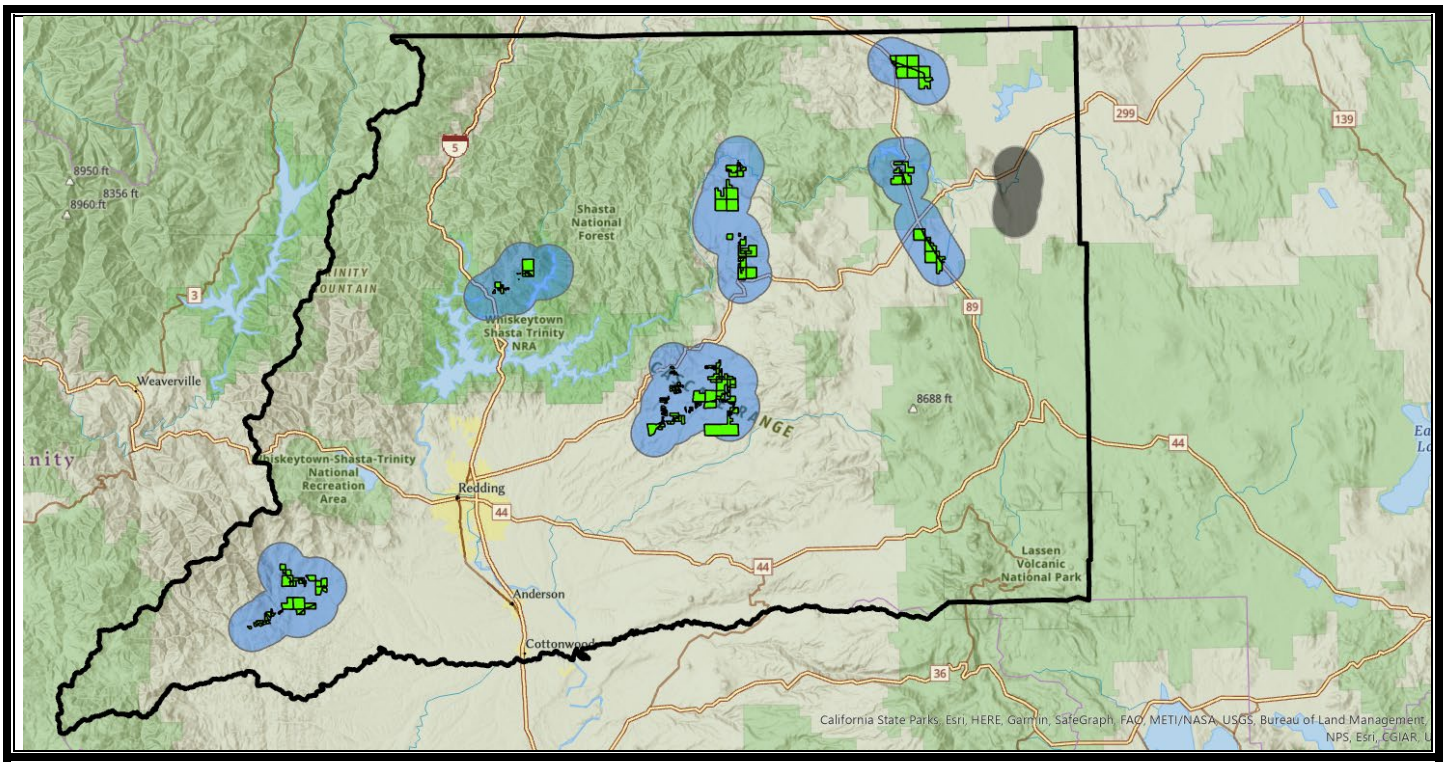
FINAL - Initial Study-Mitigated Negative Declaration
for the
Shasta County Wildfire Mitigation/Hazardous Fuels Reduction Project
Shasta County, California
Under Grant # 5293

State Clearing House Number 2023120622



prepared by:

VESTRA Resources, Inc.
5300 Aviation Drive
Redding, CA 96002
for The McConnell Foundation
Under Grant # 5293_PJ0349

September 21, 2023

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STAGE OF CEQA DOCUMENT DEVELOPMENT

☐ **Administrative Draft.** This California Environmental Quality Act (CEQA) document is in preparation by California Department of Forestry and Fire Protection (CAL FIRE) staff.

☐ **Public Document.** This completed CEQA document has been filed by CAL FIRE at the State Clearinghouse on February 6th, 2024 and is being circulated for a 30-day state agency and public review period. The review period ends on March 8th, 2024.

☒ **Final CEQA Document.** This final CEQA document contains the changes made by the Department following consideration of comments received during the public and agency review period. The CEQA administrative record supporting this document is on file, and available for review, at CAL FIRE's Sacramento Headquarters, Environmental Protection Program.

INTRODUCTION

This initial study-mitigated negative declaration (IS-MND) describes the environmental impact analysis conducted for the proposed project. This document was prepared for CAL FIRE staff utilizing information gathered from a number of sources including research, field review of the proposed project area and consultation with environmental planners and other experts on staff at other public agencies. Pursuant to § 21082.1 of CEQA, the lead agency, CAL FIRE, has prepared, reviewed, and analyzed the IS-MND and declares that the statements made in this document reflect CAL FIRE's independent judgment as lead agency pursuant to CEQA. CAL FIRE further finds that the proposed project, which includes revised activities and mitigation measures designed to minimize environmental impacts, will not result in a significant effect on the environment.

REGULATORY GUIDANCE

This IS-MND has been prepared for CAL FIRE to evaluate potential environmental effects that could result following approval and implementation of the proposed project. This document has been prepared in accordance with current CEQA Statutes (Public Resources Code §21000 *et seq*.) and current CEQA Guidelines (California Code of Regulations [CCR] §15000 *et seq*.)

An initial study is prepared by a lead agency to determine if a project may have a significant effect on the environment (14 CCR § 15063(a), and thus, to determine the appropriate environmental document. In accordance with CEQA Guidelines §15070, a "public agency shall prepare…a proposed negative declaration or mitigated negative declaration…when: (a) The initial study shows that there is no substantial evidence…that the project may have a significant impact upon the environment, or (b) The initial study identifies potentially significant effects but revisions to the project plans or proposal are agreed to by the applicant and such revisions will reduce potentially significant effects to a less-than-significant level." In this circumstance, the lead agency prepares a written statement describing its reasons for concluding that the proposed project will not have a significant effect on the environment and, therefore, does not require the preparation of

an environmental impact report. This IS-MND conforms to these requirements and to the content requirements of CEQA Guidelines § 15071.

PURPOSE OF THE INITIAL STUDY

CAL FIRE has primary authority for oversight of the proposed project and is the lead agency under CEQA. The purpose of this IS-MND is to present to the public and reviewing agencies the environmental consequences of implementing the proposed project and to describe the adjustments made to the project to avoid significant effects or reduce them to a less-than-significant level. This disclosure document is being made available to the public and reviewing agencies for review and comment. The IS-MND is being circulated for public and state agency review and comment for a review period of 30 days as indicated on the ***Notice of Intent to Adopt a Mitigated Negative Declaration*** (NOI). The 30-day public review period for this project begins on February 6th 2024, period ends on March 8th, 2024.

The requirements for providing an NOI are found in CEQA Guidelines §15072. These guidelines require CAL FIRE to notify the general public by providing the NOI to the State Clearing House for posting, sending the NOI to those who have requested it, and utilizing at least one of the following three procedures:

- Publication in a newspaper of general circulation in the area affected by the proposed project,
- Posting the NOI on- and off-site in the area where the project is to be located, or
- Direct mailing to the owners and occupants of property contiguous to the project.

CAL FIRE will post the NOI on- and off-site at:

- Big Bend Post Office 30487 Hot Springs Rd, Big Bend, CA 96011 (5293)
- Montgomery Creek Post Office 30346 State Highway 299 E, Montgomery Creek, CA 96065
- Oak Run Post Office 27600 Oak Run to Fern Rd, Oak Run, CA 96069
- CAL FIRE Shasta-Trinity Unit Headquarters, 875 Cypress Ave., Redding, CA 96001
- Lakehead Post office 20856 Antlers Rd Lakehead, CA 9605
- Burney Post Office 20655 Commerce Way Burney, CA 96013
- Fall River Mills Post Office 43294 CA-299 E Fall River Mills, CA 96028
- McArthur Post Office 44160 1 CA-299 E Ste McArthur, CA 96056
- Igo Country Store 6490 Placer Rd Igo, CA 96047
- Platina Post Office 4554 CA-36 W Platina, CA 96076

If submitted prior to the close of public comment, views and comments are welcomed from reviewing agencies or any member of the public on how the proposed project may affect the environment. Written comments must be postmarked or submitted on or prior to the date the public review period will close (as indicated on the NOI) for CAL FIRE's consideration. Written comments may also be submitted via email (using the email address that appears below), but comments sent via email must also be received on or prior to the close of the 30-day public comment period. Comments should be addressed to:

Ben Rowe
Shasta-Trinity Unit Forester
RPF No.

CAL FIRE
875 Cypress Ave.
Redding, CA 96002
Phone: (530) 225-2432
Email: SacramentoPublicComment@fire.ca.gov

After comments are received from the public and reviewing agencies, CAL FIRE will consider those comments and may (1) adopt the mitigated negative declaration and approve the proposed project; (2) undertake additional environmental studies; or (3) abandon the project.

Project Description and Environmental Setting

PROJECT LOCATION

The project includes hazardous fuel reduction on private property within Wildland Urban Interface (WUI) areas in Shasta County. The project site includes 11 Project Activity Areas (PAAs) throughout Shasta County adjacent to public roadways. The general location of each PAA within Shasta County is included in Figure 1 of Attachment A. Individual PAAS are shown in Figures 2 through 12. Maximum potential acreage, number of parcels, and landowners for each PAA are included in Table 1. The final acreage and number of parcels included in the project will be determined based on landowner participation and the environmental, operational, or physical constraints of each parcel. The maximum potential acreage to be treated would be 6,291 acres. The number of acres that will receive treatment and number of participating landowners will be less than the maximum extent of the PAAs. PAAs may be removed from the project if too few landowners choose to participate. At the time of preparation of this document, the acreage on which landowner participation was obtained was 3,899 acres.

Table 1
PROJECT ACTIVITY AREA (PAA) SUMMARY

Project Activity Area	Maximum Potential Acres	Maximum Number of Parcels	Maximum Number of Landowners
Oak Run Road	831	124	82
Oak Run to Fern Road	688	104	69
Phillips Road	707	88	65
Gilman Road	369	87	65
Big Bend Road	1,515	103	46
Highway 89 Cassel Road	261	13	3
Cassel Fall River Road	272	145	118
State Route 89 SP	140	25	14
McArthur Road	353	14	2
Rainbow Lake Road	506	67	45
Platina Road	649	39	29

The project will not include work in areas with slopes over 65 percent or in areas with highly erosive soils on slopes greater than 50 percent. In addition, the project will include a 75-foot setback from perennial streams and wetlands and a 50-foot setback from intermittent and ephemeral streams. Prior to project implementation, special treatment zones (STZ) will be identified for known cultural resources within the project area. Dredge tailings, areas treated

previously by another party will not be included in the project. These constraint areas will be identified and treatment prescription (TP) for each individual parcel within the PAAs modified prior to project implementation.

BACKGROUND AND NEED FOR THE PROJECT

The McConnell Foundation (TMF) has been awarded a Fire Prevention Grants funded with Cap-and-Trade auction proceeds appropriated by the California Department of Forestry and Fire Protection (Cal Fire) and a wildfire mitigation grants by the California Governor's Office of Emergency Services (Cal OES) to manage hazardous vegetation under the Hazard Mitigation Grant Program (HMGP). The grants will be used to perform hazardous fuel treatments in 11 Project Activity Areas (PAAs) of widths varying between 100 and 400 feet from the roadway centerline on each side. The PAAs include critical transportation routes for ingress and egress during emergencies within high-priority Wildland Urban Interface (WUI) areas in Shasta County.

The geographic scope of the project was determined by prioritizing the areas where fire prevention activities would have the greatest impact on community safety. Work elements included in the project either are contained in *Shasta County's Community Wildfire Protection Plan* or have been identified by the CAL FIRE Unit battalion chief as projects that would protect rural communities or that are essential to evacuation routes for a large number of people. Project selection criteria were based on operational need, communities at risk, ingress and egress routes, fire history and risk of ignition.

PROJECT OBJECTIVES

The objective of the project is to reduce hazardous fuel along critical transportation routes within high -priority Wildland Urban Interface (WUI) areas in Shasta County. Through hazardous fuel reduction and roadside fuel treatment, the project will lessen the probability of moderate-to-high-severity wildfires spreading into and through WUI areas. Reducing the probability of WUI wildfires will reduce loss of life and personal injury, increase effective ingress and egress, and protect critical facilities, essential services, infrastructure, continuity of government operations, and public and private property.

The goals identified for the project include:

- Reduce the number and intensity of wildfires and suppression costs
- Increase public safety
- Increase safe ingress and egress for public and firefighters
- Increase water quantity and maintain water quality from managed watersheds
- Decrease the potential for damage from flooding, siltation, and landslides
- Protect and improve soil productivity and decrease erosion over the long term
- Improve wildlife and fisheries habitat
- Improve woodlands through fire management and regeneration
- Establish and maintain desired plant communities
- Improve air quality over the long-term
- Decrease the risk to firefighters and other responders during wildland fires

Other benefits include the following:

- Protection of cultural resources
- Protection of ecosystem services such as water quality, flood control, green infrastructure, wildlife habitat, soil structure and carbon sequestration
- Provision of a safer working environment for firefighters by reducing fire severity, intensity, and rate of spread, allowing them to more effectively combat catastrophic wildfires

PROJECT START DATE

Spring 2024

PROJECT DESCRIPTION

The proposed action consists of removing ground and ladder fuels up to 400 feet from each side of the PAA roadway centerlines, thinning trees to reduce crown closure, removing dead and dying trees within 100 to 200 feet of serviceable roadways, and after removal activities, applying herbicide at regular intervals to control the future regrowth of unwanted vegetation and maintain an understory canopy without fire-prone fuels.

Work will focus on improving forest health, including vegetation management, forest undergrowth reduction and biomass utilization. Treatment will focus on reducing vertical and horizontal continuity of fuels; removing competition from small, closely spaced, fire-vulnerable species; and promoting a smaller number of resilient larger trees. Generally, living trees will be spaced to a distance of greater than 30 feet. These fuel reduction treatments will allow roadways to serve as areas where fire intensity decreases and can act as strategic locations to deploy firefighting resources in the event of fire, hampering fire's ability to jump roadways. Both mechanized and manual techniques will be deployed for the removal of fuels. Areas that would be heavily disturbed by equipment or stacked logs would be reseeded with sterile cover crops or mulched with certified weed-free rice straw or wheat straw. Fuel reduction, biomass disposal, herbicide treatment and site restoration activities are described in greater detail below.

The treatment contractor will conduct the hazardous fuel reduction techniques appropriate for each individual parcel. A Preliminary Site Assessment (PSA) will be conducted on each eligible parcel to identify water courses, special-status species and habitat, cultural resources, or any other obstacles to be avoided. An individual Treatment Prescription (TP) will be developed for each parcel based on the Preliminary Site Assessment.

Commercial sized trees will be included in the thinning operations. Commercial sized logs may be left for the property owner of each parcel to sell appropriately or will be sold by the treatment contractor to offset project costs Property owners who elect to sell commercial sized logs will be required to submit and receive approval of an appropriate Timber Harvest Document per the California Forest Practice Rules prior to any timber operations, pursuant to Title 14 California Code of Regulations.

Hazard Fuel Reduction

Fuel reduction will use mechanized or manual techniques. The mechanized technique will involve the use of heavy machinery and equipment such as track hoes, track chippers, track equipment with masticator heads, and logging equipment. The manual technique will involve the use of hand

crews equipped with chainsaws and other field-deployable equipment. The mechanized technique may cover more acreage per day, but its use is limited by slope, access, seasonal consideration, and similar limitations that do not apply to the manual technique. Mechanical treatment will not occur on slopes of 65% or greater or whenever site conditions require handwork. The general contractor(s) or subcontractors will determine which technique or combination of techniques will be appropriate for each PAA following the Preliminary Site Assessment.

Mechanical Treatment
Mechanical treatment is effective for removing dense stands of vegetation and is typically used in shrub and tree fuel-removal operations. Mechanical treatments are generally the most cost effective and are the preferred treatments under the project. Mechanical treatments that may be used during the project include:

- Mastication (track, rubber tire or skid steer mounted)
- Logging and skidding
- Bucket and boom
- Chipping and grinding

Manual Treatment
Manual treatment would involve the use of hand tools and hand-operated power tools to cut, clear, or prune herbaceous and woody species. Activities could include the following:

- Removing trees and undesirable species with chainsaws, lopper, or pruners
- Pulling, grubbing, or digging out root systems of undesired plants to prevent sprouting and regrowth
- Placing mulch around desired vegetation to limit competitive growth
- Hand piling for burning

Ground disturbance from manual treatments is typically less than mechanical treatment within an equivalent area. Manual treatments will be used in sensitive habitats such as riparian areas, on steeper slopes, within constrained areas (biological or archeological), and in areas that are inaccessible to vehicles and around structures.

Biomass Disposal

Biomass waste generated is anticipated to include:

- Removal of woody debris up to 6 inches in diameter, woody debris, commercial and non-commercial trees at an undesired density as determined by a registered professional forester, or supervised designee
- Green plant material from thinning and brush residuals
- Cut shrubs, branches, and saplings.
- Branches and logs from dead or mortally diseased trees.
- Felled trees.

On-Site Disposal
Some residual biomass from treatment activities may be left in place for habitat, erosion control or other purposes. Biomass that is of a size and constitution suitable for chipping will be disposed of on-site to the extent that it is feasible to do so without compromising the objective of reducing fire risk and fuel load. Such biomass will be handled in the following manner:

- Green waste will be cut or chipped
- Logs and large branches, free of smaller branches and leaves., will be cut into pieces and material will be masticated, chipped or lopped and scattered per Forest Practice hazard reduction requirements.
- Chipped waste will be disposed where appropriate in a manner that suppresses invasive plant and weed growth and helps stabilize soil in steep terrain. In no case will chipped material be spread greater than 2 inches.
- Green waste piles will not be placed in Defensible Space Zones (they will be moved to other areas within open lands).
- Green waste from branches and logs from dead or mortally diseased trees, particularly those that might be infected with sudden oak death, will not be chipped. But will be left to decompose in place help prevent spread of disease.

Key points for the above parameters include spreading to a depth of 2 inches and avoiding piling around remaining trees.

Off-Site Disposal

Strategic use of biomass that is removed from the site can divert material from decay and open-pile burning that landowners currently do.; this will produce greenhouse gas reduction benefits outside of the forest. Use of this material can provide renewable electricity and potentially biofuels, offsetting consumption of fossil fuels. The project will use biomass facilities as a first option for the disposal of woody biomass generated by project activities. Several biomass facilities are located in Shasta County in the Anderson and Burney areas. Biomass will be delivered to the nearest facility where economically and contractually feasible to reduce transportation-related emissions. Delivery of biomass material (chips and or/logs) is estimated at a rate of 0.5 loads per acre on 40 percent of the acreage. Any income generated from Off-Site Biomass operations will be reported and used to offset project costs.

Herbicide Treatment

Most or all treatment areas will need some level of pre-treatment with herbicide prior or post to biomass removal. A secondary herbicide treatment prescription will be applied where fuel reduction work has been completed. The treatment prescription will be determined by California a Licensed Pest Control Advisor (PCA) and will target the control of fire-prone and invasive vegetation. Treatments will be prescribed by a PCA during periods of the year when species are most vulnerable and will promote restoration of native or desired plant communities that reduce the potential for accumulating excessive fuel loads and increased wildfire hazards.

All herbicide applications for this project will be conducted using hand-backpack equipment. Only the following herbicides will be used onsite (unless otherwise specified by a PCA):

- Glyphosate (Rodeo/ Roundup)
- Triclopyr (Garlon 4/Vastlan)
- Imazapyr (Arsenal/Chopper)
- Aminopyralid (Milestone)

For work between 50 and 200 feet of a wetland or waterbody, herbicides will be restricted to glyphosate-based herbicides that are approved by the EPA for use around water (e.g., Rodeo), per

FEMA Best Management Practices.

The use of cut stump treatment is allowed, but is discouraged around residential properties where non-target vegetation may be affected through root-to-root contact.

All work will be conducted by Licensed Pest Applicators. Due to the nature of the project, licensed applicators must have either a *right-of-way* or *landscape certification* (i.e. forestry alone is insufficient).

Glyphosate
Glyphosate, known by the common name of Roundup or Rodeo, is the most commonly used broad-spectrum, non-selective systemic herbicide in the United States. It is categorized as a phosphonomethyl amino acid. Some varieties are also used to control aquatic plants. It kills both broadleaf plants and grasses and works by preventing plants from making certain proteins that they need for plant growth. It is absorbed through the leaves and is translocated throughout the plant. Glyphosate concentrates in the meristem tissue where it stunts growth, malforms and discolors leaves, and causes death. It has very low toxicity to birds and mammals. It is moderately toxic to fish. The typical half-life of glyphosate in soil is 47 days. It is relatively unaffected by light. Surfactants can help improve the efficacy of glyphosate. Colorants and dyes that are agriculturally approved may be added to this product.

Triclopyr
Triclopyr, known by the common names of Garlon 4 and Vastlan, is one of the most commonly used selective systemic herbicides. It is used to control woody and herbaceous broadleaf plants with little to no impact on grasses. It works by mimicking the plant growth hormone auxin and causes uncontrolled and disorganized plant growth and allows the cell walls to separate causing vascular tissue destruction and death. Triclopyr is slightly toxic to fish, birds, and mammals. The typical half-life of Triclopyr is 30 days. It degrades readily in the sunlight. The Garlon formulation can be highly volatile and must be applied in cool temperatures with no wind. The Vastlan formulation is more stable and may be used at higher temperatures. A surfactant should be added to increase efficacy.

Imazapyr
Imazapyr, known by the common names of Arsenal and Chopper, is a non-selective herbicide which can control grasses, broadleaves, vines, brambles, shrubs, trees, and riparian emergent species. It is categorized in the herbicide family as Imidazolinone and works by inhibiting plant growth by preventing synthesis of branched-chain amino acids. It translocates in the xylem and phloem to meristematic tissues where it inhibits the enzyme that is required for plant growth. Imazapyr has a low toxicity to mammals, birds, fish, or invertebrates but can cause damage if gotten in the eye. The typical half-life of Imazapyr is one to five months. It rapidly degrades in sunlight. Imazapyr is not readily volatile; however, in increased temperature, the potential for volatility increases. A surfactant should be added to increase efficacy.

Aminopyralid
Aminopyralid, also known as Milestone, is a broad-spectrum herbicide used to control

noxious, poisonous, and invasive broadleaf weeds – especially thistle and clovers. It is intended for rangeland pastures and non-cropland areas. It is categorized as a pyridine carboxylic acid and provides residual weed control. It works by affecting the growth process by causing uneven cell division when it mimics the plant growth hormone auxin. It disfigures and cracks stems and leaves, killing the plant. Aminopyralid is virtually non-toxic to birds, fish, mammals, and aquatic invertebrates but can cause eye damage if exposure occurs. There are no grazing restrictions with this herbicide. The average half-life of Aminopyralid in soil is 40 days. It is highly water soluble and the half-life in water is 15 hours. It is not significantly degraded by sunlight. A surfactant should be added to increase efficacy. Aminopyralid is non-volatile and is considered a *reduced risk* herbicide by the EPA.

Surfactants

Surfactants are added to herbicides to improve performance and reduce application problems. Surfactants are surface-active agents and they aid by increasing the spreading and wetting properties of herbicide liquids. They improve retention and penetration and generally work by reducing surface tensions and increasing the amount of herbicide that reaches the target site. Nonionic surfactants work well with glyphosate, while petroleum oil-based surfactants inhibit glyphosate performance. Surfactants that are oil based are more effective for annual grasses or weeds with waxy cuticles. It is important to select the proper surfactant for the proper herbicide. All surfactants are good dispersing agents and have low toxicity to plants and animals.

