICANCE

Thresholds of significance are based on Appendix G of the State CEQA Guidelines. A treatment implemented under the proposed CalVTP would result in a significant impact on hydrology or water quality if it would:

- Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality;
- Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin;

- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream of river or through the addition of impervious surfaces, in a manner which would:
  - Result in substantial erosion or siltation on or off-site;
  - Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;
  - Create or contribute runoff water which would exceed the capacity of exiting or planned stormwater drainage system or provide substantial additional sources of polluted runoff; or
  - Impede or redirect flood flows.
- Risk release of pollutants due to project inundation in flood hazard, tsunami, or seiche zones; or
- Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

ISSUES NOT EVALUATED FURTHER

The CalVTP would not create any impervious surfaces, which would interfere with groundwater recharge. Implementation of qualifying treatments under the proposed CalVTP would also not decrease groundwater supplies through extraction because the program would not include the construction of permanent facilities that would draw on groundwater. Therefore, issues related to groundwater supplies and groundwater management are not discussed further.

Additionally, qualifying treatments implemented under the proposed CalVTP would not include construction of buildings or other facilities or store materials on site where they could be inundated by tsunami, floodwater, or seiche. Therefore, the potential for release of pollutants due to project inundation is not discussed further.

IMPACT ANALYSIS

Impact HYD-1: Violate Water Quality Standards or Waste Discharge Requirements, Substantially Degrade Surface or Ground Water Quality, or Conflict with or Obstruct the Implementation of a Water Quality Control Plan Through the Implementation of Prescribed Burning

Implementation of the CalVTP includes prescribed broadcast burning and pile burning in tree, shrub, and grass fuel types across the state. Prescribed broadcast burning would include fire behavior modeling and burning would be conducted when fuel moisture and environmental conditions allow for effective fuel reduction while reducing the risk of high severity burns. The patchwork of low and moderate intensity fire in a prescribed burn would preserve vegetated islands to capture runoff and sediment and buffers would be preserved to act as buffers around watercourses. Compared to forested and grassland environments, prescribed fire in chaparral and shrublands is more likely to result in severe burns and increased sediment loading. However, the proposed program would utilize prescribed burning in these vegetation types only when it is consistent with the natural fire return interval or when the project proponent clearly demonstrates that habitat function would be protected. Because the CalVTP includes SPRs incorporating best management practices to protect water quality, the potential for prescribed burns implemented under the CalVTP to adversely affect water quality would be **less than significant**.

General Effects of Fire on Water Quality

Fire (wildfire and prescribed burning), like any landscape scale disturbance, can result in adverse effects to water quality. However, the degree to which water quality is affected is dependent on several factors including the severity of the fire, the intensity of precipitation events following the fire, and the hydrologic connectivity of the burned area to downstream waterbodies.

Severe wildfires have resulted in catastrophic erosion rates and water quality effects, typically when intense burning by wildfires was followed by large rainfall events (Wallbink et al. 2004, Dahm et al. 2015). High severity burns generally consume all surface litter, plants, and branches (large woody debris). Stumps, logs, and trees will be deeply charred and black, often with 100 percent tree mortality. Characteristically, an area burned at high severity has extensive exposed mineral soil, often greater than 80 percent (Lewis et al. 2006). Wildfires in California typically occur in the summer and fall near the end of the dry season and are more likely to be high severity burns. Prescribed burning is typically planned for seasons where fuel moisture levels are high enough to slow the spread and reduce the intensity of fire. Because of this, the risk of water quality effects is typically lower for prescribed fires than for wildfire.

Prescribed burns are designed to be low-severity burns in confined areas, which leave fine fuels such as litter and small woody debris partially charred and consumed, and little mineral soil exposed (Lewis et al. 2006, Cawson et al. 2012). Prescribed burning in California's conifer forests have showed little to no increase in erosion (MacDonald et al. 2004), whereas prescribed burning in chaparral vegetation causes a marked increase in runoff and erosion (Valeron and Meixner 2009, Wohlgemuth et al. 1999). The higher rates of erosion in chaparral are because prescribed fire in chaparral can burn at higher intensity, remove more surface organic material, and have a higher likelihood for post-fire water repellency (Hubbert et al. 2006). However, a 10-year study of prescribed burns and wildfire in chaparral found that sediment delivery from prescribed burns in chaparral environments produced only ten percent of the sediment that is produced after a wildfire in chaparral. Also, after prescribed burns, erosion levels typically return to pre-burn levels within 2 to 4 years (Wohlgemuth et al. 1999).

Fire affects the rate of runoff by removing the vegetation canopy that intercepts raindrops, reducing plant litter on the ground surface that slows overland flow, and creating water repellency in surface soils. The vegetation cover reduces runoff and erosion by intercepting rainfall, protecting the soil surface, and creating surface roughness which increases ponding and slows water movement. The amount of surface litter has a strong influence on infiltration and runoff rates and can account for nearly two-thirds of the variability in the amount of sediment carried in runoff (Cawson et al. 2012). A summary of multiple studies found that sediment yield increased exponentially when bare soil exceeded 60-70 percent (Cawson et al. 2012). Water repellency is created when organic materials such as plant litter and duff are vaporized by high heat. As organic vapors cool and condense, soils are coated by naturally occurring water repellent hydrocarbons (Lewis et al. 2006, Wallbrink et al. 2004). This phenomenon is typically observed after moderate to high severity burns where most or all of the fine fuels and surface litter are consumed (Lewis et al. 2006). Water repellency typically occurs within the upper two inches of the soil profile and persists for several weeks (Hubbert et al. 2006). The vegetation canopy in riparian areas also provides shade and cover for adjacent water bodies in addition to providing many other ecosystem services. During low intensity fires or backing fires, riparian areas can act as fire breaks due to their high fuel moisture content. However, the capacity of riparian vegetation to affect fire behavior depends on the environmental conditions driving the fire and the size, moisture content, and topography of the riparian area (Kobziar and McBride 2006). When fire intensity is high enough to destroy riparian vegetation, stream temperature, flow, and nutrient inputs may be increased (Kobizar and McBride 2006).

In addition to sediment, the runoff from burned areas often carries increased levels of nutrients, metals, and certain organic pollutants. Combustion of plants and natural materials releases metals, nitrogen compounds, phosphorus, calcium, magnesium, and potassium and toxic organic and inorganic compounds (Crouch et al. 2006, Wallbrink et al. 2004). These materials can be carried in runoff and in high enough concentrations can adversely affect water quality leading to changes in pH, decreased dissolved oxygen levels, and even toxicity. Fires may also burn vegetation adjacent to watercourses leading to greater inputs of solar radiation and increased water temperature. These changes would be greatest in small, shallow watercourses.

The degree to which a burned area is hydrologically connected to a water body has a strong influence on the potential for water quality effects. For instance, sediment eroded from an upper area of a catchment may be distributed and held in depressions or trapped by vegetation in unburned areas rather than being discharged into a water body. Conversely, roads, tracks, and skidpaths can become extensions of the drainage system and enhance the efficiency of runoff routing and sediment transport to streams (Wallbrink et al. 2004). In a low intensity burn, variations in fire severity and the presence of unburned areas create a mosaic of patches. Higher severity burns are often found on ridges and drier aspects, with lower severity or unburnt areas found in gullies and on wetter aspects

(Cawson at al. 2012). This patchiness influences hydrologic connectivity with bare patches acting as sediment sources and vegetated areas as sediment sinks. Vegetated patches are most effective when they are located near to the catchment outlet or as buffers surrounding a waterbody (Cawson et al. 2012).

Potential Effects of the CalVTP

The CalVTP would use prescribed burning treatments in a manner that avoids the potential for the detrimental conditions of more intensive wildfires discussed above. Although pile burning would result in localized high severity burn conditions, pile sites would be limited in size (per SPR GEO-6) and dispersed throughout the landscape with unburned areas between each pile to act as buffers and to reduce hydrologic connectivity. Additionally, SPR HYD-4 prohibits the placement of burn piles within WLPZs, as defined by 14 CCR Section 916.5 of the California Forest Practice Rules. WLPZ's vary in width depending on the steepness of the slope and the class of stream. WLPZs for Class I streams (streams used for domestic water supply or providing fish habitat) range from 75 feet to 150 feet. For Class II streams (streams with fish habitat within 1,000 feet downstream or providing habitat for other aquatic species) WLPZs range from 50 feet to 75 feet). WLPZ widths for Class III and Class IV streams are determined on a site-specific basis to prevent the degradation of downstream water quality. Class III streams do not provide aquatic habitat but are hydrologically connected during normal high flow events to a Class I or Class II stream. Class IV streams are constructed channels. Broadcast burning implemented under the CalVTP would be conducted when fuel moisture and environmental conditions allow for effective understory and ladder fuel control while reducing the risk of high severity burns. In addition, all prescribed burns would include the development of a CAL FIRE burn plan with fire behavior modeling (SPR AQ-3) and no ignition points would be located within WLPZs (SPR HYD-4). To further protect streams and riparian habitats and avoid increases in water temperature, projects would implement SPR BIO-4 and MM BIO-3b which minimize streamside vegetation loss and require restoration where loss is unavoidable. These SPRs would reduce the potential for escaped fire or severe burns and would preserve unburned streamside buffers to capture runoff from treatment areas.

The SPRs described above would minimize the likelihood that prescribed burning in tree and grass fuel types would result in adverse effects to water quality. However, in chaparral and shrub dominated environments the risk to water quality is greater due to the potential for severe burns and water repellency. The majority of shrub dominated environments within the treatable area occur in the South Lahontan, Colorado River, and South Coast hydrologic regions which are subject to flashy, high intensity storms which further increases the risk of sediment and ash-laden runoff reaching water bodies. The proposed program recognizes the additional risks associated with the use of prescribed fire in these environments and describes the likelihood of using prescribed burns for Wildland Urban Interface (WUI) or Ecological Restoration projects in shrub dominated environments as "Low" (see Table 2-3 in Chapter 2, Program Description). Additionally, SPR BIO-5 requires that treatments in chaparral and coastal sage environments be timed to mimic the natural fire return interval for that system and that treatments retain a minimum percent cover of mature native shrubs to maintain habitat function and avoid type conversion. As described in Section 3.6.1 of Section 3.6, "Biological Resources," fires have increased substantially in coastal scrub and chaparral environments, resulting in conversion of shrub dominated habitats to annual grasslands dominated by nonnative species. Because the proposed program would utilize prescribed burning in shrub dominated habitats when the treatment is consistent with natural fire return interval or when the project proponent demonstrates that habitat function will be maintained, the program would not create an additional risk to water quality from prescribed burning.

Summary

The proposed program would include prescribed broadcast burning and pile burning in forests, shrublands, and grasslands across the state. High intensity fires can result in severe burns where soils become water repellent and increased runoff carries ash, sediment, and debris into downstream watercourses. However, the prescribed burning that would be implemented under the CalVTP would include fire behavior modeling (for broadcast burns) and burning would be conducted when fuel moisture and environmental conditions allow for effective fuel reduction while reducing the risk of high severity burns. The patchwork of low and moderate intensity fire in a prescribed burn would preserve vegetated islands to capture runoff and sediment and WLPZs would be persevered to act as buffers around watercourses. Although prescribed fire in chaparral and shrubland environments is more likely to result in severe burns and increased sediment loading, qualifying treatments under the CalVTP would implement prescribed burning in these vegetation types only when it is consistent with the natural fire return interval or when the proponent can demonstrate with substantial evidence that habitat function will not be degraded. Implementation of these SPRs would avoid and minimize the potential for substantial water quality degradation from prescribed burning. This impact would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

Impact HYD-2: Violate Water Quality Standards or Waste Discharge Requirements, Substantially Degrade Surface or Ground Water Quality, or Conflict with or Obstruct the Implementation of a Water Quality Control Plan Through the Implementation of Manual or Mechanical Treatment Activities

The proposed CalVTP includes manual and mechanical treatment activities to reduce wildfire risk within the treatable landscape. All qualifying manual and mechanical treatments implemented under the CalVTP would integrate SPRs into treatment design to protect watercourses, limit equipment use on wet soils or steep slopes, stabilize highly disturbed areas, prevent concentration of runoff in non-shaded fuel breaks, and prevent spill or leaks from equipment. Implementation of SPRs would avoid and minimize the risk of substantial degradation to surface or groundwater quality from manual or mechanical treatment activities; this impact would be **less than significant**.

The proposed program would include manual and mechanical treatment activities to reduce fuel loading within the treatable area. Manual treatment activities are unlikely to result in ground disturbance or adverse effects to water quality. As described in Impact HYD-1, piles created by hand treatment crews would be hydrologically isolated and would not be placed within WLPZs.

The mechanical vegetation removal activities that would be used in the implementation of WUI fuel reduction, ecological restoration, and shaded fuel break treatment types would use heavy equipment and would likely create disturbance similar to timber harvest and forest health projects. For this reason, the SPRs incorporate relevant elements of the California Forest Practice Rules pertaining to erosion control and protection of waterbodies. The vegetation removal and chipping activities within the treatment area could loosen and disturb soils, remove ground surface litter in some areas exposing the soil surface and facilitating erosion, and compact soils so that they are not able to infiltrate or filter runoff. Some activities, such as chaining and tilling would loosen soils at depths several inches below the soil surface. Rain of sufficient intensity and duration could dislodge soil particles, generate runoff, and cause localized erosion. The most effective water quality protections are avoidance of sensitive areas and providing undisturbed buffers between work areas and watercourses. As discussed above, the proposed program would incorporate the WLPZ protections defined in 14 CCR Section 916 .5 of the California Forest Practice Rules (SPR HYD-4). Additionally, SPR BIO-1 requires that a qualified RPF or biologist identify sensitive habitats such as wetlands, wet meadows, or riparian areas as well as a suitable buffer area for avoidance during project activities. This buffer would act as a filter to slow runoff from adjacent treatment areas, allow infiltration of stormwater, and trap sediment that could otherwise be carried into surface waters. SPR GEO-1 and SPR GEO-2 limit ground disturbance during precipitation or heavy equipment operation over saturated soils, when such activity could produce ruts where runoff could concentrate. Equipment operation would be limited on steep or unstable slopes (SPR GEO-7 and SPR GEO-8) to reduce the potential for erosion. Additionally, highly disturbed areas would be stabilized with mulch (SPR GEO-3) and treatment areas would be inspected for erosion and remediated prior to the rainy season and following the first large storm or rainfall event (SPR GEO-4). Finally, qualifying projects under the CalVTP would comply with all State and Regional water quality regulations, including conditions of waste discharge requirement waivers that are applicable to fuel reduction and fire prevention activities (SPR HYD-1). These waivers (presented in Appendix HYD-1) include supplemental requirements for water quality protection to ensure that project activities do not conflict with the regional water quality control plan.

The creation of non-shaded fuel breaks would involve extensive ground disturbance and removal of all vegetation within the treatment area. The loss of vegetative canopy and surface litter would result in an increase in stormwater runoff from these treatment areas, potentially carrying high sediment loads. Non-shaded fuel breaks would typically be placed on ridgelines where there is little contributing watershed area, however in some cases natural topography could direct stormwater to flow down the length of the fuel break where it could become concentrated. SPR GEO-5 incorporates California Forest Practice Rules Section 914.6 which prescribes the use of waterbreaks to divert runoff from fuel breaks and roads into adjacent areas where it can infiltrate naturally. Waterbreaks would be spaced every 50 to 300 feet depending on the slope and erosion hazard rating of the underlying soil. Where waterbreaks cannot effectively disperse surface runoff, other erosion controls would be implemented as needed. Waterbreaks are required to be installed upslope of watercourses regardless of the maximum distances specified in California Forest Practice Rules Section 914.6, which would help prevent concentrated runoff from being directed into a stream or drainage. Additionally, SPR HYD-4 prevents the operation of equipment, and thus the construction of non-shaded fuel breaks, within WLPZs. As discussed above, the protection of WLPZs would provide a buffer area to capture runoff and sediment and protect surface water resources.

The equipment used for mechanical vegetation removal treatments require the use of fuels and lubricants. Qualifying treatments implemented under the CalVTP would control the potential risks of spills and leaks through application of SPRs HYD-5, which requires that equipment be fueled and serviced outside of WLPZs and wet areas, and SPR HAZ-1, which requires that all equipment be maintained and regularly inspected for leaks. Additionally, SPR HAZ-5 requires that the project proponent prepared a Spill Prevention and Response Plan and maintain a spill kit onsite. Implementation of these SPRs would prevent spills of fuels and lubricants onto soils that could be carried by runoff into adjacent waterbodies.

Summary

Qualifying projects implemented under the CalVTP would be required to implement SPRs that protect watercourses, limit equipment use on wet soils or steep slopes, stabilize highly disturbed areas, prevent concentration of runoff in non-shaded fuel breaks, and prevent spill or leaks from equipment. Therefore, the risk of substantial degradation to surface or groundwater quality from manual and mechanical treatments would be avoided and minimized; this impact would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

Impact HYD-3: Violate Water Quality Standards or Waste Discharge Requirements, Substantially Degrade Surface or Ground Water Quality, or Conflict with or Obstruct the Implementation of a Water Quality Control Plan Through Prescribed Herbivory

The proposed program includes the use of prescribed herbivory to reduce fuels. Qualifying treatments under the proposed CalVTP would incorporate livestock management best practices in SPR HYD-3 which exclude grazing animals from sensitive areas, provide alternative water sources, and move animals when erosion is observed. For these reasons, the risk of substantial degradation to surface or groundwater quality from prescribed herbivory would be **less than significant**.

The proposed CalVTP includes the use of prescribed herbivory to treat vegetation. When allowed to move according to their own preferences, grazing animals will often congregate near water sources and in riparian areas where vegetation is lusher and more abundant. The potential for water quality effects from prescribed herbivory can be effectively controlled through active grazing management and application of best practices (Freitas et al. 2014, Higgins et al. 2011). Relevant best practices are encompassed in SPR HYD-3 and include active herding to prevent livestock from lingering in riparian areas, establishing riparian buffers where livestock are excluded, fencing streams and providing access to alternative water sources. Implementation of this SPR would avoid impacts to water quality caused by the persistence of grazing animals in riparian areas for extended periods of time, such as denuding of vegetation, loss of soil structure and increased sedimentation, and accumulation of manure and urine which contribute nutrients and pathogens to adjacent waterbodies (Higgins et al. 2011). The action of animal hoofs can lead to erosion of stream banks and on gentle slopes trampling of moist soils can create soil compaction, increasing the likelihood of runoff. Additionally, SPR HYD-3 limits stream access points and crossings which would avoid and minimize water quality degradation resulting from the concentration of runoff and alteration of drainage patterns caused by the creation of new trails when animals move across the stream to access water, shade or new grazing areas.

Because qualifying prescribed herbivory projects implemented under the CalVTP would exclude grazing animals from sensitive areas, provide alternative water sources, and move animals when erosion is observed, the risk of substantial degradation to surface or groundwater quality from prescribed herbivory would be avoided and minimized; this impact would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

Impact HYD-4: Violate Water Quality Standards or Waste Discharge Requirements, Substantially Degrade Surface or Ground Water Quality, or Conflict with or Obstruct the Implementation of a Water Quality Control Plan Through the Ground Application of Herbicides

The CalVTP would ensure that herbicides are applied according to the manufacturer's label directions and consistent with program SPRs which limit herbicide use in sensitive areas or under conditions that could lead to misapplication and require each project to be prepared to respond to a spill. Because qualifying projects would integrate these protective measures into treatment design, risk of substantial degradation to surface or groundwater quality from herbicide application would be avoided and minimized; this impact would be **less than significant**.

General Effects of Herbicides on Water Quality

In general, the use of herbicides can affect water quality through off-site movement of herbicides from runoff, leaching, drift, and misapplication or spills. Surface water can be affected by any of these means but only leaching has the potential to degrade groundwater. Site conditions, chemical characteristics, and application technique are other factors that can influence how likely an herbicide is to degrade water quality.

The first line of protection for water quality is the herbicide product label. Not all herbicides act the same way in the environment; some are active for only a short time while others may persist for years, they also have varying degrees of water solubility and soil sorption. Additionally, each herbicide may have several formulations for specific uses. Because of this complexity, each herbicide product carries a legally enforceable label which provides critical information about product use. Before an herbicide can be registered for sale, EPA requires extensive scientific data on the potential health and environmental effects. EPA evaluates the data and ensures that that label describes a set of conditions, directions, and precautions that define how and where the product can be safely used. Following the directives of the product label greatly reduces the potential for herbicides to be applied in a way that contaminates water resources.

Herbicides can be carried in stormwater runoff or carried through soils to leach into groundwater. The potential for leaching and runoff contamination is dependent on the available water in the soil, the soil's permeability, the proximity to surface or groundwater, and the length of time that the herbicide remains active in the environment. Herbicides applied to wet soil, areas of shallow groundwater, or applied when significant precipitation is expected are more likely to be problematic.

In addition to transport in runoff, herbicides can reach water through drift, which is the airborne movement of herbicides beyond the treatment area. The risk of drift is affected by the application technique and weather conditions. Aerial or boom applications are most likely to reach water through drift because the herbicide must settle through the air to reach the treatment area. Spot and localized treatments are less likely to drift because these applications are targeted at specific plants and less herbicide is applied.

Potential Effects of the CalVTP

Qualifying treatments under the proposed CalVTP could use herbicides to prevent the growth or regrowth of target species. SPR HYD-5 prohibits herbicide application during precipitation or if precipitation is forecast 24 hours before or after project activities. Some formulations may require longer precipitation-free windows, as required by the label, which would be adhered to by applicators. Additionally, SPR HYD-5 prohibits non-aquatic herbicide formulations from being applied within 50 feet of a waterbody riparian area or wetland. These precautions would avoid and minimize the potential for herbicides to leach into groundwater or contaminate stormwater runoff.

The CalVTP does not include aerial application of herbicides. Broadcast applications of herbicide could occur using a boom applicator attached to an all-terrain vehicle or tractor. SPR HYD-5 prohibits spray applications of herbicides when wind speeds are 7 miles per hour or greater and prohibits herbicide application within 50 feet of surface water or wet meadows for non-aquatic formulations. SPR BIO-4 allows only hand application of herbicides in riparian areas. These protections along with compliance with label requirements would avoid and minimize the potential for spray drift from herbicides to impact water quality. Although the protections described above would prevent impacts to water quality during herbicide application, the accidental misapplication or spill of an herbicide could degrade water quality. The potential for water quality degradation from an accidental misapplication or spill would depend on the location and site conditions, herbicide formulation, and quantity of material. In addition to the label requirements for storage, transport, mixing and container disposal, SPR HAZ-5 requires that all projects implemented through the proposed program develop a Spill Prevention and Response Plan and that projects maintain an onsite spill kit throughout the life of the activity. SPR HAZ-7 also includes requirements for rinsing and disposal of herbicide containers and requires that equipment and personnel washing occur in a manner that protects water resources. These protections would avoid and minimize the potential for misapplication or spills of herbicides to adversely affect water quality.

As discussed above, qualifying treatments under the CalVTP would use herbicides in accordance with the manufacturer's label directions and implement all relevant SPRs, which would reduce the potential for contamination of surface or groundwater resources. Therefore, risk of substantial degradation to surface or groundwater quality from herbicide application would be avoided and minimized; this impact would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

Impact HYD-5: Substantially Alter the Existing Drainage Pattern of a Treatment Site or Area

Treatments implemented under the CalVTP would include ground disturbing activities that could intersect existing drainage infrastructure at treatment sites. As discussed in Impacts HYD-1 through HYD-4, prescribed burning, prescribed herbivory, and most forms of mechanical vegetation removal would have minor effects on site drainage. Non-shaded fuel breaks constructed along roadways could intersect existing roadway drainage systems. SPR HYD-6 requires that all projects avoid disturbance of existing drainage systems and maintain pre-treatment drainage conditions. Therefore, qualifying treatments implemented under the CalVTP would not substantially alter the existing drainage pattern of a treatment site or area. This impact would be **less than significant**.

Treatments implemented under the CalVTP would include ground disturbing activities that could intersect existing drainage patterns to varying degrees. Prescribed fire, prescribed herbivory, and most forms of mechanical vegetation removal would have only minor effects on site drainage with implementation of SPRs, as discussed in Impacts HYD-1 through HYD-4. However, the extensive ground disturbance required for creation of non-shaded fuel breaks warrants further discussion related to alteration of drainage patterns.

Non-shaded fuel breaks would typically be located along ridge lines or along roads. As discussed in Impact HYD-2, the potential for non-shaded fuel breaks to modify local runoff patterns would be avoided and minimized through the implementation of SPRs GEO-5 and HYD-4. SPR GEO-5 incorporates California Forest Practice Rules Section 914.6 which prescribes the use of waterbreaks to divert runoff from fuel breaks and roads into adjacent areas where it can infiltrate naturally. HYD-4 prohibits the placement of burn piles within WLPZs, as defined by 14 CCR Section 916.5 of the California Forest Practice Rules, which would avoid diversion of runoff that could result in adverse alteration of a drainage system. SPR HYD-6 would prevent the diversion of runoff or disturbance of existing drainage systems to avoid impacts from the implementation of non-shaded fuel breaks adjacent to roadways, which typically have existing roadway drainage or stormwater management systems. This SPR requires that ground disturbing activities, including blading for the construction of non-shaded fuel breaks, would avoid disturbance of roadway drainage infrastructure and would ensure that pre-project drainage conditions are maintained. Therefore, qualifying treatments implemented under the CalVTP would not substantially alter the existing drainage pattern of a treatment site or area. This impact would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

3.12 LAND USE AND PLANNING, POPULATION AND HOUSING

This section describes the applicable land use policies and existing population and housing conditions in California, presents a description of applicable regulations, and analyzes whether possible changes in population and housing or land use effects could occur from the program implementation. Information used in this section was obtained from CAL FIRE, the California Department of Finance, and the California Employment Development Department.

No comments received on the Notice of Preparation were related to land use and planning or population and housing (see Appendix A).

3.12.1 Environmental Setting

LAND USE AND PLANNING

Land Ownership

Land ownership in the treatable landscape is highly varied with types of owners including private owners, state agencies, special districts, counties, non-profit organizations, and cities. The amount of land owned by individual entities within the treatable landscape ranges from less than one acre to hundreds of thousands of acres. The majority of the land within the treatable landscape is in private ownership.

Table 3.12-1 Land Ownership in the Treatable Landscape

Types of Owner	Amount of Land (acres)	Proportion of the Treatable Landscape
Private Owners	18,674,650	92%
State Agencies	805,950	4%
Special Districts	255,340	1%
Counties	196,320	1%
Non-profit Organizations	194,300	1%
Cities	173,440	1%
Total Area	**20,300,000**	**100%**

Source: Compiled by Ascent Environmental in 2019 based on CAL FIRE data

<u>State Agencies</u>

There are 18 state agencies, including California State Parks (CSP), California Department of Fish and Wildlife (CDFW), California State Lands Commission (CSLC), and CAL FIRE, that own land within the treatable landscape. CSP lands include state parks, state recreation areas, state historical monuments, state historic parks, state vehicular recreation areas, and state natural reserves. CDFW lands include ecological reserves and wildlife areas throughout the state, which are managed for conservation purposes. CSLC lands include "school lands" (lands located throughout the state that Congress granted to California in 1853 to benefit public education); and the beds of California's navigable rivers, lakes, streams, tidelands, and associated natural resources under its jurisdiction. CAL FIRE lands in the treatable landscape include Demonstration State Forests. These forests are used for timber harvesting, forest management research and demonstration projects, public recreation, fish and wildlife habitat, and watershed protection. Refer to Section 3.14, "Recreation," for additional description of CSP and CDFW lands in the treatable landscape.

Special Districts

Within the treatable landscape, 131 special districts own 1 percent of the land. The types of special districts include open space, park, recreation, utility, irrigation, water, sanitation, and community services districts. The special districts that own the largest areas include East Bay Regional Park District, Midpeninsula Regional Open Space District, East Bay Municipal Utility District, Mountains Recreation and Conservation Authority, and Vista Irrigation District.

Non-profit Organizations

The treatable landscape encompasses land owned by 81 non-profit organizations. These lands are within preserves, reserves, conservancies, and land trusts. These lands are managed for a variety of uses, including protection and preservation of open space, wildlife habitat, watersheds, and other important natural and scenic features; retaining public access for education or recreation opportunities; preserving farmland; and conducting research.

Cities and Counties

Within the treatable landscape, 131 cities and 43 counties collectively own 2 percent of the land. Some of the cities (or city agencies) that own the largest areas include San Diego, Santa Barbara, Santa Cruz, Santa Clarita, and the City of Los Angeles' Department of Water and Power. Counties (or county agencies) that own the largest areas include City and County of San Francisco's Public Utilities Commission, Santa Clara County Parks and Recreation Department, San Diego County, Orange County, and Riverside County.

Coastal Zone

A portion of the treatable landscape is located within the coastal zone, which was established in the Coastal Act and is in the jurisdictional boundary of the Coastal Commission. The Coastal Act is further discussed under Section 3.12.2, "Regulatory Setting," below. The majority of the treatable landscape within the coastal zone falls within areas that are covered by Local Coastal Programs (LCPs), which are developed and implemented by local jurisdictions (see Table 3.12-2). For the purposes of compliance with the Coastal Act, areas outside of LCPs are under the jurisdiction of the Coastal Commission.

Table 3.12-2 Areas of the Treatable Landscape within the Coastal Zone

Coastal Zone Management	Amount of Land (acres)	Number of LCPs
Local Coastal Programs	528,810	54
Coastal Commission	13,360	NA
Total	**542,170**	**54**

Note: NA = not applicable

Source: Compiled by Ascent Environmental in 2019 based on CAL FIRE and Coastal Commission data

Land Use Planning and Wildfires

Treatments occur within the treatable landscape in areas governed by various city and county land use plans and ordinances. As described in Chapter 1, "Introduction" and Section 2.3.1, "Past and Current Treatments," vegetation treatment currently occurs around the state under several other wildfire risk reduction programs implemented by various federal, state, and local agencies. In 2017–2018, CAL FIRE treated approximately 33,000 acres in California using the same treatment activities as proposed under the CalVTP.

CAL FIRE maps Fire Hazard Severity Zones (FHSZs) based on defined factors (e.g., fuel, slope, and fire weather) with varying degrees of fire hazard (i.e., moderate, high, and very high). While FHSZ zones do not predict when or where a wildfire will occur, they do identify areas where wildfire hazards could be more severe and, therefore, are of greater concern. FHSZs are meant to help limit wildfire damage to structures through planning, prevention, and mitigation activities or requirements that reduce risk (CAL FIRE 2018). FHSZs are mapped for SRAs, local responsibility areas, and federal responsibility areas.

The FHSZs are used to designate areas where California's wildland urban interface building codes apply to new buildings. They can be a factor in real estate disclosure and local governments consider fire hazard severity in the safety elements of their general plans. CAL FIRE has released their recommendations for very high FHSZ maps in LRAs. Government Code Section 51179 requires every local agency to designate, by ordinance, very high fire hazard severity zones in its jurisdiction within 120 days of receiving recommendations from CAL FIRE pursuant to subdivisions (b) and (c) of Section 51178. A local agency shall be exempt from this requirement if ordinances of the local agency, adopted on or before December 31, 1992, impose standards that are equivalent to, or more restrictive than, the standards imposed by this chapter. Adoption of the very high FHSZ designations in LRAs by the local jurisdiction will impose requirements for new buildings to be constructed of fire-resistant building materials as described in Chapter 7A of the California Building Code. Currently, there are 189 cities and 35 counties with very high FHSZ in the LRA; however, CAL FIRE does not have a current list of local agencies that have adopted ordinances establishing Very High Fire Hazard Severity zones within their boundaries (CAL FIRE 2018, 2019).

The CAL FIRE Land Use Planning Program also engages with city and county planning and development departments to improve comprehensive fire hazard planning through general plan safety elements and other plans. Where city or county general plans cover lands within the SRA, the safety elements of those general plans must address the risk of fire for land classified as SRA and land classified as very high FHSZs. CAL FIRE's review shall consider the advice included in the Office of Planning and Research's most recent publication of "Fire Hazard Planning, General Plan Technical Advice Series" and other fire hazard-related topics as identified in California Government Code Section 65302(g)(3). Additionally, development in SRA, very high FHSZs, or wildland-urban interface fire area must also comply with applicable buildings codes included in Chapter 7A, Materials and Construction Methods for Exterior Wildfire Exposure, of the California Building Code. Refer to Section 1.3 in Chapter 1, "Introduction," for additional information about land use planning programs intended to reduce wildfire risk.

Community Wildfire Protection Plans

Communities at risk from wildland fire can develop Community Wildfire Protection Plans (CWPP) to plan how they will reduce wildfire risk. CAL FIRE Units or Contract Counties prepare Fire Management Plans/Strategic Fire Plans (Unit Fire Plans), which also function as CWPPs. CWPPs must identify and prioritize areas for hazardous fuel reduction treatments across the landscape and jurisdictional boundaries and recommend the methods of treatment that will protect at-risk communities and structures. A CWPP must also recommend measures that homeowners can take to reduce the ignitability of structures throughout the area addressed by the plan. Preparation of CWPPs is a collaborative process that can include local, state, and federal agencies; local fire districts; and other interested parties. The local county, local fire district, and CAL FIRE must sign off on the final CWPP document. Qualifying projects under the CalVTP may be identified in CWPPs.

POPULATION AND HOUSING

Population

The existing and projected population for California and counties in the treatable landscape (i.e., all counties except San Francisco and Sutter, which do not contain SRA land) are provided in Table 3.12-3. Over the next 40 years, the state's population is expected to grow by 28 percent. Seven counties are anticipated to grow by over 50 percent, including Imperial County in the south; Kern, Madera, Merced, San Joaquin, and Yolo Counties in the central valley; and Placer County spanning from the central valley into the Sierra Nevada.

Table 3.12-3 Existing and Projected Population for California and Counties in the Treatable Landscape

Population	2018	Projections					Population Growth (2018 – 2060)
		2020	2030	2040	2050	2060	
California	39,809,693	40,639,392	43,939,250	46,804,202	49,077,801	50,975,904	28%
Alameda County	1,660,202	1,703,660	1,873,622	2,027,328	2,154,848	2,260,737	36%
Alpine County	1,154	1,107	1,134	1,145	1,085	1,031	-11%
Amador County	38,094	37,560	39,917	41,502	42,494	44,028	16%
Butte County	227,621	230,701	247,331	263,634	277,504	292,884	29%
Calaveras County	45,157	44,953	46,920	48,033	48,566	50,259	11%
Colusa County	22,098	23,144	24,948	26,419	27,450	28,594	29%
Contra Costa County	1,149,363	1,178,639	1,309,118	1,420,595	1,500,541	1,563,465	36%
Del Norte County	27,221	26,997	27,570	28,104	28,568	29,345	8%
El Dorado County	188,399	189,576	206,010	222,972	235,323	250,957	33%
Fresno County	1,007,229	1,033,095	1,145,673	1,256,599	1,358,990	1,457,732	45%
Glenn County	28,796	29,691	31,600	33,267	34,363	35,395	23%
Humboldt County	136,002	137,711	140,779	141,236	140,471	139,767	3%
Imperial County	190,624	195,814	219,733	243,249	266,693	289,380	52%
Inyo County	18,577	18,724	19,118	19,259	19,075	18,763	1%
Kern County	905,801	930,885	1,068,729	1,214,656	1,351,803	1,489,326	64%
Kings County	151,662	154,549	170,251	187,194	202,906	217,204	43%
Lake County	65,081	65,302	67,536	70,093	72,833	76,695	18%
Lassen County	30,911	30,626	30,157	29,117	27,941	26,999	-13%
Los Angeles County	10,283,729	10,435,036	10,868,614	11,144,846	11,257,873	11,234,711	9%
Madera County	158,894	162,990	186,937	212,405	237,292	262,241	65%
Marin County	263,886	265,152	272,375	277,087	275,467	271,601	3%
Mariposa County	18,129	18,031	18,419	18,761	19,050	19,593	8%
Mendocino County	89,299	90,175	93,452	95,124	95,403	96,164	8%
Merced County	279,977	286,746	326,923	369,542	410,444	452,868	62%
Modoc County	9,612	9,422	9,267	9,061	8,746	8,587	-11%
Mono County	13,822	13,986	14,663	14,991	14,749	14,150	2%
Monterey County	443,281	454,599	489,001	518,441	538,908	552,239	25%
Napa County	141,294	143,800	152,833	160,521	165,360	169,134	20%
Nevada County	99,155	99,548	105,318	111,007	115,407	123,265	24%
Orange County	3,221,103	3,260,012	3,433,510	3,558,071	3,615,935	3,616,576	12%
Placer County	389,532	397,368	454,801	508,439	552,359	594,978	53%
Plumas County	19,773	19,374	19,069	18,413	17,652	17,585	-11%
Riverside County	2,415,955	2,500,975	2,857,496	3,159,599	3,400,372	3,596,588	49%
Sacramento County	1,529,501	1,572,886	1,757,616	1,936,861	2,100,156	2,257,413	48%
San Benito County	57,088	60,067	66,693	73,432	79,107	84,370	48%
San Bernardino County	2,174,938	2,230,602	2,478,888	2,730,966	2,976,804	3,232,412	49%
San Diego County	3,337,456	3,398,672	3,631,155	3,822,756	3,989,654	4,129,358	24%
San Joaquin County	758,744	782,662	894,330	995,469	1,078,992	1,149,124	51%
San Luis Obispo County	280,101	284,126	300,033	308,077	307,134	305,391	9%

Table 3.12-3 Existing and Projected Population for California and Counties in the Treatable Landscape

Population	2018	Projections					Population Growth (2018 – 2060)
		2020	2030	2040	2050	2060	
San Mateo County	774,155	792,271	844,778	884,198	913,131	936,154	21%
Santa Barbara County	453,457	460,444	491,023	514,691	529,780	539,036	19%
Santa Clara County	1,956,598	2,011,436	2,223,743	2,436,897	2,633,652	2,804,044	43%
Santa Cruz County	276,864	282,627	301,494	315,659	325,799	335,767	21%
Shasta County	178,271	180,198	188,989	196,798	202,959	210,156	18%
Sierra County	3,207	3,129	3,087	2,980	2,894	2,905	-9%
Siskiyou County	44,612	44,186	44,406	44,253	43,938	44,868	1%
Solano County	439,793	453,784	507,219	554,668	593,854	631,028	43%
Sonoma County	503,332	515,486	554,694	583,517	597,749	608,250	21%
Stanislaus County	555,624	572,000	638,840	699,022	747,188	787,145	42%
Tehama County	64,039	65,119	68,985	72,840	76,464	80,732	26%
Trinity County	13,635	13,389	13,322	13,232	13,319	14,151	4%
Tulare County	475,834	487,733	540,580	593,788	638,917	678,607	43%
Tuolumne County	54,740	53,976	54,801	55,400	55,534	56,595	3%
Ventura County	859,073	869,486	919,527	959,354	977,265	982,080	14%
Yolo County	221,270	229,023	261,715	295,954	330,480	365,070	65%
Yuba County	74,727	79,087	86,718	93,304	98,341	102,221	37%

Source: DOF 2018a, 2018b

Housing

The housing characteristics for California and counties in the treatable landscape (i.e., all counties except San Francisco and Sutter, which do not contain SRA land) are provided in Table 3.12-4. Counties with the highest vacancy rates are generally those in more rural areas, such as in the Sierra Nevada mountains and in the northern portion of the state. Counties with the lowest vacancy rates are generally those within the metropolitan areas of the state, including the San Francisco bay area, Sacramento area, and the coastal area that stretches from Santa Barbara to San Diego Counties. The central valley counties of Fresno, Merced, and Kings also have vacancy rates lower than that of the state.

Table 3.12-4 Housing Characteristics for California and Counties in the Treatable Landscape

Geographic Area	Total	Vacant Units	Vacancy Rate	Geographic Area	Total	Vacant Units	Vacancy Rate
California	14,157,590	1,043,750	7.4%				
Alameda	602,047	24,924	4.1%	Orange	1,094,169	56,996	5.2%
Alpine	1,778	1,301	73.2%	Placer	164,820	20,746	12.6%
Amador	18,221	3,536	19.4%	Plumas	15,850	7,280	45.9%
Butte	99,353	8,391	8.4%	Riverside	840,904	110,984	13.2%
Calaveras	28,074	9,784	34.9%	Sacramento	570,305	33,249	5.8%
Colusa	8,151	840	10.3%	San Benito	18,935	1,105	5.8%
Contra Costa	413,923	21,738	5.3%	San Bernardino	719,911	75,664	10.5%
Del Norte	11,322	1,579	13.9%	San Diego	1,210,138	70,487	5.8%
El Dorado	91,745	17,480	19.1%	San Joaquin	243,420	15,220	6.3%

Table 3.12-4 Housing Characteristics for California and Counties in the Treatable Landscape

Geographic Area	Total	Vacant Units	Vacancy Rate	Geographic Area	Total	Vacant Units	Vacancy Rate
Fresno	332,051	23,782	7.2%	San Luis Obispo	121,661	14,405	11.8%
Glenn	11,170	1,072	9.6%	San Mateo	278,044	13,033	4.7%
Humboldt	62,870	5,931	9.4%	Santa Barbara	158,622	9,757	6.2%
Imperial	57,737	7,646	13.2%	Santa Clara	667,970	25,877	3.9%
Inyo	9,522	1,428	15.0%	Santa Cruz	105,646	8,786	8.3%
Kern	298,301	28,077	9.4%	Shasta	78,745	6,414	8.1%
Kings	46,170	2,293	5.0%	Sierra	2,345	951	40.6%
Lake	34,560	9,966	28.8%	Siskiyou	24,185	4,816	19.9%
Lassen	12,756	3,125	24.5%	Solano	158,786	10,108	6.4%
Los Angeles	3,546,853	208,195	5.9%	Sonoma	203,579	16,903	8.3%
Madera	50,315	5,098	10.1%	Stanislaus	181,916	12,884	7.1%
Marin	112,293	7,702	6.9%	Sutter	34,363	2,154	6.3%
Mariposa	10,449	2,650	25.4%	Tehama	27,636	2,989	10.8%
Mendocino	40,560	5,243	12.9%	Trinity	8,892	2,898	32.6%
Merced	85,927	5,883	6.8%	Tulare	149,342	11,528	7.7%
Modoc	5,268	1,409	26.7%	Tuolumne	31,573	9,384	29.7%
Mono	14,061	8,414	59.8%	Ventura	288,579	14,907	5.2%
Monterey	140,330	13,991	10.0%	Yolo	77,138	3,509	4.5%
Napa	55,157	5,876	10.7%	Yuba	28,324	2,367	8.4%
Nevada	53,745	12,098	22.5%				
Source: DOF 2018c							

Employment

The housing characteristics for California and counties in the treatable landscape (i.e., all counties except San Francisco and Sutter, which do not contain SRA land) are provided in Table 3.12-5. The statewide unemployment rate is 4.8 percent. The unemployment rate for individual counties in California ranges between 2.7 percent in San Mateo County to 19.1 percent in Imperial County. Over half of the counties in the state have unemployment rates that exceed the statewide unemployment rate.

Table 3.12-5 Unemployment for California and Counties in the Treatable Landscape

Geographic Area	Unemployment	Rate	Geographic Area	Unemployment	Rate
California	918,900	4.8%			
Alameda County	30,900	3.6%	Orange County	56,600	3.5%
Alpine County	30	6.1%	Placer County	7,000	3.8%
Amador County	720	4.9%	Plumas County	690	8.9%
Butte County	5,900	5.7%	Riverside County	56,300	5.2%
Calaveras County	1,000	4.7%	Sacramento County	32,600	4.6%
Colusa County	1,540	14.3%	San Benito County	1,800	5.9%
Contra Costa County	21,400	3.8%	San Bernardino County	46,600	4.9%

Table 3.12-5 Unemployment for California and Counties in the Treatable Landscape

Geographic Area	Unemployment	Rate	Geographic Area	Unemployment	Rate
Del Norte County	630	6.4%	San Diego County	63,500	4.0%
El Dorado County	3,900	4.4%	San Joaquin County	2,260	7.0%
Fresno County	38,100	8.5%	San Luis Obispo County	5,100	3.6%
Glenn County	960	7.5%	San Mateo County	12,100	2.7%
Humboldt County	2,640	4.2%	Santa Barbara County	9,700	4.5%
Imperial County	14,100	19.1%	Santa Clara County	33,400	3.2%
Inyo County	380	4.4%	Santa Cruz County	8,200	5.7%
Kern County	35,400	9.2%	Shasta County	4,300	5.8%
Kings County	5,100	8.9%	Sierra County	80	6.5%
Lake County	1,710	5.7%	Siskiyou County	1,300	7.2%
Lassen County	560	5.6%	Solano County	9,900	4.8%
Los Angeles County	240,300	4.7%	Sonoma County	8,800	3.4%
Madera County	4,900	8.1%	Stanislaus County	18,200	7.5%
Marin County	4,000	2.9%	Sutter County	3,900	8.7%
Mariposa County	450	5.9%	Tehama County	1,630	6.4%
Mendocino County	1,790	4.5%	Trinity County	300	6.0%
Merced County	10,800	9.3%	Tulare County	21,400	10.4%
Modoc County	260	8.0%	Tuolumne County	1,160	5.4%
Mono County	380	4.4%	Ventura County	19,100	4.5%
Monterey County	15,800	7.2%	Yolo County	5,400	5.0%
Napa County	2,700	3.7%	Yuba County	2,100	7.5%
Nevada County	2,000	4.1%			

Source: EDD 2018

3.12.2 Regulatory Setting

LAND USE AND PLANNING

Federal

No federal laws or regulations related to land use and planning are applicable to the project.

State

California State Parks General Plans

A State Park general plan is the primary management document for a CSP unit, defining a framework for resource stewardship, interpretation, facilities, visitor use, and operations. General plans define an ultimate purpose, vision, and intent for unit management through goal statements, guidelines, and broad objectives, but stop short of defining specific objectives, methodologies, designs, and timelines on how and when to accomplish these goals. The general plans also include guidelines to address public safety issues that are related to the issues and conditions that exist in each park unit. Guidelines do not replicate

District Superintendents may develop or cause to be developed any number of management plans for units as needed or directed by the general plan for the unit. This includes, but is not limited to, wildfire management plans, area development plans, interpretation management plans, roads and trails plans, and vegetation management plans. In developing goals and guidelines for a general plan, current CSP policies that apply to units statewide are generally not included, other than to reference their source and application to future park management. For example, CSP Department Operations Manual includes policies that guide the development and implementation of fire management programs in state parks, which involves involve pre-fire planning, fuel (vegetation) management, public safety measures, fire control support, post-fire evaluation and rehabilitation.

California Department of Fish and Wildlife Land Management Plans

Per Section 1019 of the Fish and Game Code, CDFW must draft Land Management Plans (LMPs) for any property wholly under its jurisdiction, such as wildlife areas and ecological reserves. LMPs include:

- Inventories of fish, wildlife, and native plant habitats;
- Guidance for management of habitats, species, and programs to protect and enhance native wildlife for their ecological value and enjoyment by the public;
- Guidance for public uses;
- Operation, maintenance, and personnel requirements to implement management goals; and
- Environmental documentation necessary for compliance with state and federal statutes and regulations.

Individual LMPs may also include goals related to wildfire management and coordination with CAL FIRE and other fire protection agencies.

California Coastal Act

The Coastal Act (PRC Section 30000 et seq.) includes specific policies that address issues such as shoreline public access and recreation, lower cost visitor accommodations, terrestrial and marine habitat protection, visual resources, landform alteration, agricultural lands, commercial fisheries, water quality, transportation, development design, and public works. The Coastal Commission partners with local municipalities, such as such as cities and counties, to plan and regulate the use of land and water in the coastal zone. Development within the coastal zone would require a coastal permit from the Coastal Commission or from the local jurisdiction if the activity is within an LCP. “Development” is defined by the Coastal Act (PRC Section 30106) as follows:

> “Development” means, on land, in or under water, the placement or erection of any solid material or structure; discharge or disposal of any dredged material or of any gaseous, liquid, solid, or thermal waste; grading, removing, dredging, mining, or extraction of any materials; change in the density or intensity of use of land, including, but not limited to, subdivision pursuant to the Subdivision Map Act (commencing with Section 66410 of the Government Code), and any other division of land, including lot splits, except where the land division is brought about in connection with the purchase of such land by a public agency for public recreational use; change in the intensity of use of water, or of access thereto; construction, reconstruction, demolition, or alteration of the size of any structure, including any facility of any private, public, or municipal utility; and the removal or harvesting of major vegetation other than for agricultural purposes, kelp harvesting, and timber operations which are in accordance with a timber harvesting plan submitted pursuant to the provisions of the Z’berg-Nejedly Forest Practice Act of 1973 (commencing with Section 4511).
>
> As used in this section, “structure” includes, but is not limited to, any building, road, pipe, flume, conduit, siphon, aqueduct, telephone line, and electrical power transmission and distribution line.

According to Coastal Commission staff, the CalVTP treatment activities are considered development under the Coastal Act and would be required to obtain a coastal development permit for any future activities that would occur within the coastal zone.

Local

When state agencies, including CAL FIRE, are conducting governmental activities under the authority of state law or the State Constitution, in this case, treatments implemented under the proposed CalVTP, they are exempt from local government plans, policies, and ordinances (unless a constitutional provision or statute directs otherwise). Nonetheless, CAL FIRE voluntarily seeks to operate consistently with local governance to the extent feasible. Given its statewide extent and the possible number of local and regional responsible agencies, this PEIR does not identify potentially applicable local government plans, policies, and ordinances. Types of local regulations relevant to land use and planning include general plans and local coastal programs, which are described below. This PEIR assumes that any vegetation treatments proposed by local or regional agencies under the CalVTP would be consistent with local plans, policies, and ordinances, as required by SPR AD-3.

City and County General Plans

California Government Code (Government Code) Section 65300 et seq. establishes the obligation of cities and counties to adopt and implement general plans. A general plan is a comprehensive, long-term document that describes plans for the physical development of a city or county and of any land outside its boundaries that, in the city's or county's judgment, bears relation to its planning. A general plan addresses a broad range of topics, including, at a minimum, land use, circulation, housing, conservation, open space, noise, and safety (and, going forward, environmental justice). In addressing these topics, a general plan typically identifies the goals, objectives, policies, principles, standards, and plan proposals that support the city's or county's vision for the area. A general plan is a long-range document that typically addresses the land use, development policies, and desired resource characteristics of a jurisdiction over a 20-year period or longer (though housing elements must be updated every eight years). General plans are required to include a safety element for the protection of the community from a number of risks, including wildland fires.

Senate Bill 379, Statutes of 2015, added a requirement for safety elements of general plans to address climate adaptation and resiliency. On or after January 1, 2017, or beginning on January 1, 2022 for jurisdictions that have not yet adopted a local hazard mitigation plan, the safety element shall address climate adaptation and resiliency strategies, which includes how climate change may affect risks related to wildfires. These requirements are included in Government Code Section 65302(g)(4). A vulnerability assessment must be prepared that identifies the risks that climate change poses to the local jurisdiction, including how climate change may affect risks related to wildfire. The safety element must also include a set of adaptation and resilience goals, policies, objectives, and implementation measures that are developed for the protection of the community related to climate change risks, such as increased risk of wildfire exacerbated by climate change.

The Planning and Zoning Law (Chapter 4 of Division 1 ["Planning and Zoning Law"] of Title 7 ["Planning and Land Use"] of the Government Code) establishes that zoning ordinances, which are laws that define allowable land uses in a specific zone district, are generally required to be consistent with the applicable general plan and any applicable specific plans. Zoning ordinances generally also set forth standards for development of land, use of hazardous materials, and noise generation.

The treatable landscape covers land owned by local jurisdictions, special districts, non-profit-organizations, and private landowners in multiple counties with multiple cities. Each of these counties and cities has local regulations and general plans with unique goals and policies related to land use and planning.

Local Coastal Programs

LCPs are developed by local governments and set forth goals, objectives, and policies that govern the use of land and water in the coastal zone consistent with Chapter 3 of the California Coastal Act of 1976. LCPs contain coastal resources planning and management policies that address public access, recreation, marine environment, land resources, development, and industrial development. They must also address coastal hazards, including minimizing risks to life and property in areas of high fire hazards, by providing for solutions that have the least impacts on coastal resources.

LCPs specify appropriate location, type, and scale of new or changed uses of land and water. Each LCP includes a land use plan and measures to implement the plan (such as zoning ordinances). Prepared by local government, these programs govern decisions that determine the short- and long-term conservation and use of coastal resources.

After an LCP has been finally approved, the Commission's coastal permitting authority over most new development is transferred to the local government, which applies the requirements of the LCP in reviewing proposed new developments. The Coastal Commission retains permanent coastal permit jurisdiction over development proposed on tidelands, submerged lands, and public trust lands. The Coastal Commission also acts on appeals from certain local government coastal permit decisions, such as approvals of Coastal Development Permits.

POPULATION AND HOUSING

Federal

No federal laws or regulations related to population and housing are applicable to the project.

State

California Housing Element Law

The California Department of Housing and Community Development (HCD) implements the California Housing Element Law, enacted in 1969. HCD is responsible for reviewing local government housing elements for compliance with state law and providing written comments to local governments. HCD determines the regional housing need for each county and allocates funding to meet this need to the council of government for distribution to its jurisdictions. The regional housing need is informed by population projections developed by the California Department of Finance. Other factors, including economic conditions and regional housing markets, are also considered in developing the regional housing needs. HCD also oversees distribution of funding related to the regional housing need by the council of governments to the local governments to ensure that funds are appropriately allocated.

Local

A description of the applicability of and compliance with local regulations for CalVTP is provided above under "Land Use and Planning."

The following describes only those regional governmental agencies with plans and policies pertaining to socioeconomic resources applicable to the areas within the treatable landscape.

Councils of Government

Councils of Government (COGs) throughout the state act as area-wide planning agencies, assisting local governments with multijurisdictional issues such as air quality, transportation, water quality, energy, land use, greenhouse gases, and housing. COGs operate either under a joint powers authority or a memorandum of understanding with the member agencies and can conduct a range of duties as directed by their member agencies, including regional review of environmentally significant projects per CEQA; area-wide clearinghouse for review of federal financial assistance; regional housing needs assessment; modeling and programming; and general planning support and technical assistance. Although many COGs are formed to focus on transportation planning and programming, some COGs are tasked by their local governments to address homelessness, water infrastructure, energy efficiency, earthquake safety, and more.

Under California housing law, the HCD is responsible for estimating the relative share of California's projected population growth that will reside in each county in the state based on California Department of Finance population projections and historical growth trends. Based upon the projected growth in the number of households in each COG region, the HCD calculates the number of additional units needed during that period. In turn, each COG is required by state law to determine the portion of funding for regional housing to be allocated to each jurisdiction within the region.

<u>General Plan Housing Elements</u>

In accordance with state law, each local municipality general plan's housing element must be consistent and compatible with other general plan elements. Additionally, housing elements must provide clear policy and direction for making decisions pertaining to zoning, subdivision approval, housing allocations, and capital improvements. State law (Government Code Sections 65580–65589.8) mandates the contents of housing elements. By law, a housing element must contain:

- An assessment of housing needs and an inventory of resources and constraints relevant to meeting those needs (Government Code Section 65583(a)),
- A statement of the community's goals, quantified objectives, and policies relevant to the maintenance, preservation, improvement, and development of housing (Government Code Section 65583(b)),
- A program which sets forth a schedule of actions during the planning period, each with a timeline for implementation, which the local government is undertaking or intends to undertake to implement the policies and achieve the goals and objectives of the housing element, and
- The land use and development controls, regulatory concessions and incentives, appropriate federal and state financing and subsidy programs, and low- and moderate-income housing fund of the agency if the locality has established a redevelopment project area pursuant to the Community Redevelopment Law (Division 24 [commencing with Section 33000] of the Health and Safety Code) to support implementation of the programs identified in the housing element. (Government Code Section 65583(c).)

A housing element must identify existing and projected housing needs and establish goals, policies, objectives, and programs for the preservation, improvement, and development of housing to meet the needs of all economic sectors of a community. Its purpose is to provide an assessment of both current and future housing needs and the constraints in meeting those needs; it must also provide a strategy to establish local housing goals and policies and set forth programs to accomplish those goals and policies.

3.12.3 Impact Analysis and Mitigation Measures

ANALYSIS METHODOLOGY

The analysis of environmental impacts on land use and population focuses on the potential for the physical division of an established community; significant environmental impacts due to conflicts with a land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect; inducing substantial unplanned population growth; and displacing substantial numbers of people or housing. Qualitative methods were used to assess the impact of vegetation treatment activities related to land use and planning and population and housing. Potential impacts were assessed based on the activities, methods, and techniques for implementing the proposed CalVTP. Significance determinations account for the influence of relevant SPRs, which are incorporated into treatment design and listed below.

- **SPR AD-3 Consistency with Local Plans, Policies, and Ordinances**: The project proponent will design and implement the treatment in a manner that is consistent with applicable local plans (e.g., general plans), policies, and ordinances to the extent the project is subject to them. This SPR applies to all treatment activities and treatment types.

THRESHOLDS OF SIGNIFICANCE

Thresholds of significance are based on Appendix G of the State CEQA Guidelines. A treatment implemented under the proposed CalVTP would result in a significant impact related to land use and planning and population and housing if it would:

- physically divide an established community;

- cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect;
- induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure); or
- displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere.

ISSUES NOT EVALUATED FURTHER

Wildland-urban interface (WUI) fuel reduction treatments would be implemented in areas near development in communities and cities to reduce wildfire risk. Fuel breaks would be established typically along prominent topographic features (e.g., ridgelines) and existing roadways. Ecological restoration would be implemented outside of the WUI in order to restore ecosystem processes, conditions, and resiliency. These treatment types could be located near communities and cities; however, they would not result in construction of physical barriers that would change the connectivity between portions of a community or city. The nature of these treatment types would not result in the physical division of an established community. Similarly, for the reasons described above, the nature of proposed CalVTP treatments would also not displace people or housing, necessitating the construction of replacement housing elsewhere. These issues are not evaluated further.

IMPACT ANALYSIS

Impact LU-1: Cause a Significant Environmental Impact Due to a Conflict with a Land Use Plan, Policy, or Regulation

The proposed CalVTP would implement vegetation treatment on lands owned and managed by various entities, including state agencies, private owners, special districts, non-profit organizations, cities, and counties. For projects on state lands, a land management agency would develop the project consistent with its land management plan. For projects subject to local plans, policies, or regulations, CAL FIRE would voluntarily seek to operate consistently with local governance to the extent feasible. In general, all project proponents will design and implement treatments in a manner that is consistent with applicable local plans (e.g., general plans), policies, and ordinances to the extent the project is subject to them, as required SPR AD-3. Furthermore, the environmental impacts of the proposed CalVTP are addressed throughout this PEIR and mitigation is identified to reduce significant effects, thereby avoiding a conflict with a land use plan, policy, or regulation that was adopted for the purpose of avoiding or mitigating an environmental effect. This impact would be **less than significant**.

The proposed CalVTP would implement treatment activities on lands owned and managed by various entities, including state agencies, private owners, special districts, non-profit organizations, cities, and counties. Treatment activities on state-owned and -managed lands would be subject to plans that have been adopted by the subject agency, including general plans for state parks and land management plans for CDFW wildlife areas and ecological reserves. Treatment activities on lands owned or managed by private owners, special districts, non-profit organizations, cities, and counties are generally required to comply with applicable city and county general plans and other local policies and ordinances. Treatments on land within the coastal zone are subject to the requirements of the Coastal Act and associated LCPs.

For projects on state lands, the implementing state agency (project proponent) would be involved in designing the project; therefore, it is assumed that the treatment project would inherently be consistent with its land management plan (e.g., general plan, land management plan). As described above under "Local" in Section 3.12.2, "Regulatory Setting," qualifying treatments implemented by CAL FIRE or other state agency under the proposed CalVTP are exempt from compliance with local government plans, policies, and ordinances (unless a constitutional provision or statute directs otherwise). However, CAL FIRE would voluntarily seek to operate consistently with local governance to the extent feasible, which is demonstrated through incorporation of SPR AD-3, which requires project proponents to design and implement treatment activities in a manner that is consistent with applicable local plans (e.g., general plans), policies, and ordinances to the extent the project is subject to them.

Treatments implemented under the CalVTP on land located within the coastal zone are subject to the California Coastal Act. According to California Coastal Commission staff, the CalVTP treatment activities are typically considered development under the Coastal Act, because they can result in the removal of major vegetation for purpose other than agricultural use in accordance with PRC Section 30106. As a result, they would generally be required to obtain a coastal development permit for any treatment activities that would occur within the coastal zone. Applicable measures would be determined on a project-level, site-specific basis through the coastal development permit process. Coastal development permits are issued by the California Coastal Commission or from the local agency that has coastal permitting authority in an LCP.

As described above, when designing treatments, project proponents would be required to review consistency with local plans, policies, and ordinances. The potential environmental impacts that could result from implementation of the proposed CalVTP are assessed throughout this PEIR and mitigation is identified to reduce significant impacts; thus, this PEIR addresses, to the extent applicable to the proposed CalVTP, potentially significant impacts for which a land use plan, policy, or regulation was developed to avoid or mitigate. Additionally, project proponents would be required to complete a project-specific analysis (PSA, see Appendix PD-3, "Project-Specific Analysis") that would evaluate the proposed treatment to determine whether the activity(ies) and environmental effects are addressed within the scope of this PEIR, consistent with Section 15168 of the State CEQA Guidelines for later activities consistent with a program and its PEIR. The PSA requires the project proponent to determine that all applicable SPRs and mitigation measures identified in the CalVTP PEIR have been incorporated into the project, and whether additional mitigation would be necessary.