Site Restoration

Some degree of ground disturbance will be caused by the machinery and equipment that will be used with any mechanized techniques. Disturbance will be addressed to ensure that additional risks (erosion and slope destabilization) do not occur. Grass seeding, slash packing or other appropriate erosion control or slope stabilization techniques will be deployed on any site where site inspection determines that disturbance would likely lead to an increased risk of erosion or slope stabilization. The technique to be used will be site-specific and will be implemented by hand crews in areas that are sensitive to soil stabilization issues. The determination of risk will be based on:

- Exposure of the disturbance
- Soil type disturbed
- The capability of the soil to support germination of grass seeding
- Timeframe (proximity to the rainy season)
- Proximity of the disturbance to a water course

Project Schedule

Project activities will be limited to the hours of 7:00 a.m. to 7:00 p.m. during weekdays and 8:00 a.m. to 5:00 p.m. on Saturday and Sunday.

Best Management Practices

Applicable Best Management Practices (BMPs) included in the FEMA *Programmatic*

Environmental Assessment, Recurring Actions in Arizona, California, and Nevada (December 2014). The BMPs included in EA document applicable to the project are listed in Checklist and Discussion section of this document. The treatment contractor will be required to adhere to these BMPs during project implementation.

ENVIRONMENTAL SETTING OF THE PROJECT REGION

The project site includes areas adjacent to critical transportation routes for rural communities located throughout Shasta County in the wildland urban interface (WUI).

DESCRIPTION OF THE LOCAL ENVIRONMENT

The project includes 11 Project Activity Areas (PAAs) located throughout Shasta County. The location of each PAA within the County is included in shown in Figure 1. A Description of the Local Environment within each PAA is described in this section. Individual PAAs are shown in Figures 2 through 12. PAAs included in this grant project include: Big Bend, Fall River Cassel Road, Gilman Road, Highway 89 SP, Highway 89/Cassel Road, McArthur Road, Platina Road, Rainbow Lake Road, Oak Run Road, Oak Run to Fern Road, and Phillips Road.

OAK RUN ROAD

The Oak Run Road PAA includes areas adjacent to Oak Run Road west of the community of Oak Run to the intersection of Highway 299. The Oak Run Road PAA is shown in Figure 2. Oak Run Road is a primary emergency access and evacuation route for properties on Oak Run, Fern, and Phillips Road. Portions of the PAA contain dense vegetation encroachment immediately adjacent to the roadway.

General Plan designations within the PAA include N-H-40: Habitat Resource 40-Acre Density, N-H-80: Habitat Resource 80-Acre Density, RA: Rural Residential A, RB: Rural Residential B, and MU: Mixed Use (Shasta County 2022). Zoning designations for parcels within the PAA include: R-L: Limited Residential, U: Unclassified, PD: Planed Development, HP-BA-40: Habitat Protection District- 40-Acre Minimum, U-IMR: Unclassified-Interim Mineral Resource, R-R-T-BA-5: Rural Residential-Mobile Home District- 5-Acre Minimum, HP-BSM: Habitat Protection District- Building Site Minimum, HP-BA-80: Habitat Protection District- 80-Acre Minimum, EA-AP: Exclusive Agricultural District-Agricultural Preserve District (Shasta County 2022). General Plan designations and Zoning designations for the PAA are shown on Figure 13 and Figure 14, respectively.

The PAA is located within the Cow Creek Watershed (HUC8 18020151) (CDFW 2022a). The PAA does not have any mapped 100-year flood plains and is not within a groundwater basin (CDFW 2022a, FEMA 2022). Slopes are generally under 30 percent with steeper slopes along Little Cow Creek. Topography in the vicinity generally slopes west and southwest toward the Sacramento River. Elevations range from 1060 to 2080 feet above MSL. (USGS 2010). Topography for the PAA is shown on Figure 15E.

The Oak Run Road PAAs northern terminus is at the intersection of Oak Run Road and State Route 299 near the confluence of Cedar Creek and Little Cow Creek, perennial tributaries to Cow Creek. The PAA crosses Little Cow Creek and includes four unnamed intermittent tributaries to Little Cow Creek. Further south the PAA crosses Oak Run Creek, a perennial tributary to Cow Creek and two of its intermittent tributaries. At the southern terminus of the PAA, it crosses Tracy Creek

a perennial tributary to Oak Run Creek (CDFW 2022a, USGS 2022). Hydrology within the PAA is shown on Figure 16E.

Eleven ponds exist within the bounds or directly adjacent to the PAA. Three ponds are found just south of the project's northern terminus on either side of Oak Run Road. Three Ponds are found further south just north of the Lookout Mountain Road intersection on the western side of Oak Run Road. An onstream pond along Oak Run Creek is found between Swede Creek Road, and Teahouse Way on the east side of Oak Run Road. Three small ponds exist around the Oak Run Road and Oak Run to Fern Road intersection, two directly southeast of the intersection and an additional one 0.2 mile northeast. The final pond is found just north of the PAA's southern terminus, this pond is a dammed section of Tracy Creek. According to U.S. Fish and Wildlife Service Wetlands Mapper, Freshwater Emergent Wetlands and Freshwater Forested/Shrub Wetland may be found along the streams and ponds within the PAA (Figure 18E).

The northern section of Oak Run Road is a mix of Mixed Chaparral, and Montane Hardwood, with limited occurrences of Blue Oak -Foothill Pine, Pondarosa Pine and Annual Grasslands. In the southern sections Mixed Chaparral becomes the most prevalent habitat type intermixed with Pasture, Montane Hardwood, Annual Grassland, and Blue Oak Woodland (CDFW 2022b). Mapped CHWR vegetation types are shown on Figure 19E. Potential commercial timber species have potential to occur in the Montane Hardwood and Ponderosa Pine habitats. Timberland species are found primarily in the northern section of the PAA with some few limited occurrences in the southern section (Figure 20E).

Soils in the Oak Run Road area are mostly well drained but can vary between excessively drained and somewhat poorly drained. Run off classes for these soils very between low and very high. The most common soil profile in this PAA is loam, with some variation in areas with higher sand, clay, or gravel contents. Other typical soil profiles include clay loam, cobbly loam, stony loam, gravelly loam. Soils in this PAA have a variety of parent materials including residuum weathered from volcanic rock, tuff breccia, green stone, shale, sandstone, metamorphic and sedimentary rock. Several soil groups area also derived from alluvium and gravelly alluvium (NRCS 2022).

OAK RUN TO FERN ROAD

The Oak Run to Fern Road PAA is shown in Figure 3. The PAA includes areas adjacent to Oak Run to Fern Road which is located east of the community of Oak Run and connects to Fern Road. The PAA contains dense vegetation encroachment immediately adjacent to the roadway which is a primary emergency access and evacuation route for landowners along Oak Run, Fern and Phillips Road.

The PAA contains a variety of land uses and parcel sizes. General Plan designations within the PAA include N-H-40: Habitat Resource 40-Acre Density, RA: Rural Residential A, RB: Rural Residential B, A-G: Agricultural Grazing, T: Timber, and MU: Mixed Use (Shasta County 2022). Zoning designations for parcels within the PAA include: U: Unclassified, PF: Public Facilities, MU: Mixed Use District, R-R-T: Rural Residential—Mobil Home District, EA-AP: Exclusive Agricultural District-Agricultural Preserve District, HP-BA-40: Habitat Protection District- 40-Acre Minimum, R-R-T-BSM: Rural Residential-Mobile Home District-Building Site Minimum, R-R-T-BA-40: Rural Residential-Mobile Home District-Building- 40-Acre Minimum, TP: Timber Production, TL: Timberland, EA: Exclusive Agriculture District (Shasta County 2022). General Plan designations and Zoning designations for the PAA are shown on Figure 13 and Figure 14, respectively.

The PAA is located within the Cow Creek Watershed (HUC8 18020151) (CDFW 2022a). The PAA does not have any mapped 100-year floodplains and is not within a groundwater basin (CDFW 2022a, FEMA 2022). Slopes onsite are generally under 30 percent with steeper slopes along Clover Creek. Topography in the vicinity generally slopes west and southwest toward the Sacramento River. Elevations range from 1600 to 2900 feet above MSL (USGS 2010). Topography for the PAA is shown on Figure 15E.

Near the eastern terminus of the PAA, the PAA is adjacent to Wildcat Creek, a perennial spring fed tributary to Dry Clover Creek. Further north the PAA crosses Clover Creek a perennial tributary to Cow Creek and one of its unnamed intermittent tributaries. Oak Run Creek, a perennial tributary to Cow Creek, runs along the PAA between Phillips Road and Sesame Street but does not cross Oak Run to Fern Road. However Oak Run to Fern Road does cross an unnamed intermittent tributary to Oak Run Creek. The project also includes but does not cross an unnamed intermittent tributary to Clover Creek (CDFW 2022, USGS 2022). Hydrology within the PAA is shown on Figure 16E. One pond exists in the vicinity of the PAA. The pond is found south of the Johnson Road intersection to the north of the road. According to U.S. Fish and Wildlife Service Wetlands Mapper, Freshwater Emergent Wetlands and Freshwater Forested/Shrub Wetland may be found along the streams and ponds within the PAA (Figure 18E).

The western end of the Oak Run to Fern Road PAA is comprised of Cropland, Montane Hardwood, Montane Hardwood-Conifer, and Ponderosa Pine habitat intermixed with limited instances of Blue Oak Woodland and Blue Oak-Foothill Pine. Further east within the PAA, Ponderosa Pine becomes more prevalent, with regular occurrences of Montane Hardwood, Mixed Chaparral, and limited occurrences of Montane Hardwood-Conifer habitat (CDFW 2022b). Mapped CHWR vegetation types are shown on Figure 19E. Potential timberlands consist of the Montane Hardwood-Conifer, Montane Hardwood and Pondarosa Pine habitats. Timberland species are found throughout the PAA (Figure 20E).

Soils in the Oak Run to Fern Road PAA are mostly well drained, and have run off classes between, medium and very high. Typical soil profiles in the PAA include loam, stony loam, stony clay loam, and clay stony clay. Soils are derived primarily from volcanic parent materials such as: colluvium over residuum weathered from andesitic tuff breccia, residuum weathered from volcanic rock, colluvium derived from volcanic rock. However, some limited soil groups parent material is residuum weathered from sedimentary rock (NRCS 2022).

PHILLIPS ROAD

The Phillips's Road PAA is located south of the community of Round Mountain and northeast of Oak Run and includes the areas adjacent to the length of Phillips Road from Oak Run to Fern Road to Buzzard's Roost Road as shown in Figure 4. The PAA is a primary emergency access and evacuation route for properties on Oak Run, Fern, and Phillips Road. The PAA contains dense vegetation encroachment immediately adjacent to the roadway. The majority of the PAA is consists of Timberland use. General Plan designations within the PAA include RB: Rural Residential B, A-G: Agricultural Grazing and T: Timber (Shasta County 2022). Zoning designations for parcels within the PAA include U: Unclassified, TP: Timber Production, EA-AP: Exclusive Agricultural District-Agricultural Preserve District (Shasta County 2022). General Plan designations and Zoning designations for the PAA are shown on Figure 13 and Figure 14, respectively.

The PAA is located within the Cow Creek Watershed (HUC8 18020151) (CDFW 2022a). The PAA does not have any mapped 100-year floodplains and is not within a groundwater basin

(CDFW 2022a, FEMA 2022). Slopes onsite are generally under 30 percent with steeper slopes along Little Cow Creek. Topography in the vicinity generally slopes west and southwest toward the Sacramento River. Elevations range from 1920 to 3100 feet above MSL (USGS 2010). Topography for the PAA is shown on Figure 15E.

The Phillips's Road PAA crosses two unnamed spring fed tributaries to Oak Run Creek and Little Cow Creek a perennial tributary to Cow Creek. Near the northern end, the PAA crosses an unnamed perennial tributary to Cedar Creek, and three unnamed spring fed streams between Little Cow Creek Road and Dragon Fly Drive (CDFW 2022a, USGS 2022). Hydrology within the PAA is shown on Figure 16E.

Three other surface water features have been identified within or adjacent to the PAA. South of the Thomas Road intersection there is a collection of four ponds within or adjacent to the PAA. There is one additional pond adjacent to the PAA west of Philips Road between Thomas Road and Amidon Ranch Road. Another collection of five spring ponds exists between Little Cow Creek Road and Dragon Fly Drive (USGS 2022). According to U.S. Fish and Wildlife Service Wetlands Mapper, Freshwater Emergent Wetlands and Freshwater Forested/Shrub Wetland may be found along the streams and ponds within the PAA (Figure 18E).

The majority of the Phillips Road PAA is Pondarosa Pine habitat with areas of Mixed Chaparral primarily found where clearing related to utility, forestry, or agricultural operations have taken place. Some limited sections of Montane Hardwood, and Montane Hardwood-Conifer exist. The habitat shifts in the far northern section of the PAA where the Pondarosa Pine transitions to primary Montane Hardwood habitat intermixed with some Ponderosa Pine, Blue Oak-Foothill Pine, and Montane Hardwood-Conifer (CDFW 2022b). Mapped CHWR vegetation types are shown on Figure 19E. Potential timberlands consist of the Pondarosa Pine, Montane Hardwood-Conifer, and Montane Hardwood habitats. Timberland species are found throughout the PAA (Figure 20E).

Soils in the Phillips Road PAA are well drained, with medium to very high run off classification. Soils in the area commonly have clay, stone and gravel components with typical profiles being gravelly loam, gravelly clay loam, clay loam, clay, stony loam and stony clay. Parent materials for these soils are residuum weathered from metamorphic rock, sedimentary rock, volcanic rock, and metasedimentary rock (NRCS 2022).

GILMAN ROAD

The Gilman Road PAA includes areas adjacent to portions of Gilman Road between Interstate 5 and Buckleaf Drive. The Gilman Road PAA is shown on Figure 5. Gilman Road is the only access for emergency response and evacuation for properties accessed from Gilman Road. General Plan designations within the PAA include RB: Rural Residential B, T: Timber, and N-R: Recreation Resource (Shasta County 2022). Zoning designations for parcels within the PAA include R-R-T-BA-5: Rural Residential-Mobile Home District- 5-Acre Minimum, R-R-BSM-NRA-S: Rural Residential- Building Site Minimum- National Recreation Area-Shasta Unit District, NRA-S: National Recreation Area-Shasta Unit District, C-R-NRA-S-BA-2.5: Commercial Recreation-National Recreation Area-Shasta Unit District- 2.5-Acre Minimum, TL: Timberland, and NRA-S-PD: National Recreation Area-Shasta Unit District-Planned Development (Shasta County 2022). General Plan designations and Zoning designations for the PAA are shown on Figure 13 and Figure 14, respectively.

The eastern portion of the PAA is in the Sacramento Headwaters Watershed (HUC8 18020005), and the McCloud Watershed (HUC8 18020004) (CDFW 2022). The PAA does not have any

mapped 100-year flood plains and is not within a groundwater basin (CDFW 2022a, FEMA 2022). Slopes range from under 30 percent to over 60 percent, with a few areas exceeding 65 percent. Topography in the vicinity generally slopes east and west toward Shasta Lake. Elevations range from 1080 to 1840 feet above MSL (USGS 2010). PAA topography is shown on Figure 15B.

The PAA is directly adjacent to Lake Shasta and all streams within the McCloud Watershed drain to the McCloud River Arm of Lake Shasta. Streams within the Sacramento Headwaters Watershed drain to the Salt Creek Arm of Lake Shasta (USGS 2022). The PAA includes seventeen streams. Portions of the PAA within the McCloud watershed cross or include fifteen unnamed intermittent streams. Portions of the PAA within the Sacramento Headwaters Watershed include the perennial stream Fall Creek and seven of its intermittent tributaries. Fall Creek flows into Salt Creek within the PAA. Salt Creek a perennial stream then flows into Lake Shasta crossing an additional ten unnamed intermittent tributaries to Salt Creek (CDFW 2022a, USGS 2022). According to U.S. Fish and Wildlife Service Wetlands Mapper, Freshwater Emergent Wetlands and Freshwater Forested/Shrub Wetland may be found along the streams and ponds within the PAA (Figure 18B). Hydrology within the PAA is shown on Figure 16B.

The Gilman Road PAA is comprised of a verity of habitat types which include, Sierra Mixed Conifer, Montane Chaparral, Montane Hardwood-Conifer, Closed Cone Pine-Cypress, Montane Hardwood, Blue Oak- Foothill Pine, Douglas fir, Mixed Chaparral, and Pondarosa Pine (CDFW 2022b). Mapped CHWR vegetation types are shown on Figure 19B. The potential commercial timber species would be found within the: Douglas Fir, Montane Hardwood-Conifer, Montane Hardwood, Pondarosa Pine, and Sierran Mixed Conifer habitats. Potential commercial timber species are distributed throughout the PAA (Figure 20B).

Soils in the Gilman Road PAA are well drained with run off class ranging from high to very high. Soils in this area tend to be gravelly, and commonly have a clay component. Typical soil profiles for the area are gravelly loam, and gravelly clay loam. Parent materials for soils in the area included residuum weathered from metavolcanics, granite, metasedimentary rock, metamorphic rock, and sedimentary rock (NRCS 2022).

BIG BEND ROAD

The Big Bend Road PAA includes the areas adjacent to the length of Big Bend Road between Highway 299 and the community of Big Bend. Big Bend Road is the only viable access into the Big Bend Community. The Big Bend Road PAA is shown in Figure 6. General Plan designations within the PAA include RA: Rural Residential A, T: Timber, and MU: Mixed Use (Shasta County 2022). (Shasta County 2022). Zoning designations for parcels within the PAA include TL: Timberland, TP: Timber Production, and U: Unclassified and MU: Mixed Use District (Shasta County 2022). General Plan designations and Zoning designations for the PAA are shown on Figure 13 and Figure 14, respectively.

The PAA is located within the Lower Pit Watershed (HUC8 18020003) (CDFW 2022a). The PAA does not have any mapped 100-year flood plains and is not within a groundwater basin (CDFW 2022a, FEMA 2022). The PAA crosses or includes numerous streams including the Pit River and tributaries to the River. The Pit River exists at the northern terminus of the PAA. Hydrology within the PAA is shown in Figure 16C. Freshwater Forested/ Shrub Wetland, and Freshwater Emergent Wetland are found along many of the creeks and tributaries (Figure 18C). In addition, several ponds are located within the PAA.

Slopes on site are generally under 30 percent with steeper slopes along Hatchet Creek. Topography in the vicinity generally slopes toward the Pit River. Elevations range from 1700 to 3200 feet above

MSL (USGS 2010). Topography of the PAA is shown on Figure 15C.

The Big Bend Road PAA is comprised of Sierran Mixed Conifer, Mixed Chaparral, Montane Hardwood, Montane Chaparral, Ponderosa Pine, Annual Grassland, Montane Hardwood-Conifer, Valley Foothill Riparian, Lacustrine and Cropland. Mapped CHWR vegetation types are shown on Figure 19C. The potential commercial timber species would be found within the: Montane Hardwood-Conifer, Montane Hardwood, Sierran Mixed Conifer, and Ponderosa Pine Habitats. Potential commercial timber species are shown in Figure 20C.

Soils in Big Bend Road PAA are well drained and have a run off class ranging from low to high. Typical soil profiles in the area include loam, clay loam, stony loam, stony clay loam and stony clay, sandy loam, and gravelly sand. Parent materials for these soils include alluvium, tephra, colluvium derived from volcanic rock, Residuum weathered from volcanic rock, metasedimentary rock, metamorphic rock, or sedimentary rock and colluvium derived from volcanic rock (NRCS 2022).

HIGHWAY 89/ CASSEL ROAD

The Highway 89/ Cassel Road PAA includes areas adjacent to portions of Highway 89 south of the intersection of Highway 299 and north of Cassel Road. The Highway 89/ Cassel Road PAA is shown in Figure 7. The PAA was selected to reduce the potential of a roadside fire start along Highway 89 and rapid growth of a fire that would threaten the community of Cassel. The PAA includes mostly large parcels. General Plan designations within the PAA include T: Timber, T-MRB Timber-Mining Resource Buffer, PUB: Public Land, CH: Commercial Highway, and A-C: Agricultural Croplands (Shasta County 2022). Zoning designations for parcels within the PAA include TP: Timber Production, TP-MRB: Timber Production-Mineral Resource Buffer, U: Unclassified, PD: Planed Development (Shasta County 2022). General Plan designations and Zoning designations for the PAA are shown on Figure 13 and Figure 14, respectively.

The PAA is located within the Lower Pit Watershed (HUC8 18020003) (CDFW 2022a). The PAA does not have any mapped 100-year floodplains and is not within a groundwater basin (CDFW 2022a, FEMA 2022). Slopes onsite are generally under 30 percent. Topography in the vicinity generally slopes west and northwest toward Burney Creek. Elevations range from 3140 to 3280 feet above MSL (USGS 2010). Topography for the PAA is shown on Figure 15D.

The PAA is northwest of Hat Creek a perennial tributary to the Pit River. Hat Creek has 100-year floodplain and wetlands associated with it; the PAA is over 500 feet away from these features (CDFW 2022a, USGS 2022, USFWS 2022). Mapped FEMA Flood Hazard Zones for the PAA are found at Figure 17D. According to U.S. Fish and Wildlife Service Wetlands Mapper, no wetlands areas occur within the PAA (Figure 18D).

The majority of the Highway 89/Cassel Road PAA is Ponderosa Pine habitat with some intermixing of Montane Hardwood-Conifer, Montane Chaparral, Eastside Pine, and limited occurrences of Perennial Grassland, Sierran Mixed Conifer, and Bitterbrush (CDFW 2022b). Mapped CHWR vegetation types are shown on Figure 19D. Commercial timber species have the potential to be found within the Sierran Mixed Conifer, Ponderosa Pine, Montane Hardwood, Montane Hardwood-Conifer, and Eastside Pine Habitats. Potential commercial timber species are found throughout the PAA (Figure 20D).

Soils in the Highway 89/Cassel Road PAA are well drained with medium run off class. Soils within the PAA tend to be loamy with gravel and clay components in lower horizons. Typical soil profiles

include loam or gravelly loam in the higher horizons with gravelly clay loam, and very stony clay loam found in lower soil horizons. Parent materials for these soils are residuum weathered from basalt or slope alluvium derived from basalt (NRCS 2022).

FALL RIVER CASSEL ROAD

The Fall River Cassel Road PAA includes areas adjacent to Fall River Cassel Road South of Highway 299. The Fall River Cassel Road PAA is shown in Figure 8. Fall River Cassel Road is a primary emergency access and evacuation route for the communities of Cassel and Fall River and contains dense vegetation encroachment immediately adjacent to the roadway.

General Plan designations within the PAA include RA: Rural Residential A, N-O: Open Space, T: Timber, A-C: Agricultural Croplands, C: Commercial, and UR: Urban Residential (Shasta County 2022). Zoning designations for parcels within the PAA include EA-AP: Exclusive Agricultural District-Agricultural Preserve District, C-M: Commercial-Light Industrial, OS: Open Space, EA: Exclusive Agriculture District, R-R: Rural Residential, TL: Timberland, R-R-BSM: Rural Residential -Building Site Minimum, R-R: Rural Residential, and R-R-T-BSM: Rural Residential-Mobile Home District-Building Site Minimum (Shasta County 2022). General Plan designations and Zoning designations for the PAA are shown on Figure 13 and Figure 14, respectively.

The PAA is located within the Lower Pit Watershed (HUC8 18020003) (CDFW 2022a). The PAA is not within a groundwater basin (CDFW 2022a). Slopes onsite are generally under 30 percent. Topography in the vicinity generally slopes north toward the Pit River. Elevations range from 3240 to 3560 feet above MSL (USGS 2010). Topography for the PAA is shown on Figure 15D.

The PAA includes one stream and the Pit River. The PAA runs along an unnamed intermittent tributary to its confluence with the Pit River at the northern terminus of the PAA (CDFW 2022a, USGS 2022). Hydrology within the PAA is shown on Figure 16D. According to U.S. Fish and Wildlife Service Wetlands Mapper, Freshwater Emergent Wetlands and Freshwater Forested/Shrub Wetland may be found along the stream and the Pit River within the PAA (Figure 18D). Sections of mapped 100-year flood plain surrounding the Pit River and stream may exist within the PAA. These areas are mapped as Zone A by FEMA's National Flood Hazard Layer Viewer, the remainder of the PAA is mapped as Zone X or Zone D (Figure 17D).