Treatments under the CalVTP on state-owned and -managed lands would be developed to be consistent with applicable state plans; treatment activities that are within the jurisdiction of local governments would adhere to SPR AD-3 that would require consistency with local plans, policies, and ordinances to the extent the project is subject to them. Treatment activities that would occur within the coastal zone would be required to comply with the California Coastal Act, including obtaining a coastal development permit, when necessary. Applicable measures to avoid or reduce potential impacts or inconsistencies related to the Coastal Act would be determined on a project-level, site-specific basis. Further, the environmental impacts of the proposed CalVTP are evaluated throughout this PEIR; SPRs and mitigation measures are identified to avoid or reduce impacts and ensure consistency with land use plans, policies, or regulations pertinent to resources considered in this PEIR and adopted for the purpose of avoiding or mitigating effects to these resources. For these reasons, implementation of the proposed CalVTP would not cause a significant environmental impact due to a conflict with a land use plan, policy, or regulation. This impact would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

Impact LU-2: Induce Substantial Unplanned Population Growth

The increase in the pace and scale of vegetation treatments under the proposed CalVTP would result in additional demand for employees to implement treatments across the state within and near the treatable landscape. Implementation of the proposed CalVTP would result in an average of approximately five additional employees within each CAL FIRE unit (21 units). Other state agencies, such as CSP and CDFW, could also generate demand for some additional employees, although at a lower rate than the employment increase anticipated for CAL FIRE. Other project proponents may employ or contract workers permanently or seasonally to perform treatments. The increase in employee demand would be spread throughout the state and there would not be any specific areas that would experience a substantial increase in demand for vegetation treatment employees. Thus, implementation of the proposed CalVTP would not induce substantial unplanned population growth in any one area to cause a need for new housing, roads, or infrastructure. This impact would be **less than significant**.

CAL FIRE currently employs an estimated 110 staff who implement vegetation treatment projects within the state. These employees are typically not dedicated solely to vegetation treatment and may work on other projects or tasks for CAL FIRE; however, achieving the identified treatment acreage target under the CalVTP would require dedicated vegetation treatment crews. Currently, the average crew size for treatments is 20 to 25 staff. With implementation of the proposed CalVTP, the amount of land that would be treated would increase from approximately 33,000 acres up to approximately 250,000 acres treated each year by 2024.

Vegetation treatments associated with CalVTP would be implemented by a number of different entities including the 21 CAL FIRE Units within the state, six contract counties; other state, regional, and local agencies with land management or ownership authority; and Fire Safe Councils or other non-governmental organizations. Staff for vegetation treatments are provided by these entities and others, including from Resource Conservation Districts (RCDs), California Conservation Corps (CCC), local fire districts, and local contractors.

The increase in pace and scale of vegetation treatments that would occur with implementation of CalVTP would increase the number of people employed across the state to conduct treatment activities. It is anticipated that the majority of employment demand, especially for project proponents other than CAL FIRE, would be seasonal. CAL FIRE estimates that the number of CAL FIRE employees implementing vegetation treatment projects could double and add approximately 110 new employees under the scenario where approximately 250,000 acres are treated per year. This would result in an average of five new employees within each CAL FIRE Unit. Privately owned land, which would be treated by CAL FIRE, accounts for 92 percent of the treatable landscape (see Table 3.12-1). Outside of privately-owned land in the treatable landscape, state agencies own approximately 50 percent of remaining acres in the treatable landscape. Because of the high proportion of state-owned land in the treatable landscape, state agencies, such as CSP and CDFW, could also demand new employees, but not to the extent of the demand identified for CAL FIRE.

Other demand could be met through increases in the number of CCC members and seasonal or permanent increases in local contractor crews, local fire districts, RCDs, and other state, regional, and local agency staff. The state currently has plans to expand CCC operations to include dedicated crews to treat vegetation to reduce wildfire risk (CCC 2019). The state also has allocated budget to expand and improve residential bed space for CCC members and includes plans for three new CCC residential centers and renovation of the Fortuna residential center. The state's plans to increase vegetation treatment staff capacity and residential capacity could meet the needs for additional vegetation treatment employees generated by the proposed CalVTP. Any new residential facilities would be required to undergo project-level environmental review to assess environmental effects.

For the purposes of this PEIR, an increase in permanent employment demand would also result in an increase in population growth. If the employment demand is not "planned" (i.e., accounted for in city or county general plans), it is considered unplanned. A substantial increase in unplanned population growth would likely necessitate the construction of housing or other infrastructure to support the population increase; this construction could cause physical environmental effects. Any new housing or infrastructure would be required to undergo project-level environmental review to assess environmental effects. Employee demand could be met by residents near treatment activities or could result in some people relocating to those areas where treatment activities would occur. However, because of the nature of the location of these entities (e.g., CAL FIRE Units, CCC crews, local contractor crews) and treatment activities within the state, implementation of the proposed CalVTP would not result in substantial demand for permanent employment in any one area. Thus, the increase in employment needs for CalVTP would not induce substantial unplanned population growth. Additionally, as indicated in Table 3.12-4, 37 of the 57 counties within the treatable landscape have higher vacancy rates than the statewide vacancy rate of 7.4 percent, which indicates there would be sufficient sources of existing housing to meet any additional demand.

As described above, the proposed CalVTP would increase employment demand across the state within and in the areas near the treatable landscape. However, because the increase in demand would be spread throughout the state there would not be specific areas that would experience a substantial increase in demand for vegetation treatment employees. It is expected that the demand could be met by new employees that are existing residents in the vicinity of where treatments would occur. The potential also exists for people to relocate to the area where there is a demand for vegetation treatment employees, but there would be sufficient housing to meet the housing demand associated with these new employees that may relocate from outside of an area. Thus, implementation of the proposed CalVTP would not induce substantial unplanned population increases in any one area to cause a need for new housing and other infrastructure. This impact would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

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3.13 NOISE

This section describes ambient-noise conditions, identifies applicable regulations related to noise and vibration, the methods used for assessment, and the potential direct and indirect impacts of program implementation related to noise. Additional data are provided in Appendix NOI-1, "Noise Measurement Data and Noise Modeling Calculations."

No comments received on the Notice of Preparation were related to noise and vibration (see Appendix A).

3.13.1 Environmental Setting

ACOUSTIC FUNDAMENTALS

The following provides background information about sound, noise, vibration, and common noise descriptors to give context to and a better understanding of the technical terms used throughout this section.

Sound, Noise, and Acoustics

Sound is the mechanical energy of a vibrating object transmitted by pressure waves through a liquid or gaseous medium (e.g., air) to a human ear. Noise is defined as loud, unexpected, annoying, or unwanted sound.

In the science of acoustics, the fundamental model consists of a sound (or noise) source, a receiver, and the propagation path between the two. The loudness of the noise source and obstructions or atmospheric factors affecting the propagation path to the receiver determines the sound level and characteristics of the noise perceived by the receiver. The field of acoustics deals primarily with the propagation and control of sound.

Frequency

Continuous sound can be described by frequency (pitch) and amplitude (loudness). A low-frequency sound is perceived as low in pitch. Frequency is expressed in terms of cycles per second, or hertz (Hz) (e.g., a frequency of 250 cycles per second is referred to as 250 Hz). High frequencies are sometimes more conveniently expressed in kilohertz (kHz), or thousands of hertz. The audible frequency range for humans is generally between 20 Hz and 20 kHz (20,000 Hz).

Sound Pressure Levels and Decibels

The amplitude of pressure waves generated by a sound source determines the loudness of that source. Sound pressure amplitude is measured in micro-Pascals (mPa). One mPa is approximately one hundred billionth (0.00000000001) of normal atmospheric pressure. Sound pressure amplitudes for different kinds of noise environments can range from less than 100 to 100,000,000 mPa. Because of this large range of values, sound is rarely expressed in terms of mPa. Instead, a logarithmic scale is used to describe sound pressure level (SPL) in terms of decibels (dB).

Addition of Decibels

Because decibels are logarithmic units, SPLs cannot be added or subtracted through ordinary arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3-dB increase. In other words, when two identical sources are each producing sound of the same loudness at the same time, the resulting sound level at a given distance would be 3 dB higher than if only one of the sound sources was producing sound under the same conditions. For example, if one idling truck generates an SPL of 70 dB, two trucks idling simultaneously would not produce 140 dB; rather, they would combine to produce 73 dB. Under the decibel scale, three sources of equal loudness together produce a sound level approximately 5 dB louder than one source.

A-Weighted Decibels

The decibel scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Although the intensity (energy per unit area) of the sound is a purely physical quantity, the loudness or human response is determined by the characteristics of the human ear.

Human hearing is limited in the range of audible frequencies as well as in the way it perceives the SPL in that range. In general, people are most sensitive to the frequency range of 1,000–8,000 Hz and perceive sounds within this range better than sounds of the same amplitude with frequencies outside of this range. To approximate the response of the human ear, sound levels of individual frequency bands are weighted, depending on the human sensitivity to those frequencies. Then, an "A-weighted" sound level (expressed in units of A-weighted decibels) can be computed based on this information.

The A-weighting network approximates the frequency response of the average young ear when listening to most ordinary sounds. When people make judgments of the relative loudness or annoyance of a sound, their judgment correlates well with the A-scale sound levels of those sounds. Thus, noise levels are typically reported in terms of A-weighted decibels. All sound levels discussed in this section are expressed in A-weighted decibels. Table 3.13-1 describes typical A-weighted noise levels for various noise sources.

Table 3.13-1 Typical A-Weighted Noise Levels

Common Outdoor Activities	Noise Level (dB)	Common Indoor Activities
	— 110 —	Rock band
Jet fly-over at 1,000 feet	— 100 —	
Gas lawn mower at 3 feet	— 90 —	
Diesel truck at 50 feet at 50 miles per hour	— 80 —	Food blender at 3 feet, Garbage disposal at 3 feet
Noisy urban area, daytime, Gas lawn mower at 100 feet	— 70 —	Vacuum cleaner at 10 feet, Normal speech at 3 feet
Commercial area, Heavy traffic at 300 feet	— 60 —	
Quiet urban daytime	— 50 —	Large business office, Dishwasher next room
Quiet urban nighttime	— 40 —	Theater, large conference room (background)
Quiet suburban nighttime	— 30 —	Library, Bedroom at night
Quiet rural nighttime	— 20 —	
	— 10 —	Broadcast/recording studio
Lowest threshold of human hearing	— 0 —	Lowest threshold of human hearing

Source: Caltrans 2013: Table 2-5.

All sound levels are expressed in dB in this Program EIR are A-weighted sound levels, unless noted otherwise.

Human Response to Changes in Noise Levels

The doubling of sound energy results in a 3-dB increase in the sound level. However, given a sound level change measured with precise instrumentation, the subjective human perception of a doubling of loudness will usually be different from what is measured.

Under controlled conditions in an acoustical laboratory, the trained, healthy human ear can discern 1-dB changes in sound levels when exposed to steady, single-frequency ("pure-tone") signals in the mid-frequency (1,000–8,000 Hz) range. In general, the healthy human ear is most sensitive to sounds between 1,000 and 5,000 Hz and perceives both higher and lower frequency sounds of the same magnitude with less intensity (Caltrans 2013:2-18). In typical noisy environments, changes in noise of 1–2 dB are generally not perceptible. However, it is widely accepted that people can begin to detect sound level increases of 3 dB in typical noisy environments. Further, a 5-dB increase is generally perceived as a distinctly noticeable increase, and a 10-dB increase is generally perceived as a doubling of loudness (Caltrans 2013:2-10). Therefore, a doubling of sound energy (e.g., doubling the volume of traffic on a highway) that would result in a 3-dB increase in sound would generally be perceived as barely detectable.

Vibration

Vibration is the periodic oscillation of a medium or object with respect to a given reference point. Sources of vibration include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) and those introduced by human activity (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources may be continuous (e.g., operating factory machinery), random, or transient in nature (e.g., explosions). Vibration levels can be depicted in terms of amplitude and frequency, relative to displacement, velocity, or acceleration.

Typical outdoor sources of perceptible ground vibration are construction equipment, steel-wheeled trains, and traffic on rough roads (assuming a receptor is near enough to the road to feel the vibration). If a roadway is smooth, the ground vibration is rarely perceptible. Vibrations generated by construction activity can be transient, random, or continuous. Transient construction vibrations are typically generated by more vibration-intensive construction activities and equipment such as blasting, impact pile driving, and wrecking balls. Continuous vibrations are typically generated by more vibration-intensive construction activities and equipment such as vibratory pile drivers, large pumps, and compressors. Random vibration can result from jackhammers, pavement breakers, and heavy construction equipment.

Table 3.13-2 summarizes the general human response to different ground vibration-velocity levels.

Table 3.13-2 Human Response to Different Levels of Ground Noise and Vibration

Vibration-Velocity Level	Human Reaction
65 VdB	Approximate threshold of perception.
75 VdB	Approximate dividing line between barely perceptible and distinctly perceptible. Many people find that transportation-related vibration at this level is unacceptable.
85 VdB	Vibration acceptable only if there are an infrequent number of events per day.

Notes: VdB = vibration decibels referenced to 1 μ inch/second and based on the root mean square (RMS) velocity amplitude.

Source: FTA 2006:7-8.

Common Noise Descriptors

Noise in our daily environment fluctuates over time. The following noise descriptors are used throughout this section to describe time-varying noise levels.

Equivalent Continuous Sound Level (L_{eq}): L_{eq} represents an average of the sound energy occurring over a specified period. In effect, L_{eq} is the steady-state sound level containing the same acoustical energy as the time-varying sound level that occurs during the same period (Caltrans 2013:2-48). For instance, the 1-hour equivalent sound level, also referred to as the hourly L_{eq}, is the energy average of sound levels occurring during a 1-hour period and is the basis for noise abatement criteria used by California Department of Transportation (Caltrans) and Federal Transit Administration (FTA) (Caltrans 2013:2-47, FTA 2006:2-19).

Percentile-Exceeded Sound Level (L_X): L_X represents the sound level exceeded for a given percentage of a specified period (e.g., L_{10} is the sound level exceeded 10 percent of the time, and L_{90} is the sound level exceeded 90 percent of the time) (Caltrans 2013:2-16).

Maximum Sound Level (L_{max}): L_{max} is the highest instantaneous sound level measured during a specified period (Caltrans 2013:2-48; FTA 2006:2-16).

Community Noise Equivalent Level (CNEL): CNEL is the energy average of the A-weighted sound levels occurring over a 24-hour period, with a 10-dB penalty applied to sound levels occurring during the nighttime hours between 10 p.m. and 7 a.m. and a 5-dB penalty applied to the sound levels occurring during evening hours between 7 p.m. and 10 p.m. (Caltrans 2013:2-48).

Single Event [Impulsive] Noise Level (SENL): The SENL describes a receiver's cumulative noise exposure from a single impulsive noise event (e.g., an automobile passing by or an aircraft flying overhead), which is defined as an acoustical event of short duration and involves a change in sound pressure above some reference value. SENLs typically represent the noise events used to calculate the L_{eq}, L_{dn}, and CNEL.

Sound Propagation

When sound propagates over a distance, it changes in level and frequency content. The manner in which a noise level decreases with distance depends on the following factors.

Geometric Spreading

Sound from a localized source (i.e., a point source) propagates uniformly outward in a spherical pattern. The sound level attenuates (or decreases) at a rate of 6 dB for each doubling of distance from a point source. Roads and highways consist of several localized noise sources on a defined path and hence can be treated as a line source, which approximates the effect of several point sources, thus propagating at a slower rate in comparison to a point source. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of 3 dB for each doubling of distance from a line source.

Ground Absorption

The propagation path of noise from a source to a receiver is usually very close to the ground. Noise attenuation from ground absorption and reflective-wave canceling provides additional attenuation associated with geometric spreading. Traditionally, this additional attenuation has also been expressed in terms of attenuation per doubling of distance. This approximation is usually sufficiently accurate for distances of less than 200 feet. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receiver, such as a parking lot or body of water), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface between the source and the receiver, such as soft dirt, grass, or scattered bushes and trees), additional ground-attenuation value of 1.5 dB per doubling of distance is normally assumed. When added to the attenuate rate associated with cylindrical spreading, the additional ground attenuation results in an overall drop-off rate of 4.5 dB per doubling of distance. This would hold true for point sources, resulting in an overall drop-off rate of up to 7.5 dB per doubling of distance.

Atmospheric Effects

Because wind can carry sound, receivers located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Sound levels can be increased over large distances (e.g., more than 500 feet) from the source because of atmospheric temperature inversion (i.e., increasing temperature with elevation). Other factors such as air temperature, humidity, and turbulence can also affect sound attenuation.

Shielding by Natural or Human-Made Features

A large object or barrier in the path between a noise source and a receiver attenuate noise levels at the receiver. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Natural terrain features (e.g., hills and dense woods) and human-made features (e.g., buildings and walls) can substantially reduce noise levels. A barrier that breaks the line of sight between a source and a receiver will typically result in at least 5 dB of noise reduction (Caltrans 2013:2-41, FTA 2006:5-6, 6-25). Barriers higher than the line of sight provide increased noise reduction (FTA 2006:2-12). Vegetation between the source and receiver is rarely effective in reducing noise because it does not create a solid barrier unless there are multiple rows of vegetation (FTA 2006:2-11).

EXISTING NOISE ENVIRONMENT

Because of the varied characteristics across the treatable landscape, the existing noise environment is described by developed and undeveloped areas.

Existing Noise-Sensitive Land Uses

Noise-sensitive land uses are generally considered to include those uses where noise exposure could result in health-related risks to individuals, as well as places where quiet is an essential element of their intended purpose. Residential dwellings are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels, and because of the potential for nighttime noise to result in sleep disruption. Additional land uses such as schools, transient lodging, historic sites, cemeteries, and places of worship are also generally considered sensitive to increases in noise levels. These land use types are also considered vibration-sensitive land uses, as are commercial and industrial buildings where vibration would interfere with operations within the building, including levels that may be well below those associated with human annoyance.

Portions of the treatable landscape are adjacent to developed areas, including residential communities, commercial and industrial parks, roadways, and freeways and highways. Residences and other buildings are present in some more developed areas of the treatable landscape. Therefore, the likelihood is high that noise-sensitive receptors could be in close proximity to vegetation treatments.

Most of the treatable landscape is undeveloped and rural. These areas are composed of dense forests, grasslands, and other vegetation and generally have little urban intrusion. Because these undeveloped areas are primarily on private lands, no public access is permitted, and few trails or roadways are present. Scattered residences also exist in the rural areas of the treatable landscape.

Existing Noise Sources and Ambient Levels

In developed areas near treatable landscape areas, typical noise sources include those associated with residential communities, commercial and industrial parks, roadways, and freeways and highways. The ambient noise environment in developed areas would be primarily influenced by vehicle traffic along nearby roadway, freeways, and highways. Most of the treatable landscape is undeveloped and rural. The noise sources in the areas where there is little development typically consist of natural sounds. The ambient noise environment of rural and undeveloped areas within the treatable landscape varies based on nearby noise sources; however, as shown in Table 3.13-1 quiet rural nighttime noise levels are typically approximately 20 dB.

Vegetation treatments are currently implemented within the treatable landscape by CAL FIRE and result in temporary increases in noise. Noise sources from current vegetation treatments (i.e., prescribed burning and manual and mechanical treatments) include masticators, chippers, bulldozers, skid steers, excavators, and chainsaws. As described in Chapter 1, “Introduction,” and Section 2.3.1, “Past and Current Treatments,” vegetation treatment currently occurs around the state under several other wildfire risk reduction programs implemented by various federal, state, and local agencies. In 2017–2018, CAL FIRE treated approximately 33,000 acres in California using the same treatment activities as proposed under the CalVTP. Vegetation treatments occur in undeveloped areas but can also occur near development.

3.13.2 Regulatory Setting

FEDERAL

U.S. Environmental Protection Agency Office of Noise Abatement and Control

The U.S. Environmental Protection Agency (EPA) Office of Noise Abatement and Control was originally established to coordinate Federal noise control activities. In 1981, EPA administrators determined that subjective issues such as noise would be better addressed at more local levels of government. Consequently, in 1982 responsibilities for regulating noise control policies were transferred to state and local governments. However, documents and research completed by the EPA Office of Noise Abatement and Control continue to provide value in the analysis of noise effects.

STATE

California General Plan Guidelines for Noise Elements

The State of California General Plan Guidelines 2017, published by the California Governor's Office of Planning and Research (2017), provides guidance for the compatibility of projects within areas of specific noise exposure. Acceptable and unacceptable community noise exposure limits for various land use categories have been determined to help guide new land use decisions in California communities. In many local jurisdictions, these guidelines are used to derive local noise standards and guidance. These guidelines are presented in Table 3.13-3. Citing EPA materials and the State Sound Transmissions Control Standards, the State's general plan guidelines recommend interior and exterior CNEL of 45 and 60 dB for residential units, respectively (OPR 2017:378). For commercial land uses, the guidelines recommend an exterior CNEL of up to 65 dB for multi-family residential building and hotels, 70 dB for office buildings, schools, libraries and churches, and 75 dB for industrial, agricultural and recreational land uses.

Table 3.13-3 General Plan Community Noise Exposure Guidance by Land Use

Land Use Category	Noise Exposure Ranges (dB CNEL)			
	Normally Acceptable [1]	Conditionally Acceptable [2]	Normally Unacceptable [3]	Clearly Unacceptable [4]
Single-family residential, duplexes, mobile homes	<60	55-70	70-75	>75
Multi-family residential	<65	60-70	70-75	>75
Hotels and motels	<65	60-70	70-80	>80
Schools, Libraries, Churches, Hospitals, Nursing Homes	<70	60-70	70-80	>80
Playgrounds, Neighborhood Parks	<70	67-75	>73	Undefined
Office Buildings	<70	67-77	>75	Undefined
Industrial & Manufacturing	<75	70-80	>75	Undefined

Notes: CNEL = Community Noise Equivalent Level; dB = decibels.

1 For conventional construction, without any special noise insulation design features.

2 For construction with noise reduction features and/or conventional construction with permanently closed windows.

3 Unacceptable unless noise insulation features have been included in the design and noise reduction requirements in place.

4 Incompatible with construction and development.

Source: OPR 2017

California Building Standards Code

The 24, Part 2, Section 1207 of the California Building Standards Code establishes a uniform minimum noise insulation performance standard to protect persons within hotels, motels, dormitories, apartment houses, and dwellings other than detached single-family dwellings from the effects of excessive noise, including hearing loss or impairment and interference with speech and sleep. Title 24 states that interior noise levels attributable to exterior sources are not to exceed 45 dB in any habitable room (California Building Code 2016). The noise metric must be either the L_{dn} or CNEL, consistent with standards in the noise element of the local general plan.

Under California Public Resources Code Section 25402.1(g), all cities and counties in the state are required to enforce the adopted California Building Standards Code, including these noise insulation performance standards.

LOCAL

When state agencies, including CAL FIRE, are conducting governmental activities under the authority of state law or the State Constitution, in this case, treatments implemented under the proposed CalVTP, they are exempt from local government plans, policies, and ordinances (unless a constitutional provision or statute directs otherwise). Nonetheless, CAL FIRE voluntarily seeks to operate consistently with local governance to the extent feasible. Given its statewide extent and the possible number of local and regional responsible agencies, this PEIR does not identify potentially applicable local government plans, policies, and ordinances.

Cities and counties establish general plan noise elements and/or noise ordinance standards that provide land use compatibility guidelines and locally acceptable standards to reduce noise conflicts between land uses. The State of California General Plan Guidelines 2017 described in the previous subsection are used as a guide for local government when developing these thresholds.

This PEIR assumes that any vegetation treatments proposed by local or regional agencies under the CalVTP would be consistent with local plans, policies, and ordinances, as required by SPR AD-3.

3.13.3 Impact Analysis and Mitigation Measures

ANALYSIS METHODOLOGY

The analysis of noise impacts focuses on the potential for nearby noise-sensitive receptors to experience a substantial temporary or permanent increase in ambient noise levels as a result of treatment implementation. Significance determinations account for the influence of relevant SPRs, which are incorporated into treatment design and listed below.

- SPR AD-3 Consistency with Local Plans, Policies, and Ordinances: The project proponent will design and implement the treatment in a manner that is consistent with applicable local plans (e.g., general plans), policies, and ordinances to the extent the project is subject to them. This SPR applies to all treatment activities and treatment types.
- SPR NOI-1 Limit Heavy Equipment Use to Daytime Hours: The project proponent will require that operation of heavy equipment associated with treatment activities (heavy off-road equipment, tools, and delivery of equipment and materials) will occur during daytime hours if such noise would be audible to receptors (e.g., residential land uses, schools, hospitals, places of worship). Cities and counties in the treatable landscape typically restrict construction-noise (which would apply to vegetation treatment noise) to particular daytime hours. If the project proponent is subject to local noise ordinance, it will adhere to those to the extent the project is subject to them. If the applicable jurisdiction does not have a noise ordinance or policy restricting the time-of-day when noise-generating activity can occur noise-generating vegetation treatment activity will be limited to the hours of 7:00 a.m. to 6:00 p.m., Monday through Saturday, and between 9:00 a.m. and 6:00 p.m. on Sunday and federal holidays. If the project proponent is not subject to local ordinances (e.g., CAL FIRE), it will adhere to the restrictions stated above or may elect to adhere to the restrictions identified by the local ordinance encompassing the treatment area. This SPR applies to all treatment activities and treatment types.
- SPR NOI-2 Equipment Maintenance: The project proponent will require that all powered treatment equipment and power tools will be used and maintained according to manufacturer specifications. All diesel- and gasoline-powered treatment equipment will be properly maintained and equipped with noise-reduction intake and exhaust mufflers and engine shrouds, in accordance with manufacturers' recommendations. This SPR applies to all treatment activities and all treatment types.
- SPR NOI-3 Engine Shroud Closure: The project proponent will require that engine shrouds be closed during equipment operation. This SPR applies only to mechanical treatment activities and all treatment types.
- SPR NOI-4 Locate Staging Areas Away from Noise-Sensitive Land Uses: The project proponent will locate treatment activities, equipment, and equipment staging areas away from nearby noise-sensitive land uses (e.g., residential land uses, schools, hospitals, places of worship), to the extent feasible, to minimize noise exposure. This SPR applies to all treatment activities and treatment types.
- SPR NOI-5 Restrict Equipment Idle Time: The project proponent will require that all motorized equipment be shut down when not in use. Idling of equipment and haul trucks will be limited to 5 minutes. This SPR applies to all treatment activities and all treatment types.

- **SPR NOI-6 Notify Nearby Off-Site Noise-Sensitive Receptors:** For treatment activities utilizing heavy equipment, the project proponent will notify noise-sensitive receptors (e.g., residential land uses, schools, hospitals, places of worship) located within 1,500 feet of the treatment activity. Notification will include anticipated dates and hours during which treatment activities are anticipated to occur and contact information, including a daytime telephone number, of the project representative. Recommendations to assist noise-sensitive land uses in reducing interior noise levels (e.g., closing windows and doors) will also be included in the notification. This SPR applies only to mechanical treatment activities and all treatment types.

To assess treatment-related noise, sensitive receptors that have the potential to be impacted and their relative exposure were identified based on public and private land uses in the treatable landscape. Reference noise levels for specific equipment and treatment activities are well documented and application of reference noise levels is a common practice in the field of acoustics. Treatment-generated noise levels were determined based on methodologies, reference noise levels, and usage factors from FTA's *Guide on Transit Noise and Vibration Impact Assessment* (FTA 2006). See Appendix NOI-1 for detailed calculations of treatment-generated noise levels.

The SENL describes a receiver's cumulative noise exposure from a single impulsive noise event (e.g., a passing truck, a truck downshifting to engine brake, or an aircraft flying overhead), which is a rating of a discrete noise event that compresses the total sound energy of the event into a 1-second period, measured in decibels (Caltrans 2011). These noise events can be more startling to receptors if they occur when ambient noise levels are quieter, such as during nighttime hours.

Many studies have been conducted regarding the effects of single-event noise on sleep disturbance, but due to the wide variation in the reactions of test subjects to SENLs of various levels, no definitive consensus has been reached with respect to a universal criterion to apply. Based on its review of studies about sleep disturbance and SENLs, Federal Interagency Committee on Aviation Noise (FICAN) provided estimates of the percentage of people expected to be awakened when exposed to specific SENLs inside a home (FICAN 1997). According to FICAN's review, 10 percent of the population is estimated to be awakened when the SENL interior noise level is 81 dB. An estimated 5 to 10 percent of the population is affected when the SENL interior noise level is between 65 and 81 dB, and few sleep awakenings (less than 5 percent) are predicted if the interior SENL is less than 65 dB. The SENL analysis is based on reference noise levels published by EPA.

THRESHOLDS OF SIGNIFICANCE

Thresholds of significance are based on Appendix G of the State CEQA Guidelines and professional judgment. A treatment implemented under the proposed CalVTP would result in a significant noise-related impact if it would:

- generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- expose noise-sensitive residential receptors to sleep disturbance resulting from noise generated by treatment activity, including SENLs generated by trucks at night;
- generate excessive groundborne vibration or groundborne noise levels; or
- for project areas located within the vicinity of a private airstrip or an airport land use plan, or where such a plan has not been adopted, within two miles of a public airport of public use airport, expose people residing or working in the project area to excessive noise.

ISSUES NOT EVALUATED FURTHER

Implementation of treatments under the CalVTP would not result in the long-term operation of any source of ground vibration, such as pile driving, drilling, boring, or rock blasting. Thus, treatments under the CalVTP would not result in the exposure of sensitive receptors to levels of excessive vibration or groundborne noise levels. Groundborne vibration and groundborne noise are not discussed further.

Implementation of treatments under the CalVTP would not result in the long-term operation of any stationary noise sources, result in a permanent increase in noise-generating vehicle trips or other long-term or permanent noise-generating activity. Therefore, implementation of the CalVTP would not result in a permanent increase in ambient noise levels anywhere in the treatable landscape. Permanent increase in ambient noise is not discussed further.

Implementation of treatments under the CalVTP would not result in the siting of noise-sensitive land uses or receptors in the vicinity of a private airstrip, airport land use plan, or within two miles of a public airport. Airport noise exposure is not discussed further.

IMPACT ANALYSIS

Impact NOI-1: Result in a Substantial Short-Term Increase in Exterior Ambient Noise Levels During Treatment Implementation

Vegetation treatment activities implemented under the CalVTP would adhere to the SPRs that require consistency with local noise policies and ordinances to the extent the project is subject to them, limit vegetation treatment activities to daytime hours, ensure proper notification of nearby sensitive receptors, and locate treatment activities and staging areas away from sensitive receptors to minimize noise exposure. Additionally, any increase in noise exposure at nearby receptors would be temporary and periodic. Therefore, implementation of the CalVTP would not result in the exposure of noise-sensitive receptors to a substantial temporary increase in ambient noise levels. This impact would be **less than significant**.

Treatment activities would typically be applied in combination to implement a treatment type. Vegetation treatment types would vary across the treatable landscape based on the fuel type being treated, site topography, accessibility, ecological conditions, and other factors. The most noise-intensive vegetation treatment activities are prescribed burning, mechanical vegetation treatment, and manual vegetation treatment. Prescribed herbivory and herbicide application would not require the use of heavy off-road equipment; noise generated by these treatment types would be negligible and they are not further discussed. The typical equipment used for each noise-generating treatment activity, as described in Section 2.5.2 of Chapter 2, "Program Description," is summarized in Table 3.13-4.

Table 3.13-4 Equipment by Treatment Activity

Treatment Activity	Equipment Types
Prescribed Burn	Fire Engines (2 to 10 engines) Bulldozers (up to 2) Masticators or Track Chippers Water Truck Helicopter[1]
Mechanical Vegetation Treatment	Dozers Excavators Masticators Chippers Skid Steer Fire Engines (at least 1)
Manual Vegetation Treatment	Chainsaws (4 to 8) Masticators Chippers (only used occasionally) Fire Engine

Notes: [1] A helicopter carrying a helitorch may be used in prescribed burns that involve large areas or in terrain with limited accessibility by ground vehicles and equipment.

Reference noise levels for individual equipment used in treatment activities are summarized in Table 3.13-5.

Table 3.13-5 Noise Levels from Treatment Equipment Types

Equipment Type	Typical Noise Level (dB) at 50 Feet[1]
Chain Saw	85
Dozer	85
Shears (on Backhoe)	85
Excavator	85
Flat Bed Trucks	84
Wood Chipper	75[2]
Helicopter	87.9

Notes: Assumes all equipment is fitted with a properly maintained and operational noise control device, per manufacturer specifications. Noise levels listed are manufacture-specified noise levels for each piece of equipment.

Sources:
[1] reference noise levels from FTA 2006 except where indicated otherwise
[2] Berger et. al. 2010

As shown in Table 3.13-5, noise levels generated by individual equipment range from 77 to 87.9 dB at 50 feet from the noise source. Though multiple pieces of equipment would be operated simultaneously to implement a treatment they would typically be spread out (i.e., usually more than 100 feet apart) rather than operating next to each other. This is particularly true of larger, heavy-duty off-road equipment such as masticators, chippers, bulldozers, skid steers, and excavators. This helps ensure worker safety and maximizes efficiency.

Although all pieces of heavy equipment could operate simultaneously for vegetation treatment activities under CalVTP, because of the size of the vegetation treatment sites and the spatial operational constraints of heavy equipment (only so many could operate in close proximity to one another because of function and size) it is unlikely that all pieces of equipment would operate in close proximity to each other near the boundaries of the project site. Therefore, it is unlikely that noise from multiple pieces of equipment would combine to affect any noise-sensitive receptor for an extended period. However, this analysis conservatively assumes that four of the highest noise-generating pieces of equipment could operate simultaneously in close proximity to each other near the boundaries of the treatment site (i.e., locations nearest to where noise-sensitive receptors could be located). This assumption is used because the estimated combined noise level for four pieces of equipment would not be noticeable higher if a fifth piece of equipment were also operating 100 feet from the nearest affected receptor. This is the case because noise levels from point sources attenuates at a rate of 7.5 dB per doubling of distance and because the logarithmic nature of adding noise levels.

Table 3.13-6 shows the combined noise level at 50 feet from the source for each noise-generating treatment activity, assuming four of the loudest pieces of equipment listed in Table 3.13-4 are operated next to each other. See Appendix NOI-1 for the specific equipment assumed to be operated under each treatment activity and the associated noise calculations.

Table 3.13-6 Noise Levels from Treatment Activities

Treatment Activity	Noise Level (L_{eq} dB) at 50 feet	Noise Level (L_{max} dB) at 50 feet
Prescribed Burning (including heliotorching)	86.8/89.9	90.8/91.8
Mechanical Vegetation Treatment	87.0	91.0
Manual Vegetation Treatment	87.0	91.0

Notes: dB = decibels; L_{eq} = Equivalent Continuous Sound Level

Assumes all equipment is fitted with a properly maintained and operational noise control device, per manufacturer specifications. Noise levels listed are manufacture-specified noise levels for each piece of heavy construction equipment.

Source: FTA 2006

As shown in Table 3.13-6, the highest noise-generating pieces of equipment used for each of the treatment activities produce similar noise levels; and thus, the combined noise levels of the four of the highest noise-generating pieces of equipment for each treatment activity are similar.

In developed areas the likelihood is high that noise-sensitive receptors could be located in close proximity to vegetation treatments. Additionally, although less likely, noise-sensitive receptors could be located in close proximity to vegetation treatments in undeveloped areas as well. The specific location of any such noise-sensitive receptors relative to later treatment activities are unknown at this time, because neither has been identified. It is assumed that noise-sensitive receptors near treatment activity sites could experience elevated noise levels. However, any increase in ambient noise levels exposure at nearby receptors would be temporary and periodic.

Helicopter Noise

In addition to typical land-based equipment used during vegetation treatment activities, a helicopter with a helitorch may be used when a large area needs to be burned or an area is not easily accessible by ground equipment. Due to the inherently remote nature of the treatable landscape within which prescribed burning by helitorch would be utilized, it is assumed that noise-sensitive receptors would not be located in close proximity to the vegetation treatment site. However, noise-sensitive receptors could be exposed to helicopter noise during approach and takeoff procedures.

The helicopter and helitorch would only be used to ignite the prescribed burn; and thus, total helicopter usage for individual vegetation treatment sites would be limited to one helicopter trip over the span of one day. Additionally, for safety and visibility reasons, helicopters would be used only during the day. Therefore, overall any exposure of sensitive receptors to noise generated by helicopter activity would be brief, infrequent, and pursuant to SPR NOI-1 would not occur during noise-sensitive evening and nighttime hours.

Conclusion

Qualifying projects under the proposed CalVTP would integrate various SPRs into treatment design to reduce exposure to noise generated by vegetation treatment activities. SPR AD-3 requires that treatments are designed and implemented in a manner that is consistent with applicable local plans (e.g., general plans), policies, and ordinances to the extent the project is subject to them. An example of how compliance with local noise ordinance would avoid and minimize increased noise levels and exposure to noise for qualifying treatments implemented by local agencies is presented for Humboldt County, which is the county with the greatest number of total acres within the treatable landscape. The Humboldt County Code does not contain any noise standards or noise-exemption time periods related to construction activity, which would also apply to vegetation treatment activities. In the absence of standards for construction noise, the county's land use/noise compatibility interior standards would be applied, which limit interior noise to 45 dB L_{dn} for noise sensitive receptors. With implementation of SPR AD-3, noise levels associated with vegetation treatment activities under the CalVTP would not exceed local land use/noise compatibility standards. and noise exposure attributed to vegetation treatment activities under the CalVTP would not generate a substantial temporary increase in ambient noise levels in the vicinity of the project in excess of local standards when local standards are applicable.

Other SPRs that avoid and minimize noise exposure are SPRs NOI-1, NOI-4, and NOI-6. SPR NOI-1 restricts vegetation treatment activities to daytime hours. SPR NOI-4 would require vegetation treatment activities and staging areas be located away from sensitive receptors to the extent feasible to minimize noise exposure. Additionally, SPR NOI-6 requires notification be provided to nearby sensitive receptors when heavy equipment would be used for a treatment.

SPRs to reduce noise levels during treatment would also be integrated into treatment design. SPR NOI-2 requires all equipment to be maintained appropriately and equipped with the proper intake and exhaust shrouds. SPR NOI-3 requires all equipment engine shrouds to be closed during operation. SPR NOI-5 restricts equipment idling time.

Each vegetation treatment activity under the CalVTP would be required to adhere to the applicable SPRs identified above that avoid and minimize exposure to noise and reduce noise levels during treatment. Any increase in noise exposure at nearby receptors would only occur during daytime hours; thus, avoiding the potential to cause sleep disturbance to residents during the more noise-sensitive evening and nighttime hours. Although noise-sensitive receptors near vegetation treatment sites could experience a temporary increase in ambient noise levels, this increase would not be substantial with implementation of SPRs. This impact would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

Impact NOI-2: Result in a Substantial Short-Term Increase in Truck-Generated SENL's During Treatment Activities

Because vegetation treatment activities under the CalVTP would be required to adhere to SPR NOI-1, which limits vegetation treatment activities to daytime hours, SENLs generated by associated haul truck trips would not have the potential to result in sleep disturbance during noise-sensitive evening and nighttime hours. For this reason, implementation of the CalVTP would not result in a substantial temporary increase in SENL's during vegetation treatment activities. This impact would be **less than significant**.

Treatment activities implemented under the CalVTP would involve large trucks hauling heavy equipment, crews, and/or livestock to the treatment sites. Many of these haul truck trips would use roads that would pass by residential receptors and the event of each truck passing by could generate a SENL that could be noticeable to residents. Reference SENLs for heavy truck passbys were measured by Bollard Acoustical Consultants and reported in an EIR for a proposed commercial center (City of Ceres 2010). The results of the outdoor measurements indicated that SENLs generated by heavy truck passbys range from 77 to 85 dB SENL, with a mean of 83 dB SEL at a reference distance of 50 feet. It is assumed that SELs from engine braking (a.k.a., Jake braking) are is at least as loud.

As described above, the SENL describes a receiver's cumulative noise exposure from a single impulsive noise event, which is a rating of a discrete noise event that compresses the total sound energy of the event into a 1-second period, measured in decibels (Caltrans 2011). These noise events can be more startling to receptors if they occur when ambient noise levels are quieter, such as during nighttime hours. Assuming the average exterior-to-interior noise level reduction of 20 dB provided by wood frame buildings with the windows closed (Caltrans 2011), the highest SENL in the interior of rooms located closer than 50 feet from a passing truck would exceed 65 dB SEL. Because some houses along routes used by haul trucks could have inhabitable rooms located closer than 50 feet to the roadway, these rooms would experience SENLs that exceed the criterion of 65 dB and, therefore, the percentage of people expected to be awakened when inside the affected homes would exceed 5 percent. However, SPR NOI-1 restricts hauling of equipment to daytime hours; and thus, the haul truck passbys associated with treatment activity would not occur during more noise-sensitive evening and nighttime hours. Also, the increase in SENL-generating haul truck passbys associated with treatment activity at any particulate treatment site would be temporary. Therefore, for these reasons, this impact would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

3.14 RECREATION

This section describes existing recreation resources within the treatable landscape. The analysis includes a description of the existing environmental conditions including applicable regulatory requirements, the methods used for assessment, and the potential direct and indirect impacts of program implementation related to recreation.

Comments on the Notice of Preparation (NOP) related to recreation generally addressed impacts (including cumulative impacts) to recreational facilities throughout the state as well as impacts to users of recreation facilities and consideration of aesthetic impacts in the context of recreation (see Appendix A). These are addressed in Section 3.14.3, "Impact Analysis and Mitigation Measures."

3.14.1 Environmental Setting

Recreational opportunities throughout the treatable landscape are available within lands owned by State agencies, local governments, special districts and non-profit organizations, and privately-owned land.

STATE RECREATIONAL FACILITIES

California State Parks

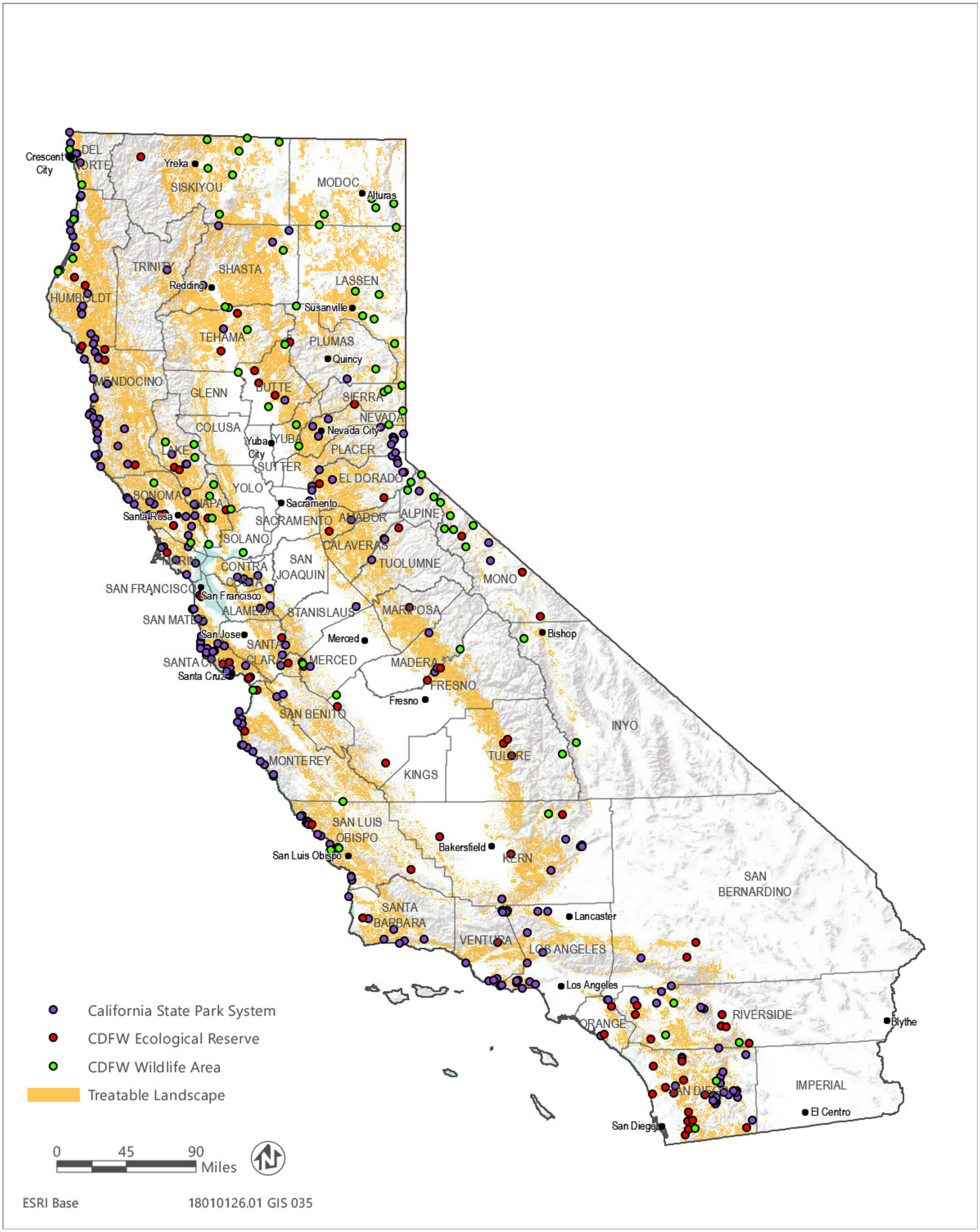
The California State Parks (CSP) manages diverse natural and cultural heritage landholdings in California. These lands encompass an array of the state's landscape provinces, environmentally sensitive habitat areas, habitat for endangered and threatened species, ancient Native American sites, and historic facilities. CSP manages almost twenty-five percent of California's coastline, including coastal wetlands, estuaries, and dune systems. Collectively, CSP manages 280 state park units, including 340 miles of coastline, 970 miles of lake and river frontage, 15,000 campsites, and 4,500 miles of trails. Each year, more than 67 million people visit facilities within the state park system, including beaches, ghost towns, monuments, parks, recreation areas, visitor centers, lakes, and reservoirs. Recreational activities include boating, fishing, camping, trails, biking, hiking, sightseeing, interpretative exhibits, picnic tables, museums, horseback riding, and nature viewing (CSP 2019). State park facilities located within the treatable landscape are shown on Figure 3.14-1.

California Department of Fish and Wildlife

The California Department of Fish and Wildlife (CDFW) manages fish, wildlife, and plant resources, and habitats on which species depend, for their ecological values and for public enjoyment. Collectively, CDFW manages over 1,100,000 acres of fish and wildlife habitat through 79 properties throughout the state. CDFW lands provide habitat for a rich diversity of fish, wildlife, and plant species and comprise habitats from every major ecosystem in the state. In addition, several private lands conservation programs assist landowners with the management of wetlands, riparian habitats, native grasslands and wildlife-friendly farmlands. CDFW prepares Land Management Plans (LMP) for managed areas to guide the management of natural resources and to protect and enhance native wildlife for their ecological value and enjoyment by the public. LMPs also serve as a guide for appropriate public uses for that property. CDFW facilities located within the treatable landscape are shown on Figure 3.14-1.

Public Trails

There are a variety of public hiking and multi-use trails throughout California; they vary in length and use type depending on the location. For example, some wilderness trails are strictly for hikers while others are designated for equestrian and mountain biking as well. Two of the most well-known are the Pacific Coast Trail (PCT) and John Muir Trail. The PCT spans 2,650 miles from Mexico through California, Oregon, and Washington. Due to its length, the PCT traverses through multiple jurisdictions and is managed by the U.S. Forest Service, in partnership with the National Park Service, Bureau of Land Management, CSP, and the Pacific Crest Trail Association. Similarly, the John Muir Trail spans 211 miles from Yosemite Valley to Mt. Whitney though the Sierra Nevada and uses the PCT trail for most of its length. The treatable landscape encompasses hiking trails throughout the state, including sections of the PCT trail and John Muir trail.



Source: Data downloaded from CDFW and CSP in 2019

Figure 3.14-1 State Recreational Facilities within the Treatable Landscape

LOCAL RECREATIONAL FACILITIES

County Recreational Facilities

There is a total of 58 counties within California, and each county is responsible for providing municipal services to residents, including roads, parks, law enforcement, emergency response services, and libraries. Each county is also charged with providing and maintaining recreational services within the unincorporated areas. For example, the Santa Clara County Parks and Recreation Department manages 28 regional parks encompassing over 52,000 acres of land within the County. Recreational opportunities include biking, hiking, boating, fishing, camping, picnic tables, dog parks, cultural venues, playgrounds, and sports facilities. Similarly, the San Mateo County Parks Department manages 22 parks, encompassing over 16,000 acres, and 190 miles of local trails.

City Operated Recreational Facilities

There is a total of 482 cities in California, and each city is responsible for providing municipal services and maintaining infrastructure, including roads, parks, law enforcement, emergency response services, and libraries. Cities are also charged with providing recreational resources to residents within their respective city limits. For example, the City of Santa Rosa Recreation and Parks Department maintains approximately 525 acres of city parks, sports facilities, and historic structures. The City of Redding Parks and Recreation Department owns 41 parks and nine school-park sites, including playgrounds, and facilities for picnicking, walking, boating, fishing, basketball, softball, baseball, volleyball, soccer skateboarding, aquatics, and off-leash dog play. Incorporated cities are excluded from the SRA and thus the treatable landscape; however, city-owned lands occur outside of incorporated city limits and may be within the treatable landscape.

Special Districts and Nonprofit Organizations

Special districts are a form of local government created to deliver specific public services within a defined boundary. They are governed by an independent board of directors elected by the districts' voters or appointed to a fixed term of office by either the city council or board of supervisors. In California, there are nearly 3,400 special districts that provide a variety of services including water, sewer, fire protection, and parks. Examples of recreation and parks districts in the treatable landscape include the Santa Clara Valley Open Space Authority, East Bay Regional Park District, and Midpeninsula Regional Open Space District. Recreational opportunities can vary depending on the location and type of special districts; however, common recreational opportunities include hiking, sightseeing, mountain biking, horseback riding, and educational activities.

In addition to special districts, there are a variety of nonprofit organizations in California that preserve undeveloped land as open space for historical, educational, ecological, recreational, and scenic purposes. Typically, nonprofits receive private donations and raise funds from the community to purchase undeveloped properties as opportunities arise. Examples of nonprofit organizations that manage public open space in the treatable landscape include the Nature Conservancy, Big Sur Land Trust, and Wildlands Conservancy. Recreation opportunities can vary depending on the location and habitat sensitivity; however, common recreational opportunities include hiking, outdoor education, camping, picnicking, birding, fishing, and wildlife viewing.

PRIVATELY-OWNED FACILITIES

Private recreation consists of privately-owned facilities which generally required some form of membership or residence. Types of privately-owned facilities include yacht clubs, marinas, boat-docks, sports leagues, camps, amusement parks, commercial recreation development, and recreational vehicle (RV) parks. These types of facilities are located throughout the State, and recreational opportunities can vary depending on the location. Common recreational opportunities include camping, hiking, horseback riding, sailing, and sporting activities.

EFFECTS OF WILDFIRE ON RECREATION

As discussed in Section 3.17, "Wildfire," many of California's ecosystems are fire-adapted. However, in recent decades, increasing drought frequency and warming temperatures have led to an increase in wildfire activity (Westerling et al. 2006, Schoennagel et al. 2017). California has seen increases in wildfire activity in terms of area burned, frequency of large fires, and fire season length (Westerling et al. 2006, Abatzoglou and Williams 2016). During wildfire incidents all areas near or adjacent to managed recreational areas are closed to ensure visitor safety. In 2018, CSP closed numerous state parks as a result of the Butte County Camp fire, Los Angeles County Woolsey fire, and the Ventura County Hill fire (CSP 2018).

PAST AND CURRENT VEGETATION TREATMENTS

Vegetation treatments are currently implemented within the treatable landscape by CAL FIRE and sometimes have temporary effects on recreation, such as limiting access in public parks and trails for public safety reasons. In addition, there are a variety of organizations that currently implement vegetation treatments in the treatable landscape including Bridgeville Community Center, Western Shasta Resource Conservation District, Sonoma County Regional Parks, East Bay Regional Parks District, and Fall River Resource Conservation District. As described in Chapter 1, "Introduction," and Section 2.3.1, "Past and Current Treatments," vegetation treatment currently occurs around the state under several other wildfire risk reduction programs implemented by various federal, state, and local agencies. In 2017–2018, CAL FIRE treated approximately 33,000 acres in California using the same treatment activities as proposed under the CalVTP.

3.14.2 Regulatory Setting

FEDERAL

No federal laws or regulations related to recreation are applicable to the program.

STATE

California Department of Fish and Wildlife

CDFW manages fish, wildlife, and plant resources, and habitats on which species depend, for their ecological values and for public enjoyment. CDFW is divided into seven regions throughout the state. Each region is responsible for the conservation, protection, and management of wildlife, native plants, and habitat necessary to maintain biologically sustainable populations. Per Section 1019 of the Fish and Game Code, CDFW must draft LMP for any property wholly under its jurisdiction that was purchased after January 1, 2002. Generally, each LMP includes an Element that serves as a guide for appropriate public uses for that property, including recreation. In addition, visitor use of all CDFW properties is subject to 14 CCR, which includes regulations that outline designated public uses, allowed activities, and restrictions for all CDFW properties.

California Department of Parks and Recreation

CSP is charged with preparing and adopting a general plan for each of its facilities. The general plan directs the long-range development and management of a park by providing broad policy and program guidance. For the purposes of lands managed by California State Parks, the State is divided into 19 districts. Each district provides oversight for facilities within its service area.

California State Parks Department Operation Manual

The Department Operation Manual (DOM), prepared by CSP, includes a policy framework to guide recreation, interpretive opportunities, and maintenance of the park system. Relevant DOM recreation-related management policies, processes, and procedures are briefly described below (CSP 2004:65):

- **Visitor Recreational Uses (0317.1):** Interim management plans and General Plans should assess natural resource values and visitor needs and opportunities on a regional basis. These plans can contribute to higher quality recreation, reduced capital outlay costs, reduced staff demands, and habitat conservation.
- **Visitor Recreational Uses Policy (0317.1.1):** It is the policy of CSP that careful analysis of long-term impacts to natural processes and resources are carried out when planning recreational uses, including interim public use, for State Parks, State Reserves, State Natural Preserves and State Wildernesses. Districts should complete long-term planning for removal or relocation of impacting visitor uses within prime resource areas.
- **Closure of Fire of Damaged Areas (0313.2.1.3):** All or a portion of a park unit may be closed when an unwanted wildland fire is threatening or burns on CSP lands. Areas of a park unit which have burned will remain closed until appropriate CSP staff have inspected the area and rectified any public safety, property or resource protection issues.

LOCAL

When state agencies, including CAL FIRE, are conducting governmental activities under the authority of state law or the State Constitution, in this case, treatments implemented under the proposed CalVTP they are exempt from local government plans, policies, and ordinances (unless a constitutional provision or stature directs otherwise). Nonetheless, CAL FIRE voluntarily seeks to operate consistently with local governance to the extent feasible. Given its statewide extent and the possible number of local and regional responsible agencies, this PEIR does not identify potentially applicable local government plans, policies, and ordinances. Types of local regulations relevant to recreation may include general plans, zoning ordinances, and adopted policies to avoid conflicts with recreational uses. This PEIR assumes that any vegetation treatments proposed by local or regional agencies under the CalVTP would be consistent with local plans, policies, and ordinances, as required by SPR AD-3.

3.14.3 Impact Analysis and Mitigation Measures

ANALYSIS METHODOLOGY

The analysis of environmental impacts on recreation facilities focuses on the potential for substantial physical deterioration of existing facilities, construction or expansion of recreation facilities, and disruption of recreational activities within a designated recreation area. Significance determinations account for the influence of relevant SPRs, which are incorporated into treatment design and listed below.

- **SPR AD-3 Consistency with Local Plans, Policies, and Ordinances**: The project proponent will design and implement the treatment in a manner that is consistent with applicable local plans (e.g., general plans), policies, and ordinances to the extent the project is subject to them. This SPR applies to all treatment activities and treatment types.
- **SPR REC-1 Notify Recreational Users of Temporary Closures.** If a treatment activity would require temporary closure of a public recreation area or facility, the project proponent to will coordinate with the owner/manager of that recreation area or facility. If temporary closure of a recreation area or facility is required, the project proponent will work with the owner/manager to post notifications of the closure approximately 2 weeks prior to the commencement of the treatment activities. This SPR applies to all treatment activities and treatment types.

THRESHOLDS OF SIGNIFICANCE

Thresholds of significance are based on Appendix G of the State CEQA Guidelines and comments received on the NOP. A treatment implemented under the proposed CalVTP would result in a significant impact on parks and recreational facilities if it would:

- increase the use of existing neighborhood parks or recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated;
- include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment; or
- directly or indirectly disrupt recreational activities within designated recreation areas.

ISSUES NOT EVALUATED FURTHER

Implementation of the CalVTP would consist of vegetation treatment activities that would modify portions of the treatable landscape to reduce wildfire risk. Treatment activities would not increase the use of recreational facilities to the extent that substantial deterioration would occur. Typically, this impact occurs when a project induces population growth, such as a new housing development or a business that would necessitate a large number of new employees. As discussed in Section 3.12, "Land Use and Planning, Population and Housing," implementation of the proposed VTP would not induce substantial population growth. New employment would vary and would be dispersed over a large geographic area rather than concentrated in the same location. This would not substantially increase use of existing recreational facilities by employees associated with vegetation treatments. Therefore, implementation of the CalVTP is not expected to generate employees such that substantial physical deterioration of recreational facilities would occur through increased use, and this issue is not evaluated further.

Implementation of the CalVTP would not involve the development of residential communities or other similar types of development or induce substantial population growth in an area that would require the construction of or expansion of recreational facilities. As discussed previously, employees required to implement the proposed CalVTP would be dispersed over a large geographic area rather than concentrated in the same location. This would minimize any localized demand for recreational facilities from employees associated with vegetation treatments such that the construction or expansion of recreational facilities would not be needed. This issue is not evaluated further.

IMPACT ANALYSIS

Impact REC-1: Directly or Indirectly Disrupt Recreational Activities within Designated Recreation Areas

Implementation of treatment activities within the treatable landscape could result in potential conflicts with recreationists and recreation areas. Conflicts include access restrictions or nuisance impacts during treatment activities including degradation of views, dust emissions, and increased traffic that disrupt the recreational experience. Implementation of SPRs would avoid and minimize disruptions to recreation. This impact would be **less than significant**.

Implementation of the CalVTP would result in disruption of recreational activities if the proposed treatment directly impedes use of an existing recreational resource or indirectly degrade the experience of recreationists.

Depending on the location and other site-specific considerations of the treatment, proposed treatment activities may temporarily restrict public access to surrounding areas for safety reasons, which would disrupt the recreation experience. Potential nuisance impacts that could also disrupt recreation may include:

- degradation of scenic resources (e.g., short-term presence of equipment or long-term changes to the landscape) within the viewshed of designated recreation areas;

- decreased air quality (e.g., smoke, dust) due to prescribed burning, pile burning, and the use of motorized equipment along unpaved roadways; or
- traffic as a result of ingress/egress of heavy equipment, which may limit, restrict, or delay access to recreation areas.

Each of these potential disruptions and associated mitigation are discussed in PEIR Sections, 3.2, “Aesthetics,” 3.4, “Air Quality,” and 3.15, “Transportation,” respectively. Regulatory compliance, SPRs, and mitigation measures, that would minimize these impacts would also reduce disruption of recreation by requiring workers to store equipment outside of the viewshed, minimize smoke dispersion, suspend ground disturbing treatment activities when there is visible dust, and minimize the ingress/egress of heavy equipment along public roadways. In addition, SPR REC-1 requires the project proponent to coordinate with the owner/manager of any public recreation area or facility that would require temporary closure as a result of treatment activities and post notifications of the closure approximately 2 weeks prior to the commencement of the treatment activities. Implementation of this SPR would avoid and minimize disruptions to recreational users be affording recreationists the opportunity to use alternate recreation areas. This impact would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

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3.15 TRANSPORTATION

This section describes the existing transportation system, with focus on rural road networks in the treatable landscape, identifies applicable regulatory requirements, and evaluates impacts to traffic operations, bicycle, pedestrian, and transit facilities, roadway hazards and obstructions, and emergency access resulting from implementation of the proposed CalVTP.

Comments on the Notice of Preparation related to transportation included comments from the California Department of Transportation (Caltrans) (see Appendix A). These are addressed in Sections 3.15.2 and 3.15.3, below.

3.15.1 Environmental Setting

STUDY AREA

The SRA encompasses 31 million acres of public and private land throughout the state, of which 20.3 million acres are considered treatable landscape for the purposes of the CalVTP. CAL FIRE has a legal responsibility to provide fire protection on all SRA lands, which are defined based on land ownership, population density and land use (CAL FIRE 2012). SRAs generally exclude densely populated areas, agricultural lands, or lands administered by the federal government. Within the treatable landscape are state and locally managed roadways that would provide access to treatment areas. The proposed CalVTP would annually treat approximately 250,000 acres of SRA lands with a combination WUI fuel reduction, fuel break, and ecological restoration treatments. Implementation of treatment activities would require the short-term use of state and locally managed roadways.