The southern half of the Fall River Cassel Road PAA is comprised mainly of Mixed Chaparral and Eastside Pine with smaller occurrences of Montane Chaparral, Montane Hardwood, and Montane Hardwood-Conifer. The northern section closer to the Pit River is comprised of a mix of Pondarosa Pine, Eastside Pine, Montane Hardwood, Mixed Chaparral, Montane Hardwood-Conifer, Montane Chaparral, Lacustrine, and Pasture (CDFW 2022b). Mapped CHWR vegetation types are shown on Figure 19D. Commercial timber species have the potential to be found within the Ponderosa Pine, Montane Hardwood, Montane Hardwood-Conifer, and Eastside Pine Habitats. Potential commercial timber species are found throughout the PAA (Figure 20D).

Soils in the Fall River Cassel Road PAA range from poorly drained to excessively drained, and range in run off class from medium to high. Sections of this PAA are surface exposed bedrock or rubble lands with no or limited soil horizon profiles. Developed soils in this area are commonly sandy or silty. Typical soil profiles include sandy loam, sandy clay loam, silty loam, silty clay loam, and silty clay. Parent materials include alluvium or fine-textured alluvium derived from igneous rock, tephra, or colluvium derived from volcanic sandstone. Some soils in this PAA contain up to 5 percent to 10 percent calcium carbonate content (NRCS 2022).

STATE ROUTE 89 SP

The State Route 89 PAA includes areas adjacent to State Route 89 south of Lake Britton in the vicinity of McArthur-Burney Falls Memorial State Park. The State Route 89 PAA is shown in Figure 9. The PAA was selected to provide fuel treatment adjacent to the State Park boundary and campgrounds. General Plan designations within the PAA include I: Industrial, RB: Rural Residential B, PUB: Public Land, and T: Timber (Shasta County 2022). Zoning designations for parcels within the PAA include TP: Timber Production, A-1-BA-5: Limited Agriculture 5-Acre Minimum, U: Unclassified, C-1-BSM: Local Convenience Center District- Building Site Minimum, M: General Industrial District, C-M-DR: Commercial Light Industrial- Design Review District (Shasta County 2022). General Plan designations and Zoning designations for the PAA are shown on Figure 13 and Figure 14, respectively.

The PAA is located within the Lower Pit Watershed (HUC8 18020003) (CDFW 2022a). The PAA not within a groundwater basin (CDFW 2022a). Slopes are generally under 30 percent except along Pit Depression Road south of Lake Britton. Topography in the vicinity generally slopes north toward Lake Britton. Elevations range from 2820 to 3040 feet above MSL (USGS 2010). Topography for the PAA is shown on Figure 15D.

The PAA includes Burney Creek and Lake Britton. Burney Creek flows just west of State Route 89 and enters and exits the western side of the PAA several times before entering Lake Britton. Lake Britton, a reservoir along the Pit River exists at the project's northern terminus (CDFW 2022a, USGS 2022). Hydrology within the PAA is shown on Figure 16D. Small sections of the mapped 100-year flood plain surrounding lake Britton and Burney Creek may exist within the PAA. These areas are mapped as Zone A by FEMA's National Flood Hazard Layer Viewer, the remainder of the PAA is mapped as Zone D (Figure 17D). According to U.S. Fish and Wildlife Service Wetlands Mapper, Freshwater Emergent Wetlands and Freshwater Forested/Shrub Wetland may be found along Burney Creek within the PAA. Additionally, two other Fresh Water Emergent Wetlands exist within the PAA, the first is just north of the project's southern terminus on the west side of Highway 89, the other is near the projects northern end, just south of Highway 89, across from McArthur-Burney Falls Memorial State Park (Figure 18D).

The State Route 89 SP is comprised of a mix of habitats including Pondarosa Pine, Sierran Mixed Conifer, Montane Hardwood-Conifer, Perennial Grassland, and Mixed Chaparral (CDFW 2022b). Mapped CHWR vegetation types are shown on Figure 19D. Commercial timber species have the potential to be found within the Ponderosa Pine, Montane Hardwood, Montane Hardwood-Conifer, and Eastside Pine habitats. Potential commercial timber species are found throughout the PAA (Figure 20D).

Soils in the State Route 89 vary from somewhat poorly drained to well drained and range in run off class from medium to very high. Soil profiles vary though out the PAA and include loam, clay loam, sandy clay loam, sandy loam, gravelly loam, gravelly clay loam, stony clay loam, and silty clay loam. Some sections of this PAA are comprised of fragmented material and do not have developed soil horizons. Parent materials for the soils in PAA include tephra or alluvium derived from basalt, diatomaceous earth, or igneous rock (NRCS 2022).

MCARTHUR ROAD

The McArthur Road PAA includes areas adjacent to McArthur Road east of State Route 89 and west of the community of Dana. The McArthur Road PAA is shown in Figure 10. The PAA contains dense vegetation encroachment immediately adjacent to the roadway. The General Plan designation within the PAA is exclusively T: Timber (Shasta County 2022). The zoning

designation for parcels within the PAA is TP: Timber Production (Shasta County 2022). General Plan designations and Zoning designations for the PAA are shown on Figure 13 and Figure 14, respectively.

The PAA is located within the Lower Pit Watershed (HUC8 18020003) (CDFW 2022a). The PAA does not have any mapped 100-year floodplains and is not within a groundwater basin (CDFW 2022a, FEMA 2022). Slopes onsite are generally under 30 percent. Topography in the vicinity generally slopes southeast toward Fall River Valley. Elevations range from 3380 to 4140 feet above MSL (USGS 2010). Topography for the PAA is shown on Figure 15D.

The PAA crosses one stream which is an intermittent tributary to the Fall River (CDFW 2022a, USGS 2022). Hydrology within the PAA is shown on Figure 16D. According to U.S. Fish and Wildlife Service Wetlands Mapper, no wetlands are within the PAA.

The McArthur Road PAA is predominantly Sierran Mixed Conifer with small areas of Montane Hardwood-Conifer, and Montane Chaparral (CDFW 2022b). Mapped CHWR vegetation types are shown on Figure 19D. Commercial timber species have the chance to occur in the Sierran Mixed Conifer and Montane Hardwood-Conifer habitats which encompass the vast majority of the PAA (Figure 20D).

Soils in the McArthur Road PAA are well drained and range in run off class from medium to high. Soils in the PAA tend to be comprised of mostly sand and clay. Typical soil profiles include sandy loam, clay, clay loam, loam cobbly clay loam, and sandy clay loam. Soil parent materials are primarily derived from volcanic sources and include alluvium derived from igneous rock, old tephra deposit and material from lava flows, and older volcanic ash (NRCS 2022).

RAINBOW LAKE ROAD

The Rainbow Lake Road PAA includes areas adjacent to Rainbow Lake Road extending from the community of Ono to the top of the ridge above Rainbow Lake. The Rainbow Lake Road PAA is shown in Figure 11. Rainbow Lake Road is a primary emergency access and evacuation route for Rainbow Lake and Platina and contains dense vegetation encroachment immediately adjacent to the roadway. The PAA consists mainly of rural residential parcels. General Plan designations within the PAA include RB: Rural Residential B, A-G: Agricultural Grazing, and MU: Mixed Use (Shasta County 2022). Zoning designations for parcels within the PAA include U: Unclassified, A-1-T-BA-40: Limited Agriculture-Mobile Home District-40-Acre Minimum, and EA-AP: Exclusive Agricultural District-Agricultural Preserve District (Shasta County 2022). General Plan designations and Zoning designations for the PAA are shown on Figure 13 and Figure 14, respectively.

The PAA is located within the Cottonwood Creek Watershed (HUC8 18020152) (CDFW 2022a). The PAA does not have any mapped 100-year floodplains and is not within a groundwater basin (CDFW 2022a, FEMA 2022). Slopes onsite area generally under 30 percent with small steeper areas just south of the intersection of Rainbow Lake Road and Rector Creek Road. Topography in the vicinity generally slopes east toward the Sacramento River. Elevations range from 900 to 2460 feet above MSL (USGS 2010). Topography for the PAA is shown on Figure 15A.

The PAA crosses or includes ten streams. The PAA crosses Ducket Creek, Doby Creek and Rector Creek, along with seven unnamed intermittent, and perennial streams. These waterways are all tributaries to North Fork Cottonwood Creek a perennial tributary to Cottonwood Creek. The PAA also crosses the Happy Valley Irrigation Canal (CDFW 2022a, USGS 2022). Hydrology within the PAA is shown on Figure 16A. According to U.S. Fish and Wildlife Service Wetlands Mapper,

Freshwater Emergent Wetlands and Freshwater Forested/Shrub Wetland may be found along the streams and creeks within the PAA. The most notable wetland area is a Freshwater Emergent Wetland to the east of Rector Creek near the project's southern terminus in Ono (Figure 18A).

There are several other water bodies within the PAA or directly adjacent to it. The PAA's northern terminus is located just south of Rainbow Lake, a reservoir filled by North fork Cottonwood Creek. A collection of three ponds exists between Sunny Hill Road and Mountain Side Drive on the north and south side of Rainbow Lake Road. Two more small ponds exist on the south side of the road between the Baker Ridge Road and Devils Gap Drive intersections with Rainbow Lake Road.

The Rainbow Lake Road PAA is comprised of Pondarosa Pine, Sierran Mixed Conifer, Montane Hardwood, Montane Hardwood-Conifer, Blue Oak-Foothill Pine, and Mixed Chaparral. In the lower elevations to the east the habitat transitions to Montane Hardwood, Mixed Chaparral, Annual Grasslands, Blue Oak-Foothill Pine, Valley Oak Woodland, and Chamise-Redshank Chaparral (CDFW 2022b). Mapped CHWR vegetation types are shown on Figure 19A. Commercial timber species have the potential to be found within the Ponderosa Pine, Montane Hardwood, Montane Hardwood-Conifer habitat, and Sierran Mixed Conifer Habitats. These areas are mostly concentrated on the western side of the PAA, while almost no potential commercial timber species exist on the eastern side of the project (Figure 20A).

Soils in the Rainbow Lake PAA are well drained with some variation to somewhat excessively drained, and runoff class varies from very low to very high. Soil profiles typically consist of sandy loam, gravelly loam, unweathered bedrock, clay loam and sandy clay loam. Parent material for these soils include alluvium, residuum weathered from: granite, serpentinite, granodiorite, volcanic rock, sedimentary rock, or metavolcanics shale.

PLATINA ROAD

The Platina Road PAA includes areas adjacent to Platina Road west of the Community of Ono and east of Hart Ranch Road. The Platina Road PAA is shown in Figure 12. The PAA includes dense vegetation encroachment immediately adjacent to the roadway and numerous fire killed and damaged trees.

General Plan designations within the PAA include N-H-80: Habitat Resource 80-Acre Density, and A-G: Agricultural Grazing (Shasta County 2022). Zoning designations for parcels within the PAA include: A-1-T-BA-40: Limited Agriculture-Mobile Home District-40-Acre Minimum, R-R-T-BSM: Rural Residential-Mobile Home District-Building Site Minimum, HP-T-BA-40: Habitat Protection-Mobile Home District- 40-Acre Minimum, HP-T-BA-54: Habitat Protection-Mobile Home District- 54-Acre Minimum, HP-T-BA-62: Habitat Protection-Mobile Home District- 62-Acre Minimum, EA-AP: Exclusive Agricultural District-Agricultural Preserve District, and U: Unclassified (Shasta County 2022). General Plan designations and Zoning designations for the PAA are shown on Figure 13 and Figure 14, respectively.

The PAA is located within the Cottonwood Creek Watershed (HUC8 18020152) (CDFW 2022a). The PAA does not have any mapped 100-year floodplains and is not within a groundwater basin (CDFW 2022a, FEMA 2022). Slopes onsite are generally under 30 percent with small steeper areas along the North Fork of Cottonwood Creek and just south of Roaring Creek. Topography in the vicinity generally slopes east toward the Sacramento River. Elevations range from 940 to 1620 feet above MSL (USGS 2010). Topography for the PAA is shown on Figure 15A.

The PAA crosses Wilson Creek a perennial tributary to Roaring River and seven of its intermittent

tributaries. Further east the project crosses Roaring River and Bee Creek along with one unnamed intermittent tributary to Roaring River. Additionally, the North Fork Cottonwood Creek briefly enters a small section of the PAA's northern boundary near the Nono Road and Platina Road intersection (CDFW 2022a, USGS 2022). Hydrology within the PAA is shown on Figure 16A. According to U.S. Fish and Wildlife Service Wetlands Mapper, Freshwater Emergent Wetlands and Freshwater Forested/Shrub Wetland may be found along the streams and creeks within the PAA. Other surface water features included two large ponds just west of the Platina Road and Shoup Road intersection (Figure 18A).

The eastern side of the Platina Road PAA is mostly Blue Oak-Foothill Pine habitat with small amounts of Blue Oak Woodland and Annual Grasslands. In the eastern section of the PAA this transitions to an even mixture of Annual Grasslands and Blue Oak Woodland (CDFW 2022b). Mapped CHWR vegetation types are shown on Figure 19A. There is no potential commercial timber within the PAA.

Soils in the Platina Road PAA are well drained and vary in run off class from medium to very high. Typical soil profiles for this area include gravelly loam, sandy loam, loam, and silty clay loam. Parent materials for soils in this area include alluvium, residuum weathered from sedimentary rock, volcanic rock, sandstone, metamorphic rock or shale (NRCS 2022).

SPECIAL-STATUS WILDLIFE SPECIES

Special-status animal species include species that are (1) listed as threatened or endangered under the CESA or the ESA; (2) proposed for federal listing as threatened or endangered; (3) identified as state or federal candidates for listing as threatened or endangered; and/or (4) identified by the CDFW as Species of Special Concern or California Fully Protected Species.

A list of regionally occurring special-status wildlife species in the project site was compiled based on a review of pertinent literature and consultations with the USFWS Information for Planning and Consultation (iPAC) database, CNDDB database records, California Wildlife Habitats Relationship (CWHR) and Vegetation Classification and Mapping Program (VegCAMP) maps.

For each special-status wildlife species, habitat and other ecological requirements were evaluated and compared to the habitats in the study area and immediate vicinity to assess the presence of potential habitat in the project area. The habitat assessments for special-status species wildlife species are provided in Table 2. Potential project impacts to special-status wildlife species with potential to occur within the project area are discussed in the Biological Resources section of the Environmental Checklist and Discussion.

SPECIAL-STATUS PLANT SPECIES

Special-status plant species include plants that are (1) designated as rare by CDFW or USFWS or are listed as threatened or endangered under the California Endangered Species Act (CESA) or ESA; (2) proposed for designation as rare or listing as threatened or endangered; (3) designated as state or federal candidate species for listing as threatened or endangered; and/or (4) ranked as California Rare Plant Rank (RPR) 1A, 1B, 2A, or 2B. A list of regionally occurring special-status plant species was compiled based on a review of pertinent literature, a review of the USFWS species list, CNDDB database records, and a -quad search for each PAA of CNPS database records. The California Rare Plant Ranking (CRPR) results are included in Table 3.

For each special-status plant species, habitat and other ecological requirements were evaluated and compared to the habitats in the project and immediate vicinity to assess the presence of potential habitat. The habitat assessments for special-status species are provided in Table 3. Project impacts to special-status plant species with potential to occur within the project area are discussed in the Biological Resources section of the Environmental Checklist and Discussion.

Table 2
POTENTIALLY OCCURRING SPECIAL-STATUS WILDLIFE SPECIES

Common Name	Scientific Name	Conservation Status (CDFW/State/Fed)	Habitat Description	Potential to Occur in Project Area
Birds				
American peregrine falcon	*Falco peregrinus anatum*	FP/SD/FD	Frequents bodies of water in open areas with cliffs and canyons nearby for cover and nesting.	**Potential to occur in: Big Bend, Gilman Road, Oak Run Road (Observed 1993), Where the following exists: Cliffs, canyons, open water**
Bald eagle	*Haliaeetus leucocephalus*	FP/SE/FD	Near open water, nesting habitat consists of large trees usually within riparian forest	**Potential to occur in: Big Bend, Cassel Fall River Road, Gilman Road, Highway 89 SP, and Highway 89-Cassel Rd. Where the following exists: Open water, riparian habitat**
Bank swallow	*Riparia riparia*	--/ST/--	Riparian scrub, willow thickets	**Potential to occur in: Cassel Fall River Road, and Highway 89 SP. Where the following exists: Riparian habitat, willow thickets**
Black swift	*Cypseloides niger*	SSC/--/--	Nests in moist crevice or cave on sea cliffs on cliffs behind, or adjacent to, waterfalls in deep canyons. Forages widely over many habitats.	**Potential to occur in Highway 89 SP. Where the following exists: Caves, cliffs, waterfalls**
California black rail	*Laterallus jamaicensis coturniculus*	FP/ST/--	Commonly in tidal emergent wetlands dominated by pickleweed, or in brackish marshes supporting bulrushes in association with pickleweed. In freshwater, usually found in bulrushes, cattails, and salt grass. Nest concealed in dense vegetation	**Potential to occur in Oak Run. Where the following exists: Tidal emergent wetlands, marshes**
California spotted owl	*Strix occidentalis*	SSC/--/--	Breeds and roosts in old growth forests and woodlands, high basal areas of trees and snags, dense canopies (≥70% canopy closure), multiple canopy layers, and downed woody debris breeds.	**Potential to occur in Big Bend. Where the following exists: Old growth timber, mixed conifer**
Greater sandhill crane	*Antigone canadensis tabida*	FP/ST/--	Marsh & swamp, Meadow & seep, wetlands	**Potential to occur in Fall River Castle Road. Habitat**

Table 2
POTENTIALLY OCCURRING SPECIAL-STATUS WILDLIFE SPECIES

Common Name	Scientific Name	Conservation Status (CDFW/State/Fed)	Habitat Description	Potential to Occur in Project Area
				will be avoided with implementation of wetland and stream buffers. Where the following exists: Marshes, swamp, wetlands
Northern goshawk	*Accipiter gentilis*	SSC/--/--	Dense, mature conifer and deciduous forest, interspersed with meadows, other openings, and riparian areas required. Nesting habitat includes north-facing slopes near water.	**Potential to occur in: Big Bend, McArthur Road and Oak Run Road. Where the following exists: Mature conifer, north facing slopes**
Northern spotted owl	*Strix occidentalis caurina*	--/ST/FT	North coast coniferous forest, old growth, redwood. High, multistory canopy dominated by big trees.	**Potential to occur in McArthur Road, and Big Bend Road. Where the following exists: Old growth timber, mixed conifer**
Osprey	*Pandion haliaetus*	WL/--/--	Fish-bearing water bodies; flat or broken tops of native conifer trees, snags, or power poles.	**Potential to occur in: Big Bend Road, Fall River Cassel Road, and Highway 89 SP. Where the following exists: Water bodies, isolated perch trees**
Prairie falcon	*Falco mexicanus*	WL/--/--	Open terrain for foraging; nests in open terrain with canyons, cliffs, escarpments, and rock outcrops	**Potential to occur in Fall River Cassel Road. Where the following exists: Cliffs, canyons, rock outcrops**
Purple martin	*Progne subis*	SSC/--/--	For breeding, prefers moist, shady coniferous forest, oak woodland, or riparian woodland near forest openings, and usually near water. Often forages in forest openings and along forest edges.	**Potential to occur in: Highway 89 SP, Highway 89/Cassel Road, and Oak Run Road. Where the following exists: Riparian habitat, forest openings**
Tricolored blackbird	*Agelaius tricolor*	SSC/ST/--	Freshwater marshes in dense cattail stands. Forages in field, pastures.	**Potential to occur in: Fall River Cassel Road. Where the following exists: Freshwater marshes**

Table 2
POTENTIALLY OCCURRING SPECIAL-STATUS WILDLIFE SPECIES

Common Name	Scientific Name	Conservation Status (CDFW/State/Fed)	Habitat Description	Potential to Occur in Project Area
Willow flycatcher	*Empidonax traillii*	--/SE/--	Extensive thickets of low, dense willows edge on wet meadows, ponds, or backwaters	**Potential to occur in Highway 89 SP. Habitat will be avoided with implementation of wetland and stream buffers. Where the following exists: Ponds, meadows with willows**
Yellow-billed Cuckoo	*Coccyzus americanus*	--/ST/FT	Wooded habitat with dense cover and water nearby, including woodlands with low, scrubby, vegetation, overgrown orchards, abandoned farmland, and dense thickets along streams and marshes	**Potential to occur in: Gilman Road. Where the following exists: Wooded riparian habitat, marshes**
Mammals				
American badger	*Taxidea taxus*	SSC/--/--	Dry, open stages of shrub and forest with friable soils	**Potential to occur in Fall River Cassel Road (Observed onsite n.d.). Where the following exists: Dry shrublands**
Fisher	*Pekania pennanti*	SSC/--/--	North Coast coniferous forest, Old growth, Riparian forest	**Potential to occur in: Big Bend Road, Gilman Road, McArthur Road, Oak Run to Fern Road, Phillips Road, and Rainbow Lake Road. Where the following exists: Old growth, Riparian habitat**
Oregon snowshoe hare	*Lepus americanus klamathensis*	SSC/--/--	Dense understory, particularly in riparian habitats, or areas with young firs with branches drooping to ground, and in patches of ceanothus and manzanita within, or bordering, fir or pine forests.	**Potential to occur in Fall River Cassel Road. Where the following exists: Fir or pine forests, riparian habitat**
Pallid bat	*Antrozous pallidus*	SSC/--/--	Prefers rocky outcrops, cliffs, and crevices with access to open habitats for foraging	**Potential to occur in all PAAs. Where the following exists: Rock outcrops, cliffs, caves**
Sierra Nevada red fox-southern Cascades DPS	*Vulpes vulpes necator*	--/ST/--	Open areas are used for hunting, forested habitats for cover and reproduction.	**Potential to occur in: Highway 89/Cassel Road,**

Table 2
POTENTIALLY OCCURRING SPECIAL-STATUS WILDLIFE SPECIES

Common Name	Scientific Name	Conservation Status (CDFW/State/Fed)	Habitat Description	Potential to Occur in Project Area
			Edges are utilized extensively. In lowlands, uses fence lines, hedgerows, woodlots, and other brushy, wooded areas for cover and reproduction, and hunts in cropland, wetland, urban habitats and other open areas	**and McArthur Road. Where the following exists: Open and early seral forest, wetland**
Spotted bat	*Euderma maculatum*	SSC/--/--	Prefers sites with adequate roosting habitat, such as cliffs. Feeds over water and along washes. May move from forests to lowlands in autumn	**Potential to occur in all PAAs Where the following exists: Rock outcrops, cliffs, caves near open water.**
Townsend's big-eared bat	*Corynorhinus townsendii*	SSC/--/--	Requires caves, mines, tunnels, buildings, or other human-made structures for roosting. Prefers mesic habitats. Gleans from brush or trees or feeds along habitat edges.	**Potential to occur in: Fall River Cassel Road, Gilman Road, and Highway 89 SP. Where the following exists: Caves, mines, tunnels, buildings**
Wolverine	*Gulo*	FP/ST/--	Alpine, Moist forested areas, North coast conifer forests	**Potential to occur in: Big Bend Road and Gilman Road, Where the following exists: High-elevation moist forest**
Reptiles & Amphibians				
Cascades frog	*Rana cascadae*	SSC/CS/--	Found primarily in montane aquatic habitats during warm, moist periods.	**Potential to occur in: McArthur Road and Oak Run to Fern Road Philips Road. Where the following exists: Aquatic habitat with cascade morphology. Habitat will be avoided with implementation of wetland and stream buffers**
Foothill yellow-legged frog	*Rana boylii*	SSC/SE/--	Found in or near rocky streams in a variety of habitats, including valley-foothill hardwood, valley-foothill hardwood-conifer, valley-foothill riparian, ponderosa pine, mixed conifer, coastal	**Potential to occur in: Platina Road, Big Bend Road, Gilman Road (observed 2003), Oak Run Road, Oak Run to Fern Road, Phillips Road, Platina Road and**