ROADWAY SYSTEM

The three basic types of roadways in the treatable landscape include interstate highways, state routes, and local roadways. Roadways are generally classified according to Federal Highway Administration (FHWA) Functional Classification Guidelines and the designed level of mobility and land access. Local roadways provide the greatest access to adjacent land via driveways and other roadways and are consequently generally smaller than interstate highways and state routes. Other roadway types in the treatable landscape are arterials and collectors. Arterials emphasize a high level of mobility for through movement and consequently have higher capacity and speed with relatively little accessibility to adjacent land. Collectors offer a combination of both functions. The treatable landscape is served directly and/or indirectly by one or more of these roadway types.

LEVEL OF SERVICE DEFINITIONS

Level of service (LOS) is used to rank traffic operation on various types of facilities based on traffic volumes and roadway capacity using a series of letter designations ranging from A to F. Generally, LOS A represents free flow conditions and LOS F represents forced flow or breakdown conditions. A unit of measure that indicates a level of delay for intersections or travel speed for highways generally accompanies the LOS designation. Methods for determining LOS are published in the Highway Capacity Manual (HCM) (Transportation Research Board 2010). Table 3.15-1 summarizes the LOS descriptions for two-lane conventional highways. Table 3.15-2 displays the delay range associated with each LOS category for signalized and unsignalized intersections. All LOS designations are present in the roadways within the treatable landscape.

Table 3.15-1 Two-Lane Conventional Highway Level of Service Definitions

LOS	Traffic Description
A	Motorists experience high operating speeds and little difficulty passing.
B	Passing demand and passing capacity are balanced.
C	Most vehicles travel in platoons and speeds are noticeably curtailed.
D	Platooning increases significantly, passing demand is high.
E	Demand is approaching capacity, passing is virtually impossible, and speeds are seriously curtailed.
F	Demand flow in one or both directions exceeds the segment's capacity. Operating conditions are unstable, and heavy congestion exists.

Source: Transportation Research Board 2016

Table 3.15-2 Intersection Level of Service Definitions

LOS	Description (for Signalized Intersections)	Average Delay (Seconds/Vehicle)	
		Signalized Intersections	Unsignalized Intersections
A	Operations with very low delay occurring with favorable traffic signal progression and/or short cycle lengths.	≤ 10.0	≤ 10.0
B	Operations with low delay occurring with good progression and/or short cycle lengths.	> 10.0 to 20.0	> 10.0 to 15.0
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	> 20.0 to 35.0	> 15.0 to 25.0
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	> 35.0 to 55.0	> 25.0 to 35.0
E	Operations with high delay values indicating poor progression, and long cycle lengths. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	> 55.0 to 80.0	> 35.0 to 50.0
F	Operations with delays unacceptable to most drivers occurring due to over-saturation, poor progression, or very long cycle lengths.	> 80.0	> 50.0

Note: LOS = level of service; V/C ratio= volume-to-capacity ratio

LOS at signalized intersections and roundabouts based on average delay for all vehicles. LOS at unsignalized intersections is reported for entire intersection and for minor street movement with greatest delay.

Source: Transportation Research Board 2016

Tables 3.15-3 shows the generalized service volumes which denote the maximum values that can be maintained and still be within the LOS range, or the maximum volumes that can be achieved for that LOS category. The simplified and generalized roadway segment LOS criteria shown is for rural two-lane highways which would be the primary road type that would provide access to and within treatment areas. LOS for rural highways is largely determined by roadway geometry factors, such as grades, vertical and horizontal curves, and the presence of passing opportunities. In mountainous topography and particularly through canyons, roadway LOS can be relatively poor, even absent substantial traffic volumes. The volume thresholds apply to one direction of travel; and thus, for roadways that are bi-directional, average annual daily traffic should be divided by two.

Table 3.15-3 Rural Two-Lane Highway Level of Service Thresholds

Speed Limit (mph)	Upper Limit Daily Traffic Volume Threshold[1,2]		
	LOS B	LOS C	LOS D
45	3,200	7,700	12,300
50	7,700	12,300	16,900
55	12,300	16,900	21,500
60	16,900	21,500	26,100
65	21,500	26,100	30,700

Notes: mph = miles per hour; LOS = Level of Service.

[1] Assumes a truck percentage of 2 percent

[2] Assumes mountainous terrain

Source: FHWA 2017

PUBLIC TRANSIT

Public transit service is provided by various agencies throughout the state. Local and regional transit organizations offer a variety of transit options, including buses, subways, and light rail. Service is provided with varying frequency and cost. Due to the rural and remote character of much of the transportation network within the treatable landscape, transit service and facilities are likely to be intermittent or absent in many locations within the treatable landscape.

BIKEWAYS AND PEDESTRIAN CIRCULATION

The bicycle and pedestrian network and the applicable plans, policies, and standards are highly variable across regional and local agencies within California. However, agencies typically conform to the Caltrans Highway Design Manual bikeway facility classification system, described as follows:

- **Class I bikeways** are facilities with exclusive right-of-way for bicyclists and pedestrians, away from the roadway and with cross flows by motor traffic minimized. In some areas, pedestrian facilities are separated from the bikeway.
- **Class II bikeways** are bike lanes established along streets and are defined by pavement striping and signage to delineate a portion of a roadway for bicycle travel.
- **Class III bikeways** are shared routes for bicyclists on streets with motor traffic not served by dedicated bikeways to provide continuity to the bikeway network.

PAST AND CURRENT VEGETATION TREATMENTS AND WILDFIRE

Treatments occur within the treatable landscape that result in temporary increases in traffic. As described in Chapter 1, “Introduction,” and Section 2.3.1, “Past and Current Treatments,” vegetation treatment currently occurs around the state under several other wildfire risk reduction programs implemented by various federal, state, and local agencies. In 2017–2018, CAL FIRE treated approximately 33,000 acres in California using the same treatment activities as proposed under the CalVTP.

CAL FIRE does not have data regarding the total trips or VMT for current vegetation treatment. Treatment crews typically originate from the region of the treatment site, as directed by the local CAL FIRE Unit manager. Under existing conditions, crew sizes and equipment hauled to and from treatment sites varies based on treatment location, type, and size. Therefore, due to the lack of data regarding current vegetation treatment activities; the number heavy-vehicle trips to haul equipment and materials, trips associated with the workers commuting to and from the treatment areas, and the associated trip lengths are not known. Thus, the VMT generated by current vegetation treatments cannot be meaningfully quantified, but typically require a small number of trips per day on an individual basis, considering that vegetation treatment projects are generally consistent with construction activities in terms of the temporary nature of activities, trip generation characteristics, and types of vehicles and equipment required.

Wildfire can occur throughout the state and require emergency response in the form of personnel and equipment. In cases where a wildfire exceeds the capacity of a local CAL FIRE unit, emergency resources may be diverted to a wildfire from elsewhere in the state or some cases, elsewhere in the country or internationally (refer to Section 3.9.2 in Section 3.9, "Energy Resources," for examples). Additional VMT results from this wildfire response. During wildfire, the main goal is containment and reducing impacts to human life and property; efficient travel and VMT minimization are not prioritized.

3.15.2 Regulatory Setting

FEDERAL

Federal Highway Administration

FHWA, an agency of the U.S. Department of Transportation, provides stewardship over the construction and preservation of the nation's highways, bridges, and tunnels. FHWA also conducts research and provides technical assistance to State and local agencies to improve safety, mobility, and livability and to encourage innovation in these areas. FHWA also provides regulation and guidance related to work zone safety, mobility, and temporary traffic control device implementation. FHWA regulation and guidance related to work zone safety, mobility, and temporary traffic control device implementation is relevant because it informs the standard project requirements of the proposed CalVTP addressed within this PEIR.

STATE

California Department of Transportation

Caltrans is responsible for planning, designing, constructing, operating, and maintaining the state highway system and ramp interchange intersections. Caltrans is also responsible for highway, bridge, and rail transportation planning, construction, and maintenance.

Environmental planning for transportation improvement projects involving California state highways follow the procedures set forth in the agency's Standard Environmental Reference and Section V of Guidance for Compliance Environmental Handbook. This guidance is intended for transportation-specific improvement projects where Caltrans operates as the CEQA lead agency but can also be used by other agencies, including local agencies, for ideas supplemental to their own procedures.

Caltrans provides guidance to local agencies on assessing the performance of rural roadways to enhance safety, mobility, accessibility and productivity under continued use. Caltrans requires transportation permits for the movement of vehicles or loads exceeding the limitations on the size and weight contained in Division 15, Chapter 5, Article 1, Section 35551, of the California Vehicle Code. Treatment activities would require the short-term use of state and locally managed roadways; and thus, Caltrans guidance and standards specifically related to the performance of rural state roadways and vehicle size and weight limitations would apply to the proposed CalVTP.

California Manual on Uniform Traffic Control Devices

This *California Manual on Uniform Traffic Control Devices* (California MUTCD) is published by the California Department of Transportation (Caltrans) and is issued to adopt uniform standards and specifications for all official traffic control devices in California. Temporary traffic control (TTC) applies when the normal function of the roadway, or a private road open to public travel, is suspended and is intended to provide for the reasonably safe and effective movement of road users through or around TTC zones while reasonably protecting road users, workers, responders to traffic incidents, and equipment. TTC planning provides for continuity of the movement of motor vehicle, bicycle, and pedestrian traffic (including accessible passage); transit operations; and access to property and utilities. TTC plans should be prepared by persons knowledgeable about the fundamental principles of TTC and work activities to be performed, and the design, selection, and placement of TTC devices for a TTC plan should be based on engineering judgment (Caltrans 2019). California MUTCD TTC standards and specifications would apply to TTC or other related plans developed as part of, or in response to the proposed CalVTP.

Transportation Management Plan Guidelines

The Caltrans *Transportation Management Plan Guidelines (2015)* identify the processes, roles, and responsibilities for preparing and implementing Transportation Management Plans (TMPs), as well as useful strategies for reducing congestion and managing work zone traffic impacts. TMP strategies are required for all planned construction, maintenance, and encroachment permit activities within Caltrans right-of-way and requires a Caltrans encroachment permit. A TMP encompasses activities that are implemented to minimize traffic delays that may result from lane restrictions or closures in a work zone. TMP strategies are designed to improve mobility, as well as safety for the traveling public and highway workers. TMP strategies would be required if treatment activities would require a Caltrans encroachment permit. Additionally, TMP guidance will inform the standard project requirements of the proposed CalVTP addressed within this PEIR.

Senate Bill 743

Senate Bill (SB) 743, passed in 2013, required the Governor's Office of Planning and Research (OPR) to develop new CEQA guidelines that address traffic metrics under CEQA. As stated in the legislation, upon adoption of the new guidelines, "automobile delay, as described solely by LOS or similar measures of vehicular capacity or traffic congestion shall not be considered a significant impact on the environment pursuant to this division, except in locations specifically identified in the guidelines, if any."

OPR published its proposal for the comprehensive updates to the CEQA Guidelines in November 2017 which included proposed updates related to analyzing transportation impacts pursuant to Senate Bill 743. These updates indicated that vehicle miles traveled (VMT) be the primary metric used to identify transportation impacts. In December of 2018, OPR published the most recent version of the Technical Advisory on Evaluating Transportation Impacts (December 2018) which provides guidance for VMT analysis. The Office of Administrative Law approved the updated CEQA Guidelines and lead agencies have an opt-in period until July 1, 2020 to implement the updated guidelines.

As noted in the updated guidelines, agencies are directed to choose metrics that are appropriate for their jurisdiction to evaluate the potential impacts of a project in terms of VMT. The guidance provided thus far relative to VMT significance criteria is focused on residential, office, and retail uses which would not apply to the rural and temporary transportation uses that would occur with implementation of CalVTP. For rural land uses, OPR guidance states that projects in rural areas outside of a metropolitan planning organization, as in the case of many locations of the treatable landscape, fewer options may be available for reducing VMT and significance thresholds may be best determined on a case-by-case basis. Additionally, as stated above, lead agencies have until July 1, 2020 to implement the updated guidelines.

LOCAL

When state agencies, including CAL FIRE, are conducting governmental activities under the authority of state law or the State Constitution, in this case, treatments implemented under the proposed CalVTP, they are exempt from local government plans, policies, and ordinances (unless a constitutional provision or statute directs otherwise). Nonetheless, CAL FIRE voluntarily seeks to operate consistently with local governance to the extent feasible. Given its statewide extent and the possible number of local and regional responsible agencies, this PEIR does not identify potentially applicable local government plans, policies, and ordinances.

The transportation metrics and standards set by regional and local agencies and plans are highly variable with respect to LOS. What is considered acceptable delay in a dense urban environment may not be acceptable in a rural environment. Types of local regulations relevant to transportation include City and County General Plans, zoning ordinances, traffic impact analysis guidelines, and associated policies. State law requires cities and counties to adopt general plans, which must contain a transportation element which include goals and policies related to transportation and traffic. Many jurisdictions and regional transportation agencies also have congestion management plans (CMPs) which are used to monitor and manage traffic congestion on roadways that comprise the CMP network.

This PEIR assumes that any vegetation treatments proposed by local or regional agencies under the CalVTP would be consistent with local plans, policies, and ordinances to the extent particular projects are subject to them, as required by SPR AD-3.

3.15.3 Impact Analysis and Mitigation Measures

ANALYSIS METHODOLOGY

The analysis of transportation impacts related to implementation of the CalVTP includes qualitative analysis of temporary traffic operations, bicycle, pedestrian, and transit facilities, hazards, emergency access, and VMT. The analysis is based on details of typical treatment activities, the equipment utilized for treatments, and methods for transporting the equipment. Significance determinations account for the influence of relevant SPRs (i.e., TMPs), which are incorporated into treatment prescriptions and project design and listed below.

- SPR AD-3 Consistency with Local Plans, Policies, and Ordinances: The project proponent will design and implement the treatment in a manner that is consistent with applicable local plans (e.g., general plans), policies, and ordinances to the extent the project is subject to them. This SPR applies to all treatment activities and treatment types.
- SPR HYD-2 Avoid Construction of New Roads: The project proponent will not construct or reconstruct (i.e., cutting or filling involving less than 50 cubic yards/0.25 linear road miles) any new roads (including temporary roads). This SPR applies to all treatment activities and treatment types.
- SPR TRAN-1 Implement Traffic Control during Treatments: Prior to initiating vegetation treatment activities the project proponent will work with the agency(ies) with jurisdiction over affected roadways to determine if a Traffic Management Plan (TMP) is needed. A TMP will be needed if traffic generated by the project would result in obstructions, hazards, or delays exceeding applicable jurisdictional standards along access routes for individual vegetation treatments. If needed, a TMP will be prepared to provide measures to reduce potential traffic obstructions, hazards, and service level degradation along affected roadway facilities. The scope of the TMP will depend on the type, intensity, and duration of the specific treatment activities under the CalVTP. Measures included in the TMP could include (but are not be limited to) construction signage to provide motorists with notification and information when approaching or traveling along the affected roadway facilities, flaggers for lane closures to provide temporary traffic control along affected roadway facilities, treatment schedule restrictions to avoid seasons or time periods of peak vehicle traffic, haul-trip, delivery, and/or commute time restrictions that would be implemented to avoid peak traffic days and times along affected roadway facilities. If the TMP identifies impacts on transportation facilities outside of the jurisdiction of the project proponent, the TMP will be submitted to the agency with jurisdiction over the affected roadways prior to commencement of vegetation treatment projects. This SPR applies to all treatment activities and treatment types.

  Smoke generated during prescribed burn operations could potentially affect driver visibility and traffic operations along nearby roadways. Direct smoke impacts to roadway visibility and indirect impacts related to driver distraction will be considered during the planning phase of burning operations. Smoke impacts and smoke management practices specific to traffic operations during prescribed fire operations will be identified and addressed within the TMP. The TMP will include measures to monitor smoke dispersion onto public roadways, and traffic control operations will be initiated in the event burning operations could affect traffic safety along any roadways. This SPR applies only to prescribed burn treatment activities and all treatment types.

Methodology for Determining VMT Threshold of Significance

Section 15064.3 was added to the State CEQA Guidelines effective December 28, 2018 as part of a comprehensive guidelines update. The section addresses the determination of significance for transportation impacts, which requires that the analysis be based on VMT instead of a congestion metric (such as LOS). The change in the focus of transportation analysis is the result of legislation (SB 743, Statutes of 2013) and is intended to change the focus from congestion to, among other things, reduction in greenhouse gas emissions, encouraging mixed use development, and other factors. Pursuant to State CEQA Guidelines Section 15064.3(c), this change in analysis may be implemented now and is mandated to be addressed beginning July 1, 2020. Because the CalVTP will apply to vegetation treatment projects after the date on which VMT is required to be considered, it is included in the analysis in this PEIR.

SB 743 requirements are most applicable to travel related to urban land uses, such as residential, employment, or commercial development projects; however, requirements are not limited to those types of projects. State CEQA Guidelines Section 15064.3(b) identifies criteria for analyzing the transportation impacts of a project, including land use projects (Section 15064.3(b)(1)) and transportation projects (Section 15064.3(b)(2)). Vegetation treatment projects under the proposed CalVTP are not land use or transportation projects, so neither of these sections apply. However, State CEQA Guidelines Section 15064.3(b)(1) notes that projects that would decrease VMT in the project area as compared to existing conditions should be presumed to have a less than significant effect. State CEQA Guidelines Section 15064.3(b)(3) (Qualitative Analysis) explains that there may be conditions under which a qualitative rather than quantitative analysis of VMT is appropriate. This section states that if existing models or methods are not available to estimate the VMT for the particular project being considered, a lead agency may analyze the project’s VMT qualitatively. Additionally, this section notes that for many projects, a qualitative analysis of construction traffic may be appropriate.

Vegetation treatment projects occur on undeveloped landscapes. They may be located next to urban land uses or in rural locations well outside of metropolitan areas. Due to the variability of the scale and location, the number of vehicle trips and trip lengths are not feasible to precisely predict at this time, but they would typically require a small number of trips per day on an individual basis, considering that vegetation treatment projects are generally consistent with construction activities in terms of the temporary nature of activities, trip generation characteristics, and types of vehicles and equipment required. The Technical Advisory on Evaluating Transportation Impacts (OPR 2018) notes that projects that generate or attract fewer than 110 trips per day generally may be assumed to cause a less-than-significant transportation impact, absent substantial evidence indicating otherwise (OPR 2018). Individual vegetation treatment projects under the CalVTP are likely to generate fewer than 110 trips per day, recognizing that would accommodate up to 50 vehicles bringing crews and equipment to a treatment site in a day (i.e., 100 trips commuting to and from a treatment site each day, plus a few additional incidental trips during the day). Therefore, using OPR guidance, individual vegetation treatments that would generate fewer than 110 trips per day would result in a less-than-significant VMT impact.

The change in VMT considered in this PEIR would be not only for individual treatment projects, but also for the proposed CalVTP program as a whole. Individual treatment projects would contribute to the total annual change in VMT attributable to the CalVTP. The VMT of the total annual program would need to be compared to a different threshold than 110 trips per day, because it comprises many individual vegetation treatment projects carried out each year with locations potentially across much of the state. The Technical Advisory describes no scenario analogous to the overall CalVTP, i.e., where a natural resources management program is proposed to consist of an array of individual, in-field activities on different sites over a broad geography. Inherently, managing trip length is not feasible for such a natural resources management program scenario, because of the variability of location of individual activities, broad geography of the program, and special skill set of vegetation treatment workers. Therefore, qualitative analysis allowed by Section 15064.3(b)(3) provides the most applicable approach for analyzing the change in VMT resulting from implementation of the CalVTP.

Given the absence of a quantitative method or applicable Technical Advisory scenario, this PEIR relies on fundamental CEQA principles for defining a qualitative threshold of significance for VMT. The statutory and regulatory definition of “significant effect on the environment” provides the fundamental principle applicable to thresholds of significance. A significant effect on the environment is defined in CEQA as a “substantial or potentially substantial adverse change in the environment." (PRC Section 21068). For purposes of PRC Section 21100, governing actions for proposed state projects, subpart (a) limits significant effects on the environment to "substantial or potentially substantial adverse changes in physical conditions…" This definition of significant effect on the environment is repeated in Sections 15002(g) in Article 1, General, under Section 15002, General Concepts, and 15382 in Article 20, Definitions. Based on these provisions, this PEIR considers whether an adverse change in physical conditions would occur. In the case of VMT, an adverse change would be an increase in VMT, because statutory environmental policy seeks to decrease VMT. Consequently, a qualitative threshold of no net increase in VMT is used in this PEIR to determine significance of the annual implementation of the CalVTP program. A relative increase in VMT under the CalVTP within the treatable landscape, as compared to existing conditions, is be determined to result in a significant effect on the environment (see listing under Thresholds of Significance, below).

THRESHOLDS OF SIGNIFICANCE

Thresholds of significance are based on Appendix G of the State CEQA Guidelines and professional judgment. The following discussion identifies the thresholds of significance used to assess impacts to the transportation and circulation system from implementation of treatments under the proposed CalVTP.

Implementation of the CalVTP would result in a significant transportation impact if it would:

- conflict with a program, plan, ordinance, or policy addressing roadway facilities;
- result in prolonged road closures;
- conflict with a program, plan, ordinance, or policy addressing bicycle, pedestrian, and transit facilities;
- substantially increase hazards due to a geometric design features or incompatible uses;
- result in inadequate emergency access; or
- result in a net increase in VMT.

ISSUES NOT EVALUATED FURTHER

Implementation of the CalVTP would not alter the physical transportation network surrounding where vegetation treatments would occur. Therefore, the CalVTP would not adversely affect any existing or planned public transit, bicycle, or pedestrian facilities. Additionally, due to the temporary nature of the treatment activities at individual locations, the rural character of much of the transportation network in and around the treatable landscape, and the anticipated dispersion of the individual vegetation treatment sites within the treatable landscape, the project would not generate substantial pedestrian, bicycle, or transit demand. Thus, the project would not conflict with a program, plan, ordinance or policy addressing pedestrian, bicycle, and transit facilities. This issue is not discussed further.

Implementation of the CalVTP would not locate any new development or land uses within the treatable landscape that would require installation of emergency access routes, or alter any existing roadways/emergency access routes. Emergency fire suppression services to ensure safety during prescribed burning would be available onsite during the treatment. Therefore, implementation of the CalVTP would not result in a degradation of emergency access. Additionally, prescribed burns, mechanical vegetation treatments, and manual vegetation treatments would always include between one and ten fire engines on-site during treatment activities. Thus, providing on-site emergency services would ensure that project-specific activities would not result in inadequate emergency access to any areas. This issue is not discussed further.

IMPACT ANALYSIS

Impact TRAN-1: Result in Temporary Traffic Operations Impacts by Conflicting with a Program, Plan, Ordinance, or Policy Addressing Roadway Facilities or Prolonged Road Closures

Vegetation treatments implemented under the CalVTP would adhere to the SPRs that require consistency with local traffic operations policies and standards to the extent the project is subject to them, and would require that a TMP be prepared to manage and minimize potential temporary traffic operations effects resulting from individual vegetation treatment projects. Additionally, effects related to traffic operations during vegetation treatments under the CalVTP would be localized and temporary. Therefore, temporary traffic operations impacts would be **less than significant.**

The implementation of vegetation treatments under the CalVTP would not result in long-term operational increases in vehicular traffic along roadways surrounding vegetation treatment sites because vegetation treatments are temporary in nature. However, vegetation treatment projects under the CalVTP would temporarily increase vehicular traffic along roadways used to access treatment areas. Treatment-related traffic would include heavy-vehicle trips to haul equipment and materials, and trips associated with the workers commuting to and from the treatment areas. The number of haul trips and workers trips to and from the treatment areas would vary based on the size of the area being treated, the type of treatment being implemented, and the duration of the vegetation treatments. Additionally, the vegetative debris produced by mechanical or manual treatments may be processed into several products: electricity, soil additives and amendments, engineered/composite wood, firewood, paper, densified wood, and potentially biofuels. This could result in additional haul truck trips to processing facilities. Due to the variability of the scale, location, and duration of vegetation treatment projects that could be implemented under the CalVTP, the number of trucks, truck routing, number of employees, employee parking, truck idling, lane closures, and a variety of other treatment-related activities are unknown at this time. Therefore, it would be speculative to conduct any type of quantitative analysis.

As shown in Table 3.15-4, between 20 and 45 workers would be necessary for the most labor-intensive vegetation treatment projects under a typical CalVTP scenario, and the hauling of heavy equipment would be limited to the trips needed to get the equipment to and from the individual vegetation treatment areas. These trips would be short-term and in some cases workers meet at off-site and carpool to the vegetation treatment area.

Table 3.15-4 Workers by Treatment Activity

Treatment Activity	Average Workers
Prescribed Burn	45
Mechanical Treatment	20
Manual Treatment	20-40
Prescribed Herbivory	1-2
Herbicide Application	2-4

In some remote areas of the treatable landscape, the circulation network includes roadway facilities with limited lane and shoulder widths, curvilinear alignment, low design speeds, and roadways that pass through mountainous terrain with no available services. In these areas, the hauling of heavy machinery (e.g., bulldozers, excavators) and operation of large trucks occurring along roadways with limited lane width, little or no roadway shoulders, and curvilinear alignment (generally located in rural, remote, and mountainous regions), could potentially result in disruptions to traffic operations along the roadway network. Thus, due to the nature of the study area roadway network and the vehicle trip types generated by vegetation treatment activities, the relatively small number of treatment-generated trips could result in temporary roadway obstructions and degradation of traffic operations at intersections and roadway segments if project-generated traffic is not appropriately planned and managed.

Qualifying projects under the proposed CalVTP would integrate various SPRs into treatment design that would avoid and minimize impacts to traffic operations during implementation of vegetation treatments. SPR TRAN-1 requires that if traffic generated by the treatment activity would result in obstructions, hazards, or delays exceeding applicable jurisdictional standards along access routes for individual vegetation treatments, a TMP will be prepared prior to initiating vegetation treatment activities. The TMP will include measures to avoid and minimize traffic obstructions, prolonged roadway closures, and the degradation of traffic operations (i.e., LOS) along affected roadway facilities, as needed. The scope of the TMP will depend on the type, intensity, and duration of the specific vegetation treatments under the CalVTP. Measures included in the TMP could include (but are not be limited to) notification of vegetation treatments, temporary traffic control signage, and flaggers for lane closures. Additionally, the TMP could include transportation demand management measures such as treatment schedule restrictions, delivery time of day restrictions, and worker commute time restrictions. These measures would promote safe and efficient mobility during vegetation treatments and would avoid or minimize substantial traffic delays resulting from lane or roadway closures. The TMP would also be submitted to the applicable department within the local agency with jurisdiction over the affected transportation facilities.

Additionally, SPR AD-3 requires that treatments be designed and implemented in a manner that is consistent with applicable local plans (e.g., general plans), policies, and ordinances to the extent the treatment is subject to them. With implementation of SPR AD-3, traffic generated by vegetation treatment activities under the CalVTP would comply with local standards and policies including, but not limited to traffic operations standards and policies. Therefore, with implementation of SPR AD-3, the vehicle traffic associated with vegetation treatment activities under the CalVTP would not conflict with local programs, plans, ordinances, or policies addressing the circulation system to the extent the project is subject to them.

Each qualifying vegetation treatment under the CalVTP would be required to adhere to the SPRs identified above that manage and minimize potential effects to traffic operations during treatment activities. Additionally, project-generated effects on traffic operations would be localized and temporary, and the project proponent would prepare and implement a TMP to reduce any temporary transportation effects to the degree feasible. Therefore, no conflict with any program, plan, ordinance, or policy addressing roadway facilities or prolonged road closures would occur and this short-term treatment activity related traffic operations impact would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

Impact TRAN-2: Substantially Increase Hazards due to a Design Feature or Incompatible Uses

Implementation of the CalVTP would not require the construction or alteration of any roadways, and qualifying vegetation treatment projects under the CalVTP would adhere to SPRs that manage and minimize potential hazards due to smoke generated during prescribe burns. The project proponent would prepare and implement a TMP to avoid and minimize temporary transportation impacts. Therefore, vegetation treatment activities would not substantially increase hazards due to a design feature or incompatible uses. This impact would be **less than significant**.

Agencies with the responsibility for roadway design and operation within the treatable landscape all have adopted and enforce roadway design standards. These standards address a variety of roadway elements, including safety and hazards. The use and enforcement of these design standards prevents the development of transportation infrastructure that would substantially increase hazards because of a design feature. The implementation of vegetation treatments under the CalVTP would not require the construction, re-design, or alteration of any public roadways, and vegetation treatments would not occur within any road right-of-way. Additionally, as detailed in SPR HYD-2, project proponents will not construct or reconstruct any new roads (including temporary roads). Thus, the implementation vegetation treatments under the CalVTP would not substantially increase hazards due to a design feature.

Prescribed burning operations would produce smoke and could potentially affect visibility along nearby roadways such that a transportation hazard could occur. Additionally, as detailed above, the roadway network within and surrounding the treatable landscape includes roadways with limited lane and shoulder widths, curvilinear alignment, and that pass through mountainous terrain. Thus, the hauling of heavy machinery (e.g., bulldozers, excavators) and operation of large trucks along such roadways could potentially result in increased transportation hazards due to incompatible uses.

SPR TRAN-1 requires the project proponent to monitor prescribed burning operations and the associated smoke dispersion. Traffic control operations would be initiated in the event burning operations began to affect traffic safety along any roadways. SPR TRAN-1 also requires that if deemed necessary by the treatment manager, a TMP will be prepared prior to initiating vegetation treatment activities if traffic generated by the qualifying project would result in obstructions, hazards, or delays exceeding applicable jurisdictional standards along access routes for individual vegetation treatments. The TMP will include measures to avoid and minimize traffic obstructions and hazards along affected roadway facilities, as needed. The scope of the TMP will depend on the type, intensity, and duration of the specific vegetation treatments under the CalVTP.

Measures included in the TMP could include (but are not be limited to) notification of vegetation treatments, temporary traffic control signage, flaggers for lane closures., and delivery, hauling, and worker commute schedule restrictions. These measures would promote safe and efficient transportation circulation during vegetation treatment projects and would address and plan for any potential transportation hazards resulting from the operation of incompatible vehicles on roadways not designed to accommodate these vehicle classes.

Additionally, as described above, SPR AD-3 requires that treatments be designed and implemented in a manner that is consistent with applicable local plans (e.g., general plans), policies, and ordinances to the extent the treatment is subject to them. Therefore, with implementation of SPR AD-3, traffic generated by vegetation treatment activities under the CalVTP would comply with local standards and policies including, but not limited to any applicable transportation haul and/or oversized trucking requirements. Therefore, with implementation of SPR AD-3, the vehicle traffic associated with vegetation treatment activities under the CalVTP would not conflict with local programs, plans, ordinances, or policies addressing the circulation system to the extent the project is subject to them.