Table 2
POTENTIALLY OCCURRING SPECIAL-STATUS WILDLIFE SPECIES

Common Name	Scientific Name	Conservation Status (CDFW/State/Fed)	Habitat Description	Potential to Occur in Project Area
			scrub, mixed chaparral, and wet meadow types.	**Rainbow Lake Road. Where the following exists: Rocky streams with moderate riparian cover. Habitat will be avoided with implementation of wetland and stream buffers.**
Oregon spotted frog	*Rana pretiosa*	SSC/--/FT	Highly aquatic species, never found far from various aquatic habitats, springs, small cold streams and lakes It is usually buried in the mud during the cold winter months	**Potential to occur in Fall River Cassel Road. Habitat will be avoided with implementation of wetland and stream buffers. Where the following exists: Small cold streams, springs, lakes**
Pacific tailed frog	*Ascaphus truei*	SSC/--/--	Occur in permanent streams of low temperatures in conifer-dominated habitats including redwood, Douglas fir, Klamath mixed-conifer, ponderosa pine habitats or in montane hardwood-conifer habitats.	**Potential to occur in: Big Bend Road, Gilman Road, and Phillips Road. Where the following exists: cold permanent streams Habitat will be avoided with implementation of wetland and stream buffers**
Southern long-toed salamander	*Ambystoma macrodactylum sigillatum*	SSC/--/--	Found primarily in yellow pine, mixed conifer, and red fir forests associated with mountain meadows.	**No potential to occur in any PAAs.**
Western pond turtle	*Emys marmorata*	SSC/--/--	Aquatic, marsh & swamp, ponds and wetland habitat, nest in adjacent uplands under loose dirt or leaf litter.	**Potential to occur in: Big Bend 1 Road, Fall River Cassel Road, Gilman Road, Highway 89 SP, Oak Run Road, Oak Run to Fern Road, Phillips Road, and Platina Road. Habitat will be avoided with implementation of wetland and stream buffers. Where the following exists: Marsh, Swamp, Ponds, Wetlands**

Table 2
POTENTIALLY OCCURRING SPECIAL-STATUS WILDLIFE SPECIES

Common Name	Scientific Name	Conservation Status (CDFW/State/Fed)	Habitat Description	Potential to Occur in Project Area
Fish and Aquatic Vertebrates				
Bigeye marbled sculpin	*Cottus klamathensis macrops*	SSC/--/--	Found in low-gradient runs and pools with abundant aquatic vegetation and coarse substrates, especially cobble, boulder, and gravel	**Potential to occur in: Big Bend Road, Fall River Cassel Road, Highway 89 SP, and McArthur Road. Where the following exists: Low-gradient runs pools, Course substrate. Habitat will be avoided with implementation of wetland and stream buffers.**
Bull trout	*Salvelinus confluentus*	--/SE/FT	Once inhabited the McCloud river and tributaries (Shasta and Siskiyou counties) from the mouth of the river (now inundated by Lake Shasta) to Lower Falls in very cold and non-polluted waters.	**No potential to occur. PAAs are outside of the historic range of these species. Habitat will be avoided with implementation of wetland and stream buffers.**
Green sturgeon-southern DPS	*Acipenser medirostris pop. 1*	--/--/FT	Spawn in cool, deep, swift flowing river reaches over gravel and cobble bottoms, may over-summer in deep pools.	**Potential to occur in: Big Bend Road, Fall River Cassel Road, and Highway 89 SP (Observed n.d.). Habitat will be avoided with implementation of wetland and stream buffers. Where the following exists: Deep cool river with cobble bottoms, deep pools**
Chinook Salmon CV Spring-run ESU	*Oncorhynchus tshawytscha pop.11*	--/ST/FT	Aquatic; Rivers and perennial and intermittent tributaries.	**Potential to occur where the following exists: Rivers, perennial tributaries. Habitat will be avoided with implementation of wetland and stream buffers.**
Delta smelt	*Hypomesus transpacificus*	--/--/FT	Open waters of bays, tidal rivers, channels, and sloughs Populations are	**No potential to occur. PAAs are outside of the historic range of these species.**

Table 2
POTENTIALLY OCCURRING SPECIAL-STATUS WILDLIFE SPECIES

Common Name	Scientific Name	Conservation Status (CDFW/State/Fed)	Habitat Description	Potential to Occur in Project Area
			concentrated mainly in the lower Delta and upper Suisun Bay after breeding	
Hardhead	*Mylopharodon conocephalus*	SSC/--/--	Often found at low to mid-elevations in relatively undisturbed habitats of larger streams with high water quality (clear, cool). In the Sacramento River, however, they are common in both the mainstem and tributaries up to 1500 m in elevation	**Potential to occur in: Big Bend Road, Fall River Cassel Road (Observed 1992), and Highway 89 SP (Observed 1997). Where the following exists: Clear cool streams. Habitat will be avoided with implementation of wetland and stream buffers.**
Longfin Smelt	*Spirinchus thaleichthys*	--/ST/FC	Habitat includes a wide range of temperature and salinity conditions in coastal waters near shore, bays, estuaries, and rivers; some populations are landlocked in lakes. Spawning occurs in fresh water, over sandy-gravel substrates, rocks, and aquatic plants	**No potential to occur. PAAs are outside of the historic range of these species.**
Pacific Lamprey	*Entosphenus tridentatus*	SSC/--/--	Requires cold, clear, water for spawning and incubation. Ammocoetes need soft sediments in which to burrow during rearing.	**Potential to occur in: Highway 89-Cassel Rd (Observed 2000) and Oak Run Road. Where the following exists: Cold clear streams, soft sediment Habitat will be avoided with implementation of wetland and stream buffers.**
Pit-Klamath brook lamprey	*Entosphenus lethophagus*	SSC/--/--	Requires cold, clear, water for spawning and incubation. Ammocoetes need soft sediments in which to burrow during rearing.	**Potential to occur in: Big Bend Road, Highway 89 SP (Observed 2013), and McArthur Road. Where the following exists: Cold clear streams, Soft sediment. Habitat will be avoided with implementation of wetland and stream buffers.**

Table 2
POTENTIALLY OCCURRING SPECIAL-STATUS WILDLIFE SPECIES

Common Name	Scientific Name	Conservation Status (CDFW/State/Fed)	Habitat Description	Potential to Occur in Project Area
McCloud River redband trout	*Oncorhynchus mykiss* ssp. *2*	SSC/--/--	Native to the upper McCloud River (Shasta and Siskiyou counties). Found mostly in isolated headwater tributaries where non-native trout were not introduced.	**No potential to occur. PAAs are not within headwater tributaries to the McCloud River.**
Northern roach	*Hesperoleucus mitrulus*	SSC/--/--	Associated with spring pools and swampy stream reaches.	**Potential to occur in: Big Bend Road, and Highway 89 SP (observed 1991). Where the following exists: Spring pools, swampy stream reaches. Habitat will be avoided with implementation of wetland and stream buffers.**
Rough sculpin	*Cottus asperrimus*	FP/ST/--	Found in clear, cool, fast water. They live in spring-fed streams and occupy areas with aquatic vegetation and a sand or gravel substrate	**Potential to occur in: Big Bend Road, Fall River Cassel Road, and Highway 89 SP (Observed 2012). Where the following exists: Vegetated spring fed streams. Habitat will be avoided with implementation of wetland and stream buffers.**
Steelhead CV DPS	*Oncorhynchus mykiss irideus pop. 11*	--/--/FT	Aquatic; Rivers and perennial and intermittent tributaries	**Potential to occur in: Oak Run Road, and Platina Road, Habitat will be avoided with implementation of wetland and stream buffers. Where the following exists: Rivers, perennial/intermittent tributaries**
Invertebrates & Insects				
Shasta crayfish	*Pacifastacus fortis*	--/SE/FE	Cold, clear spring water with rocky substrate.	**Potential to occur in: Fall River Cassel Road (observed 1992), Highway 89 SP (observed 1990), and**

Table 2
POTENTIALLY OCCURRING SPECIAL-STATUS WILDLIFE SPECIES

Common Name	Scientific Name	Conservation Status (CDFW/State/Fed)	Habitat Description	Potential to Occur in Project Area
				McArthur Road. Habitat will be avoided with implementation of wetland and stream buffers. Where the following exists: Spring fed streams
Monarch Butterfly	*Danaus plexippus*	--/--/FC	Forages on nectar producing plants, Milkweed required for reproduction.	**Potential to occur in all PAAs wherever Milkweed is found.**
Conservancy fairy shrimp	*Branchinecta conservation*	--/--/FE	Vernal pools, wetlands	**Habitat will be avoided with implementation of wetland and stream buffers. Where the following exists: Vernal pools, wetlands**
Valley Elderberry longhorn beetle	*Desmocerus californicus dimorphus*	--/--/FT	Reliant on host plant – elderberry.	**Potential to occur in: Oak Run Road and Oak Run to Fern Road. Where the following exists: Elderberry shrubs**
Western Bumble Bee	*Bombus occidentalis*	--/SCE/--	Found in mixed woodlands, farmlands, urban areas, montane meadows and prairie grasslands often utilizing rodent burrows for nesting habitat	**Potential to occur in: Highway 89 SP (Observed 1974). Where the following exists: Mixed woodlands, rodent burrows**

FT: federally listed as threatened; **FE**: federally listed as endangered; **FC**: Candidate for listing; **FD**: Federally delisted **ST**: state listed as threatened **SE:** state listed as endangered **CDFW SSC**: Species of Special Concern; **CDFW FP**: CDFW fully protected; **CDFW WL**: CDFW watch list **CV**: Central Valley **SCE** State Candidate Endangered

Table 3
POTENTIALLY OCCURRING SPECIAL-STATUS PLANT SPECIES

Common Name	Scientific Name	Conservation Status CA Rare Plant Rank	Habitat Description	Potential to Occur in Project Area
Ahart's paronychia	*Paronychia ahartii*	1B.1	Annual herb occurring in cismontane woodland, valley and foothill grassland and vernal pools. Grows at elevations of 100-1675 feet and blooms Feb-June.	**Potential to occur in: Oak Run Road, Oak Run to Fern Road, Philips Road. Where the following exists: Cismontane woodland, Vernal pools**
Aleppo avens	*Geum aleppicum*	2B.2	Perennial herb occurring in Great Basin scrub, lower montane coniferous forest, meadows and seeps. Elevations 1475-4920. Blooms Jun- August.	**Potential to occur in Big Bend Road. Where the following exists: Great basin scrub, lower montane coniferous forest, meadows and seeps.**
Bellinger's meadowfoam	*Limnanthes floccosa* ssp. *bellingeriana*	1B.2	Annual herb that occurs in cismontane woodland and meadows and seeps and in mesic micro habitat. Elevations of 950-3610 feet and blooms from April-June.	**Potential to occur in Fall River Cassel Road, Gilman Road, Highway 89 SP, Highway 89/ Cassel Road, McArthur Road, Oak Run Road, Oak Run to Fern Road. Where the following exists: Cismontane woodland, meadows, seeps**
Big-scale balsamroot	*Balsamorhiza macrolepis*	1B.2	Perennial herb occurring in chaparral, cismontane woodland, and valley and foothill grassland. Occurs sometimes in serpentinite microhabitat. Present at elevations of 150-5100 feet and blooms March-June.	**Potential to occur in: Platina Road, Rainbow Lake Road, Oak Run Road, Oak Run to Fern Road. Where the following exists: Serpentine soils, chaparral, cismontane woodland**
Blushing wild buckwheat	*Eriogonum ursinum* var. *erubescens*	1B.3	Perennial herb growing in chaparral(montane), lower montane coniferous forest habitats and rocky, scree, and talus micro habitat. Elevations of 2460-6235 feet and blooms June-September.	**Potential to occur in Big Bend Road, Gilman Road, Highway 89 SP, Platina Road, Rainbow Lake Road, Oak Run Road, Oak Run to Fern Road. Where the following exists: Montane chaparral, rocky talus**
Boggs Lake hedge-hyssop	*Gratiola heterosepala*	1B.2	Annual herb occurring in marshes and swamps at lake margins and vernal pools and clay micro habitat. Elevations of 35-7790 feet and blooms April-August.	**Potential to occur in: Gilman Road, and Fall River-Cassel Road. The project will not impact this species due to buffers implemented for**

Table 3
POTENTIALLY OCCURRING SPECIAL-STATUS PLANT SPECIES

Common Name	Scientific Name	Conservation Status CA Rare Plant Rank	Habitat Description	Potential to Occur in Project Area
				streams and wetlands. Where the following exists: Vernal pools, clay micro habitat, lakes, marshes
Bristly sedge	*Carex comosa*	2B.1	Perennial rhizomatous herb occurring in coastal prairie, marshes and swamps at lake margins, and valley and foothill grassland habitats. Elevations of 0-2050 feet. Blooms May-September.	**Potential to occur in Big Bend Road, Fall River Cassel Road, Highway 89 SP, Highway 89/ Cassel Road, McArthur Road, Philips Road. Where the following exists: Marshes, swamps, lakes, valley and foothill grassland**
Broad-nerved hump moss	*Meesia uliginosa*	2B.2	Moss found in bogs and fens, meadows and seeps, subalpine coniferous forest, and upper montane coniferous forest. Elevations of 2804-9200 feet	**Potential to occur in Highway 89 SP and Highway 89/ Cassel Road. Where the following occurs Bogs and fens, meadows and seeps, subalpine coniferous forest, upper montane coniferous forest.**
Callahan's mariposa-lily	*Calochortus syntrophus*	1B.1	Perennial bulbiferous herb occurring in cismontane woodland and vernally mesic valley and foothill grassland. Elevations of 1725-3755 feet. Blooms May-June.	**Potential to occur in: Big Bend Road, Oak Run Road, Oak Run to Fern Road, and Phillips Road. Where the following exists: Cismontane woodland, vernally mesic valley, foothill grassland**
Cantelow's lewisia	*Lewisia cantelovii*	1B.2	Perennial herb growing in broadleafed upland forest, chaparral, cismontane woodland, and Lower montane coniferous forest. Micro habitats include granite, mesic, and sometimes seeps and serpentinite. Elevation of 1085-4495. Blooms May-October.	**Potential to occur in: Big Bend Road, and Gilman Road. Where the following exists: Broadleaf forest, cismontane woodland, lower montane coniferous forest**
Canyon Creek stonecrop	*Sedum paradisum* ssp. *paradisum*	1B.3	Perennial herb occurring in granitic and rocky micro habitats within broadleafed upland forest, chaparral, lower montane coniferous forest, subalpine coniferous forest. Elevation of 985-6235 feet. Blooms May-June	**Potential to occur in Big Bend Road, Gilman Road, Highway 89 SP, Platina Road, Rainbow Lake Road, Oak Run Road, Oak Run to Fern Road. Where the following exists: Granitic or rocky**

Table 3
POTENTIALLY OCCURRING SPECIAL-STATUS PLANT SPECIES

Common Name	Scientific Name	Conservation Status CA Rare Plant Rank	Habitat Description	Potential to Occur in Project Area
				broadleafed upland forest, chaparral, lower montane coniferous forest, and subalpine coniferous forest
Cascade grass-of-Parnassus	*Parnassia cirrata* var. *intermedia*	2B.2	Perennial herb found in rocky serpentine soils within bogs and fens, and meadows and seeps. Elevation 1980-6495. Blooms (July) August-September.	**Potential to occur in Gilman Road. Where rocky serpentine soils exist within bogs and fens, or meadows and seeps.**
Columbia yellow cress	*Rorippa columbiae*	1B.2	Perennial rhizomatous herb found in mesic areas of lower montane coniferous forest, meadows and seeps, playas, vernal pools. Elevations 1800-5905 feet. Blooms May-September.	**Potential to occur in McArthur Road. where the following exist: Lower montane coniferous forest, meadows and seeps, playas, vernal pools.**
Eel-grass pondweed	*Potamogeton zosteriformis*	2B.2	Aquatic annual herb occurring in freshwater marshes and swamps. Elevation of 0-6105 feet. Blooms June-July.	**Potential to occur in Fall River Cassel Road, Highway 89/ Cassel Road, and McArthur Road, and observed in Highway 89 SP Project area in 2015. Where the following exists: Freshwater marsh, swamp Habitat will be avoided with implementation of wetland and stream buffers**
Engelmann spruce	*Picea engelmannii*	2B.2	Perennial evergreen tree occurring in upper montane coniferous forest. Elevations of 3495-7005 feet.	**Potential to occur in Big Bend Road, Highway 89 SP, Highway 89/ Cassel Road, McArthur Road. Where the following exists: Upper montane coniferous forest**
English sundew	*Drosera anglica*	2B.3	Carnivorous perennial herb. Occurs in bogs and fens and mesic meadows and seeps. Elevations of 4265-7400 feet. Blooms June-September.	**Potential to occur in Big Bend Road, Highway 89 SP, Highway 89/ Cassel Road, McArthur Road, Oak Run to Fern Road, and Philips Road. Habitat will be avoided with implementation of wetland and stream buffers. Where the following exists: Bogs, fens, mesic meadows**

Table 3
POTENTIALLY OCCURRING SPECIAL-STATUS PLANT SPECIES

Common Name	Scientific Name	Conservation Status CA Rare Plant Rank	Habitat Description	Potential to Occur in Project Area
Ephemeral monkeyflower	*Erythranthe inflatula*	1B.2	Annual herb occurring in vernally mesic areas in Great Basin scrub, lower montane coniferous forest, pinyon and juniper woodland	**Potential to occur in Highway 89 SP, Highway 89/ Cassel Road, McArthur Road. Where vernally mesic areas in Great Basin scrub, lower montane coniferous forest, pinyon and juniper woodland occurs**
Finger rush	*Juncus digitatus*	1B.1	Annual herb growing in openings of cismontane woodland and lower montane coniferous forest as well as xeric vernal pools. Elevations of 2165-3600 feet. Bloom (April)May-June.	**Potential to occur in: Oak Run to Fern Road, Philips Road. Where the following exists: Xeric vernal pools, cismontane woodland, lower montane coniferous forest**
Great Basin nemophila	*Nemophila breviflora*	2B.3	Annual herb growing in Great Basin scrub, meadows and seeps, and upper montane coniferous forest habitats. Occurs in mesic micro habitats. Elevations of 4005 to 7905 feet. Blooms May-July.	**Potential to occur in Fall River Cassel Road, Highway 89 SP, Highway 89/ Cassel Rad, McArthur Road. Where mesic micro habitats within Great Basin scrub, meadows and seeps, and upper montane coniferous forest occur.**
Greene's tuctoria	*Tuctoria greenei*	1B.1	Annual herb which occurs in Vernal pools. Elevation 1070-3510 feet. Blooms May-July (September)	**Potential to occur in: Fall River Cassel Road, and Highway 89/ Cassel Road in Vernal pools. Habitat will be avoided with implementation of wetland and stream buffers**
Hairy marsh hedge-nettle	*Stachys pilosa*	2B.3	Perennial rhizomatous herb occurring in Great basin scrub (mesic) and meadows and seeps. Elevations of 3935 to 5805. Blooms June to August.	**Potential to occur in: Fall River Cassel Road, Highway 89 SP, Highway 89/ Cassel Road, McArthur Road. Where Great basin scrub (mesic) and meadows and seeps occur.**
Heckner's lewisia	*Lewisia cotyledon* var. *heckneri*	1B.2	Perennial herb. Occurs in rocky lower montane coniferous forest. Elevations of 740-6890 feet. Blooms May-July.	**Potential to occur in Gilman Road, Platina Road, Rainbow Lake Road.**

Table 3
POTENTIALLY OCCURRING SPECIAL-STATUS PLANT SPECIES

Common Name	Scientific Name	Conservation Status CA Rare Plant Rank	Habitat Description	Potential to Occur in Project Area
				Where the following exists: Rocky lower montane forest
Holzinger's orthotrichum moss	*Orthotrichum holzingeri*	1B.3	Moss found in Cismontane woodland, lower montane coniferous forest, pinyon and juniper woodland, upper montane coniferous forest. Elevations 18-5905	**Potential to occur in Big Bend Road. Where the following occurs: Cismontane woodland, lower montane coniferous forest, pinyon and juniper woodland, upper montane coniferous forest**
Howell's thelypodium	*Thelypodium howellii* ssp. *howellii*	1B.2	Perennial herb. Occurs in Great Basin scrub, meadows and seeps. Elevations 1800-6005. Blooms May-July.	**Potential to occur Fall River Cassel Road. Where the following exists: Great Basin scrub, meadows and seeps**
Jepson's dodder	*Cuscuta jepsonii*	1B.2	Parasitic annual vine. Occurs in North Coast coniferous forest and streambank micro habitat. Elevations of 3935-7545 feet. Blooms July-September.	**Potential to occur in Fall River Cassel Road, Highway 89 SP, Highway 89/ Cassel Road, and McArthur Road. Where the following exists: Streambank micro habitat The project will not impact this species due to buffers implemented for streams and wetlands.**
Jepson's horkelia	*Horkelia daucifolia* var. *indicta*	1B.1	Perennial herb occurring within cismontane woodland and in quaternary-pyroclastic flows clay, openings, volcanic and vernally mesic microhabitats. Occurs at elevations of 785-2200 feet and blooms April-June.	**Potential to occur in: Platina Road, Rainbow Lake Road, Oak Run Road, Oak Run to Fern Road, and Philips Road. Where the following exists: Volcanic geology, cismontane woodland**
Klamath fawn lily	*Erythronium klamathense*	2B.2	Perennial bulbiferous herb growing in meadows and seeps and upper montane coniferous forest. Occurs at elevations of 3935 to 6070 feet and blooms April-July.	**Potential to occur in Big Bend Road, Highway 89 SP, and McArthur Road. Where the following exists: Meadows, upper montane coniferous forest**
Klamath manzanita	*Arctostaphylos klamathensis*	1B.2	Perennial evergreen shrub. Occurs in Gabbroic (sometimes), rocky, serpentinite (sometimes) micro habitats within chaparral,	**Potential to occur in Gilman Road. Where the following exists. Gabbroic (sometimes), rocky,**

Table 3
POTENTIALLY OCCURRING SPECIAL-STATUS PLANT SPECIES

Common Name	Scientific Name	Conservation Status CA Rare Plant Rank	Habitat Description	Potential to Occur in Project Area
			lower montane coniferous forest, subalpine coniferous forest, upper montane coniferous forest. Elevations 2250-7380. Blooms May-August	**serpentinite (sometimes) micro habitats within chaparral, lower montane coniferous forest, subalpine coniferous forest, upper montane coniferous forest**
Lassen paintbrush	*Castilleja lassenensis*	1B.3	Perennial herb occurring in meadow and seeps and subalpine coniferous forest and volcanic micro habitats. Occurs at elevations of 3135 to 10235 feet and blooms June-September.	**Potential to occur in Highway 89 SP, Highway 89/ Cassel Road, McArthur Road. where the following exist: meadow and seeps and subalpine coniferous forest and volcanic micro habitats**
Lemmon's milk-vetch	*Astragalus lemmonii*	1B.2	Perennial herb. Occurs in Great Basin scrub, marshes and swamps, meadows and seeps. Elevations 2200-7220 feet.	**Potential to occur in Fall River Cassel Road, Highway 89 SP, Highway 89/ Cassel Road, and McArthur Road. where the following occurs Great Basin scrub, marshes and swamps, meadows and seeps.**
Liddon's sedge	*Carex petasata*	2B.3	Perennial herb occurring in Broadleafed upland forest, lower montane coniferous forest, meadows and seeps, pinyon and juniper woodland. Elevation 3320-10895	**Potential to occur in Fall River Cassel Road. Where the following occurs: in Broadleafed upland forest, lower montane coniferous forest, meadows and seeps, pinyon and juniper woodland**
Little hulsea	*Hulsea nana*	2B.3	Perennial herb occurring in Alpine boulder and rock field, Subalpine coniferous forest at elevations of 3355 to 11010 feet. Blooms July-August	**Potential to occur in Fern Road. where Alpine boulder and rock field, and Subalpine coniferous forest exists.**
Long-haired star-tulip	*Calochortus longebarbatus* var. *longebarbatus*	1B.2	Perennial bulbiferous herb occurring in Great Basin scrub, lower montane coniferous forest in openings and drainages, meadows, seeps, and vernal pools in clay and mesic micro habitats. Occurs at elevations from 3295-6235 feet and blooms June- August (Sep).	**Potential to occur in Highway 89/ Cassel Road, and McArthur Road. Where the following exists: Great Basin scrub, drainages, meadows, seeps, vernal pools**

Table 3
POTENTIALLY OCCURRING SPECIAL-STATUS PLANT SPECIES

Common Name	Scientific Name	Conservation Status CA Rare Plant Rank	Habitat Description	Potential to Occur in Project Area
Long-leaved starwort	*Stellaria longifolia*	2B.2	Perennial rhizomatous herb growing in bogs and fens, meadows and seeps (mesic), riparian woodland, and upper montane coniferous forest. Occurs at elevations of 2955-6005 feet and blooms May-August.	**Potential to occur in Big Bend Road, Fall River Cassel Road, Highway 89 SP, Highway 89 Cassel Road, McArthur Road, Oak Run to Fern Road, Philips Road. Where the following exists: in bogs and fens, meadows and seeps (mesic), riparian woodland, and upper montane coniferous forest.**
Long-stiped campion	*Silene occidentalis* ssp. *longistipitata*	1B.2	Perennial herb which occurs in chaparral, lower montane coniferous forest, upper montane coniferous forest. Elevation 2000-6560 feet. Blooms June- August.	**Potential to occur Big Bend Road, Highway 89 SP, Highway 89/ Cassel Road, McArthur Road, Philips Road. Where the following exist: chaparral, lower montane coniferous forest, upper montane coniferous forest**
Marsh skullcap	*Scutellaria galericulata*	2B.2	Perennial rhizomatous herb found in lower montane coniferous forest, meadows and seeps (mesic), and marshes and swamps. Occurs at elevation ranging from 0-6890 feet. Blooming period June-September.	**Potential to occur in: Fall River Cassel Road, Highway 89 SP, Highway 89/ Cassel Road, McArthur Road. Where the following exists: meadows, seeps, marshes, swamps**
Maverick clover	*Trifolium piorkowskii*	1B.2	Annual herb found in chaparral, cismontane woodland, lower montane coniferous forest, valley and foothill mesic grassland, and vernal pools. Grows clay, openings, streambanks, and volcanic habitats at elevations ranging from 525 to 2230 feet. Blooming period April-May.	**Potential to occur in: Big Bend Road, Gilman Road, Oak Run, Oak Run to Fern Road, and Phillips Road. Where the following exists: vernal pools, chaparral, cismontane woodland, valley grassland**
Mingan moonwort	*Botrychium minganense*	2B.2	Perennial rhizomatous herb found in mesic areas of Bogs and fens, lower montane coniferous forest, meadows and seeps, upper montane coniferous forest	**Potential to occur in Big Bend Road, Highway 89 SP, Oak Run to Fern Road, and Philips Road. Where the following exists: Bogs and fens, lower montane coniferous**

Table 3
POTENTIALLY OCCURRING SPECIAL-STATUS PLANT SPECIES

Common Name	Scientific Name	Conservation Status CA Rare Plant Rank	Habitat Description	Potential to Occur in Project Area
				forest, meadows and seeps, upper montane coniferous forest.
Modoc County knotweed	*Polygonum polygaloides* ssp. *esotericum*	1B.3	Annual herb found in Great Basin scrub, lower montane coniferous forest, meadows and seeps, and vernal pools mesic habitats. Found at elevations 2905 to 5545 feet. Blooming period May-September.	**Potential to occur: Highway 89 SP (Observed 2008), Highway 89/ Cassel Road, McArthur Road. Where the following exists: Great Basin scrub, vernal pools, lower montane, meadows**
Modoc green-gentian	*Frasera albicaulis* var. *modocensis*	2B.3	Perennial herb found in Great Basin grassland, upper montane coniferous forest (openings). Elevations 1750-5740. Blooms May-July.	**Potential to occur in Fall River Cassel Road, Highway 89 SP, Highway 89/ Cassel Road, McArthur Road. Where the following exists: Great Basin grassland, upper montane coniferous forest (openings).**
Northern slender pondweed	*Stuckenia filiformis* ssp. *alpina*	2B.2	Perennial rhizomatous aquatic herb growing in shallow freshwater marches and swamps. Found in elevations of 985 to 7055 feet. Blooming period May-July.	**Potential to occur in Big Bed Road, Fall River Cassel Road, Highway 89 SP, Highway 89/ Cassel Road, McArthur Road, Philips Road. Where the following exists: shallow freshwater marches and swamps**
Nuttall's ribbon-leaved pondweed	*Potamogeton epihydrus*	2B.2	Aquatic perennial rhizomatous herb found in Marshes and swamps. Elevation 2172-7125 feet. Blooms (June)July-September.	**Potential to occur in Platina Road, Rainbow Lake Road. Where the following is found: Marshes and swamps. Habitat will be avoided with implementation of wetland and stream buffers.**
Oregon fireweed	*Epilobium oreganum*	1B.2	Perennial herb found in Bogs and fens, lower montane coniferous forest, meadows and seeps, upper montane coniferous forest (mesic). Elevation 2240-7350. Blooms June-September.	**Potential to occur in Gilman Road. Where the following exists: Bogs and fens, lower montane coniferous forest, meadows and seeps, upper montane coniferous forest (mesic).**
Oval-leaved viburnum	*Viburnum ellipticum*	2B.3	Perennial deciduous shrub found in chaparral, cismontane woodland, and lower montane coniferous forest. Found at	**Potential to occur in: Big Bend Road, Gilman Road, Platina Road, Rainbow Lake, Oak Run Road,**

Table 3
POTENTIALLY OCCURRING SPECIAL-STATUS PLANT SPECIES

Common Name	Scientific Name	Conservation Status CA Rare Plant Rank	Habitat Description	Potential to Occur in Project Area
			elevations of 705 to 4595 feet. Blooming period May-June.	**Oak Run to Fern Road. Where the following exists: Chaparral, cismontane woodland, lower montane forest**
Rattlesnake fern	*Botrypus virginianus*	2B.2	Perennial herb found in bogs and fens, lower montane coniferous forest, meadows and seeps, and riparian forest. Occurs at elevations of 2345 to 4445 feet. Blooming period June through September.	**Potential to occur in: Big Bend Road, Gilman Road, Highway 89 SP, Highway 89 /Cassel Road, Oak Run Road, Oak Run to Fern Road, Phillips Road, Where the following exists: bogs, fens, meadows, riparian habitat**
Red Bluff dwarf rush	*Juncus leiospermus* var. *leiospermus*	1B.1	Annual herb occurring in chaparral, cismontane woodland, meadows and seeps, valley and foothill grasslands and vernal pool habitat. Vernally mesic micro-habitat. Elevations of 115-4100 feet. Blooms March-June.	**Potential to occur in: Gilman Road, Highway 89 SP and Highway 89/ Cassel Road, McArthur Road, Oak Run Road, Oak Run to Fern Road. Where the following exists: Chaparral, cismontane woodland, meadows, vernal pools**
Sanford's arrowhead	*Sagittaria sanfordii*	1B.2	Emergency perennial rhizomatous herb found in shallow freshwater marshes and swamps. Elevations of 0-2135 feet. Blooms May-October (November).	**Potential to occur in Gilman Road. Where the following exists: Freshwater marshes, swamps. Habitat will be avoided with implementation of wetland and stream buffers.**
Scabrid alpine tarplant	*Anisocarpus scabridus*	1B.3	Perennial herb. Found in Upper montane coniferous forest. Elevation of 2300-7545 feet. Blooms July-August (September)	**Potential to occur in Big Bend Road, Highway89 SP. Where the following exists: Upper montane coniferous forest.**
Scalloped moonwort	*Botrychium crenulatum*	2B.2	Perennial rhizomatous herb. Occurs in bogs and fens, lower montane coniferous forest, meadows and seeps, freshwater marshes and swamps, and upper montane coniferous forest. Elevations of 4160-10760 feet. Blooms Jun-September.	**Potential to occur in: Big Bend Road, Gilman Road, Highway 89 SP, Highway 89/ Cassel Road, Oak Run to Fern Road, Philips Road. Where the following exists: Bogs, fens, meadows, lower montane**

Table 3
POTENTIALLY OCCURRING SPECIAL-STATUS PLANT SPECIES

Common Name	Scientific Name	Conservation Status CA Rare Plant Rank	Habitat Description	Potential to Occur in Project Area
				coniferous forest, freshwater marshes
Scott Mountain bedstraw	*Galium serpenticum* ssp. *scotticum*	1B.2	Perennial rhizomatous herb found in bogs and fens, lower montane coniferous forest, marshes and swamps, meadows and seeps, upper montane coniferous forest. Elevations of 3280-10760. Blooms June-September.	**Potential to occur in Gilman Road where the following exists: Bogs and fens, lower montane coniferous forest, marshes and swamps, meadows and seeps, upper montane coniferous forest**
Serpentine rockcress	*Boechera serpenticola*	1B.2	Perennial herb occurring in serpentinite ridges within lower montane coniferous forest, upper montane coniferous forest. Elevation 2100-6890 feet. Blooms March-June.	**Potential to occur in Platina Road, Rainbow Lake Road. where the following exists serpentinite ridges within lower montane coniferous forest, upper montane coniferous forest.**
Shasta ageratina	*Ageratina shastensis*	1B.2	Perennial herb occurring in chaparral and lower montane coniferous forest habitat. Occurs in often carbonate and rocky micro habitat. Elevations ranging from 1310-5905 feet. Blooms June-October.	**Potential to occur in: Big Bend Road and Gilman Road. Where the following exists: Carbonate and rocky habitat**
Shasta clarkia	*Clarkia borealis* ssp. *arida*	1B.1	Annual herb known from fewer than 10 occurrences near Shingletown. Occurs in cismontane woodland and openings in lower montane coniferous forest habitat. Elevations of 1610-1950 feet. Blooms June-August.	**Potential to occur in: Big Bend Road, Gilman Road, Oak Run, Oak Run to Fern Road, and Phillips Road. Where the following exists: Cismontane woodland, Openings in lower montane coniferous habitat**
Shasta fawn lily	*Erythronium shastense*	1B.2	Perennial bulbiferous herb. Occurs in cismontane woodland, lower montane coniferous forest habitats. Microhabitats include north-facing or shaded, can form clumps due to bulb offsets and usually carbonate and rocky micro habitat. Elevations of 1150-3345 feet. Blooms (February)March-April.	**Potential to occur in: Gilman Road, Big Bend Road, Gilman Road, Oak Run Road, Oak Run to Fern Road, Philips Road. Where the following exists: Cismontane woodland, lower montane coniferous forest**

Table 3
POTENTIALLY OCCURRING SPECIAL-STATUS PLANT SPECIES

Common Name	Scientific Name	Conservation Status CA Rare Plant Rank	Habitat Description	Potential to Occur in Project Area
Shasta huckleberry	*Vaccinium shastense* ssp. *shastense*	1B.3	Perennial deciduous shrub. Occurs in chapparal, cismontane woodland, lower montane coniferous forest, riparian forest, and subalpine coniferous forest habitats. Rocky outcrop microhabitats including acidic, disturbed, mesic, roadsides, rocky, sometimes seeps, and often streambanks. Elevations of 1065 to 4005 feet. Blooms (June-September) December-May.	**Potential to occur in: Big Bend Road, Gilman Road, Oak Run Road, Oak Run to Fern Road, and Philips Road. Where the following exists: chapparal, cismontane woodland, lower montane coniferous forest, riparian forest, and subalpine coniferous forest habitats**
Shasta limestone monkeyflower	*Erythranthe taylorii*	1B.1	Annual herb occurring in carbonate crevices and rocky outcrops micro habitats within Cismontane woodland lor lower montane coniferous forest between 1165-3215 feet. Flowering April-May.	**Potential to occur in: Big Bend Road, Gilman Road, Oak Run Road, Oak Run to Fern Road, and Philips Road. Where the following exists: Carbonate crevices, Rocky outcrops within cismontane forest**
Shasta snow-wreath	*Neviusia cliftonii*	1B.2	Deciduous shrub in the rose family endemic to Shasta County in the mountains around Lake Shasta. Occurs on north facing slopes at elevations of 381 to 2148 feet. Flowers from April to June.	**Potential to occur in: Big Bend Road, Gilman Road, Oak Run Road, Oak Run to Fern Road, Philips Road. Where the following exists: Limestone embankments**
Sierra blue grass	*Poa sierrae*	1B.3	Perennial glasslike herb occurring in openings in Lower montane coniferous forest at elevations ranging from 1166 to 5130. Flowers from April to June.	**Potential to occur in: Big Bend Road, Gilman Road, Oak Run Road, Oak Run to Fern Road, and Phillips Road. Where the following exists: Openings in lower montane coniferous forest**
Silky cryptantha	*Cryptantha crinita*	1B.2	Rocky volcanic soils, gravelly streambanks, gravel bars in foothill woodland between 200 - 3985 feet; flowers April to May.	**Potential to occur in: Gilman Road, Oak Run Road, Oak Run to Fern Road, Philips Road. Where the following exists: Rocky volcanic soils, gravelly streambanks**
Siskiyou clover	*Trifolium siskiyouense*	1B.1	Perennial herb occurring in mesic areas of Meadows and seeps or streambanks, between 2885-4920 feet. Flowers June-July.	**Potential to occur in Big Bend Road, Oak Run to Fern Road, Philips Road. Where the following exists: Meadows, seeps**

Table 3
POTENTIALLY OCCURRING SPECIAL-STATUS PLANT SPECIES

Common Name	Scientific Name	Conservation Status CA Rare Plant Rank	Habitat Description	Potential to Occur in Project Area
Siskiyou fireweed	*Epilobium siskiyouense*	1B.3	Perennial herb found in rocky or serpentinite micro habitats within alpine boulder and rock field, subalpine coniferous forest, upper montane coniferous forest. Elevation 2500-8205. Blooms July-September	**Potential to occur in Gilman Road, Platina Road, and Rainbow Lake. Where the following exist: rocky or serpentinite micro habitats within alpine boulder and rock field, subalpine coniferous forest, upper montane coniferous forest.**
Slender Orcutt grass	*Orcuttia tenuis*	1B.1	Foothill Woodland, Freshwater Wetlands; between 115 - 5775 feet, flowers May to September	**Potential to occur in: Fall River Cassel Road, Highway 89 SP, Highway 89/ Cassel Rad, McArthur Road, Oak Run Road, Oak Run to Fern Road. Where the following exists: Freshwater wetlands, vernal pools Habitat will be avoided with implementation of wetland and stream buffers**
Stebbins' harmonia	*Harmonia stebbinsii*	1B.2	Annual herb found in serpentinite areas within Chaparral, Lower montane coniferous forest. Elevations 1580-5185. Blooms May-June	**Potential to occur in Platina Road, and Rainbow Lake Road. Where the following exists serpentinite areas within chaparral, lower montane coniferous forest**
Tufted loosestrife	*Lysimachia thyrsiflora*	2B.3	Perennial herb often growing in marshes, shorelines of lakes and ponds and occasionally along streams. Occurs at elevations from 3115 to 5498 feet. Flowers May to August.	**Potential to occur in Fall River Cassel Road, Highway 89 SP Highway 89/ Cassel Road, McArthur Road and Fall River Cassel Road. Where the following exists: Marshes, lakes, ponds, streams The project will not impact this species due to buffers implemented for streams and wetlands.**
Upswept moonwort	*Botrychium ascendens*	2B.3	Perennial rhizomatous herb that occurs in mesic Lower montane coniferous forest, meadows and seeps. Elevations of 3045 to 9990. Blooms (June) July to August.	**Potential to occur in Big Bend Road, Highway 89 SP where mesic lower montane coniferous forest, meadows and seeps exists**

Table 3
POTENTIALLY OCCURRING SPECIAL-STATUS PLANT SPECIES

Common Name	Scientific Name	Conservation Status CA Rare Plant Rank	Habitat Description	Potential to Occur in Project Area
Water star-grass	*Heteranthera dubia*	2B.2	Aquatic perennial herb that grows in submersed freshwater such as rivers and lakes at elevations ranging from 68 to 4402 feet. Flowers July to August.	**Potential to occur in Fall River Cassel Road, Highway 89 SP, Highway 89/ Cassel Road, McArthur Road. Where the following exists: Rivers, Lakes The project will not impact this species due to buffers implemented for streams and wetlands.**
Watershield	*Brasenia schreberi*	2B.3	Aquatic perennial herb with floating leaves that grows in ponds, lakes, and slow-moving streams. Occurs at elevations of 60 to 7211 feet.	**Potential to occur in Big Bend Road, Oak Run Road, Oak Run to Fern Road, and Fall River Castel Road, Gilman Road, Highway 89 SP, Highway 89/ Cassel Road, McArthur Road, and Philips Road. Where the following exists: Ponds, lakes, slow-moving streams The project will not impact this species due to buffers implemented for streams and wetlands.**
Western goblin	*Botrychium montanum*	2B.1	Perennial rhizomatous herb which occurs in mesic lower montane coniferous forest, meadows and seeps, upper montane coniferous forest. Elevations of 2180 to 7155. Blooms July-September.	**Potential to occur in Big Bend Road, Highway 89 SP, Philips Road. Where the following exists: Mesic lower montane coniferous forest, meadows and seeps, upper montane coniferous forest**
Woolly-fruited sedge	*Carex lasiocarpa*	2B.3	Perennial grass like herb occurring in lake margins, freshwater-marsh and edges of bogs and fens at elevations ranging from 1935 to 7515 feet.	**Potential to occur in Big Bend Road. The project will not impact this species due to buffers implemented for streams and wetlands. Where the following exists: Lakes, freshwater marshes, bogs, fens**
Sensitive Habitats				

Table 3
POTENTIALLY OCCURRING SPECIAL-STATUS PLANT SPECIES

Common Name	Scientific Name	Conservation Status CA Rare Plant Rank	Habitat Description	Potential to Occur in Project Area
Northern Interior Cypress Forest	--	--	Upper slopes and ridges. Soils developed from sterile basaltic and serpentine substrates.	**Potential to occur in Platina Road, Rainbow Lake Road (observed 1967), Big Bend Road.**
Alkali Seep			Seasonally or permanently flooded brackish marshes, channels, ponds, rivers, coastal wetlands; low-lying basins of high evaporation and infrequent inputs of freshwater into alkaline wetlands.	**Potential to occur in: Oak Run Road, Oak Run to Fern Road, Philips Road.**
Northern Basalt Flow Vernal Pool			Seasonally flooded channel scours, floodplains, seeps on flats, vernal pools. Soils are usually volcanic and rocky or clayey.	**Potential to occur in Fall River Cassel Road, Highway89/Cassel Road**

ARCHEOLOGY

An Archaeological Survey Report was prepared for the project by Alta Archaeological Consulting, LLC (ALTA). Since the project will be funded with federal and state grants, the project is subject to both the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). The Archaeological Survey Report was prepared to address the responsibilities of NEPA, Section 106 of the National Historic Preservation Act (NHPA) (36 CFR Part 800), CEQA, as codified in Public Resources Code sections 5097, and its implementing guidelines 21082 and 21083.2. A records search was completed at the California Historical Resources Information System. An archaeological field survey was completed by ALTA between February 2023 and June 2023 for the purpose of identifying cultural resources within the area of potential effect (APE) where landowner authorization was granted. The APE, encompassing a total area of approximately 3,899 acres, was surveyed. The Archaeological Survey Report was provided to CAL FIRE on June 12, 2023, and then submitted to Sonoma State University Anthropological Studies Center for review. Management recommendations included in the Archaeological Survey Report will be implemented for the project to avoid impacts to cultural resources.

CURRENT LAND USE AND PREVIOUS IMPACTS

The PAAs are located in high-priority WUI areas in Shasta County. Land use and zoning designations vary throughout the project site. Land Use Designations within each PAA are included in Figure 13 of Attachment A. Zoning districts are included in Figure 14. Due to the geographic extent of the project, existing conditions vary throughout the project area and within each individual PAA. In general, the PAAs include areas where dense vegetation is encroaching along county roadways and/or primary emergency evacuation or access routes for communities in WUI areas of the County. There are currently ongoing fuel treatment activities by private landowners and other entities within the project area. The project will involve coordination of activities between entities to ensure effective project implementation and avoid duplication of effort.

Conclusion of the Mitigated Negative Declaration

ENVIRONMENTAL PERMITS

Order R5-2017-0061 Waste Discharge Requirements General Order for Discharges Related to Timberland Management Activities for Non-Federal and Federal Lands.

Timber Harvest Plan or Exemption

Caltrans Encroachment Permit

MITIGATION MEASURES

In additions to the Best Management Practices implemented during the project, the following four mitigation measures will be implemented to avoid or minimize environmental impacts. Implementation of these mitigation measures will reduce the environmental impacts of the proposed project to a less than significant level.

Mitigation Measure 1: Pre-Treatment Botanical Surveys (All PAAs)
As part of the preliminary site assessment (PSA) conducted on each eligible parcel potential habitat for special-status plants with potential occur within the treatment area will be identified along with species included in any sensitive natural communities. If potential habitat for special-status plants or sensitive natural communities are identified, protocol-level surveys of the eligible parcels shall be conducted by a qualified biologist during the flowering window for special-status plant species with potential to occur within the treatment area. Surveys shall comply with survey protocols for plants species listed under the CDFW *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities* (2018). If no special-status plants are found, no further measures pertaining to special-status plants are necessary. If special-status plant species are identified during the botanical surveys, the individuals will be avoided. The treatment prescription (TP) for the parcel will be modified to exclude activities within 25 feet of the individual and exclusionary fencing will be placed around the plants prior to operations on the parcel to establish the avoidance area during project implementation.

Mitigation Measure 2: Herbicide Treatment Buffers (Anadromous Fish-Bearing Streams)
Herbicide treatment buffer will coincide with the prescribed treatment buffer for perennial and ephemeral streams for any anadromous fish bearing streams. In order to limit the effect of herbicides on anadromous fish. Herbicides with the potential to harm aquatic life shall not be applied within 150 feet of anadromous fish bearing streams. If conditions necessitate that herbicides are applied within the 150-foot buffer, then the application shall be completed in the dry season when no precipitation is forecasted.

Mitigation Measure 3: Riparian and Wetland Identification and Exclusion (All PAAs)
During the preliminary site assessment of each eligible parcel, eligible parcels will be surveyed for aquatic resources. The treatment prescription (TP) will exclude activities within 75 feet of perennial streams and wetlands (including vernal pools) as well as a 50-feet from ephemeral and

intermittent streams. The exclusion area will be marked with flagging. Biomass removal, herbicide application, equipment staging, operation of mechanical equipment, and on-site disposal of removed biomass shall not occur within the marked buffers.

Mitigation Measure 4: Surveys for Special-Status Amphibians and Reptiles (All PAAs)
During the Preliminary Site Assessment of each eligible parcel, work areas within 150 feet of flowing watercourses will be evaluated to determine if suitable upland dispersal habitat for potentially occurring special-status amphibians and reptiles are present. If no potential suitable upland dispersal habitat is identified, no further action is required. If suitable upland habitat is identified, no more than two days prior to the start of ground disturbing activities, focused pretreatment surveys for special status amphibians, reptiles, and their eggs will be completed by a qualified biologist in all suitable upland dispersal habitat areas within 150 feet of flowing watercourses. If a special-status species is found, CDFW will be notified. If an adult individual is observed within the survey area, then the animal shall be avoided until it is no longer in harm's way, or it may be relocated by a qualified biologist if an area offsite that has appropriate habitat for the species is available. If relocating, the animal should be moved to a nearby area with habitat similar to the environment in which it was found.

If a nest, eggs, hatchlings, or an aestivating adult are observed within the survey area, then an avoidance buffer of 50 to 100 feet shall be applied to heavy equipment access, ground disturbing activities, and herbicide application. The qualified biologist shall consider the topography and vegetation onsite, as well as the treatments proposed onsite and the potential for disturbance when determining the buffer distance. Additionally, to avoid impacts to hatchlings' dispersal from the nest site, no woody debris or other barrier shall be placed in between the nest site and the nearest body of water..

Mitigation Measure 5: Bat Roost Humane Exclusion (All PAAs)
During the Preliminary Site Assessment of eligible parcels, trees with maternity roost structures (i.e. cavities in the trunk or branches, woodpecker holes, loose bark, cracks) will be identified. If no trees with maternity roost structures are identified, no further measures are necessary. If removal of trees identified to have bat roost structure occurs from September 1 to October 30, no measures for special-status bats are required.

If removal of trees identified to have bat roost structure potential will occur during the bat maternity season, when young are non-volant (March 1- August 31), or during the bat hibernacula (November 1-March 1), when bats have limited ability to safely relocate roosts, humane exclusions should be implemented which consist of a two-day removal process by which the non-habitat trees and brush are removed along with smaller tree limbs on the first day, and the remainder of the tree limbs and the tree trunk on the second day.