Implementation of the CalVTP would not require the construction, re-design, or alteration of any roadways. Additionally, each qualifying vegetation treatment project under the CalVTP would be required to adhere to the SPRs identified above that manage and minimize potential hazards due to smoke associated with prescribe burns, and the operation of incompatible uses along the roadway network during vegetation treatments. Additionally, project-generated effects to transportation hazards would be localized and temporary, and the project proponent would prepare and implement a TMP to reduce any temporary transportation effects to the degree feasible. Therefore, vegetation treatment activities would not substantially increase hazards due to a design feature or incompatible uses. This impact would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

Impact TRAN-3: Result In a Net Increase in VMT for the Proposed CalVTP

Under the proposed CalVTP, the scale of treatment activities would substantially increase to achieve the annual treatment target of approximately 250,000 acres. With the increase in treatment acreage, the VMT generated by treatment activities in comparison to existing conditions would also increase because many more individual treatment projects would be implemented. A key goal of the CalVTP is to decrease the occurrence and severity of wildfires. Reduced occurrence and severity of wildfires would result in a reduction in response activity and trips, which would be reasonably expected to decrease in VMT over the long term, compared to conditions without the CalVTP. However, it is not feasible to predicting changes in wildfire occurrence and severity sufficiently to quantify potential changes in fire response VMT. Thus, to meet CEQA's mandate of good faith disclosure and to not risk understating potential future impacts in light of the uncertainties, this PEIR classifies this impact as **potentially significant**, because VMT generated by vegetation treatments under the CalVTP would increase in comparison to existing conditions, notwithstanding the potential VMT-reducing effects of reduced wildfire response.

Under existing conditions, vegetation treatments are implemented within the treatable landscape by CAL FIRE and other land management agencies and agencies with land ownership responsibilities. As described in Section 2.3.1 of Chapter 2, "Program Description," CAL FIRE treated approximately 33,000 acres in 2017/2018 and other agencies currently treat additional acres within the treatable landscape. These treatment activities generate a baseline amount of VMT from heavy-vehicle trips to haul equipment and materials, and trips associated with the workers commuting to and from the treatment areas. Additionally, the vegetative debris produced by mechanical and manual treatments is currently hauled by truck to processing facilities.

Under the proposed CalVTP, the scale of these treatment activities would substantially increase to achieve the annual treatment target of approximately 250,000 acres. With the increase in treatment acreage, the VMT generated in comparison to existing conditions would increase. The VMT would vary based on the location, size of the area being treated, the type of treatment being implemented, and the duration of the vegetation treatments. Because the specific locations of CalVTP vegetation treatments, the origin of workers and equipment, and number of crew and vehicles are variable from year to year, VMT generated under the CalVTP cannot be meaningfully quantified. Implementation of the proposed program would increase VMT above current conditions, because the greater proposed scale of vegetation treatments and associated trips. Individual vegetation treatment projects under the CalVTP are likely to generate fewer than 110 trips per day which is generally assumed to cause a less-than-significant transportation impact for specific later activities, as described in the Technical Advisory on Evaluating Transportation Impacts (OPR 2018). Many individual treatment projects would contribute to the overall annual program, so a net increase in VMT would occur for annual implementation of the CalVTP.

A primary objective of the CalVTP is to reduce wildfire risk. Wildfires require an immediate response from emergency personnel and mobilization of equipment. During wildfires that exceed the containment capacity of local resources, personnel from throughout the state (and occasionally nationally and internationally) are dispatched to assist in firefighting. The reduction of VMT is not a primary consideration during wildfires. Rather, protecting human life and property is prioritized. The movement of personnel associated with containment of wildfires results in a surge of VMT associated with vehicle travel. While implementation of treatment activities under the CalVTP cannot ensure that wildfires would not occur due to known or unforeseen factors (e.g., future climate conditions, availability of resources), implementation of the proposed CalVTP is designed to reduce wildfire occurrence and severity and the surge in VMT resulting from increased trip generation and trip lengths associated with response to such events.

When VMT attributable to wildfire response is considered with the VMT from vegetation treatments, it is conceivable that implementation of the proposed program could result in a net decrease in total VMT. This could compensate for the comparatively smaller increase in VMT attributable to increased scale of vegetation treatments, but predicting this outcome with certainty is not feasible.

In summary, due to an intended decrease in the occurrence and severity of wildfires following achievement of the proposed treatment acreage targets under the CalVTP, implementation of the CalVTP could result in a net reduction in VMT in the long term because wildfire response travel could be reduced, resulting in a less-than-significant impact. However, because of the increase in treatment acreage under the CalVTP, VMT associated with treatment activities would increase in comparison to the existing condition. Additionally, there is uncertainty in predicting future wildfire occurrence and intensity; and thus, recognizing uncertainty in future predictions, to meet CEQA's mandate of good faith disclosure (*California Native Plant Society v. City of Santa Cruz, supra*, 177 Cal.App.4th at p. 979) and to not risk understating potential future impacts in light of the uncertainties, this PEIR classifies the VMT impact as **potentially significant**.

Mitigation Measures

Vehicular travel associated with implementation of the CalVTP would primarily originate from the CAL FIRE operational unit, or applicable local operational unit of other project proponent, nearest to where individual vegetation treatments would occur. Mitigation Measure AQ-1 would encourage workers to carpool to work sites, and/or use public transportation for their commutes which could result in the reduction of vehicular trips associated with vegetation treatments; and thus, could potentially reduce VMT. However, due to the rural nature of the majority of the treatable landscape and the required equipment and number of employees (i.e., the primary trip-generators associated with vegetation treatments) associated with each vegetation treatment project, it would not be feasible to reduce VMT generated under the CalVTP beyond encouraging worker to carpool and/or use public transportation (see Mitigation Measure AQ-1 in Section 3.4, "Air Quality"), and the current practice of employing local crews and equipment as available and feasible. Therefore, there is no feasible mitigation available.

Significance after Mitigation

As stated above under the pre-mitigation significance determination, to meet CEQA's mandate of good faith disclosure and to not risk understating potential future impacts in light of uncertainties related to wildfire, this PEIR classifies this VMT impact as **potentially significant and unavoidable**, even though the probability of a net VMT reduction could be reasonably expected to occur in the long term with the intended reduction in wildfire occurrence and severity, and individual vegetation treatments would likely be less than significant pursuant to the thresholds identified in OPR's Technical Advisory on Evaluating Transportation Impacts. Even though the intended outcome would be less than significant, the "potentially significant and unavoidable" determination is necessary under CEQA to disclose in good faith the potential effects related to VMT generated by the program as a whole.

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3.16 PUBLIC SERVICES, UTILITIES, AND SERVICE SYSTEMS

This section describes existing public services, utilities, and service systems within the treatable landscape. The analysis includes a description of the existing environmental conditions including applicable regulatory requirements, the methods used for assessment, and the potential direct and indirect impacts of program implementation on public services, utilities, and service systems.

No comments received on the Notice of Preparation were related to public services. Comments on the Notice of Preparation related to utilities and service systems noted that laws to govern the disposal of organic waste are being developed and they will prohibit debris from prescribed fires from being taken to landfills (see Appendix A). The disposal of solid organic waste is addressed in this section.

3.16.1 Environmental Setting

PUBLIC SERVICES

Fire Protection

<u>California Department of Forestry and Fire Protection</u>

CAL FIRE provides fire protection services to 31 million acres of privately-owned wildlands within the SRA and provides emergency services to 150 counties, cities, and districts in California through mutual aid agreements. CAL FIRE maintains 21 operational units and 812 fire stations that are each designed to address fire suppression over a certain geographic area. Each unit operates within its local jurisdiction and strives to fulfill CAL FIRE's mission, whether it be responding to all-risk emergencies, participating in fire safety education and educating homeowners on how to keep their property fire safe. Staffing levels include 5,300 full-time fire professionals, foresters, and administrative employees; 1,783 seasonal firefighters; 2,750 local government volunteer firefighters; 600 volunteers in prevention; and 4,300 inmates and wards that currently provide 196 fire crews (CAL FIRE 2019).

<u>Local Fire Districts and Departments</u>

Local fire districts and departments provide fire protection and emergency services in the Local Responsibility Area under the jurisdiction of local government entities (i.e., city or county fire departments) outside of the SRA. Within the SRA, these local fire districts and departments provide fire protection through mutual aid agreements or contracts with CAL FIRE for staff and/or funding resources (these are called contract counties).

Law Enforcement

<u>California Department of Forestry and Fire Protection</u>

CAL FIRE provides enforcement of state fire and forest laws through the employment of over 300 law enforcement officers, who are trained and certified in accordance with state standards. Duties of these officers include investigating fire causes, interviewing witnesses, issuing citations and setting up surveillance operations. The officers also provide support to state agencies and local fire and law enforcement with arson, bomb, fireworks, and fire extinguisher investigations, as well as the disposal of explosives.

<u>California Department of Fish and Wildlife Officers</u>

The California Department of Fish and Wildlife officers protect California's diverse resources from poaching and overuse. Wildlife officers investigate reports of violations, collect and preserve evidence, write reports, and testify in court. Wildlife officers are typically assigned to and responsible for enforcing the law in a specific geographical area of the State. They enforce all Fish and Game laws related to hunting, recreational and commercial fishing, trapping, pollution, falconry, and exotic animal laws.

State Park Peace Officers

State Park Peace Officers (Park Rangers) provide law enforcement services within State park land. Pursuant to Penal Code Section 830.02, Park Rangers perform the full range of peace office duties and responsibilities. Duties include patrol, issuing citations, writing reports, making physical arrests, conducting investigations, taking command in emergencies, performing search and rescue activities, and providing emergency medical aid. Park Rangers can also coordinate with other law enforcement and emergency response agencies for additional or specialized support.

Local Sheriff and Police Departments

Law enforcement services within unincorporated county areas are generally provided by county sheriff's departments. Services within incorporated city limits are typically provided by local city police departments. Post-secondary education institutions provide law enforcement services on campuses. In addition, non-governmental entities provide services on private properties such retail centers and commercial centers.

California Highway Patrol

The California Highway Patrol (CHP) provides police protection services along State and interstate highways throughout California, including highways that pass throughout the treatable landscape. CHP provides traffic law enforcement to prevent crime; manages traffic and emergency incidents; assists other public agencies with law enforcement duties; and provides protection to the public, State employees, and State infrastructure. CHP headquarters is located in Sacramento and there are a total of eight CHP Divisions throughout California, including northern, valley, golden gate, central, southern, border, costal, and inland. Each division is charged with patrolling and administering all CHP operations within a specific geographical area.

Schools Districts

Public education is provided by public school districts throughout the State. Students are enrolled in a given school based on age and geographic proximity to a specific school district. Grade levels include pre-kindergarten through 12th grade. Post-secondary education is provided by private and public entities including community colleges, California State Universities, University of California, and technical colleges.

Libraries

Public library services are provided by city and county jurisdictions throughout California. As of 2017, there were a total of 1,119 libraries managed by 194 jurisdictions. Educational programming opportunities include audio materials, electronic collections, print collections, educational workshops, story time, school programs, and internet access (California State Library 2019).

Effects of Wildfire on Public Services

Depending on the scale and location of wildfire incidents local jurisdictions may provide law enforcement services and fire protection services. During emergency situations, school and library facilities may be used as temporary shelters for evacuees and/or command centers for emergency personnel. Emergency operation plans, adopted by city and county jurisdiction throughout the state, typically identify designated emergency shelters and command centers for use in emergency situations.

PUBLIC UTILITIES

Utilities available within the treatable landscape include water supply, wastewater treatment, electric power, natural gas, and telecommunications. Electrical power is generated from a variety of sources, including natural gas, hydroelectric, geothermal, solar, nuclear, and wind. There is a total of 70 electricity service providers in California including seven investor owned utilities, 45 publicly owned utilities, and 18 direct access providers (CEC 2011). Natural gas in California is supplied to consumers by Pacific Gas and Electric, Southern California Gas, San Diego Gas & Electric, Southwest Gas, and several smaller investor-owned natural gas utilities. Telecommunications services within the State are provided by a variety of providers and include wireless services, landline telephone, cable, and internet service providers. Treatments implemented under the Proposed Program would not require the use of grid-sourced electric power, natural gas, or telecommunication services. Water supply and wastewater treatment are described in the subsections below.

Water Supply and Infrastructure

In California, water utility providers are regulated by the California Public Utilities Commission. There are 98 regulated water utility provides throughout the state with over 1.5 million service connections (CPUC 2018). Water-industry infrastructure includes the various components that pump, divert, transport, store, treat and deliver safe drinking water. These may consist of groundwater wells, surface-water intakes, dams, reservoirs, aqueducts, storage tanks, treatment facilities, and pipes. In 2015, California withdrew an estimated 28,759 million gallons of water per day for thermoelectric energy generation, irrigation, public consumption, and industrial use (USGS 2019). Treatment activities under the CalVTP would not require diversion of water in the field. If water is needed during proposed treatment activities, (i.e., for non-shaded fuel breaks on slopes with a 30 percent or less gradient and prescribed burning) fire hydrants are used or the project proponent would transport water to the treatment location via fire engine tanks and water trucks. The water supply source for fire hydrants include municipal water main systems and privately-owned systems. Typically, water trucks are connected to a fire hydrant and filled with water.

Wastewater

In California, 100,000 miles of sanitary sewers and more than 900 wastewater treatment plants manage the approximately 4 billion gallons of wastewater generated every day by the state’s citizens, businesses and visitors. The state’s wastewater collection, conveyance, treatment, reuse and disposal services are provided primarily by a variety of public agencies, including cities, counties, joint powers authorities and special districts such as sanitary, sanitation and community services districts. Where treatment plants are not available or feasible, such as in sparsely populated rural areas, individualized on-site sanitation systems like septic tanks and leach lines are used (Water Education Foundation 2013). Currently implemented treatment activities do not require sanitary sewer connections or access to a septic tank. Depending on the location and duration of vegetation treatment activity, portable restrooms are provided. When provided, waste from onsite portable restrooms is transported offsite for disposal.

Solid Waste

The California Department of Resources Recycling and Recovery (CalRecycle), along with local enforcement agencies, regulates the operation of solid waste facilities. Solid waste refers to garbage, refuse, sludges, and other discarded solid materials resulting from residential activities, and industrial and commercial operations. CalRecycle manages and mitigates the impacts of solid waste on public health and safety and the environment by enforcing compliance with regulations and State minimum standards, through integrated and consistent permitting, inspection, and enforcement efforts (CalRecycle 2019a). There are 133 landfills, 283 composting facilities, and 636 material recovery facilities. In 2016, California generated 76.5 million tons of solid waste and sent about 35.2 million tons to landfills, which translates to a per capita waste disposal of 6.0 pounds per person per day and a recycling rate of 44 percent (CalRecycle 2017).

CalRecycle’s characterization of solid waste contains an organic materials subcategory that includes wastes specifically produced from plants, such as branches, stumps, pruning and trimmings. In 2014, these materials accounted for 767,418 tons, or around 3 percent of statewide waste generated from commercial operations. 56 percent of this waste was diverted to recycling, composting, energy production and 44 percent was disposed of in landfills.

As described in Chapter 1, “Introduction,” and Section 2.3.1, “Past and Current Treatments,” vegetation treatment currently occurs around the state under several other wildfire risk reduction programs implemented by various federal, state, and local agencies. In 2017–2018, CAL FIRE treated approximately 33,000 acres in California using the same treatment activities as proposed under the CalVTP. The organic waste generated from CAL FIRE’s current vegetation treatments are typically not disposed of in landfills. Currently, 70 percent of the organic waste generated during treatment activities is managed on-site by scattering wood material within the treatment boundary, generating unburned wood piles, and blowing wood chips to the ground as mulch. During wet seasonal periods, approximately 25 percent of solid organic waste is pile burned in combination with manual and mechanical treatment activities. The remaining 5 percent is used for biomass power production, as described in the following subsection.

<u>Biomass</u>

Biomass consists of organic materials from plants and animals that can be used as a fuel for energy or processed to create a wide variety of usable products. While the raw material used for biomass feedstocks can come from many of sources, the material that would be generated from CalVTP treatment activities would fall under the specific category of "woody biomass." California currently has infrastructure for the processing of woody biomass for energy production and wood products, including approximately 24 biomass power plants and 77 wood product processing facilities. An additional 15 biomass power plants were reported idle in 2018 (USFS 2018). In 2017, the 24 operational biomass facilities producing electricity accepted over 3.7 million tons of woody biomass. Forest waste accounted for 13 percent of this total and the remainder came from a combination of milling, urban and agricultural wastes as shown in Table 3.16-1[1]. A limiting factor in the amount of forest waste used for electricity generation is the proximity of processing facilities to forests due to the high cost of transporting heavy materials from remote areas. This constraint typically makes forest-sourced feedstocks one of the more expensive options relative to other sources and limits the distance of forest treatment sites to biomass power plants to 50 miles or less in order for projects to have long-term economic viability due to the high cost of transporting woody biomass material from remote locations (UC Berkeley 2019).

Table 3.16-1 Sources of Woody Biomass Used in Electricity Production in California, 2017

Source	Tons	Percentage
Urban (trimmings/pruning)	1,193,909	32
Mill Residue (sawdust, waste lumber)	1,116,881	29
Agriculture (crop residues)	968,426	26
Forests (slashings, deadwood, small-diameter trees)	503,939	13
Total	**3,783,115**	**100**

Source: CalRecycle 2017

Electric utilities in California have relied on biomass power plants to produce electricity for residential and commercial customers since the 1980s. Many of the facilities currently operating were designed in this era and are direct-combustion type plants where biomass feedstock is burned to power steam turbines that generate electricity.

The total number of operational facilities and processed material fluctuates annually based on market demand, changing energy contracts, and processing capacities, but historical data indicates an overall reduction in activity since biomass electricity generation peaked in California in the early 1990s (Forest Climate Action Team 2018, NREL 2000). The decrease in activity is attributed to a variety of regulatory and economic factors. In 2016, Senate Bill 859 was signed into law, requiring the state's electrical utilities to collectively procure 125 MW of electricity from biomass sources, with at least 80 percent of feedstock coming from dead and dying trees from hazard zones. The utility procurement contracts signed in response to this legislation were limited to five-year terms that are set to expire around 2022.

Beyond the direct combustion of woody biomass to produce electricity, there are several other current or proposed products that can be created from biomass, as shown in Table 3.16-2. Technologies have been developed to increase the energy density of woody biomass by converting feedstock into biofuels. Gasification of woody biomass materials through pyrolysis can create a synthesis gas (syngas) that can be used as a fuel source for electricity production. Researchers have also demonstrated the ability to convert woody biomass into renewable transportation fuels that serve as additives or drop-in substitutes for fossil fuels in internal combustion and jet engines (Shelley et al. 2016). The use of biomass as a transportation fuel may have promising market potential, because of the high market value of fuels for transportation, and the availability of credits from California Air Resources Board's (CARB) Low Carbon Fuel Standard Program (Forest Climate Action Team 2018). Although anaerobic digestion cannot be used to decompose

1 In the context of the Utilities and Service Systems analysis in this PEIR, "forest" as presented in CalRecycle 2017 is encompassed within the tree fuel type described in Chapter 2, "Program Description."

woody biomass because of the structural characteristics of wood, the anticipated expansion of anaerobic digestion facilities statewide under SB 1383 (as described later in this section under Impact UTIL-2) may support the formation of a larger market for alternative fuels produced from solid organic waste, including woody biomass.

Woody biomass can also be processed into mass timber, a sustainable construction material for commercial and residential buildings. Mass timber describes pre-fabricated panels and framing planks produced from woody biomass combined with other materials that are engineered for a variety of structural or aesthetic applications in buildings. Accelerating the use of mass timber was recommended by the California Natural Resources Agency to the state legislature in 2017 as a strategy for developing a statewide market to utilize woody biomass removed from high hazard zones (CNRA 2017). A grant program is currently being administered by California's Government Operations Agency to increase the in-state production capacity of mass timber using biomass materials derived from small-diameter, dead and dying trees, which are types that would be removed as part of the CalVTP program (GovOps 2019).

Table 3.16-2 Potential Products Generated from Woody Biomass

Product	Examples	Sector	Market Readiness
Electricity	Direct-combustion, Cogeneration, CHP	Energy	Available
Soil Additives and Amendments	Mulch, Compost, Biochar	Agriculture	Available: Mulch, Compost R&D: Biochar
Engineered Wood	Cross-Laminated Timber, Medium-Density Fiberboard, Particleboard, Veneer Laminated Lumber, Oriented-Strand Board	Construction	Available
Firewood	Firewood and wood chips	Consumer	Available
Paper	Pulp Chips	Manufacturing	Available
Densified Wood	Compressed wood pellets, logs or bricks	Consumer	Available
Biofuels	Synthesis Gas (syngas), Pyrolysis Oil, Producer Gas, Ethanol, drop-in fuels (gasoline/diesel/jet fuel)	Transportation & Energy	R&D

Notes: CHP = Combined Heat and Power, R&D = Research and Development

Source: Ascent Environmental 2019 from Shelly et al. 2016, and White 2010

<u>Composting and Soil Amendments</u>

Compost is a product that results from the controlled biological decomposition of solid organic wastes that are source separated from the municipal solid waste stream. Pursuant to PRC Section 40116, compost includes wood waste that is not hazardous. CalRecycle provides regulatory oversight to compost and mulch providers by enforcing compliance with regulations and State minimum standards. In 2010, 9.3 million tons of material was processed by 130 operating entities. Of the 130 entities, half were composters and the other half were processers/chippers and grinders. Composting facilities process an average of 49,000 tons of woody and green materials per year (CalRecycle 2019b). Additional infrastructure for the processing of organic materials into compost is expected to increase in California in response to CalRecycle's statewide organic waste diversion regulations, which will require the construction of 60 composting facilities, as described in Short-Lived Climate Pollutants (SB 1383) (see State under Section 3.16.2, "Regulatory Setting."

A soil amendment called biochar is created as a byproduct of converting woody biomass into biofuels through pyrolysis (McElligott et al. 2011). Biochar is currently being researched by the University of California (UC) Davis and UC Merced as a soil additive for purposes of carbon dioxide sequestration in support of the *Draft California 2030 Natural and Working Lands Climate Change Implementation Plan* (CalEPA et al. 2019). Successful demonstration of carbon dioxide sequestration potential of this material may provide an additional benefit to the conversion of woody biomass into biofuels.

3.16.2 Regulatory Setting

FEDERAL

No federal laws or regulations related to public services, utilities, and service systems are applicable to the program.

STATE

Public Services

California Fire Code

The California Fire Code is the primary means for authorizing and enforcing procedures and mechanisms to ensure the safe handling and storage of any substance that may pose a threat to public health and safety. The California Fire Code establishes minimum requirements to safeguard the public health, safety, and general welfare from the hazards of fire, explosion, or dangerous conditions in new and existing buildings. The California Fire Code also contains requirements related to emergency planning and preparedness, fire service features, building services and systems, fire resistance–rated construction, fire protection systems, and construction requirements for existing buildings, as well as specialized standards for specific types of facilities and materials.

California Occupational Safety and Health Administration

In accordance with 8 CCR Section 1270, "Fire Prevention," and Section 6773, "Fire Protection and Fire Fighting Equipment," the California Occupational Safety and Health Administration has established minimum standards for fire suppression and emergency medical services. The standards include guidelines on the handling of highly combustible materials; fire hose sizing requirements; restrictions on the use of compressed air; access roads; and the testing, maintenance, and use of all firefighting and emergency medical equipment.

Emergency Response/Evacuation Plans

The State of California passed legislation authorizing the Office of Emergency Services to prepare a Standard Emergency Management System (SEMS) program, which sets forth measures by which a jurisdiction should handle emergency disasters. Non-compliance with SEMS could result in the State withholding disaster relief from the non-complying jurisdiction in the event of an emergency disaster. The preservation of life, property and the environment is an inherent responsibility of local, state, and federal governments. Each jurisdiction within the treatable landscape is required to prepare and implement an emergency operations plan.

Utilities and Service Systems

Sustainable Groundwater Management Act

The Sustainable Groundwater Management Act (SGMA) became law on January 1, 2015 and applies to all groundwater basins in the state (Water Code Section 10720.3). (The SGMA is composed of three separate bills: Senate Bill (SB) 1168, SB 1319, and Assembly Bill (AB) 1739. All three were signed into law by the Governor on September 16, 2014.) By enacting the SGMA, the Legislature intended to provide local agencies with the authority and the technical and financial assistance necessary to sustainably manage groundwater within their jurisdictions (Water Code Section 10720.1). The source of water for treatments implemented under the CalVTP may include groundwater to the extent that a community water system, including its fire hydrants, relies on groundwater. SGMA compliance would be required of the agency or entity providing the water to CAL FIRE and other project proponents.

California Integrated Waste Management Act

The California Waste Management Act of 1989 (AB 939) requires State, County, and local governments to substantially decrease the volume of waste disposed at landfills by the year 2000 and beyond. The Act allows the CalRecycle to use per capita disposal as an indicator in evaluating compliance with the requirements of AB 939. Jurisdictions track and report their per capita disposal rates to CalRecycle. The volume of solid waste produced during treatment activities under the CalVTP would need to comply with requirements for per capita disposal rate.

Short-Lived Climate Pollutant Strategy/Diversion of Organic Waste from Landfills

Short-Lived Climate Pollutant Strategy/Diversion of Organic Waste from Landfills (SB 1383) (Statutes of 2016) established methane emissions reduction targets in a statewide effort to reduce emission of short-lived climate pollutants. In addition, the new law codified CARB's Short-Lived Climate Pollutant Reduction Strategy, to achieve reductions in the statewide emissions of short-lived climate pollutants. As it pertains to activities under the CalVTP, SB 1383 established CalRecycle targets to achieve a 50 percent reduction in statewide disposal of organic waste from the 2014 level by 2020 and a 75 percent reduction by 2025. These reductions would be enforced at the local agency level and will require, beginning in 2022, the construction of approximately 60 composting facilities and 26 anaerobic digestion (AD) facilities. Woody biomass qualifies as an organic waste subject to diversion to comply with SB 1383.

LOCAL

When state agencies, including CAL FIRE, are conducting governmental activities under the authority of state law or the State Constitution, in this case, treatments implemented under the proposed CalVTP, they are exempt from local government plans, policies, and ordinances (unless a constitutional provision of statute directs otherwise). Nonetheless, CAL FIRE voluntarily seeks to operate consistently with local governance to the extent feasible. Given its statewide extent and the possible number of local and regional responsible agencies, this PEIR does not identify potentially applicable local government plans, policies, and ordinances. This PEIR assumes that any vegetation treatments proposed by local or regional agencies under the CalVTP would be consistent with local plans, policies, and ordinances, as required by SPR AD-3.

3.16.3 Impact Analysis and Mitigation Measures

ANALYSIS METHODOLOGY

The analysis of environmental impacts on public services focuses on the potential for physical impacts associated with the provision of new or physically altered governmental facilities, require new or expanded water, wastewater treatment, stormwater, drainage, electric power, natural gas, or telecommunications facilities. The analysis of environmental impacts on utilities and service systems focuses on the potential to exceed water supplies, negatively impact solid waste services, or conflict with federal, State, and local management and reduction statutes and regulations related to solid waste. Significance determinations account for the influence of relevant SPRs, which are incorporated into treatment design and listed below.

- **SPR AD-3 Consistency with Local Plans, Policies, and Ordinances**: The project proponent will design and implement the treatment in a manner that is consistent with applicable local plans (e.g., general plans), policies, and ordinances to the extent the project is subject to them. This SPR applies to all treatment activities and treatment types.
- **SPR UTIL-1: Solid Organic Waste Disposition Plan**. For projects requiring the disposal of material outside of the treatment area, the project proponent will prepare an Organic Waste Disposition Plan prior to initiating treatment activities. The Solid Organic Waste Disposition Plan will include the amount (e.g., tons) of solid organic waste to be managed onsite (i.e., scattering of wood materials, generating unburned piles, and pile burning) and transported offsite for processing (i.e., biomass power plant, wood product processing facility, composting). If the project proponent intends to transport solid organic waste offsite, the Solid Organic Waste Disposition Plan will clearly identify the location and capacity of the intended processing facility, consistent with local and state regulations to demonstrate that adequate capacity exists to accept the treated materials. This SPR applies only to mechanical and manual treatment activities and all treatment types.

THRESHOLDS OF SIGNIFICANCE

Thresholds of significance are based on Appendix G of the State CEQA Guidelines. A treatment implemented under the proposed CalVTP would result in a significant impact on public services, utilities, and service systems if it would:

- result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, to maintain acceptable service ratios, response times or other performance objectives for any of the public services:
    - fire protection,
    - police protection,
    - schools,
    - parks, and
    - libraries.
- require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects;
- have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years;
- result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments;
- generate solid waste in excess of State or local standards or in excess of the capacity of local infrastructure;
- negatively impact the provision of solid waste services or impair the attainment of solid waste reduction goals; and
- comply with federal, State, and local management and reduction statutes and regulations related to solid waste.

ISSUES NOT EVALUATED FURTHER

Implementation of the CalVTP would consist of treatment activities that would modify portions of the treatable landscape to reduce wildfire risk. Treatment activities could include prescribed burning, pile burning, mechanical treatment, manual treatment, prescribed herbivory, and herbicide application. Implementation of treatment activities within the SRA would not directly affect the provision of public services, nor contribute to population growth that could result in a need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, to maintain acceptable service ratios, response times or other performance objectives for public service providers. However, implementation of the proposed CalVTP would result in the creation of new jobs on a localized basis to achieve the targeted increase the pace and scale of vegetation. As described in Section 3.12, "Land Use and Planning, Population and Housing," the number of employment opportunities per CAL FIRE Unit would vary according to the geographic location of and selected treatment activities within the purview of each CAL FIRE Unit or project proponent. Accordingly, the number of new employees would be dispersed over a large geographic area rather than concentrated in the same location. This would disperse pressure on public services such as police, fire, schools, parks, and libraries. Therefore, implementation of the CalVTP would not require the provision of new or physically altered governmental facility, and this issue is not evaluated further.

Treatment activities would not involve development of residential communities or other similar types of development or induce population growth in an area that would require the expansion or construction of water infrastructure, wastewater treatment facilities, or storm drainage facilities. As discussed in Section 2.5.2, "Description of Treatment Activities," implementation of treatment activities would not require connections to electric power, natural gas, or telecommunications facilities. Typically, an impact from construction or expansion of utilities and service systems results when a project induces population growth. As discussed previously, the number of new employees needed to achieve the treatment acreage targets of the CalVTP would be dispersed over a large geographic area rather than concentrated in the same location. This would disperse pressure on existing water infrastructure, wastewater treatment facilities, storm water drainage facilities, electric power, natural gas, or telecommunications facilities. Therefore, implementation of the proposed CalVTP would not require the construction or relocation of existing water, wastewater treatment, storm water drainage, electric power, natural gas, or telecommunications facilities, and this issue is not evaluated further.

Depending on the location and duration of treatment activities, portable restrooms may be provided by project proponents. This would be the only source of wastewater generated by the CalVTP. Portable restrooms would be cleaned periodically, and the waste would be hauled off-site to a wastewater treatment facility for disposal. This service is typically provided by an independent contractor permitted to handle, haul, and dispose of sanitary sewage. Pursuant to 40 CFR Part 403.5, hauled waste must be disposed of at a designated publicly owned treatment facility. Typically, publicly owned treatment facilities are responsible for implementing permit programs for hauled waste and ensure that adequate treatment capacity exists. Because new employees required to implement the CalVTP would be located over a large geographic area such that it would not induce substantial unplanned population growth in any area, the demand for wastewater treatment would be minimal and dispersed. Therefore, wastewater treatment demand would not exceed the capacity of any wastewater treatment provider, and this issue is not evaluated further.

IMPACT ANALYSIS

Impact UTIL-1: Result in Physical Impacts Associated with Provision of Sufficient Water Supplies, Including Related Infrastructure Needs

Implementation of treatment activities within the treatable landscape would require on-site water supplies for fire suppression during prescribed burning activities and for dust control during vegetation removal within non-shaded fuel breaks. Water needed to implement treatments would be minimal. Also, treatment activities would occur over a large geographic area which would disperse pressure on local water providers. Therefore, the increase in demand for water attributable to implementation of the CalVTP would be negligible and would not discernably affect the availability of water supply. This impact would be **less than significant**.

Implementation of the CalVTP would consist of treatment activities to reduce wildfire risk. Treatment activities would include prescribed burning, pile burning, mechanical treatment, manual treatment, prescribed herbivory, and herbicide application. As discussed in Section 3.12, "Land Use and Planning, Population and Housing," implementation of treatment activities in the treatable landscape would not involve development of residential communities or other similar types of development or induce population growth in an area that would increase demand for water. A minimal amount of water would be required for fire suppression during prescribed burning activities and for dust control during vegetation removal within non-shaded fuel breaks. Depending on the location of the treatment activity, water would be supplied (from surface of groundwater by local water providers) via nearby fire hydrants or be transported to remote or undeveloped treatment areas via fire trucks. Treatment activities would occur over a large geographic area which would disperse the minimal demand on local water providers. Therefore, implementation of the CalVTP would not result in a physical impact associated with provision of sufficient water supplies, including related infrastructure needs and this impact would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

Impact UTIL-2: Generate Solid Waste in Excess of State Standards or Exceed Local Infrastructure Capacity

The increase in pace and scale of vegetation treatments under the CalVTP would result in an associated increase in the volume of solid organic waste generated during treatment. The volume of biomass transported offsite to existing biomass power plants, wood product processing facilities, and/or composting facilities for processing would also increase. Although additional infrastructure for the processing of organic materials is expected to be developed in the near future in California in response to waste management statutes, expanded in-state market for wood products, and increasing demand for alternative energy sources, it is too speculative to assume that this growth would occur consistent with the increased pace and scale of vegetation treatments. Therefore, implementation of the CalVTP may generate solid organic waste in excess of infrastructure capacity. Thus, to meet CEQA's mandate of good faith disclosure and to not risk understating potential future impacts in light of the uncertainties, this PEIR classifies this impact as **potentially significant**, notwithstanding the possibility that capacity could increase with the scale of treatments such that it would not be exceeded for most or all individual treatments.

Implementation of treatment activities within the SRA could include prescribed burning, pile burning, mechanical treatment, manual treatment, prescribed herbivory, and herbicide application. These types of activities generate solid organic waste during mechanical and manual vegetation removal, in the form of organic woody biomass. The solid organic waste generated from CAL FIRE's current vegetation treatment activities are not disposed in landfills. Currently, 70 percent of the solid organic waste generated during treatment activities are managed on-site by scattering wood material within the treatment boundary, generating unburned wood piles, and blowing wood chips to the ground as mulch. During wet seasonal periods, approximately 25 percent of solid organic waste is pile burned in combination with manual and mechanical treatment activities. The remaining 5 percent is transported to a biomass facility for processing. Implementation of the proposed CalVTP would increase the pace and scale of vegetation treatments from approximately 33,000 acres per year (as treated by CAL FIRE in 2017/2018) to approximately 250,000 acres per year. This would increase the annual volume of solid organic waste removed during manual and mechanical treatment activities. Depending on the scale and location of the treatment activity, a significant portion of solid organic waste could be managed on-site, and pile burned during wet seasonal periods. Future disposition of solid organic waste could also include; transport to biomass power plants, biorefineries, wood product processing facilities, landfills, and/or composting facilities.

As discussed above, the solid organic waste that would be generated by CalVTP treatment activities is specifically categorized as woody biomass. California currently has infrastructure for the processing of woody biomass for energy production and wood products, including approximately 24 biomass power plants and 77 wood product processing facilities. As shown in Table 3.16-1, wood product processing facilities have the capacity to generate a variety of products from woody biomass including electricity, biofuels, paper, soil additives, and engineered wood. Although the California Natural Resources Agency has recommended the use of mass timber to the state legislature, a widespread market and processing infrastructure is still in early stages of development. With respect to biomass electricity generation, there are several factors that would limit the use of forest-sourced woody biomass in direct-combustion power plants. The number of biomass power plant facilities has declined in the last few decades and many of the existing plants are operating under energy contracts that are set to expire by 2022. Additionally, treatment sites must generally be within 50 miles or less in order for projects to have long-term economic viability because of the high cost of transporting woody biomass material from remote locations. Conversion of woody biomass into biofuels with higher energy densities, with greater portability and increased market value is currently being researched. Biochar byproducts created through the biofuel conversion process are additionally being explored as soil amendments for achieving carbon dioxide sequestration pursuant to state's climate policies.

Solid organic waste generated from treatment activities could also be transported to nearby composting facilities. Currently, there are approximately 130 operating entities in the state with the capacity to process an average of 49,000 tons of solid organic materials per year (CalRecycle 2019b). An additional 60 composting facilities are anticipated to be added in California starting in 2022 in response to statewide solid organic waste diversion regulations mandated under SB 1383 (CalRecycle 2018). These new facilities would create additional capacity to process solid organic waste currently being disposed in landfills, which includes woody biomass waste.

Given large geographic area of the treatable landscape and the variability of organic material produces by different fuel types, it is not possible to quantify the volume of solid organic waste that would be processed offsite, and the specific method or methods of disposition for each project cannot be known at this time. SPR UTIL-1 requires proponents of projects that would transport solid organic waste offsite to prepare a Solid Organic Waste Disposition Plan that identifies the amount (e.g., tons) of solid organic waste to be managed onsite (i.e., scattering of wood materials, generating unburned piles, pile burning, mobile biofuels refinement and/or biochar generation) and transported offsite for processing (i.e., biomass power plant, wood product processing facility, composting). If the project proponent intends to transport solid organic waste offsite, the Solid Organic Waste Disposition Plan will clearly identify the location and capacity of the processing facility, consistent with local and state regulations. Implementation of SPR UTIL-1 would require that disposition of solid organic waste is adequately managed and is not transported to a facility that lacks the processing capacity. However, existing biomass power plants, wood product processing, and composting facilities may not have the capacity to process the amount of solid organic waste that could be generated by CalVTP treatment activities. Although, additional infrastructure and market demand for the processing of organic materials is expected to increase in the near future in response to state regulations, it is too speculative to assume that this growth would occur consistent with the pace and scale of vegetation treatments. Therefore, because of some uncertainty in future predictions related to the solid organic waste processing industry, to meet CEQA's mandate of good faith disclosure (*California Native Plant Society v. City of Santa Cruz*, *supra*, 177 Cal.App.4th at p. 979) and to not risk understating potential future impacts in light of the uncertainties, this PEIR classifies this impact as **potentially significant**, notwithstanding the possibility that capacity could increase with the scale of treatments such that it would not be exceeded for most or all individual treatments.

Mitigation Measures

To reduce the potential for capacity of existing solid organic waste facilities to be exceeded, the amount of material generated during treatments under the CalVTP that requires offsite disposal would have to be reduced or the capacity of infrastructure receiving biomass would need to expand. Reduction of transported biomass would require more debris to be disposed onsite (by chipping or pile burning), which would create adverse impact trade-offs of the risk of excessive mulch from chipping or an increase in smoke emissions from pile burning. Therefore, there would be no feasible measures to adequately reduce the volume of organic waste generated by CalVTP treatment activities.

Significance after Mitigation

An increase in the capacity of local infrastructure to process woody biomass and other organic materials could occur over the next several years. Increased capacity for the processing of woody biomass could be added though a market response to increased supplies of feedstock material and demand for products that can be produced from these materials. The deployment of advanced processing and manufacturing techniques in recent years, such as Aerated Static Piles for composting, gasification for biomass energy conversion, and panelized building materials derived from mass timber are creating new pathways for the disposition of biomass wastes that previously did not exist. On-site chipping and blowing, pile burning or transport to direct-combustion biomass facilities are no longer the only viable options for managing the waste generated from dead and dying vegetation removed for purposes of fire fuels reduction. Technological advancements, state policies and demand for renewable fuel sources are driving a nascent market transformation for biomass that provides additional options for disposition.

A variety of programs have been implemented by state agencies to encourage alternative biomass applications. Since 2014, CalRecycle has invested $63.3 million in grants supporting the development of 14 expanded composting facilities throughout the state, some of which are capable of processing biomass. The California Energy Commission has funded research on gasification technologies for biomass, and two demonstration projects to explore the feasibility and scalability of converting forest-based fuels into renewable gas. The California Natural Resources Agency has also formed a Wood Products Working Group which has provided recommendations on expanding markets for products created from woody biomass derived from vegetation treatment activities. Through these efforts California's solid waste infrastructure may expand and evolve into a system with long-term capacity to manage the woody biomass generated from the activities proposed under CalVTP and other organic wastes generated from statewide landfill waste diversion.

Adequate capacity to process solid organic waste must be developed through a coordinated public agency and private industry response. The success of the private sector in responding to the increase in solid organic waste cannot be predicted due to many external factors that influence investment. Furthermore, there is a geographic consideration inherent to this conclusion that recognizes that market responses do not occur uniformly across the state. This impact assessment uses the threshold of significance from State CEQA Guidelines Appendix G, which indicates that exceeding the capacity of *local* solid waste infrastructure is the primary consideration. While some localities within the state may currently have the requisite infrastructure to process woody biomass or may develop this capacity in the near future in response to the previously mentioned state policies and programs, it cannot be guaranteed, that all localities across the state would develop the capacities to process excess solid organic waste produced from treatment activities within the timeframes of the proposed activities. For this reason, because mitigation is not available, and to not risk understating potential future impacts in light of uncertainties about market response, this PEIR classifies this impact as **potentially significant and unavoidable**, notwithstanding the possibility that capacity could increase with the scale of treatments such that it would not be exceeded for most or all individual treatments. Even though the predicted outcome would be less than significant, the "potentially significant and unavoidable" determination is intended to meet CEQA's mandate of good faith disclosure of all potential effects related solid waste capacity exceedance, in consideration of the program as a whole.

Impact UTIL-3: Comply with Federal, State, and Local Management and Reduction Goals, Statutes, and Regulations Related to Solid Waste

Implementation of the CalVTP would divert solid organic waste generated from treatment activities from solid waste facilities to biomass power plant, wood product processing facility, and/or composting for processing. This would decrease the amount of waste transported to solid waste facilities consistent with AB 939 and SB 1383. Therefore, the impact would be **less than significant**.

Treatment activities implemented under the CalVTP would not involve activities that would generate solid waste. Currently, 95 percent of solid organic waste generated during treatment activities is scattered on-site, or pile burned. Approximately, 5 percent of the solid organic waste is transported to a biomass facility for processing. Implementation of the proposed CalVTP would increase the pace and scale of vegetation treatments from approximately 33,000 acres per year (as treated by CAL FIRE in 2017/2018) to approximately 250,000 acres per year. This would increase the amount of organic waste that would be transported offsite for processing. Pursuant to AB 939, state, county, and local governments are required to decrease the volume of waste disposed at landfills by the year 2000 and beyond. In addition, SB 1383 established targets to achieve a 50 percent reduction in statewide disposal of organic waste from the 2014 level by 2020 and a 75 percent reduction by 2025. Currently, biomass facilities help local governments by diverting 4.3 million tons of low value wood residue for fuel annually (CBEA 2019). SPR UTIL-1 requires the project proponent to prepare a Solid Organic Waste Disposition Plan that identifies the amount of solid organic waste to be transported offsite to biomass power plant, wood product processing facility, and/or composting for processing. This SPR also prohibits solid organic waste generated during vegetation treatments form being transported to a landfill for disposal. Therefore, implementation of the CalVTP would contribute to the amount of organic waste diverted from solid waste facilities consistent with AB 939 and SB 1383 and would be consistent with solid waste reduction goals. This impact would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

3.17 WILDFIRE

This section evaluates the effects of proposed CalVTP implementation on wildfire and wildfire-related risks. The following analysis considers drivers of wildfire risk, and the how the proposed treatments could add to such risks or expose people or structures to wildfire risk. This section also provides background and context on wildfire concepts, such as wildfire regime and wildfire behavior, and wildfire management practices. Information used in this section was obtained from scientific journal articles, reports, and relevant fire and emergency-related plans.

Comments on the Notice of Preparation related to wildfire risk included concern that conditions are too erratic for prescribed burning to be safe and effective, recognition that wildfire ignitions are often human driven, recommendations to use the new 2019 CEQA Appendix G Checklist to address wildfire considerations, and a suggestion that the PEIR address location-specific conditions, particularly the potential for previous fires to limit the spread of subsequent wildfire (see Appendix A). Current conditions, treatment efficacy, and wildfire ignition sources are addressed in Section 3.17.1, "Environmental Setting." The thresholds of significance used for the analysis of wildfire is provided in Section 3.17.3, "Impact Analysis and Mitigation Measures."

3.17.1 Environmental Setting

WILDFIRE BEHAVIOR AND CONTROLLING FACTORS

Wildfire behavior is a product of several variables, primarily weather, vegetation, topography, and human influences, which intermix to produce local and regional fire regimes that affect how, when, and where fires burn. The fire regime in any area is defined by several factors, including fire frequency, intensity, severity, and area burned. Each of these are important for an understanding of how the variables that affect fire behavior produce fire risks. Fire frequency refers to the number of fires that occur in a given area over a given period of time; fire intensity refers to the speed at which fire travels and the heat that it produces; fire severity involves the extent to which ecosystems and existing conditions are affected or changed by a fire; and area burned is the size of the area burned by wildfire.

Human Influence on Wildfire

Human influence on wildfire is broad and can be substantial. It includes direct influences such as the ignition and suppression of fires, and indirect influence through climate change and alterations in land use patterns that support modified vegetative regimes and increased development in the WUI (refer to "Climate Change and Wildfire" below for more discussion on the indirect effect of climate change on wildfire).

Anthropogenic influence more directly controls fire frequency (i.e., number of ignitions) than size of a burn because humans are responsible for most of the of ignitions. Once started, fires spread and behavior become a function of fuel characteristics, terrain, and weather conditions (Syphard et al. 2008). Human-induced wildfire ignitions can change fire regime characteristics in two ways: (1) changing the distribution and density of ignitions, and (2) changing the seasonality of burning activity (Balch et al. 2017). A study of wildfires across the U.S. for the 20-year period between 1992 and 2012 showed that 82 percent of wildfires during that period were started by human causes (Balch et al. 2017), while in California specifically, humans account for starting approximately 95 percent of wildfires (Syphard et al. 2007, Syphard and Keeley 2015). In California in 2016, more than half of all fires were caused by humans; including miscellaneous and undetermined causes, that number increases to 98 percent (CAL FIRE 2016).

Human ignitions include a multitude of sources, including escapes from debris and brush-clearing fires, electrical equipment malfunctions, campfire escapes, smoking, fire play (e.g., fireworks), vehicles, and arson. Consequently, areas near human development, especially in the WUI or in areas near campgrounds and roads, generate fires at a more frequent rate than very remote or urban areas (Syphard et al. 2007, Mann et al. 2016, Balch et al. 2017). Circumstances in California have made the environment particularly vulnerable to human-caused fires with expansion of the WUI and introduction of more people in areas susceptible to wildfire at all times of the year. A 2018 study indicates that the number of houses in the WUI increased nationwide by 41 percent between 1990 and 2010 (Radeloff et al. 2018).

Climate Change and Wildfire

As described in Chapter 1, "Introduction," wildfires are a significant threat in California, particularly in recent years as the landscape responds to climate change and decades of fire suppression. It is estimated that since 1985, more than 50 percent of the increase in the area burned by wildfire in the western U.S. is attributable to anthropogenic climate change (Abatzoglou and Williams 2016). As climate change persists, it will produce increasing temperatures and drier conditions that will generate abundant dry fuels. All wildfires (those initiated by both natural and manmade sources) tend to be larger under drier atmospheric conditions and when fed by drier fuel sources (Balch et al. 2017).

Additionally, climate change has led to exacerbation of wildfire conditions during a longer period of the year as the spring season has warmed—driving an earlier spring snowmelt, and as winter precipitation has overall decreased (Westerling et al. 2006). Further, wildfire activity is closely related to temperature and drought conditions, and in recent decades, increasing drought frequency and warming temperatures have led to an increase in wildfire activity (Westerling et al 2006, Schoennagel et al. 2017). In particular, the western U.S., including California, has seen increases in wildfire activity in terms of area burned, number of large fires, and fire season length (Westerling et al. 2006, Abatzoglou and Williams 2016). These conditions have resulted in the largest, most destructive, and deadliest wildfires on record in California history, several of which occurred in 2018. The 2018 Camp Fire resulted in 85 known deaths, which is more than five times more deaths than the next largest and deadliest fire shown in Table 3.17-1 below (although the Camp Fire was the deadliest fire in recorded history, it is not reflected in Table 3.17-1 because it is not one of the top ten in terms of size). The 2018 Mendocino Complex, the state's largest wildfire, burned 1.5 times as many acres as the next largest fire. Nine of the state's 10 largest wildfires have occurred since 2003 (CAL FIRE 2019).

Table 3.17-1 Largest California Wildfires

Fire Name (cause)	Acres	Date	County
Mendocino Complex (under investigation)	459,123	July 2018	Colusa County, Lake County, Mendocino County & Glenn County
Thomas (powerlines)	281,893	December 2017	Ventura & Santa Barbara
Cedar (human related)	273,246	October 2003	San Diego
Rush (lightning)	271,911 CA/43,666 NV	August 2012	Lassen
Rim (human related)	257,314	August 2013	Tuolumne
Zaca (human related)	240,207	July 2007	Santa Barbara
Carr (human related)	229,651	July 2018	Shasta County, Trinity County
Matilija (undetermined)	220,000	September 1932	Ventura
Witch (powerlines)	197,990	October 2007	San Diego
Klamath Theater Complex (lightning)	192,038	June 2008	Siskiyou

Source: CAL FIRE 2019

In addition to the size and destructiveness of the largest fires, the total number and total acreage of wildfires are also important. While the highly destructive fires attract the most attention in press coverage and public awareness, from the perspective of wildfire risk reduction, it is also critical to understand and address the more frequent and more widespread smaller fires. Total burned acreage in California can be highly variable, from fewer than 150,000 acres in 2010 to more than 1.6 million acres in 2018 (CAL FIRE 2018a, 2018b). Four in the last 12 years have exceed 1.0 million acres (2007, 2008, 2017, and 2018) (CAL FIRE 2018a, 2018b, 2018c). In 2018, there were over 7,500 wildfires in the state during the calendar year (CAL FIRE 2018b).

Climate change will continue to produce conditions that facilitate a longer fire season, which, when coupled with human-caused changes in the seasonality of ignition sources, will produce more, longer, and bigger fires during more times of the year. According to California's Fourth Climate Change Assessment, *Statewide Summary Report* (2018), if GHG emissions continue to rise, the frequency of extreme wildfires burning over 25,000 acres could increase by 50 percent by 2100 and the average area burned statewide could increase by 77 percent by the end of the century (Bedsworth et al. 2018). Refer to Section 3.8, "Greenhouse Gas Emissions," for additional discussion of climate change trends and the effects of climate change on the environment.

WILDFIRE RISK REDUCTION

Historically, humans have intervened deliberately and dramatically in the fire regime through fire suppression and, more recently, actions that affect fuel connectivity. Although an important practice in limiting fire spread, over time, the land management practice of fire suppression combined with forest regrowth after extensive logging in the late 19th century has led to a buildup of forest fuels and an increase in the occurrence and threat of large, severe fires (Westerling et al. 2006), although increased wildfire activity has also been found to be strongly associated with warming temperatures and earlier spring snowmelt (Westerling 2016). More extreme fire conditions can be expected in areas where the time between fires has been extended, unless fuels have been reduced by other means. Human development and suppression can postpone wildfires, but not exclude them, except in unusual circumstances (DOI and USDA 2014). With the expansion of the WUI and the threat that large, severe, intense wildfires pose, fire suppression remains one of the primary management techniques for more than 95 percent of wildfires in the U.S. (Schoennagel et al. 2017). Contemporary fire management practices include fuel management activities that are intended to reduce the intensity and severity of wildfires. Reduced intensity also means that suppression efforts are more likely to be effective and can be conducted more safely in areas where wildfires are unwanted or threaten communities (DOI and USDA 2014). Modern wildfire management practices may also encompass actions targeted at reducing human wildfire ignition through education programs.

Currently, there is much interest among researchers regarding fuel treatment effectiveness across the western U.S. Investigations, including model-based examinations, and associated publications addressing the effectiveness of fuel treatments and fire behavior are robust. However, there are some important data gaps in documenting fuel treatment effectiveness. In part, this is because the uncertainty of wildfire timing and location does not lend itself to a controlled experimental setting within which researchers could predict and measure pre-fire and post-fire conditions, and the available datasets and records of past fire and fuel treatments are not complete and comprehensive (Syphard et al. 2011, Barnett et al. 2016). Although more research to document certain aspects of fuel treatment effectiveness in the scientific literature is needed and ongoing as wildfires continue to increase in frequency, size, severity, and duration, there is consensus on the correlation between certain fuel treatments and wildfire risk; these are discussed in more detail in the subsections that follow.

Vegetation (Fuel) Management

Vegetation treatment is the primary approach to wildfire management, because it can reduce the intensity and severity of wildfire, slowing fire movement and creating favorable conditions for firefighting to protect targeted, high-value resources (Carey and Schuman 2003, Prichard et al. 2010). Fuel reduction has proven successful where it is targeted at protecting specific resources in limited geographic areas, such as in areas of extreme fire danger or in the WUI (Loudermilk et al. 2014). Areas that are treated often exhibit different fire progression characteristics and reduced fire severity from areas that are not treated (Lydersen et al. 2017, Johnson and Kennedy 2019). Reducing fuels through mechanical treatments and prescribed fire have been found to be effective at reducing fire frequency, fire severity, and annual area burned when applied at the landscape scale over an extended period of time (Kim et al. 2013, Martinson and Omi 2013, Prichard and Kennedy 2014, Tubbesing et al. 2019). These effects have also been found to be most effective during extreme weather conditions (i.e., hotter and drier). At these times, there is also a higher likelihood that fires will intersect with treated areas, which contributes to higher effectiveness of those treatments at reducing wildfire behavior and effects (Cassell 2018). Another study found simulated fuel treatments in the Lake Tahoe basin returned the forest to more historic and fire resilient conditions, reduced wildfire risk and severity, controlled wildfire carbon emissions, and in the long run, resulted in a net carbon gain (Loudermilk et al. 2014). In another study, mechanical treatments followed by prescribed burning produced the strongest results, with more resilient forest structures, lower surface fuel loads, and a reduced rate of accumulation of surface fuels (Schwilk et al. 2009).

It has also been found that fuel treatments are most effective when wildfires are driven by typical weather situations where prevailing seasonal conditions of temperature, soil/fuel, and moisture contents are present. In circumstances where extreme weather conditions exist, such as in cases of extremely low humidity and very high winds, fuel treatments are less effective (Brown et al. 2008), particularly when persistently high winds can blow hot embers over long distances. While evidence has not yet definitively concluded that forest fuel treatments lead to a reduction in the overall size of a fire (USFS 2009, Schoennagel et al. 2017), such treatments can aid in protecting public safety and homes and other structures by reducing wildfire intensity and severity in treated areas under normal fire conditions, and increasing firefighting effectiveness (Kalies and Yocom Kent 2016). Where treatments have occurred, the pattern of wildfire progression may be limited in some areas to low-intensity underbrush and surface burning, which can create safe conditions for firefighters to successfully suppress fires in areas near homes or other structures, or around areas of high resource value. Fuel treatments also promote faster forest recovery post-fire by causing less damage to soils and leaving some live vegetation within burn areas (USFS 2009), increasing seedling regeneration (Tubbesing et al. 2019), protecting resources such as soils, wildlife, riparian function, and wetlands (Kim et al. 2013), and reducing drought related tree mortality (Restaino et al. 2019).

One published literature review found that certain treatments, such as hand or mechanical thinning followed by prescribed fire, or prescribed fire alone, are very effective at reducing wildfire severity, and that related ecological impacts are often neutral to positive (Winford et al. 2015). Another published literature review indicates that fuel treatments reduce fire severity, crown and bole scorch, and tree mortality compared to untreated areas. This finding is most applicable to the combination of thinning (manual and mechanical treatments) and prescribed burn treatments. Increased treatment size and intensity (e.g., number of trees removed) can increase the effectiveness of the treatments. Firefighting effectiveness was also reportedly increased by treatments, due to increased visibility in treated areas, decreased heat and smoke of wildfire, increased penetration of retardant to surface fuels, safe access to the fire, and the ability to quickly suppress spot fires in treated areas (Kalies and Yocom Kent 2016).

Other Wildfire Risk Reduction Programs

Treatments to reduce hazardous vegetative fuels are occurring broadly within the treatable landscape, but at a limited pace and scale. As described in Chapter 1, "Introduction" and Section 2.3.1, "Past and Current Treatments," vegetation treatment currently occurs around the state under several other wildfire risk reduction programs implemented by various federal, state, and local agencies. In 2017–2018, CAL FIRE treated approximately 33,000 acres in California using the same treatment activities as proposed under the CalVTP.

As described in Chapter 1, "Introduction," wildfire prevention requires a complex and multifaceted approach. Wildfire prevention can generally be categorized as some combination of hazardous fuel reduction projects (the focus of the proposed CalVTP), fire prevention planning, and fire prevention education. Wildfire prevention programs and hazard reduction efforts by multiple participants, including private landowners, homeowners, non-governmental organizations, as well as local, state, and federal agencies are necessary and must work in concert to maximize effectiveness of all treatments and programs.

Strategies of the Forest Management Task Force

California's Forest Management Task Force was created to protect the environmental quality, public health, and economic benefits that healthy forests provide to California. The Task Force aims to increase the rate of forest treatments and expand state wood product markets through innovation, assistance, and investment. Some of their management goals include expanding the use of prescribed fire across publicly and privately-owned lands and to increase public education and awareness of the importance of forest health and resiliency. Within the Task Force, there are seven subject matter working groups: forest management and restoration, regulations, prescribed fire, landowner education and outreach, wood utilization, tree mortality, and a science advisory panel. Each working group has identified management goals and meets regularly to identify action items, develop initiatives, and share knowledge on current and future efforts related to wildfire prevention (Forest Management Task Force 2019).

Community Wildfire Hazard Reduction Programs

Fire-adapted communities are communities located in a fire-prone area that require little assistance from firefighters during a wildfire. The general elements of a fire-adapted community include (University of Nevada 2010):

- Community protection: well-designed fuel breaks and safe areas.
- Defensible space: proper management of vegetation surrounding the home.
- Access: good access helps emergency responders arrive in a timely manner.
- Evacuation: prepared communities can evacuate safely and effectively.
- Built environment: appropriate home construction and maintenance resists ignitions.

Implementing community wildfire hazard reduction practices is an important component of establishing a fire-adapted community; key practices include establishing defensible space and implementing home hardening features. Homes have become one of the most combustible parts of the landscape and are increasingly vulnerable as development extends into the WUI; in certain cases, trees may survive a fire while a home may burn. California Public Resources Code (PRC) Section 4291, "Clearance Around Structures," requires individual homeowners to clear and remove vegetation around homes and buildings. Compliance with PRC 4291 is required by any person who owns, leases, controls, operates or maintains a building or structure in or adjoining any mountainous area, forest-covered lands, brush-covered lands, grass-covered lands or any land that is covered with flammable material and is within the SRA. PRC 4291 requires 100 feet of Defensible Space (or to the property line if less than 100 feet) from every building or structure that is used for support or shelter of any use or occupancy. CAL FIRE has developed specific defensible space guidelines for homeowners per PRC 4291, to help individual homeowners implement defensible space, as well as implement home hardening techniques.

Wildfire Prevention Education

Wildfire prevention education has also been shown to be another effective form of wildfire risk reduction by successfully reducing the incidence of wildfire (Prestemon et al. 2010). Wildfire prevention education includes methods targeted at reducing accidental, preventable wildfire starts. Such prevention education might include public service announcements on radio or TV, visiting homeowners in at-risk areas, signs, news releases, presentations at public forums, or distributing handouts such as brochures and fliers. Other effective wildfire prevention programs can include enforcement of regulations prohibiting high-risk activities (e.g., fireworks). Wildfire prevention programs can be a cost-effective approach to reducing the incidence of wildfire because it reduces future firefighting costs, which can offset the initial costs associated with implementing these programs (Butry et al. 2010). Fire Safe Councils and their allies (RCDs, watershed groups, communities and residents) are leading the way in public outreach efforts and rely on peer-to-peer outreach and collaboration (Sonoma State University 2018).

Land Use Decision-Making

Another important consideration for wildfire risk reduction is land use decision-making in cities and counties. The authority to approve land uses rests with local government, rather than with the state. Risk of damage, injury, and loss of life can increase by placing structures and occupied land uses in harm's way, when development is approved by cities or counties and implemented by property owners within fire hazard areas. While millions of California residents currently live in very high fire hazard zones, making development decisions to avoid increasing residential uses in these hazard zones has been an important and growing topic for California land use planning. One important tool will be mandated wildfire sections of local general plans. Currently, city and county general plans must include a Public Safety Element, and in the past, there have been no standards to which this element had to be prepared. Recent policy requires that Safety Elements of local general plans must be revised, upon the next update to the Housing Element, to address SRAs and very high fire hazard severity zones (VHFHSZs). The revisions must include information about wildfire hazards, as well as goals, policies, and feasible implementation measures for the protection of the community from the unreasonable risk of wildfire (OPR 2015). The Governor's Office of Planning and Research has developed a technical advisory to help provide a robust fire hazard mitigation program to California communities, including a suite of voluntary recommendations and potential actions local governments can take to reduce community wildfire risk (OPR 2015). In addition, programs have been developed to help local governments reduce wildfire risks, associated costs, and create fire-adapted communities, such as Community Planning Assistance for Wildfire (CPAW). CPAW was developed in response to increasing wildfire risk nationwide and works to help communities become better fire-adapted through improved land use planning (Headwaters Economics 2019). Local land use planning and decision-making will continue to play an important role in community wildfire risk reduction and will need to work in tandem with state and federal efforts to most effectively reduce community wildfire risks.