Mitigation Measure 6: Artificial Lighting Standards (All PAAs)
To minimize impacts of lighting to bats and other nocturnal species, any artificial lighting associated with short-term and long-term project activities should be downward facing, fully shielded, and designed and installed to minimize photo pollution of adjacent wildlife habitat.

Mitigation Measure 7: Bat Roost Habitat Avoidance (All PAAs)
During the Preliminary Site Assessment of each eligible parcel the presence of caves or bridges within the treatment area will be noted. If no caves or bridges are located within the project area, no further measures are necessary. If present within 50 feet of project activities, caves and bridges in the project area will be assessed during the Preliminary Site Assessment for potential bat roost structures (crevice roosts tend to be approximately 3/4 to 1 1/2 inches across and at least 18 inches deep. In most cases, they run from one side of the bridge to the other, and between three and several hundred meters above ground). If found, a qualified biologist will assess the structure for signs of bat presence (i.e., guano, insect pieces, etc.). If no roost is present, then no buffer is needed. If a roost is present, then a 50-foot non-disturbance buffer shall be implemented around the roost structure to prevent changes to the thermal stability and protective cover surrounding the roost structure that could result from tree removal.

Mitigation Measure 8: Mammal Den Surveys (Big Bend Road, Fall River Cassel Road, Gilman Road, Highway 89 Cassel Road, McArthur Road, Platina Road, Rainbow Lake Road, Oak Run Road, Oak Run to Fern Road, Philips Road PAAs)
During the Preliminary Site Assessment of each eligible parcel, the project area will be evaluated for suitable mammal den habitat. If potential den habitat for American badger (*Taxidea taxus*), fisher (*Pekania pennaniti*), Oregon snowshoe hare (*Lepus americanus; klamathensis*), wolverine (*Gulo gulo*), or Sierra Nevada red fox (*Vulpes culpes necator*) is identified, pretreatment surveys shall be completed within three days prior to ground disturbing activities to determine if any terrestrial mammal (e.g., American wolverine, fisher, American badger) den structures are present within the work area. If potential dens are located within the work area and cannot be avoided during project activities, a qualified biologist will determine if the dens are occupied. If occupied dens are present within the work area, their disturbance and destruction will be avoided by stopping operations until an appropriate buffer approved by CDFW or USFWS.

Mitigation Measure 9: NSO/CSO Surveys (Big Bend Road, and McArthur Road PAAs)
Surveys will be completed in areas where NSO or CSO have been previously identified. Where the project area falls within any 1.3-mile Activity center buffer, operations will take place outside of nesting season (March – August) or after surveys confirm no presence. The treatment prescription will also be modified to leave all trees >20 DBH or larger un-cut within a half mile of the confirmed Activity Center. To promote a diverse canopy that supports NSO roosting and foraging, some mature oaks will also be retained at the discretion of the landowner.

Mitigation Measure 10: Native Milkweed Buffer (All PAAs)
Surveys will be completed to determine if native milkweed (*Asclepias spp.)* are present within work areas. If milkweed is identified onsite, disturbance to the plant would be avoided by implementing a 25-foot buffer around identified individuals.

Mitigation Measure 11: Invasive Species Management (All PAAs)
An invasive species management plan (ISMP) shall be prepared to provide guidance that prevents the spread of noxious weeds. If a significant population of Cal-IPC listed invasive species is observed, then equipment shall be cleaned at the contaminated site before proceeding to any other sites.

Mitigation Measure 12: Implement Management Recommendations in Archaeological Survey Report

Management Recommendations included in the Archaeological Survey Report prepared for the project shall be implemented to ensure that cultural resources are not adversely affected by the project which include the following:

Special Conditions

Archaeological resources within the Project Area are designated for Special Conditions where fuel reduction activities may be performed within the site limits. In some instances, removal of hazard trees is beneficial to site preservation. Special Conditions of cultural resources includes the following actions:

1. Prior to the commencement of operations, the Project Manager will ensure that all Special Treatment Zones (STZ) are clearly described and illustrated in plans, and specifications.
2. All parties (CAL FIRE, Project Manager, Registered Professional Forester [RPF], or Licensed Timber Operator [LTO]) will review the plans.
3. Prior to commencement of operations, a CAL FIRE Certified Archaeological Surveyor or professional archaeologist familiar with the site, shall demarcate all sites with STZ flagging. Exclusionary flagging will be based on the site sketch map. No buffer around the site boundary is required for Special Condition sites. STZ flagging that is older than six months will be inspected and refreshed prior to operations.
4. Fuel reduction work utilizing hand tools (including chainsaws) may occur within the STZ area given the following conditions.
5. No skidding of logs shall occur within the STZ.
6. Timber shall be directionally felled away from the site.
7. Mechanized equipment shall be restricted to existing roads or disturbed areas within the STZ.
8. No tree planting will occur within STZ.
9. A CAL FIRE Certified Archaeological Surveyor or professional archaeologist will periodically inspect sites to ensure that BMPs are effective and the STZ has not been breached.

Unanticipated Discovery of Cultural Resources

If previously unidentified cultural resources are encountered during project implementation, avoid altering the materials and their stratigraphic context. A qualified professional archaeologist should be contacted to evaluate the situation. Project personnel should not collect cultural resources. Prehistoric resources include, but are not limited to, chert or obsidian flakes, projectile points, mortars, pestles, and dark friable soil containing shell and bone dietary debris, heat-affected rock, or human burials. Historic resources include stone or abode foundations or walls; structures and remains with square nails; and refuse deposits or bottle dumps, often located in old wells or privies.

Encountering Native American Remains

Although unlikely, if human remains are encountered, all work must stop in the immediate vicinity of the discovered remains and the County Coroner and a qualified archaeologist must be notified immediately so that an evaluation can be performed. If the remains are deemed to be Native American and prehistoric, the Native American Heritage Commission must be contacted by the Coroner so that a "Most Likely Descendant" can be designated and further recommendations regarding treatment of the remains is provided.

SUMMARY OF FINDINGS

This IS-MND has been prepared to assess the project's potential effects on the environment and an appraisal of the significance of those effects. Based on this IS-MND, it has been determined that the proposed project will not have any significant effects on the environment after implementation of mitigation measures. This conclusion is supported by the following findings:

1. The proposed project will have no effect related to agriculture and forest resources, energy, land use and planning, mineral resources, population and housing, public services, recreation, utility and service systems and wildfire.
2. The proposed project will have a less-than-significant impact on aesthetics, air quality, geology and soils, greenhouse gas emissions, hazards and hazardous materials, hydrology and water quality, noise, transportation, and utilities and service systems,
3. Mitigation is required to reduce potentially significant impacts related to biological resources, cultural resources, tribal cultural resources, and mandatory findings of significance.

The Initial Study-Environmental Checklist included in this document discusses the results of resource-specific environmental impact analyses that were conducted by the Department. This initial study revealed that potentially significant environmental effects could result from the proposed project. However, CAL FIRE revised its project plans and has developed mitigation measures that will eliminate impact or reduce environmental impacts to a less than significant level. CAL FIRE has found, in consideration of the entire record, that there is no substantial evidence that the proposed project as currently revised and mitigated would result in a significant effect upon the environment. The IS-MND is therefore the appropriate document for CEQA compliance.

INITIAL STUDY-ENVIRONMENTAL CHECKLIST

The environmental factors checked below would be potentially affected by this project involving at least one impact that is a potentially significant impact as indicated by the checklist on the following pages.

Project Title: Shasta County Wildfire Mitigation/Hazardous Fuels Reduction Project

Lead Agency Name and Address: California Department of Forestry and Fire Protection (CAL FIRE), 875 Cypress Ave., Redding, CA 96001

Contact Person & Phone Number:
CAL FIRE Project Manager: Ben Rowe Forester III (530) 225-2432
The McConnell Foundation, Grantee: Director of Land Management Alex Carter (530) 226-6249
Document Preparer: VESTRA Resources, Inc., Wendy Johnston, Kristine Cloward, Nicolaas VanOoyen, Anna Prang (530) 223-2585

Project Location: Wildland Urban Interface (WUI) throughout Shasta County (See Figure 1).

Project Sponsor's Name and Address: The McConnell Foundation, 800 Shasta View Drive, Redding, CA 96003

General Plan Designation: Agricultural Croplands, Agricultural Grazing, Commercial, Commercial Highway, Industrial, Mixed Use, Habitat Resource 40 and 80-acre density, Open Space, Recreation Resource, Public Land, Rural Residential A, Rural Residential B, Timber, Timber-Mining Resource Buffer, and Urban Residential (see Figure 13)

Zoning: Multiple Districts (see Figure 14).

Description of Project: Hazardous Fuels Reduction

Surrounding Land Uses and Setting: Multiple land uses adjacent to critical transportation corridors.

Other public agencies whose approval may be required: NA

Environmental Factors Potentially Affected

☐ Aesthetics	☐ Greenhouse Gas Emissions	☐ Public Services
☐ Agriculture Resources	☐ Hazards & Hazardous Materials	☐ Recreation
☐ Air Quality	☐ Hydrology and Water Quality	☐ Transportation
☒ Biological Resources	☐ Land Use and Planning	☐ Utilities and Service Systems
☒ Cultural Resources	☐ Mineral Resources	☐ Wildfire
☐ Energy	☐ Noise	☒ Mandatory Findings of Significance
☐ Geology and Soils	☐ Population and Housing	

Determination

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION would be prepared.

☒ I find that although the proposed project COULD have a significant effect on the environment, there WOULD NOT be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION would be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project COULD have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier ENVIRONMENTAL IMPACT REPORT or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier ENVIRONMENTAL IMPACT REPORT or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

DocuSigned by:
John Melvin
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3/15/2024

John Melvin
Assistant Deputy Director, Resource Protection
California Department of Forestry and Fire Protection

Date

Environmental Checklist and Discussion

AESTHETICS

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Except as provided in Public Resources Code § 21099, would the project have a substantial adverse effect on a scenic vista?	☐	☐	☒	☐

a) The Shasta County General Plan does not identify specific scenic vistas within the county. The project will result in vegetation removal that could be noticeable in close vicinity to each treatment area. The change in vegetation will not be noticeable when viewed from a distance since large healthy trees will be retained with a spacing of 30 feet. Impacts to scenic vistas will not be substantially adverse. **Less-than-significant impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Except as provided in Public Resources Code § 21099, would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒

b) The project area does not include officially designated State Scenic Highways. **No impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Except as provided in Public Resources Code § 21099, in non-urbanized areas, would the project 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 publicly accessible vantage point.) If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	☐	☐	☒	☐

c) The project is located in non-urbanized areas. The PAAs are adjacent to public roadways and will be visible to the public. The existing visual character varies for each PAA, but generally consists of rural areas with dense vegetation adjacent to public roadways. The project includes removal of vegetation, small-diameter trees, and closely spaced trees from within 100 to 400 feet from the roadway centerline in each PAA as well as removal of dead and dying trees within 100 to 200 feet from the roadway centerline. Within the treatment area, trees spaced 30 feet apart will remain and grasses will be retained as feasible for erosion control. The removal of vegetation will result in a change to the existing character of the site which could be noticeable from public areas in close distance to the treatment areas, however the change will not be substantially different from

existing conditions since large diameter trees will be retained at a spacing of 30 feet. The project will not substantially degrade the existing visual character or quality of public views of the site and the surroundings area, nor would it conflict with zoning or any other regulations governing scenic quality. **Less-than-significant impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Except as provided in Public Resources Code § 21099, would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☐	☒

d) The project does not include the installation or use of any new lighting sources or structures that would be a new source of glare. The project will not create substantial light or glare that would affect day or nighttime views in the area. **No impact.**

AGRICULTURAL RESOURCES

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project 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?	☐	☐	☐	☒

a) Portions of the project area contain California Important Farmland as mapped by the California Department of Conservation. Most of the Important Farmland within the project area is designated as grazing land. California Important Farmland within the project area is shown in Figures22A through 22E. Hazardous fuel reduction activities within the project area will not result in the conversion of Farmland to a non-agricultural uses. **No impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project conflict with existing zoning for agricultural use or a Williamson Act contract?	☐	☐	☐	☒

b) The project includes land enrolled in a Williamson Act Contract as mapped by the California Department of Conservation California Williamson Act Enrollment Finder. The project will not result in a development or change in use of these lands to non-agricultural uses. **No impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Would the project conflict with existing zoning for, or cause rezoning of forest land (as defined in Public Resources Code §12220(g)), timberland (as defined by Public Resources	☐	☐	☐	☒

Code §4526), or timberland zoned Timberland Production (as defined by Government Code §51104(g))?				

c) Portions of the project are Zoned Timber Production (TPZ or Timberland (TZ). None of the landholding within the treatment areas will be rezoned and will remain TPZ or TZ. The project would not result in rezoning of forest land (as defined in Public Resources Code §12220(g)), timberland (as defined by Public Resources Code §4526), or timberland zoned Timberland Production (as defined by Government Code §51104(g). **No impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Would the project result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒

d) Forested lands are located within the project areas approximately 48 percent of the area to be treated includes a forested landscape. The type of forested land included in descending number of acres is Ponderosa Pine, Sierra Mixed Conifer, Montane Hardwood, Montane Hardwood-Conifer, Eastside Pine. This project will result in fuel reduction within the Wildland-Urban Interface (WUI) and will aid in protecting forested lands from wildfire. Forest lands within the project site are included in Figures 20A through 20E of Attachment A. The project will not result in the loss of forest land or conversion of forest land to non-forest uses. **No impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
e) Would the project involve other changes in the existing environment, which, due to their location or nature, could result in conversion of farmland to non-agricultural use?	☐	☐	☐	☒

e) The project does not involve changes in the existing environment which could result in conversion of farmland to non-agricultural use or conversion of forest land to non-forest use. **No impact.**

AIR QUALITY

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐

a) The Northern Sacramento Valley Planning Area 2021 Triennial Air Quality Attainment Plan addresses non-attainment of California Ambient Air Quality Standards for ozone in the Northern Sacramento Valley Planning Area. The Plan requires control measures for stationary sources and incentive programs, community education efforts, reduction from land use programs, air quality forecasting, and district rules applicable to new development to address non-stationary sources of ozone.

The project does not include a permanent source of ozone emissions. The project will result in short-term emissions of ozone precursors (Reactive organic gases (ROG) and nitrogen oxides (NOx) through mobile sources including equipment, contractor worker trips, and offsite disposal of biomass as feedstock for biomass facilities. Emissions generated from using biomass from the project as fuel for biomass facilities will not exceed the permitted capacity or volume allowed by the applicable permits for each biomass facility. All emissions will be short term in nature. BMPs will be implemented during the project as described under b) below that will minimize ozone emissions generated by vehicles and equipment used during project implementation. The project will not conflict with or obstruct the Air Quality Attainment Plan. **Less-than-significant impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project 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?	☐	☐	☒	☐

b) Shasta County is designated as nonattainment for ozone and PM10 California Air Quality Standards (CAAQS). The project will result in minor, short-term emissions of PM10 and ozone precursors (ROG and NOx). The following BMPs which include applicable BMPs contained in the FEMA *Programmatic Environmental Assessment, Recurring Actions in Arizona, California, and Nevada* will be implemented by the treatment contractor during project activities:

- All exposed unpaved surfaces shall be watered two times per day to limit dust generation.
- All haul trucks transporting soil, chips, or other loose material offsite shall be covered.
- All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
- All vehicle speeds on unpaved roads shall be limited to 15 mph.
- Monitor dust-generating activities and implement appropriate measures for maximum dust control.
- Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes.
- Clear signage shall be provided for project workers at all access points.
- All equipment shall be maintained and properly tuned in accordance with manufacturer specifications. All equipment shall be checked by a certified visible emissions evaluator.

- Post a publicly visible sign with the telephone number and person to contact at the lead agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.
- All trucks and equipment, including their tires, shall be washed off prior to leaving the site.
- Sandbags or other erosion control measures shall be installed to prevent silt runoff to public roadways from sites with a slope greater than one percent.
- The idling time of diesel-powered equipment will be minimized to two minutes.
- All equipment, diesel trucks, and generators are required to be equipped with Best Available Control Technology for emission reductions of NOx and PM.
- Monitor dust-generating activities and implement appropriate measures for maximum dust control.
- All equipment used onsite will be California Air Resources Board (CARB) compliant.

The BMPs listed above will minimize emissions of PM10 and ozone precursors generated by the project. Project emissions will be temporary and will cease upon completion of the project. The project will not result in a cumulatively considerable net increase of PM10 or ozone precursors. **Less-than-significant impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Would the project expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐

c) BMPs listed in b) above will be implemented for the project to control emissions generated by vehicles and mechanical equipment used for the project. Emissions will also be generated through use of biomass from the project as fuel at biomass facilities. The project will not result in an increase in the permitted capacities or emissions of these facilities. Equipment and vehicles will not generate substantial pollutants and will not be operated in any one location for an extended period of time. The project will not expose sensitive receptors to substantial pollutant concentrations. **Less-than-significant impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Would the project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	☐	☐	☒	☐

d) The project will require equipment that could result in diesel exhaust odors. Odor emissions are highly dispersive, and equipment will not be operated in any one location for an extended period of time. In addition, the PAAs are located in rural areas with low population density. BMPs listed in b) above will be implemented by the treatment contractor for the project including limits on

equipment idling times that will minimize equipment diesel exhaust emissions. The project will not result in odors or other emissions that would adversely affect a substantial number of people. **Less-than-significant-impact.**

BIOLOGICAL RESOURCES

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project 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 or the U.S. Fish and Wildlife Service?	☐	☒	☐	☐

a) Special-status plant and wildlife species with potential to occur within each PAA are included in Tables 2 and 3 in the Project Description and Environmental Setting. Special-status species with potential to occur within the project area include:

Wildlife Species

- American peregrine falcon (*Falco peregrinus anatum*)
- Bald eagle (*Haliaeetus leucocephalus*)
- Bank swallow (*Riparia riparia*)
- Black swift (*Cypseloides niger*)
- California black rail (*Laterallus jamaicensis coturniculus*)
- California spotted owl (*Strix occidentalis occidentalis*)
- Greater sandhill crane (*Antigone canadensis tabida*)
- Northern goshawk (*Accipiter gentilis*)
- Northern spotted owl (*Strix occidentalis caurina*)
- Osprey (*Pandion haliaetus*)
- Prairie falcon (*Falco mexicanus*)
- Purple martin (*Progne subis*)
- Tricolored blackbird (*Agelaius tricolor*)
- Willow flycatcher (*Empidonax traillii*)
- Yellow-billed Cuckoo (*Coccyzus americanus*)
- American badger (*Taxidea taxus*)
- Fisher (*Pekania pennanti*)
- Oregon snowshoe hare (*Lepus americanus klamathensis*)
- Pallid bat (*Antrozous pallidus*)
- Sierra Nevada red fox-southern Cascades DPS (*Vulpes necator*)
- Spotted bat (*Euderma maculatum*)
- Townsend's big-eared bat (*Corynorhinus townsendii*)
- Wolverine (*Gulo gulo*)
- Cascades frog (*Rana cascadae*)
- Foothill yellow-legged frog (*Rana boylii*)

- Oregon spotted frog (*Rana pretiosa*)
- Pacific tailed frog (*Ascaphus truei*)
- Western pond turtle (*Emys marmorata*)
- Bigeye marbled sculpin (*Cottus klamathensis macrops*)
- Green sturgeon - southern DPS (*Acipenser medirostris pop. 1*)
- Chinook Salmon CV Spring-run ESU (*Oncorhynchus tshawytscha pop.11*)
- Hardhead (*Mylopharodon conocephalus*)
- Pacific Lamprey (*Entosphenus tridentatus*)
- Pit-Klamath brook lamprey (*Entosphenus lethophagus*)
- Northern roach (*Hesperoleucus mitrulus*)
- Rough sculpin (*Cottus asperrimus*)
- Steelhead CV DPS (*Oncorhynchus mykiss irideus pop. 11*)
- Shasta crayfish (*Pacifastacus fortis*)
- Monarch Butterfly (*Danaus plexippus*)
- Western Bumble Bee (*Bombus occidentalis*)

Plant Species

- Ahart's paronychia (*Paronychia ahartii*)
- Aleppo avens (*Geum aleppicum*)
- Bellinger's meadowfoam (*Limnanthes floccosa* ssp. *bellingeriana*)
- Big-scale balsamroot (*Balsamorhiza macrolepis*)
- Blushing wild buckwheat (*Eriogonum ursinum* var. *erubescens*)
- Boggs Lake hedge-hyssop (*Gratiola heterosepala*)
- Bristly sedge (*Carex comosa*)
- Broad-nerved hump moss (*Meesia uliginosa*)
- Callahan's mariposa-lily (*Calochortus syntrophus*)
- Cantelow's lewisia (*Lewisia cantelovii*)
- Canyon Creek stonecrop (*Sedum paradisum* ssp. *Paradisum*)
- Cascade grass-of-Parnassus (*Parnassia cirrata* var. *intermedia*)
- Columbia yellow cress (*Rorippa columbiae*)
- Eel-grass pondweed (*Potamogeton zosteriformis*)
- Engelmann spruce (*Picea engelmannii*)
- English sundew (*Drosera anglica*)
- Ephemeral monkeyflower (*Erythranthe inflatula*)
- Finger rush (*Juncus digitatus*)
- Great Basin nemophila (*Nemophila breviflora*)
- Greene's tuctoria (*Tuctoria greenei*)
- Hairy marsh hedge-nettle (*Stachys Pilosa*)
- Heckner's lewisia (*Lewisia cotyledon* var. *heckneri*)
- Jepson's dodder (*Cuscuta jepsonii*)
- Holzinger's orthotrichum moss (*Orthotrichum holzingeri*)
- Howell's thelypodium (*Thelypodium howellii* ssp. *Howellii*)
- Jepson's horkelia (*Horkelia daucifolia* var. *indicta*)

- Klamath fawn lily (*Erythronium klamathense*)
- Klamath manzanita (*Arctostaphylos klamathensis*)
- Lassen paintbrush (*Castilleja lassenensis*)
- Lemmon's milk-vetch (*Astragalus lemmonii*)
- Liddon's sedge (*Carex petasata*)
- Little hulsea (*Hulsea nana*)
- Long-haired star-tulip (Calochortus *longebarbatus* var. *longebarbatus*)
- Long-leaved starwort (*Stellaria longifolia*)
- Long-stiped campion (*Silene occidentalis* ssp. *Longistipitata*)
- Marsh skullcap (*Scutellaria galericulata*)
- Maverick clover (*Trifolium piorkowskii*)
- Mingan moonwort (*Botrychium minganense*)
- Modoc County knotweed (*Polygonum polygaloides* ssp. *esotericum*)
- Modoc green-gentian (*Frasera albicaulis* var. *modocensis*)
- Northern slender pondweed (*Stuckenia filiformis* ssp. *alpina*)
- Nuttall's ribbon-leaved pondweed (*Potamogeton epihydrusI*)
- Oregon fireweed (*Epilobium oreganum*)
- Oval-leaved viburnum (*Viburnum ellipticum*)
- Rattlesnake fern (*Botrypus virginianus*)
- Red Bluff dwarf rush (*Juncus leiospermus* var. *leiospermus*)
- Sanford's arrowhead (*Sagittaria sanfordii*)
- Scabrid alpine tarplant (*Anisocarpus scabridus*)
- Scalloped moonwort (*Botrychium crenulatum*)
- Scott Mountain bedstraw (*Galium serpenticum* ssp. *Scotticum*)
- Serpentine rockcress (*Boechera serpenticola*)
- Shasta ageratina (*Ageratina shastensis*)
- Shasta clarkia (*Clarkia borealis* ssp. *arida*)
- Shasta fawn lily (*Erythronium shastense*)
- Shasta huckleberry (*Vaccinium shastense* ssp. *shastense*)
- Shasta limestone monkeyflower (*Erythranthe taylorii*)
- Shasta snow-wreath (*Neviusia cliftonii*)
- Sierra blue grass (*Poa sierrae*)
- Silky cryptantha (*Cryptantha crinite*)
- Siskiyou clover (*Trifolium siskiyouense*)
- Siskiyou fireweed (*Epilobium siskiyouense*)
- Slender Orcutt grass (*Orcuttia tenuis*)
- Stebbins' harmonia (*Harmonia stebbinsii*)
- Tufted loosestrife (*Lysimachia thyrsiflora*)
- Upswept moonwort (*Botrychium ascendens*)
- Water star-grass (*Heteranthera dubia*)
- Watershield (*Brasenia schreberi*)
- Western goblin (*Botrychium montanum*)
- Woolly-fruited sedge (*Carex lasiocarpa*)

The following BMPs, which include applicable BMPs contained within the *Final Programmatic EIR for Recurring Actions in Arizona, California, and Nevada,* will be implemented prior to and during project implementation by the qualified biologist and treatment contractor to minimize impacts to special-status species, raptors, and migratory birds from implementation of the project:

Special-Status Species BMPs

- Treatment will generally occur during the dry season (April 15 to October 15)
- No more than two days prior to the start of ground-disturbing activities, focused pretreatment surveys for special-status species will be completed by a USFWS/CDFW-approved biologist in all suitable upland dispersal habitat areas, if special-status species have been previously identified in the area.
- If special-status species are found during focused pretreatment surveys, the USFWS/CDFW will be contacted within one working day, and a suitable protocol shall be approved by USFWS/CDFW for relocation before treatment activities may begin.
- Exclusion fencing such as Ertec E-fenceTM or an equivalent will be installed around special-status species habitat prior to any treatment during the dry season (April 1 through October 15), when special-status species are not actively dispersing or foraging. The fencing will remain in place until all project activities in the vicinity of suitable upland dispersal habitat are completed.
- To prevent special-status species from becoming entangled or trapped in erosion control materials, plastic monofilament netting (erosion control matting) or similar material will not be used for erosion control. Acceptable substitutes include coconut coir matting or tackified hydroseeding compounds.
- Prior to any project work where special-status species have been detected a USFWS/CDFW-qualified biologist will conduct an education program for operational personnel. At a minimum, the training will include a description of special-status species and their habitats; the potential occurrence of these species in the project area; the measures to be implemented to conserve listed species and their habitats as they relate to the work site; and boundaries in which work may occur. A fact sheet conveying this information will be prepared and distributed to all crews and project personnel entering the project area. Upon completion of the program, personnel will sign a form stating that they attended the program and understand all of the avoidance and minimization measures for the special-status species.
- All project-related trenches and holes in the ground will be covered at the end of each workday to prevent entrapment of special-status species. A USFWS/CDFW-approved biologist will survey the holes at the beginning of each workday to check for trapped special-status species. If a special-status species is observed, the USFWS/CDFW-approved biologist will capture and relocate them to a suitable area outside the project area.
- All organic matter should be removed from nets, traps, boots, vehicle tires and all other surfaces that have come into contact with ponds, wetlands, or potentially contaminated sediments. Items should be washed with a 5 percent bleach solution and rinsed with clean water before leaving each study site. Used cleaning materials (liquids, etc.) should be disposed of safely, and if necessary, taken off-site for proper disposal. Used disposable gloves should be retained for safe disposal in sealed bags.