WILDFIRE REGIME

Three of the four variables controlling wildfire behavior described above (weather, vegetation, and human influence) are rapidly changing in California and elsewhere—changes which are producing a fire regime that is increasingly susceptible to fire danger and gradually becoming more hazardous. Warming, frequent droughts, and the legacy of past management policies, combined with the increase in development and expansion of the WUI, have increased the risk of catastrophic damage during wildfires, which poses a substantial threat and cost to society. Wildfires in California have, consequently, become of increasing concern for Californians, particularly for those who live in or near the WUI, where houses intermingle with natural areas, as they do in areas of the treatable landscape areas. Recent trends have shown an increase in the number of ignitions, area burned, and impacts to ecosystems since 2007. Annually, since 2000, the average annual acres burned in California has more than doubled the average of the 1960s (Board and CAL FIRE 2018). As previously discussed, wildfire frequency and severity in California are anticipated to increase over the next century.

As described in Section 2.4.1 of Chapter 2, "Program Description," the treatable landscape has been divided into three broad categories (referred to as "fuel types") that exhibit similar fire characteristics: tree, shrub, and grass. Refer to Section 2.4.1 for information related to fire spread and frequency for each fuel type. Within the primary fuel types, the tree fuel type occupies approximately 40 percent of the SRA and is the largest of the three groups. The grass and shrub fuel types occupy approximately 38 percent and 22 percent of the total acreage, respectively. The occurrence of fuel types in the SRA are shown in Figure 2-2.

PRESCRIBED BURN PLANNING AND IMPLEMENTATION

Prescribed burning is an existing tool for fire fuel management. Implementing a prescribed burn requires extensive planning, including the preparation of prescription burn plans, smoke management plans (SMPs), site-specific weather forecasting, public notifications, environmental considerations, and ultimately, favorable meteorological conditions which dictate whether a planned burn can move forward on a given day. These planning efforts are required of any agency planning a prescribed burn and are described in more detail below.

Planning a Prescribed Burn

This section describes the planning efforts required of any agency planning prescribed burning activities. Areas proposed for prescribed burning by an agency are typically identified at the beginning of each season. Prescribed burning often occurs in Spring and Fall, and occasionally in Winter, depending on weather conditions. Prior to prescribed burning, fire containment lines are typically established by clearing vegetation surrounding an area proposed for burning to help prevent the accidental escape of fire.

Many factors are considered when deciding to use prescribed burning in an area, including, but not limited to:

- landowner/agency goals for the property,
- topography,
- density of fuels,
- ecological goals,
- use for fuel break maintenance,
- strategic locations for protection of communities and/or forests,

- training goals for agency staff, and
- whether the burn can generally be completed within 1 day.

Burn Plan Prescription

Once areas suitable for prescribed burning are selected, prescriptions (e.g., wind direction, humidity, weather conditions) are developed in conjunction with modeling in a program such as BEHAVE to provide specific parameters for burning. The goal is to conduct understory burns which are safer and minimize long-term damage to vegetation. CAL FIRE and other agencies such as California State Parks typically prepare several areas for burning so that prescribed burning can occur as soon as the required conditions are met.

Specific treatment details are described in a prescription burn plan, which incorporates input from review agencies such as the California Department of Fish and Wildlife, local air pollution control districts, and regional water quality control boards, if necessary. Contents of a prescription burn plan also include the date, location, and description of the area in detail, prescriptive weather requirements, fire behavior modeling (e.g., BEHAVE), the ignition plan (including technique, time of day, and mop-up), a contingency plan, the SMP, public notification plan, a go/no go checklist, and contact information for the burn boss and others in charge of the prescription burn. Appendix PD-2 contains an example Burn Plan.

Smoke Management Plan

Smoke management planning is an integrated state and local effort. Prior to obtaining air district permission to burn, an agency must complete the following steps:

- register their burn with the appropriate air district,
- obtain air district burn permit,
- submit a SMP to the air district, and
- obtain air district approval of the SMP.

The SMP specifies the “smoke prescription,” which is a set of air quality, meteorological, and fuel conditions needed before burn ignition may be allowed. Depending on the size and complexity of the burn, the SMP will contain information such as nearby population centers, acceptable burn ignition conditions, contingency planning, burn monitoring procedures, smoke travel projections (including maps), smoke minimization techniques, and public notification procedures. Once the air district reviews and approves all of the burn requirements, including the burn permit and SMP, an agency may begin making the final preparations for the burn. This includes putting into place all of the resources needed to conduct the burn, notifying the public about the planned timing and specifics of the burn, and obtaining final air district authorization to burn. An agency may contact the air district up to 96 hours before the desired burn time to obtain California Air Resources Board (CARB) or air district forecasts of meteorology and air quality needed to safely conduct the burn. Agencies will continue to work with the air district and the CARB until the day of the burn to update the forecast information. Air district authorization to conduct a prescribed burn is provided to the agency preparing the prescribed burn no more than 24 hours prior to the burn. Appendix PD-2 contains an example SMP.

Prescribed Burn Implementation Procedures Specific to CAL FIRE

Although the following prescribed burning planning efforts are specific to CAL FIRE, each agency that plans and implements prescribed burns has its own set of agency-specific planning tools, planning and safety documents, public notification protocols, and best management practices to reduce risks related to safety, human health, and the environment.

Incident Action Plan

For every prescribed burn, CAL FIRE also requires the preparation of an Incident Action Plan (IAP) that includes communications and emergency protocols, standard best management practices, and emergency procedures. Specifically, an IAP includes the burn dates; burn hours; weather limitations; the specific burn prescription; a communications plan; a medical plan; a traffic plan; and special instructions such as minimizing smoke impacts to specific local roadways. An IAP also assigns responsibilities for coordination with the appropriate air district, such as conducting onsite briefings, posting notifications, weather monitoring during burning, and other burn related preparations. Development and implementation of the IAP establishes clear safety protocols and minimizes risk during prescribed burns.

Public Notification

Prior to implementing a prescribed burn, CAL FIRE also posts burn information such as burn location and the range of dates in which the burn will occur. This information is disseminated to potentially affected communities, typically in newspapers and on community bulletin boards. Sometimes press releases that include television and radio coverage are used, as well as social media platforms such as Twitter, to notify the public of upcoming prescribed burns. If planned burns are near public roads, signs are posted at both ends of the roadway segment where prescribed burning will occur.

Executing a Prescribed Burn

As described in Chapter 2, "Program Description," the CAL FIRE staff required to execute a typical prescribed burn includes an Incident Commander and a large crew. Equipment onsite is determined by the Incident Commander on a case-by-case basis, but typically includes fire engines, large water storage containers, drip torches for ignition, and safety equipment deemed necessary by the Incident Commander (e.g., one Pulaski, which is a hand tool used in firefighting similar to an axe, per vehicle). One crew member is typically assigned to report weather to the Incident Commander every 30 minutes to make sure the burn is staying within its prescription. Also, a 10-hour fuel moisture stick is often used to monitor fuel moisture during a prescribed burn. If conditions ever deviate from the burn plan (also called "going out of prescription") (e.g., winds change direction, humidity decreases), the burn is rescheduled, and crews transition from active burning activities to patrolling and/or extinguishing. In the event a prescribed burn goes beyond the perimeter of its planned area, the crew on-site works to control the escape. For larger escapes, helicopters and air tankers are on standby and may be called in to assist with regaining control.

Mopping up occurs after the prescribed burn and includes extinguishing any smoldering material along a fires' edge, ensuring logs and debris cannot roll across the fire line, making sure all burning fuel is burnt out or is spread or buried to avoids sparks traveling, and clearing all sides of the fire containment line of snags, rotten logs, stumps, singed brush, and low hanging limbs of trees. Crews will monitor the area until the fire is completely out.

3.17.2 Regulatory Setting

STATE

Board of Forestry and Fire Protection

The Board is a Governor-appointed body within CAL FIRE. It is responsible for developing the general forest policy of the state, determining the guidance policies of CAL FIRE, and representing the state's interest in federal forestland in California. Together, the Board and CAL FIRE work to carry out the California Legislature's mandate to protect and enhance the state's unique forest and wildland resources.

The Board is charged with developing policy to protect all wildland forest resources in California that are not under federal jurisdiction. These resources include major commercial and non-commercial stands of timber, areas reserved for parks and recreation, woodlands, brush-range watersheds, and all private and state lands that contribute to California's forest resource wealth. In addition, the Board is responsible for identifying VHFHSZ in the SRA and LRA. Local agencies are required to designate, by ordinance, VHFHSZ and to require landowners to reduce fire hazards adjacent to occupied buildings within these zones (Government Code Sections 51179 and 51182). The intent of identifying areas with very high fire hazards is to allow CAL FIRE and local agencies to develop and implement measures that would reduce the loss of life and property from uncontrolled wildfires (Government Code Section 51176). Fire hazard severity zones throughout the SRA are depicted in **Error! Reference source not found.** of Chapter 1, "Introduction."

PRC Sections 4114 and 4130 authorize the Board to establish a fire plan, which, among other things, determines the levels of statewide fire protection services for SRA lands. The primary goals of the 2018 Strategic Fire Plan for California (Board and CAL FIRE 2018) include both suppression efforts and fire prevention efforts. Government Code Section 65302.5 gives the Board the regulatory authority to evaluate General Plan Safety Elements for their land use policies in the SRA and VHFHSZs, as well as methods and strategies for wildland fire risk reduction and prevention in those areas, which includes projects potentially covered by this PEIR.

2018 Strategic Fire Plan for California

The *2018 Strategic Fire Plan for California* lays out central goals for reducing and preventing the impacts of fire in the state (Board and CAL FIRE 2018). This PEIR provides a framework for CAL FIRE to achieve the goals outlined in the *2018 Strategic Fire Plan* via implementation of a variety of vegetation treatment projects. The goals are meant to establish, through local, state, federal, and private partnerships, a natural environment that is more resilient and human-made assets that are more resistant to the occurrence and effects of wildland fire. The CalVTP is one such strategy that CAL FIRE and the Board employ to achieve those goals and vision. The goals of the *2018 Strategic Fire Plan* include the following:

- improve the availability and use of consistent, shared information on hazard and risk assessment;
- promote the role of local planning processes, including general plans, new development, and existing developments, and recognize individual landowner/homeowner responsibilities;
- foster a shared vision among communities and the multiple fire protection jurisdictions, including county-based plans and community-based plans such as Community Wildfire Protection Plans;
- increase awareness and actions to improve fire resistance of man-made assets at risk and fire resilience of wildland environments through natural resource management;
- integrate implementation of fire and vegetative fuels management practices consistent with the priorities of landowners or managers;
- determine and seek the needed level of resources for fire prevention, natural resource management, fire suppression, and related services; and
- implement needed assessments and actions for post-fire protection and recovery.

CAL FIRE

CAL FIRE is the California Department of Forestry and Fire Protection. It is dedicated to the fire protection and stewardship of over 31 million acres of the state's privately-owned wildlands. In addition, CAL FIRE provides emergency services in 36 of the state's 58 counties via contracts with local governments. PRC Section 4291 gives CAL FIRE the authority to enforce 100 feet of defensible space around all buildings and structures on non-federal SRA lands, or non-federal forest-covered lands, brush-covered lands, grass-covered lands, or any land that is covered with flammable material. PRC Sections 4790 through 4799.04 provide the regulatory authority for CAL FIRE to administer the California Forest Improvement Program. PRC 4113 and 4125 give CAL FIRE the responsibility for preventing and extinguishing wildland fires in the SRA (PRC Sections 4113 and 4125). The PRC, beginning with Section 4427, includes fire safety statutes that restrict the use of equipment that may produce a spark, flame, or fire; require the use of spark arrestors on construction equipment with internal combustion engines; specify requirements for the safe use of gasoline-powered tools in fire hazard areas; and specify fire suppression equipment that must be provided on site for various types of work in fire-prone areas. These requirements would apply to CalVTP treatment activities.

CAL FIRE currently implements vegetation treatments under PRC Sections 4475 through 4495. PRC Sections 4461 through 4471 and 4491 through 4494 authorize CAL FIRE to implement its existing Chaparral Management Program, now known, in part, as the Vegetation Management Program (VMP). In addition, with the 2005 passage of Senate Bill (SB) 1084, the Legislature modified, and in some cases, added language to PRC Sections 4475 through 4480 that:

- broadened CAL FIRE's range of vegetation treatment practices beyond those described for the existing CMP and VMP,
- added a definition of "hazardous fuel reduction," and

- made other changes to the major statutory provisions guiding CAL FIRE's vegetation treatment authorities.

In addition to the *2018 Strategic Fire Plan for California*, individual CAL FIRE Units develop Fire Plans, which are major strategic documents that establish a set of tools for each CAL FIRE Unit to achieve in its local area. Updated yearly, Unit Fire Plans identify wildfire protection areas, initial attack success, assets and infrastructure at risk, pre-fire management strategies, and accountability within their Units' geographical boundaries. The Unit Fire Plan identifies strategic areas for pre-fire planning and fuel treatment as defined by the people who live and work locally. The plans include contributions from local collaborators and stakeholders and are aligned with other plans for the area, such as Community Wildfire Protection Plans.

Executive Order B-52-18

On May 10, 2018, in response to the changing environmental conditions and the increased risk to California's citizens, California Governor Brown issued Executive Order (EO) B-52-18 to support the state's resilience to wildfire and other climate impacts, to address extensive tree mortality, increase forests' capacity for carbon capture, and to improve forest and forest fire management. The Executive Order requires the California Natural Resources Agency, in coordination with the Board, CAL FIRE, and other agencies, to increase the pace and scale of fire fuel treatments on state and private lands. EO B-52-18 commits $96 million in additional state funds to for these efforts and calls for doubling the land actively managed through vegetation thinning, prescribed burning, and restoration from 250,000 to 500,000 acres per year to reduce wildfire risk.

Senate Bill 1260

On February 15, 2018, Governor Brown signed SB 1260, which aims to help protect California communities from catastrophic wildfire by improving forest management practices to reduce the risk of wildfires in light of the changing climate. It recognizes that prescribed burning is an important tool to help mitigate and prevent the impacts of the wildfire and includes provisions that encourage more frequent use of prescribed fire in managing California's forest lands. SB 1260 also includes provisions for this PEIR to serve as the programmatic CEQA coverage for future prescribed burns within the SRA.

Senate Bill 901

Senate Bill 901 boosts government fire protection efforts by $1 billion over the next five years. CAL FIRE will oversee those funds, generally divided into two categories: $165 million per year for fire prevention grants to landowners and for community prevention efforts, and $35 million to continue CAL FIRE's prescribed burning, research, and monitoring. Landowners will have new permission to help reduce overgrowth by cutting down small and mid-sized trees.

Emergency Response and Evacuation Plans

The State of California Emergency Plan was adopted on October 1, 2017 and describes how state government mobilizes and responds to emergencies and disasters in coordination with partners in all levels of government, the private sector, non-profits, and community-based organizations. The Plan also works in conjunction with the California Emergency Services Act and outlines a robust program of emergency preparedness, response, recovery, and mitigation for all hazards, both natural and human-caused. All local governments with a certified disaster council are required to develop their own emergency operations plan (EOP) for their jurisdiction that meet state and federal requirements. Local EOPs contain specific emergency planning considerations, such as evacuation and transportation, sheltering, hazard specific planning, regional planning, public-private partnerships, and recovery planning (Cal OES, 2017). Because the treatable landscape is located dispersed within the state, its spans the jurisdiction of several local and regional EOPs.

LOCAL

When state agencies, including CAL FIRE, are conducting governmental activities under the authority of state law or the State Constitution, in this case, treatments proposed under the CalVTP, they are exempt from local government plans, policies, and ordinances (unless a constitutional provision or statute directs otherwise). Nonetheless, CAL FIRE voluntarily seeks to operate consistently with local governance to the extent feasible. Given its statewide extent and the possible number of local and regional responsible agencies, this PEIR does not identify potentially applicable local government plans, policies, and ordinances. Types of local regulations relevant to reducing wildfire risk may include city and county general plan policies, zoning ordinances, CAL FIRE Unit or Contract County Fire Plans (described below), and local EOPs. This PEIR assumes that any vegetation treatments proposed by local or regional agencies under the CalVTP would be consistent with local plans, policies, and ordinances, as required by SPR AD-3.

Contract County Fire Plans

In most cases, the SRA is protected directly by CAL FIRE; however, in Kern, Los Angeles, Marin, Orange, Santa Barbara and Ventura counties, SRA fire protection is provided by the counties under contract to CAL FIRE. Known as "Contract Counties," they protect 3.4 million acres of SRA, most of which is in the treatable landscape. CAL FIRE provides funding to the six counties for fire protection services including wages of suppression crews, lookouts, maintenance of firefighting facilities, fire prevention assistants, pre-fire management positions, dispatch, special repairs, and administrative services. The funds also support infrastructure improvements and expanded firefighting needs when fires grow beyond initial attack. Similar to the Unit Fire Plans discussed above, Contract Counties develop and annually update their own Fire Plans to establish a set of tools for a Contract County to achieve in its local area.

3.17.3 Impact Analysis and Mitigation Measures

ANALYSIS METHODOLOGY

The analysis of environmental impacts on wildfire risk focuses on the potential for new or increased risks associated with wildfire, including impairment of an emergency response plan, exposing people or structures to uncontrolled fire, and post-fire risks such as slope instability or landslides. Significance determinations account for the influence of relevant SPRs, which are incorporated into treatment design and listed below.

- **SPR AD-3 Consistency with Local Plans, Policies, and Ordinances**: The project proponent will design and implement the treatment in a manner that is consistent with applicable local plans (e.g., general plans), policies, and ordinances to the extent the project is subject to them. This SPR applies to all treatment activities and treatment types.
- **SPR AQ-3 Create Burn Plan**: The project proponent will create a burn plan using the CAL FIRE burn plan template for all prescribed burns. The burn plan will include a fire behavior model output of First Order Fire Effects Model and BEHAVE or other fire behavior modeling simulation and that is performed by a qualified fire behavior technical specialist that predicts fire behavior, calculates consumption of fuels, tree mortality, predicted emissions, greenhouse gas emissions, and soil heating. The project proponent will minimize soil burn severity from broadcast burning to reduce the potential for runoff and soil erosion. The burn plan will be created with input from a qualified technician or certified State burn boss. This SPR applies only to prescribed burning treatment activities and all treatment types.
- **SPR HAZ-2 Require Spark Arrestors**: The project proponent will require mechanized hand tools to have federal- or state-approved spark arrestors. This SPR applies only to manual treatment activities and all treatment types.
- **SPR HAZ-3 Require Fire Extinguishers:** The project proponent will require tree cutting crews to carry one fire extinguisher per chainsaw. Each vehicle would be equipped with one long-handled shovel and one axe or Pulaski consistent with PRC Section 4428. This SPR applies only to manual treatment activities and all treatment types.
- **SPR HAZ-4 Prohibit Smoking in Vegetated Areas:** The project proponent will require that smoking is only permitted in designated smoking areas barren or cleared to mineral soil at least 3 feet in diameter (PRC Section 4423.4). This SPR applies to all treatment activities and treatment types.
- **SPR GEO-3 Stabilize Disturbed Soil Areas:** The project proponent will stabilize soil disturbed during mechanical and prescribed herbivory treatments with mulch or equivalent immediately after treatment activities, to the maximum extent practicable, to minimize the potential for substantial sediment discharge. If mechanical or

prescribed herbivory treatment activities could result in substantial sediment discharge from soil disturbed by machinery or animal hooves, organic material from mastication or mulch will be incorporated onto at least 75 percent of the disturbed soil surface where the soil erosion hazard is moderate or high, and 50 percent of the disturbed soil surface where soil erosion hazard is low to help prevent erosion. Where slash mulch is used, it will be packed into the ground surface with heavy equipment so that it is sufficiently in contact with the soil surface. This SPR only applies to mechanical and prescribed herbivory treatment activities and all treatment types.

- **SPR GEO-4 Erosion Monitoring:** The project proponent will inspect treatment areas for the proper implementation of erosion control SPRs and mitigations prior to the rainy season. Additionally, the project proponent will inspect for evidence of erosion after the first large storm or rainfall event (i.e., ≥ 1.5 inches in 24 hours) as soon as is feasible after the event. Any area of erosion that will result in substantial sediment discharge will be remediated. This SPR applies only to mechanical and prescribed burning treatment activities and all treatment types.
- **SPR GEO-5 Drain Stormwater via Water Breaks:** The project proponent will drain compacted and/or bare linear treatment areas capable of generating storm runoff via water breaks using the spacing and erosion control guidelines contained in Sections 914.6, 934.6, and 954.6(c) of the California Forest Practice Rules. Where waterbreaks cannot effectively disperse surface runoff, including where waterbreaks cause surface run-off to be concentrated on downslopes, other erosion controls will be installed as needed to comply with 14 CCR 914 [934, 954]. This SPR applies only to mechanical, manual, and prescribed burn treatment activities and all treatment types.
- **SPR GEO-8 Steep Slopes**: The project proponent will require a Registered Professional Forester (RPF) or licensed geologist to evaluate treatment areas with slopes greater than 50 percent for unstable areas and unstable soils. If unstable areas or soils are identified within the treatment area, are unavoidable, and will be potentially directly or indirectly affected by the treatment, a licensed geologist (P.G. or C.E.G.) will determine the potential for landslide, erosion, of other issue related to unstable soils and identity measures (e.g., those in SPR GEO-7) that will be implemented by the project proponent such that substantial erosion or loss of topsoil would not occur. This SPR applies only to mechanical treatment activities and WUI fuel reduction, non-shaded fuel breaks, and ecological restoration treatment types.

THRESHOLDS OF SIGNIFICANCE

Thresholds of significance are based on Appendix G of the State CEQA Guidelines. A treatment implemented under the proposed CalVTP would result in a significant impact related to wildfire if it would:

- impair an adopted emergency response plan or emergency evacuation plan;
- due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire;
- require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines, or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment; or
- expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes.

ISSUES NOT EVALUATED FURTHER

The proposed CalVTP would be implemented on approximately 250,000 acres annually within the treatable landscape to reduce the size, number, and frequency of damaging fires and reduce losses to life, property, and natural resources. One of the treatment types proposed includes the installation of fuel breaks within strategically located areas to support fire-control activities. Because the CalVTP includes the installation of fuel breaks, the associated potential temporary and ongoing impacts to the environment are evaluated throughout Chapter 3 of this PEIR. No other infrastructure (such as roads, emergency water sources, power lines, or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment are proposed under the CalVTP. Therefore, this issue is not discussed further.

As discussed in Section 3.10, "Hazardous Materials, Public Health, and Safety," and Section 3.15, "Transportation," implementation of the CalVTP would not alter potential emergency evacuation routes or impair an adopted emergency plan. This issue is not discussed further.

The proposed CalVTP does not include any new housing or other land uses where the public would congregate; there would be no new project occupants that could be exposed to pollutant concentrations from a wildfire or the uncontrolled spread of as wildfire as a result of the CalVTP. However, there is a risk of exposing existing receptors to smoke from prescribed burning, including when the prescribe been deviates from the prescription; this is addressed in Impact AQ-1 and Impact AQ-4 in Section 3.4, "Air Quality." The potential to expose people to the uncontrolled spread of wildfire by exacerbating wildfire risks while implementing the CalVTP is addressed in Impact WIL-1 below.

IMPACT ANALYSIS

Impact WIL-1: Substantially Exacerbate Fire Risk and Expose People to Uncontrolled Spread of a Wildfire

Vegetation treatment activities under the CalVTP could result in temporary risks associated with uncontrolled fire from prescribed burning, as well as from the use of vehicles and heavy machinery in the treatable landscape as each can increase the risk of an accidental wildfire ignition. However, several SPRs would be implemented to reduce the risk of uncontrolled spread of fire from treatment activities. Machine-powered hand tools would have federal- or state-approved spark arrestors (SPR HAZ-2); vegetation treatment crews would carry one fire extinguisher per chainsaw and one long-handle shovel and one axe or pulaski (SPR HAZ-3); and smoking would only be permitted in designated smoking areas with barren or cleared mineral soil to at least 3 feet in diameter (SPR HAZ-4). In addition, given the extensive preparation and planning prior to a prescribed burn (e.g., preparation of a SMP and Burn Plan), active monitoring and maintenance during a prescribed burn, and implementation of stringent safety protocols, prescription burning would not substantially exacerbate fire risk that could result in the uncontrolled spread of wildfire. Furthermore, one of the main objectives of the proposed CalVTP is reduce the frequency and severity of future uncontrolled wildfire. This impact would be **less than significant**.

Vegetation treatment activities could result in temporary risks associated with uncontrolled fire from prescribed burning, as well as from the use of vehicles and heavy machinery in the treatable landscape as each can increase the risk of an accidental wildfire ignition. As summarized in Chapter 2, "Program Description," several SPRs would be implemented to reduce the risk of uncontrolled spread of a wildfire from treatment activities. Machine-powered hand tools would have federal- or state-approved spark arrestors (SPR HAZ-2), which prevent the emissions of flammable debris. Vegetation treatment crews would carry one fire extinguisher per chainsaw and one long-handle shovel and one axe or pulaski (SPR HAZ-3), to quickly respond to an ignition should one occur. Additionally, smoking would only be permitted in designated smoking areas with barren or cleared mineral soil to at least 3 feet in diameter (SPR HAZ-4), which would help to minimize the risk of accidental wildfire ignition. Therefore, it's unlikely that the presence and use of vehicles and equipment needed to implement the treatment activities would substantially exacerbate fire risk resulting in the uncontrolled spread of wildfire.

As discussed in Section 3.17.1 under "Prescribed Burn Planning and Implementation," implementing a prescribed burn requires extensive planning, including the preparation of prescription burn plans, SMPs, site-specific weather forecasting, public notifications, safety considerations, and ultimately favorable weather conditions so a burn can occur on a given day. Prior to implementing a prescribed burn, fire containment lines are established by clearing vegetation surrounding the designated burn area to help prevent the accidental escape of fire. During a prescribed burn, fire engines, large water storage containers, and safety equipment deemed necessary by the Incident Commander (e.g., one Pulaski per vehicle) are on-site. One crew member is assigned to report weather to the Incident Commander every 30 minutes to make sure the burn is staying within its prescription. If conditions ever deviate from the burn plan (also called "going out of prescription"), the burn is rescheduled, and crews transition from active burning activities to patrolling and extinguishing. In the event a prescribed burn goes beyond the perimeter of its planned area, hand crews and fire engines are on-site to control the escape. In the event of a large escape (which is rare), helicopters and air tankers are on standby and may be called in to assist with regaining control and other CAL FIRE firefighting resources can be mobilized. Therefore, given the extensive planning and preparation before a prescribed burn, active monitoring and maintenance during a burn, and implementation of safety protocols, prescription burning would not substantially exacerbate fire risk or result in the uncontrolled spread of wildfire.

In the long term, as one of the primary purposes of the program, implementation of the treatment activities under the CalVTP would reduce wildfire risk. Fuel reduction activities in the WUI would consist of strategic removal of vegetation to prevent or slow the spread of wildfire between structures and wildlands and vice versa. Fuel breaks would create zones of vegetation removal and ongoing maintenance, to help passively interrupt the path of a fire or slow its progress and to support fire suppression by providing responders with a staging area and access to remote locations for fire control actions. Ecological restoration would focus on restoring ecosystem processes, conditions, and resiliency by modifying uncharacteristic wildland fuel conditions to reflect historic vegetative composition, structure, and habitat values. Therefore, to the extent the treatments reduce wildfire risk, implementation of the CalVTP would have a beneficial impact related to wildfire over the long-term and would not exacerbate fire risk. This impact would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

Impact WIL-2: Expose People or Structures to Substantial Risks Related to Post-Fire Flooding or Landslides

The proposed CalVTP does not include new housing nor would it result in substantial unplanned population growth. Therefore, it would not place people or structures in an area with risks related to post-wildfire flooding or landslides. Prescribed burning implemented under the proposed CalVTP would be low severity and typically retain substantial vegetation, thereby maintaining stability of the soil. In addition, SPRs GEO-3, GEO-4, GEO-5, GEO-8, and SPR AQ-3 would be incorporated into qualifying projects under the CalVTP to stabilize disturbed soils from treatments to minimize erosion (SPR GEO-3), inspect treatment areas for evidence of erosion after prior to the rainy season and following the first large rainfall event (SPR GEO-4), drain stormwater via water breaks to reduce stormwater runoff (SPR GEO-5), minimize soil burn severity during prescribed burns which would help to retain vegetation to stabilize the soil (SPR AQ-3), and require that a registered professional forester or licensed geologist evaluate treatment areas for potential issues with instability and modify treatments to account for instability issues (SPR GEO-8). Therefore, prescribed burning under the CalVTP would not expose people or structures to substantial risks from post-prescribed burning landslides or flooding. Furthermore, one of the primary purposes of the CalVTP is to reduce the frequency and severity of wildfire. Therefore, the intended wildfire risk reduction achieved with implementation of the CalVTP could also result in a reduction in the associated post-wildfire risk of landslides and flooding. The impact would be **less than significant.**

As described in Chapter 3.12, “Land Use and Planning, Population and Housing,” Impact LU-2, the CalVTP does not include new housing nor would it result in substantial unplanned population growth. Therefore, it would not place people or structures in areas with risks related to post-wildfire flooding or landslides.

As described in Section 3.7, “Geology, Soils, Paleontology, and Mineral Resources,” Impact GEO-2, moderate to high severity wildfire can greatly increase the likelihood of debris sliding and debris flows as well as loss of soil hydrologic function by sealing pores and degradation of soil structure and productivity. As a result, subsequent rainstorms after wildfire can produce flash floods and debris flows, which can impact people or structures these are located below an area that has burned. However, fires that burn with low severity maintain soil cover, mineralize important nutrients from plant matter stored on the soil surface, reduce fuel loads that could possibly otherwise lead to future high-severity burns, and stimulate the growth of herbaceous vegetation, which helps to facilitate nutrient cycling.

Prescribed burning under the CalVTP would be low severity and typically retain approximately 70 percent of vegetation, including root systems. Therefore, areas would remain stable post prescribed burning, and no major changes to drainage or runoff would be expected. In addition, SPRs GEO-3, GEO-4, GEO-5, GEO-8, and SPR AQ-3 would be incorporated into qualifying projects under the CalVTP projects to stabilize disturbed soil areas from treatments to minimize erosion (SPR GEO-3), inspect treatment areas for evidence of erosion before the rainy season and following the first large rainfall event (SPR GEO-4), drain stormwater via water breaks to reduce stormwater runoff (SPR GEO-5), minimize soil burn severity during prescribed burns which would help to retain vegetation to stabilize the soil (SPR AQ-3), and require that a registered professional forester or licensed geologist evaluate treatment areas for potential issues with instability and modify treatments to account for instability issues (SPR GEO-8). Therefore, prescribed burning under the CalVTP would not expose people or structures to substantial risks from post-prescribed burning landslides or flooding. Furthermore, to the extent the treatments reduce wildfire risk, they would decrease the risk of landslides and flooding in areas that could otherwise burn in a high severity wildfire without treatment.

With the implementation of SPRs, people and structures would not be exposed to substantial risks from post-fire landslides or flooding with the implementation of the CalVTP, and the impact would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

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