- Implement measures to minimize the spread of disease and non-native species based on current Wildlife Agency protocols and other best available science.

Raptor BMPs

Pretreatment surveys for raptors, other special-status birds, and appropriate nesting habitat will be conducted within 50 feet of the project area no more than three days prior to ground-disturbing activities. If an active nest is found, CDFW will be consulted to determine the appropriate buffer area to be established around the nesting site and the type of buffer to be used, which typically is ESA fencing. If establishment of a buffer is not feasible, the appropriate agency will be contacted for further avoidance and minimization guidelines.

- A qualified biologist will conduct weekly monitoring during project work, to evaluate the identified nest for potential disturbances associated with treatment activities. Project work within the buffer is prohibited until the qualified biologist determines the nest is no longer active.
- If an active nest is found after project work begins, treatment activities in the vicinity of the nest will stop until a qualified biologist has evaluated the nest and established the appropriate buffer around the nest. If establishment of the buffer is not feasible, the appropriate agency will be contacted for further avoidance and minimization guidelines

Migratory Bird BMPs

The measures below would be implemented for project activities during the nesting season (February 15 through August 31).

- A qualified biologist will conduct pretreatment surveys for nesting migratory birds in the project area no more than three days prior to the start of ground disturbing activities. If pretreatment surveys indicate the presence of any migratory bird nests where activities would directly result in bird injury or death, a buffer zone of 50 feet will be placed around the nest.
- Buffers will be established around active migratory bird nests where project activities would directly result in bird injury or death. The size of the buffer may vary for different species and will be determined in coordination with the responsible agency. A qualified biologist will delineate the buffer using ESA fencing, pin flags, and/or yellow caution tape.
- Buffer zones will be maintained around all active nest sites until the young have fledged and are foraging independently. In the event that an active nest is found after the completion of pretreatment surveys and after work begins, all treatment activities within a 50-foot radius will be stopped until a qualified biologist has evaluated the nest and erected the appropriate buffer around it.
- If an active nest is found in an area after project work begins, treatment activities in the vicinity of the nest will stop until a qualified biologist has evaluated the nest and established the appropriate buffer around the nest. If establishment of the buffer is not feasible, the responsible agency will be contacted for further avoidance and minimization guidelines.

The project will result in habitat modification to special-status species through the removal of shrubs, branches, small trees and dead or dying trees within 100 to 400 feet of the roadways. While the project would result in removal of vegetation within the project area, the surrounding land outside of the project treatment areas would remain undisturbed. This land can provide shelter and

food for wildlife species foraging or residing within shrubs and smaller trees. Project activities will not occur within 75 feet of perennial streams and wetlands or within 50 feet of other waterbodies, therefore project activities will not result in habitat impacts to streams or riparian corridors. Habitat modification impacts of the project will be **less than significant**.

Implementation of the BMPs listed above for special-status species and migratory birds will ensure project impacts to special-status and migratory birds are **less than significant**.

Potentially occurring special-status plant species vary by each PAA. Special-status plant species occurring on banks of rivers and streams and within wetlands and vernal pools will be avoided through implementation of the project wetland and stream buffers. The project includes vegetation removal, ground disturbance, and herbicide application that could result in impacts to special-status plant species present within the activity area. **Mitigation Measure 1** is included to identify potential habitat for special-status plants on each eligible parcel so protocol-level surveys can be conducted where needed and avoidance buffers implemented if necessary. In addition, **Mitigation Measure 11** will be implemented to reduce the spread of invasive plant species during project implementation. Project impacts to special-status plant species will be **less than significant with mitigation incorporation.**

The project activities include application of herbicides and vegetation removal. Many aquatic species are sensitive to the concentration of chemicals found in herbicides (i.e., glyphosate, adjuvants, and surfactants). Anadromous fish spawn in freshwater watercourses and migrate to the ocean before returning to their birthplace to reproduce. Salmonids are highly vulnerable to toxic injury and are especially susceptible as alevin (Kennedy 2018). Alevin may occur where the project area overlaps with salmonid spawning grounds. Anadromous salmon are also inherently sensitive to physical habitat changes along their long migratory corridors. Increases in temperature, siltation, and UV-B radiation are harmful to salmonid wellbeing. The removal of riparian vegetation can directly increase stream temperature and UV-B radiation levels. No project activities (including vegetation removal) will occur within 75 feet of perennial streams or wetlands or within 50 feet of ephemeral and intermittent streams. **Mitigation Measure 3** is included to ensure all ephemeral, intermittent, and perennial streams as well as wetlands and vernal pools are identified within each eligible parcel so that the appropriate buffers can be implemented for the project. Additional BMPs to protect water quality will be implemented for the project and are listed in the Hydrology and Water Quality section of this document. To minimize impacts to anadromous fish species from herbicide application, **Mitigation Measure 2** is included which includes an increased herbicide application buffer (150 feet) from anadromous fish-bearing streams. With incorporation of water quality BMPs, stream buffers, and implementation of **Mitigation Measure 2** and **Mitigation Measure 3**, project impacts to special-status fish species will be **less than significant with mitigation incorporation**.

Western Pond turtle have potential to occur within all of the PAAs in aquatic mash, swamp, pond, and wetland habitat and could also nest in adjacent uplands under loose dirt or leaf litter. The project includes a 75-foot buffer from perennial streams and wetlands as well as a 50-foot buffer from intermittent and ephemeral streams. Therefore, western pond turtles are unlikely to be impacted while they reside in the water. Pond turtles do have to potential to be impacted by habitat

modification of their nest sites. Pond turtles often nest along sandy banks of rivers, but they have also been known to move a considerable distance (over 250 feet) away from streams to find a suitable nest site (CDFW 2000). The nest sites that may occur outside of riparian buffers that are implemented are at the greatest risk of being impacted by project activities. **Mitigation Measure 4** is included to avoid impacts to upland dispersal and nesting habitat. Impacts to Western Pond Turtle will be **less than significant with mitigation incorporation**.

Special-status amphibian species could also be present along streams and ponds within the project area. Aquatic habitat for these species will be avoided with implementation of setbacks from streams and wetlands, however, they may also use suitable upland dispersal habitat within 150 feet of flowing watercourses. **Mitigation Measure 4** is included to avoid individuals within upland dispersal habitat during project activities. With implementation of **Mitigation Measure 3** and **Mitigation Measure 4**, impacts to special-status amphibians will be **less than significant with mitigation incorporation**.

Bats use a variety of different roosts throughout the year according to their life cycle. The roost structure utilized depends on the type of roost. Typically, hibernation and maternity roosts are found within permanent structures such as caves, bridges, mines, and buildings. Feeding perches and day/night roosts are more temporary and trees are utilized. While the project activities are unlikely to directly disturb permanent structures, tree removal around maternity and hibernation roosts may impact temperature conditions and the noise may cause a disturbance. Individual bats roosting in trees could be harmed if the tree is removed, or the vegetation around it is treated. **Mitigation Measure 5** and **Mitigation Measure 7** are included to avoid impacts to maternity and hibernation roosts. Additionally, nocturnal foraging may be disrupted by bright artificial lighting. **Mitigation Measure 6** is included to minimize project impacts related to artificial lighting. Impacts to special-status bat species will be **less than significant with mitigation incorporation.**

Large terrestrial mammals such as the American badger, wolverine, and fisher utilize large tracts of land for dispersal and foraging. The removal of small pockets of vegetation relative to their typical range is unlikely to cause any adverse impact unless a den occurs in the project area. Den structures vary widely by species. For example, American badgers utilize a network of tunnels, fishers den within tree cavities and in rock crevices in the winter, and wolverines den in complex snow tunnels or trees and boulders with at least 1 meter of snow (Magoun & Copeland 1998). Typically, denning occurs in the winter and early spring until young can disperse. Given the variety of den sites, a qualified biologist will survey the project site prior to operation in areas where they are likely to occur per **Mitigation Measure 8**. Impacts to special-status terrestrial mammal species will be **less than significant with mitigation incorporation**.

The planned treatment of dense understory and ladder fuels has the potential to remove Northern Spotted Owl and California Spotted Owl habitat. Spotted owls typically inhabit mature forests with a mixed canopy comprised of conifer and oak species. Older forest stands with vertical canopy layering provides shelter from weather events, higher prey density, and aids in predator avoidance (Sovern et al., 2019). The oak canopy layer provides roost and perch structures that aid foraging activities while the conifer are utilized for nesting. NSO and CSO utilize trees with specific physical characteristics that make them higher quality nest sites (i.e., broken tops and large cavities). Habitat removal poses a two-fold threat to spotted owl populations. High quality habitat

sites are limited, and the degradation of existing sites can limit successful foraging and reproduction. Further, barred owls have similar habitat requirements and compete for preferential sites. Barred owls are larger and more aggressive than spotted owls, and if habitat reduction forces them together, spotted owls may be driven to low quality sites, injured, or killed. In order to limit these threats to NSO/CSO populations, **Mitigation Measure 9** will be implemented. Spotted owls show high fidelity to historical activity centers, so protocol level surveys where NSO have been previously observed will determine stand occupancy and allow the establishment of buffers against habitat removal. With the implementation of **Mitigation Measure 9**, the impact to Northern and California Spotted Owls will be **less than significant with mitigation incorporation.**

The Monarch butterfly is dependent on native milkweeds for their life cycles. Monarch caterpillars can only feed on milkweed, so they are essential for reproduction. Given that the young of monarchs reside on milkweed, removal of these plants may result in direct harm or mortality of these species. Even if no occupation is observed, removal of these plant species reduces habitat that is essential to the monarch life cycle. With the implementation of **Mitigation Measure 10** that include disturbance setbacks, the impact to the Monarch butterfly will be **less than significant with mitigation incorporation.**

Mitigation Measure 1: Pre-Treatment Botanical Surveys (All PAAs)
As part of the preliminary site assessment (PSA) conducted on each eligible parcel potential habitat for special-status plants with potential occur within the treatment area will be identified along with species included in any sensitive natural communities. If potential habitat for special-status plants or sensitive natural communities are identified, protocol-level surveys of the eligible parcels shall be conducted by a qualified biologist during the flowering window for special-status plant species with potential to occur within the treatment area. Surveys shall comply with survey protocols for plants species listed under the CDFW *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities* (2018). If no special-status plants are found, no further measures pertaining to special-status plants are necessary. If special-status plant species are identified during the botanical surveys, the individuals will be avoided. The treatment prescription (TP) for the parcel will be modified to exclude activities within 25 feet of the individual and exclusionary fencing will be placed around the plants to establish the avoidance area during project implementation.

Mitigation Measure 2: Herbicide Treatment Buffers (Anadromous Fish-Bearing Streams)
Herbicide treatment buffer will coincide with the prescribed treatment buffer for perennial and ephemeral streams for any anadromous fish bearing streams. In order to limit the effect of herbicides on anadromous fish. Herbicides with the potential to harm aquatic life shall not be applied within 150 feet of anadromous fish bearing streams. If conditions necessitate that herbicides are applied within the 150-foot buffer, then the application shall be completed in the dry season when no precipitation is forecasted.

Mitigation Measure 3: Riparian and Wetland Identification and Exclusion (All PAAs)
During the preliminary site assessment of each eligible parcel, eligible parcels will be surveyed for aquatic resources. The treatment prescription (TP) will exclude activities within 75 feet of perennial streams and wetlands (including vernal pools) as well as a 50-feet from ephemeral and

intermittent streams. The exclusion area will be marked with flagging. Biomass removal, herbicide application, equipment staging, operation of mechanical equipment, and on-site disposal of removed biomass shall not occur within the marked buffers.

Mitigation Measure 4: Surveys for Special-Status Amphibians and Reptiles (All PAAs)
During the Preliminary Site Assessment of each eligible parcel, work areas within 150 feet of flowing watercourses will be evaluated to determine if suitable upland dispersal habitat for potentially occurring special-status amphibians and reptiles are present. If no potential suitable upland dispersal habitat is identified, no further action is required. If suitable upland habitat is identified, no more than two days prior to the start of ground disturbing activities, focused pretreatment surveys for special status amphibians, reptiles, and their eggs will be completed by a qualified biologist in all suitable upland dispersal habitat areas within 150 feet of flowing watercourses. If a special status species is found, CDFW will be notified. If an adult individual is observed within the survey area, then the animal shall be avoided until it is no longer in harm's way, or it may be relocated by a qualified biologist if an area offsite that has appropriate habitat for the species is available. If relocating, the animal should be moved to a nearby area with habitat similar to the environment in which it was found.

If a nest, eggs, hatchlings, or an aestivating adult are observed within the survey area, then an avoidance buffer of 50 to 100 feet shall be applied to heavy equipment access, ground disturbing activities, and herbicide application. The qualified biologist shall consider the topography and vegetation onsite, as well as the treatments proposed onsite and the potential for disturbance when determining the buffer distance. Additionally, to avoid impacts to hatchlings' dispersal from the nest site, no woody debris or other barrier shall be placed in between the nest site and the nearest body of water.

Mitigation Measure 5: Bat Roost Humane Exclusion (All PAAs)
During the Preliminary Site Assessment of eligible parcels, trees with maternity roost structures (i.e. cavities in the trunk or branches, woodpecker holes, loose bark, cracks) will be identified. If no trees with maternity roost structures are identified, no further measures are necessary. If removal of trees identified to have bat roost structure occurs from September 1 to October 30, no measures for special-status bats are required.

If removal of trees identified to have bat roost structure potential will occur during the bat maternity season, when young are non-volant (March 1- August 31), or during the bat hibernacula (November 1-March 1), when bats have limited ability to safely relocate roosts, humane exclusions should be implemented which consist of a two-day removal process by which the non-habitat trees and brush are removed along with smaller tree limbs on the first day, and the remainder of the tree limbs and the tree truck on the second day.

Mitigation Measure 6: Artificial Lighting Standards (All PAAs)
To minimize impacts of lighting to bats and other nocturnal species, any artificial lighting associated with short-term and long-term project activities should be downward facing, fully shielded, and designed and installed to minimize photo pollution of adjacent wildlife habitat.

Mitigation Measure 7: Bat Roost Habitat Avoidance (All PAAs)
During the Preliminary Site Assessment of each eligible parcel the presence of caves or bridges within the treatment area will be noted. If no caves or bridges are located within the project area, no further measures are necessary. If present within 50 feet of project activities, caves and bridges in the project area will be assessed during the Preliminary Site Assessment for potential bat roost structures (crevice roosts tend to be approximately 3/4 to 1 1/2 inches across and at least 18 inches deep. In most cases, they run from one side of the bridge to the other, and between three and several hundred meters above ground). If found, a qualified biologist will assess the structure for signs of bat presence (i.e., guano, insect pieces, etc.). If no roost is present, then no buffer is needed. If a roost is present, then a 50-foot non-disturbance buffer shall be implemented around the roost structure to prevent changes to the thermal stability and protective cover surrounding the roost structure that could result from tree removal.

Mitigation Measure 8: Mammal Den Surveys (Big Bend Road, Fall River Cassel Road, Gilman Road, Highway 89 Cassel Road, McArthur Road, Platina Road, Rainbow Lake Road, Oak Run Road, Oak Run to Fern Road, Philips Road PAAs)
During the Preliminary Site Assessment of each eligible parcel, the project area will be evaluated for suitable mammal den habitat. If potential den habitat for American badger (*Taxidea taxus*), fisher (*Pekania pennaniti*), Oregon snowshoe hare (*Lepus americanus; klamathensis*), wolverine (*Gulo gulo*), or Sierra Nevada red fox (*Vulpes culpes necator*) is identified, pretretament surveys shall be completed within three days prior to ground disturbing activities to determine if any terrestrial mammal (e.g., American wolverine, fisher, American badger) den structures are present within the work area. If potential dens are located within the work area and cannot be avoided during project activities, a qualified biologist will determine if the dens are occupied. If occupied dens are present within the work area, their disturbance and destruction will be avoided by stopping operations until an appropriate buffer approved by CDFW or USFWS.

Mitigation Measure 9: NSO/CSO Surveys (Big Bend Road and McArthur Road PAAs)
Surveys will be completed in areas where NSO or CSO have been previously identified. Where the project area falls within any 1.3-mile Activity center buffer, operations will take place outside of nesting season (March – August) or after surveys confirm no presence. The treatment prescription will also be modified to leave all trees >20 DBH or larger un-cut within a half mile of the confirmed Activity Center. To promote a diverse canopy that supports NSO roosting and foraging, some mature oaks will also be retained at the discretion of the landowner.

Mitigation Measure 10: Native Milkweed Buffer (All PAAs)
Surveys will be completed to determine if native milkweed (*Asclepias* sp.*)* are present within work areas. If milkweed is identified onsite, disturbance to the plant would be avoided by implementing a 25-foot buffer around identified individuals.

Mitigation Measure 11: Invasive Species Management (All PAAs)
An invasive species management plan (ISMP) shall be prepared to provide guidance that prevents the spread of noxious weeds. If a significant population of Cal-IPC listed invasive species is observed, then equipment shall be cleaned at the contaminated site before proceeding to any other sites.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project have a substantial adverse effect 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 or the U.S. Fish and Wildlife Service?	☐	☒	☐	☐

b) The project does not include biomass removal or other treatment activities within 75 feet of perennial streams and wetlands or within 50 feet of ephemeral and intermittent streams. In addition, hydrology and water quality BMPs (listed in the Hydrology and Water Quality section of this document) will be implemented for the project. Mitigation Measures 3 above is included to ensure the appropriate buffers are implemented for the project. The Northern Interior Cypress Forest, Alkali Seeps and Northern Basalt Flow Vernal Pools are potentially occurring sensitive natural communities within the Big Bend Road, Oak Run Road, Oak Run to Fern Road, Philips Road, Platina Road, Rainbow Lake Road PAAs. Sensitive natural communities would be avoided through implementation of Mitigation Measures 1 and 3. Impacts to riparian habitat and sensitive natural communities will be **Less than significant with mitigation incorporated**.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Would the project 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?	☐	☐	☐	☒

c) With implementation of **Mitigation Measures 3** above, the project will not affect any federally protected wetlands. See b). **No impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Would the project 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?	☐	☐	☒	☐

d) Project activities will occur in areas with existing human presence and disturbance (adjacent to roadways and residential land uses). Project activities could temporarily deter wildlife movement through the project area. Activities will not occur in any single location for an extended period of time and opportunities will be available for wildlife to move through adjacent undeveloped areas outside of the active treatment area while treatment activities occur.

The project will include removal of shrubs, small trees, densely spaced trees, and dead and dying trees within the treatment areas, but abundant habitat is available in areas adjacent to the project

site. As discussed under a) above, BMPs will be implemented to avoid impacts to nesting birds in the project vicinity. In addition, the project will not include activities within 75 feet of perennial streams or wetlands or 50 feet of ephemeral and intermittent streams. The project 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 or impede the use of native wildlife nursery sites. **Less-than-significant impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
e) Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒

e) Shasta County does not have a tree preservation policy or ordinance. The project does not conflict with any local policies or ordinances protecting biological resources or tree preservation policy/ordinance. **No impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
f) Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

f) No Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan exist within the project area. **No impact.**

CULTURAL RESOURCES

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project cause a substantial adverse change in the significance of a historical resource pursuant to § 15064.5?	☐	☒	☐	☐

a) The following best management practice included in the FEMA Final Programmatic EIR for Recurring Actions in Arizona, California, and Nevada will be implemented for the project.

- In the event that any prehistoric or historic subsurface cultural resources, as defined by the responsible agency, are discovered during ground disturbing activities all work within 50 feet of the resources shall be halted and the project applicant should consult with a qualified archaeologist or paleontologist to assess the significance of the find. If any find is determined to be significant, representatives of the proponent and qualified archaeologist and the landowner would meet to determine the appropriate course of action

An Archaeological Survey Report was prepared for the project by Alta Archaeological Consulting, LLC (ALTA). The survey area included 3,899 acres. Project activities could result in a substantial adverse change in the significance of a cultural resources. In addition to the BMP included above, Mitigation Measures 12 will be implemented to ensure the project does not result in substantial adverse effects to cultural resources within the project area. Impacts to cultural resources will be **less than significant with mitigation implementation.**

Mitigation Measure 12: Implement Management Recommendations in Archaeological Survey Report

Management Recommendations included in the Archaeological Survey Report prepared for the project shall be implemented to ensure that cultural resources are not adversely affected by the project which include the following:

Special Conditions

Archaeological resources within the Project Area are designated for Special Conditions where fuel reduction activities may be performed within the site limits. In some instances, removal of hazard trees is beneficial to site preservation. Special Conditions of cultural resources includes the following actions:

1. Prior to the commencement of operations, the Project Manager will ensure that all Special Treatment Zones (STZ) are clearly described and illustrated in plans, and specifications.
2. All parties (CAL FIRE, Project Manager, Registered Professional Forester [RPF], or equipment operators familiar with resource management work will review the plans.
3. Prior to commencement of operations, a CAL FIRE Certified Archaeological Surveyor or professional archaeologist familiar with the site, shall demarcate all sites with STZ flagging. Exclusionary flagging will be based on the site sketch map. No buffer around the site boundary is required for Special Condition sites. STZ flagging that is older than six months will be inspected and refreshed prior to operations.
4. Fuel reduction work utilizing hand tools (including chainsaws) may occur within the STZ area given the following conditions.
5. No skidding of logs shall occur within the STZ.
6. Timber shall be directionally felled away from the site.
7. Mechanized equipment shall be restricted to existing roads or disturbed areas within the STZ.
8. No tree planting will occur within STZ.
9. A CAL FIRE Certified Archaeological Surveyor or professional archaeologist will periodically inspect sites to ensure that BMPs are effective and the STZ has not been breached.

Unanticipated Discovery of Cultural Resources

If previously unidentified cultural resources are encountered during project implementation, avoid altering the materials and their stratigraphic context. A qualified professional archaeologist should be contacted to evaluate the situation. Project personnel should not collect cultural resources.

Prehistoric resources include, but are not limited to, chert or obsidian flakes, projectile points, mortars, pestles, and dark friable soil containing shell and bone dietary debris, heat-affected rock, or human burials. Historic resources include stone or abode foundations or walls; structures and remains with square nails; and refuse deposits or bottle dumps, often located in old wells or privies.

Encountering Native American Remains

Although unlikely, if human remains are encountered, all work must stop in the immediate vicinity of the discovered remains and the County Coroner and a qualified archaeologist must be notified immediately so that an evaluation can be performed. If the remains are deemed to be Native American and prehistoric, the Native American Heritage Commission must be contacted by the Coroner so that a "Most Likely Descendant" can be designated and further recommendations regarding treatment of the remains is provided.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?	☐	☒	☐	☐

b) See discussion to a) above. Best management practices during project implementation and implementation of Mitigation Measure 12 will ensure the project will not cause a substantial adverse change to the significance of an archaeological resource. **Less-than-significant impact with mitigation.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Would the project disturb any human remains, including those interred outside of formal cemeteries?	☐	☒	☐	☐

The project does not include excavation activities and is not anticipated to disturb human remains. In the unlikely event of discovery of human remains, the following BMP contained in the *FEMA Final Programmatic EIR for Recurring Actions in Arizona, California, and Nevada,* will be implemented for the project follows:

- There shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until:
- The Coroner of the county in which the remains are discovered must be contacted to determine that no investigation of the cause of death is required, and
- If the coroner determines the remains to be Native American:
    - The coroner shall contact the responsible agency within 24 hours.
    - The responsible shall identify the person or persons it believes to be the most likely descended from the deceased Native American.

The most likely descendent may make recommendations to the landowner or the person responsible for the excavation work, for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods.

In addition to the BMP listed above, measures included in the report prepared by the qualified archeologist for unanticipated discovery of human remains will be implemented. Impacts related to disturbance of human remains will be less than significant with implementation of the BMP above as well as **Mitigation Measure 12**. Less than significant with mitigation incorporation.

ENERGY

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	☐	☐	☐	☒

a) The project will not result in wasteful or inefficient consumption of energy. The project will require temporary consumption of energy resources (diesel fuel and gasoline) for equipment used for biomass removal and off-site disposal of biomass. Compliance with state, federal, and local regulations (limiting engine idling times, etc.) will reduce and/or minimize short-term energy demand during the project to the extent feasible and would not result in wasteful or inefficient use of energy. **No impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	☐	☐	☐	☒

b) Shasta County does not currently have a renewable energy or energy efficiency plan. The majority of biomass removed and disposed off-site will be used as fuel for biomass plants. The project will provide a source of renewable energy (biomass) which is consistent with the Energy Element of the Shasta County General Plan See a) above. **No impact.**

GEOLOGY AND SOILS

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project directly or indirectly cause potential substantial adverse effects, including 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.)				

a) Alquist-Priolo earthquake fault zones are mapped in the eastern portion of Shasta County and in close vicinity to several of the PAAs included in the project (DOC 2022). The project does not include permanent development or additional permanent occupancy within the project area. The project will not increase the risk of loss, injury or death involving rupture of a known earthquake fault. **No impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking?	☐	☐	☐	☒

b) According to the Shasta County General Plan Seismic and Geologic Hazards Element, Shasta County has a low level of historic seismic activity. Most of the stronger intensity seismic activity has occurred in eastern Shasta County. The western half of Shasta County is less seismically active (Shasta County, 2004). The project does not include construction of structures or permanent occupancy within the project site. The project will not result in the risk of loss, injury or death involving seismic ground shaking. **No impact**.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure, including liquefaction?	☐	☐	☐	☒

c) The project site is not within a mapped Liquefaction Zone where liquefaction and landslides may occur during a strong earthquake (California State Geoportal 2022). According to the Shasta County General Plan Seismic and Geologic Hazards Element, liquefaction is most likely to occur in alluvial and stream channel deposits, especially when the groundwater table is high. Areas of potential liquefaction are located in the north central valley area of the County (Shasta County 2004). The project does not include activities in areas where liquefaction is likely to occur and does not include permanent occupancy or construction of structures within the project area, therefore it will not result in the risk of loss, injury or death from seismic-related ground failure. **No impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving landslides?	☐	☐	☒	☐

d) According to the Shasta County General Plan Seismic and Geologic Hazards Element, landslides occur throughout Shasta County, although they have not been considered a major problem. Landslides are more prevalent in the eastern and northern portions of the County and are more commonly related to the sedimentary and volcanic rocks in these vicinities (Shasta County 2004). The project does not include work in areas with slopes greater than 65 percent or on slopes greater than 50 percent with high or extreme erosion hazard rating, therefore the project is not anticipated to increase the risk of landslides or expose the treatment contractor to landslide risks. **Less-than-significant impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
e) Would the project result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐

e) The project could result in erosion within the treatment areas resulting from disturbance from mechanical equipment and removal of vegetation. As discussed in the project description, no work will be conducted in areas on slopes greater than 65 percent or on slopes greater than 50 percent with high or extreme erosion hazard rating. BMPs including applicable measures contained in the FEMA *Programmatic Environmental Assessment, Recurring Actions in Arizona, California, and Nevada* (December 2014) will be implemented for the project by the treatment contractor to reduce the potential for erosion impacts. BMPs include:

- Highly erosive soils will be identified in the field by the contractor and applicable controls applied per RWQCB guidance (Order R5-2017-0061).
- Delineate clearing limits, easements, setbacks, sensitive or critical areas, trees, and buffer zones to prevent excessive or unnecessary disturbances and exposure.
- Avoid excavation and soil disturbance during wet weather. It is unlikely that operations will be limited during the winter season. This will be determined on a case-by-case basis by the contractor and CAL FIRE project manager.
- Use standard erosion control features such as hydro-seeding, wood chips, jute or straw matting; fiber rolls other mulch material to stabilize disturbed soils.
- Cover stockpiled soil and landscaping materials with secured plastic sheeting and divert runoff around them, if used.
- Protect drainage courses, creeks, or catch basins with fiber rolls, silt fences, sand/gravel bags, and/or temporary drainage swales.
- Conduct routine inspections of erosion control measures especially before and immediately after rainstorms, and repair if necessary.

As part of site restoration, grass seeding, slash packing, or other appropriate erosion control or slope stabilization techniques will be deployed on any site where site inspection determines that disturbance would likely lead to an increased risk of erosion or slope stabilization. Site restoration and implementation of the BMPs listed above will result in a **less-than-significant impact** related

to soil erosion or loss of topsoil from project activities.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
f) Would the project 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?	☐	☐	☐	☒

f) As discussed in the project description, no work will be conducted in areas on slopes greater than 65 percent or on slopes greater than 50 percent with high or extreme erosion hazard rating. In addition, BMPs listed in e) above will be implemented for the project. The project is not anticipated to result in on or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse. **No impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
g) Would the project 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?	☐	☐	☐	☒

g) The project does not include construction of buildings or structures. The project will not create a substantial direct or indirect risks to life or property from expansive soils. **No impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
h) Would the project have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒

h) The project will not require installation of a septic tank or alternative wastewater disposal system. **No impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
i) Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☒	☐

i) There are no known paleontological resources or unique geologic features within the project area. The following BMP contained in FEMA *Programmatic Environmental Assessment, Recurring Actions in Arizona, California, and Nevada* (December 2014) will be implemented in the event that unanticipated paleontological resources are uncovered during the course of the project.

- The project proponent shall notify a qualified paleontologist of unanticipated discoveries, made by either the cultural resources monitor or project personnel and subsequently document the discovery as needed. In the event of an unanticipated discovery of a breas, true, and/or trace fossil during construction, excavations within 50 feet of the find shall be temporarily halted or diverted until the discovery is examined by a qualified paleontologist. The paleontologist shall notify the appropriate agencies to determine procedures that would be followed before activities are allowed to resume at the location of the find.

Project impacts to unique geologic features and paleontological resources will be **less than significant.**

GREENHOUSE GAS EMISSIONS

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐

a) The project will result in greenhouse gas emissions from operation of mechanical equipment and vehicle trips to transport workers, equipment, and offsite biomass disposal. Best Management Practices (BMPs) described in the Air Quality Section of this document will be implemented during the project, which will minimize emissions of greenhouses gases generated by operation of vehicles and equipment used for the project. Off-site biomass disposal will include transport of removed biomass to biomass facilities for use as fuel. The project will not result in an increase in permitted production or capacity of these facilities. Due to the temporary nature of the project, the project is not likely to produce significant greenhouse gas emissions. An estimate of greenhouse gas emissions generated by vehicle and equipment operation is included in Table 4.

Generally, a limit of 10,000 metric tons of carbon has been used to determine significance. Based on the calculations in Table 4, the project emissions fall below this threshold.

All equipment used onsite will meet the CARB requirements for emissions. Idling times will be minimized. The removal of the dead trees and their use for cogeneration power will reduce overall greenhouse gas emissions (GHG) from the project compared to open pile burning methods of disposal. The removal of the vegetation for fuel will limit the nitrogen process and reduce overall GHG emissions. Because of the small scope of the project, treatments are not likely to produce significant GHG emissions which could result in adverse impacts on the environment. Project activities will be limited to a short timeframe and will not result in a long-term increase in GHG emissions. The improved growing conditions will improve residual stands photosynthetic capacity, increase vigor in residual trees and result in an overall increase in carbon sequestration rates. No significant impacts from GHGs are expected as a result of the proposed project. Less-than-significant impact. Calculation sheet and assumptions for GHGs is included in Table 4.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐

b) Onsite equipment and vehicles would generate greenhouse gas emissions. Emissions would be short-term and cease upon completion of the project. The project would not result in substantial greenhouse gas emissions or conflict with any adopted plans, policies, or regulations adopted for the purpose of reducing greenhouse gas emissions. **Less-than-significant impact.**

Table 4
GREENHOUSE GAS EMISSIONS

General Information							
Project Name	Shasta 5293				Blue = Variable Inputs		
Project Acres	5004				Black = Equation Produced Data		
Total Project Days	263				Red = Constants		
Exhaust CO_2 Emissions							
Total Round Trip Miles	60						
# of Chainsaws	4						
# of Chippers	2						
# Masticators	2						
Diesel Kilograms/Gal	10.15						
Gas Kilograms/Gal	8.91						
Pounds of CO_2/Kilogram	2.20462						
One Chipper Gas Gal/day	10						
Mastcator Diesel Gal/day	50						
Crew Bus MPG	8						
Chainsaw Gas Gal/Day/Saw	1.5						
Conversion Factor Pounds to Ton	2000						
Conversion Factor Tons of Biomass to Tons CO_2	1.65						
Crew Bus Total Miles		120,000	Chainsaws Total Gal Gas Needed	1500			
Total Gal of Diesel Needed		25,000	Chipper Total Gal Gas Needed	5000			
Total Kilograms of Diesel Produced		253,750	Total Kilograms of Gas Produced	18,365			
Diesel Total Pounds of CO_2 Produced		559,422	Gas Total Pounds of CO_2 Produce	40,488			
Diesel Total Tons CO_2		280	Gas Total Tons of CO_2 Produced	20			
		Final Outputs					
Total Tons of CO_2 for Project		300					
Sequestration Rate 2 - 6 Tons/Ac/Yr (stocked Sierra mixed coni		6					
Total Sequestration Rate/Yr		110188.08					
Years Required for Complete Sequestration		0.0					
Assumptions							
Acres 2630							
Acres Treated per Day 10							
2 Crews = 2 men, 2 saw and 1 Truck per crew							
2 chippers							
2 Masticators							
Round trip = 30 miles per day per truck							
2 trucks per day = 60 mile/day							
60 miles/day X 263 days = 15780							

HAZARDS AND HAZARDOUS MATERIALS

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐

a) The project will require the use of hazardous materials including gasoline, diesel, oil, and lubricants required for vehicle and equipment operation. In addition, herbicides may be used for pre-treatment of the project site and following biomass removal. Herbicide application will be conducted by a Licensed Pest Applicator with right-of-way or landscape certification. The Licensed Pest Applicator will obtain all applicable permits and perform the work in accordance with applicable federal, state and local rules and regulations including but not limited to holding a current Qualified Applicator License issued by the California Department of Pesticide Regulation.

In addition, the following BMPs contained in the FEMA *Programmatic Environmental Assessment, Recurring Actions in Arizona, California, and Nevada* (December 2014) will be implemented by the treatment contractor for the handling and use of hazardous materials for the project:

- Vehicles and equipment will be inspected and approved before use to ensure that they will not leak hazardous materials such as oil, hydraulic fluid, or fuel. All equipment will be equipped with spark arrestors and fire extinguishers.
- Fueling will take place in designated staging areas, outside native vegetation or wetlands.
- The contractor will prepare a Spill Prevention and Response Plan and have emergency cleanup gear for spills (spill containment and absorption materials) and fire-suppression equipment available onsite at all times.
- Leaks, drips, and other spills will be cleaned up immediately to avoid soil or groundwater contamination. Cleanup of a spill on soil will include removing the contaminated soil using the emergency spill cleanup gear. Contaminated soil and disposable gear used to clean a hazardous materials spill will be properly disposed of following State and Federal hazardous material disposal regulations.
- Major vehicle maintenance and washing will be done offsite.
- Spent fluids including motor oil, radiator coolant, and used vehicle batteries will be collected, stored, and recycled as hazardous waste offsite.
- Spilled dry materials will be swept up immediately.
- No smoking will be allowed in work areas.

The implementation of these practices will result in **less-than-significant impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and/or accident conditions involving the release of hazardous materials into the environment?	☐	☐	☒	☐

b) The project will require the use of hazardous materials (fuel and oil) within equipment and vehicles during biomass removal as well as application of herbicides. Significant quantities of these materials will not be stored within the project area. The following BMPs contained in the FEMA *Programmatic Environmental Assessment, Recurring Actions in Arizona, California, and Nevada* (December 2014) will be implemented during project implementation:

- If hazardous materials are encountered or accidentally released as a result of the project, the following procedures will be implemented:
  - Work shall stop in the vicinity of any discovered contamination or release.
  - The scope and immediacy of the problem shall be identified.
  - Coordination with the responsible agencies shall take place.
  - The necessary investigation and remediation activities shall be conducted to resolve the situation before continuing project work.

The project will not **c**reate a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials with implementation of the BMPs listed above as well as those listed under a) above. **Less-than-significant impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☒	☐

c) The project area contains several schools. Project operations will not emit hazardous emissions. The project will require handling of herbicides. Herbicide application will be conducted by a Licensed Pest Applicator with right-of-way or landscape certification. The Licensed Pest Applicator will obtain all applicable permits and perform the work in accordance with applicable federal, state and local rules and regulations including but not limited to holding a current Qualified Applicator License issued by the California Department of Pesticide Regulation. The project will not require handling of acutely hazardous materials, substances, or waste. **Less-than-significant impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Would the project be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code § 65962.5 and, as a result, would it create a	☐	☐	☐	☒

significant hazard to the public or the environment?				

d) A Search of the EnviroStor database cleanup sites including Federal Superfund, State Response, Voluntary Cleanup, School Cleanup, Evaluation, School Investigation, Military Evaluation, Tiered Permit and Corrective Action sites was conducted for the project site. None of these cleanup sites were present in the project area. In addition, a query of the Geotracker database was also conducted to determine if LUST cleanup sites, cleanup program sites, military cleanup sites, military privatized sites, and military UST sites were present within the project area. Several of the PAAs including Big Bend Road, Oak Run to Fern Road, Rainbow Lake Road, Whitmore Road 1, and Highway 89 SP contain closed leaking underground storage tank (LUST) cleanup sites. The cases are closed for each of the LUST cleanup sites within these PAAs. The project does not include excavation activities that could expose the public, environment, or contractors to hazards from LUST sites. **No impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
e) 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, would the project result in a safety hazard or excessive noise for people residing or working in the project area?	☐	☐	☐	☒

e) The northern portion of the Fall River Cassel Road PAA is within two miles of the Fall River Mills Airport. The project does not include construction of housing or an increase in the number of people residing within the vicinity of the Fall River Mills Airport. The project does not include increased airport operations that would expose existing residents to excessive noise levels from the airport. The project will not expose the treatment contractors temporarily working within the PAA to safety hazards or excessive noise from the airport. **No impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
f) Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒

f) The project will not interfere with any emergency response plan or evacuation plan. The project will provide for safe ingress and egress of evacuating residents and responding emergency personnel in the event of a fire. **No impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
g) Would the project expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires?	☐	☐	☒	☐

g) Equipment and vehicle operation as well as increased human presence in the project area could result in a temporary increased risk of fire during biomass removal activities. As described in a) above, BMPs will be implemented during project implementation which include the storage of fire suppression equipment onsite at all times by contractors. Project activities will not expose people or structures to a significant risk of loss, injury, or death involving wildland fires. Upon completion, the project will provide for safe ingress and egress of evacuated residents and emergency personnel during wildland fires, increase defensible space to effectively fight fires from the roads and reduce roadside fuels to slow the spread of a fire started in or adjacent to the roadway. **Less-than-significant impact.**

HYDROLOGY AND WATER QUALITY

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	☐	☐	☒	☐

a) Perennial, intermittent, and ephemeral streams as well as ponds are located within the project area. Hydrology within the project area is shown in Figures 16A through 16E. In addition, the project site includes wetlands mapped by the U.S. Fish & Wildlife Service National Wetland Inventory as shown in Figures 18A through 18E.

The project does not include activities within 75 feet of perennial streams or wetlands or within 50 feet of ephemeral or intermittent streams. The following applicable BMP included in the FEMA *Programmatic Environmental Assessment, Recurring Actions in Arizona, California, and Nevada* (December 2014) will be implemented for the project by the treatment contractor when working near waters of the U.S. or wetlands to protect surface water quality during project implementation and minimize potential water quality impacts from ground disturbance, spills or leaks, and herbicide application:

- For work between 50 and 200 feet of a wetland or waterbody:
    - Herbicides will be restricted to glyphosate-based herbicides that are approved by the EPA for use around water (e.g., Rodeo).
    - No equipment fueling would occur.
- Never wash down pavement or surfaces where materials have spilled. Use dry cleanup methods whenever possible.
- Protect all storm drain inlets using filter fabric cloth or other best management practices to prevent sediments from entering the storm drainage system during project activities.
- Keep materials out of the rain — prevent runoff pollution at the source. Schedule clearing for periods of dry weather. Before it rains, sweep, and remove materials from surfaces that drain to storm drains, creeks, or channels.
- Prior to project work, wetlands located in the project area will be flagged for exclusion.

- Appropriate erosion control measures will be used to reduce siltation and runoff of contaminants into wetlands and adjacent, ponds, streams, or riparian woodland/scrub. The contractor will not be allowed to stockpile brush, loose soils, or other debris material on stream banks.
- Native plant species should be used in erosion control or revegetation seed mix. Any hydroseed mulch used for revegetation must also be certified weed-free. Dry farmed straw will not be used, and certified weed-free straw will be required where erosion control straw is to be used. Filter fences and mesh will be of material that will not entrap reptiles and amphibians. Erosion-control measures will be placed between water or wetland and the outer edge of the project site.
- All off-road project equipment will be cleaned of potential noxious weed sources (mud, vegetation) before entry into the project area. Equipment will be considered fee of soil, seeds, and other such debris when a visual inspection does not disclose such material. Disassembly of equipment compartments or specialized inspection tools is not required.
- Vehicles and equipment will be parked on pavement, existing road, or specified staging areas.
- Trash generated by covered activities should be promptly removed and properly removed from the site.
- Equipment storage, fueling, and staging areas will be sited on disturbed areas or on non-sensitive nonnative grassland land cove types, when these sites are available, to minimize risk of direct discharge into riparian area or other sensitive land cover types.
- All temporarily disturbed areas, such as staging areas, will be returned to pre-project or ecologically improved conditions as required by responsible agencies.
- Dispose of all wastes properly. Materials that cannot be reused or recycled must be taken to an appropriate landfill or may require disposal as hazardous waste. Never throw debris into channels, creeks, or into wetland areas. Never store or leave debris in the street or near a creek where it may contact runoff.

Best Management Practices included above as well as soil erosion BMPs described in the Geology and Soils section of this document will minimize project impacts to surface water quality. In addition, the project is required to comply with Order R5-2017-0061 (*Waste Discharge Requirements General Order for Discharges Related to Timberland Management Activities for Non-Federal and Federal Lands*) and will be required to comply with the terms and conditions of the Order including implementation of best management practices and/or water quality protection measures and monitoring and reporting. The project does not include activities that could result in impacts to groundwater quality. The project will not violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality. **Less-than-significant impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☐	☐	☐	☒

b) The project will require minimal use of water for dust suppression during biomass removal activities. The source of water will depend on the location of the treatment area as well as the treatment contractor. Water use will be short-term and cease upon completion of biomass removal activities. The project will not substantially decrease groundwater supplies or interfere with groundwater recharge. **No impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would result in substantial on- or off-site erosion or siltation?	☐	☐	☒	☐

c) The project will not alter the course of any streams or rivers. The project will include a 75-foot buffer from perennial streams and wetlands and a 50-foot buffer from ephemeral and intermittent streams. The project does not include changes to project site topography or addition of impervious surfaces. The project includes site restoration for areas where ground disturbance will be caused by machinery and equipment in areas sensitive to soil stabilization issues. **Less-than-significant impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, or substantially increase the rate or amount of surface runoff in a manner which would result in on- or off-site flooding?	☐	☐	☐	☒

d) The project does not include substantial alteration of the existing drainage pattern of the project area or increase in impervious surfaces. See a) and c) above. The project will not substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite. **No impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
e) Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of				

a stream or river or through the addition of impervious surfaces, or substantially increase the rate or amount of surface runoff in a manner which would create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☒	☐

e) The project will not result in a substantial increase in the rate or amount of surface runoff from the project site. As discussed under a), BMPs for erosion control and water quality will be implemented for the project that will minimize pollutants in runoff from the project site. **Less-than-significant impact.**

f) Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, or substantially increase the rate or amount of surface runoff in a manner which would impede or redirect flows?	Potentially Significant Impact ☐	Less Than Significant with Mitigation Incorporated ☐	Less Than Significant Impact ☐	No Impact ☒

f) As discussed in a) through e) above, the project will not substantially alter the existing drainage pattern of the site or substantially increase the rate or amount of surface runoff. The project will not impede or redirect flows. **No impact.**

g) In flood hazard, tsunami, or seiche zones, would the project risk release of pollutants due to project inundation?	Potentially Significant Impact ☐	Less Than Significant with Mitigation Incorporated ☐	Less Than Significant Impact ☒	No Impact ☐

g) Flood Hazard Zones within the project area as mapped by FEMA National Flood Hazard Layer are shown in Figure 17A through 17E. Several portions of the project are located within Flood Hazard Zone A: Area Subject to Inundation. The project includes site restoration to stabilize treatment areas where needed following biomass removal. Grass seeding, slash packing, or other appropriate erosion control or slope stabilization techniques will be deployed in areas disturbed by mechanical equipment operation following biomass removal. Site restoration will minimize the risk of release of sediment if the project were to become inundated. In addition, the project does not include work within 75 feet of perennial streams or wetlands or within 50 feet of ephemeral and intermittent streams. **Less-than-significant impact**.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
h) Would the project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☐	☐	☒

h) The BMPs listed under a) above will be implemented by the treatment contractor to minimize impacts to surface water quality. As discussed under b) above, the project will not use significant volumes of groundwater or result in impacts to groundwater quality. The project will not conflict with or obstruct any water quality control plan or sustainable groundwater management plan. **No impact.**

LAND USE AND PLANNING

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project physically divide an established community?	☐	☐	☐	☒

a) The project will not divide and established community. **No impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project 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?	☐	☐	☐	☒

b) Best management practices and mitigation measures included this document will be implemented to avoid and reduce environmental effects of the project. The project will not 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. **No impact.**

MINERAL RESOURCES

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project 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?	☐	☐	☐	☒

a) The project does not include development activities, change in land use, or mineral extraction activities. The project will not result in the loss of availability of a mineral resource. **No impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project 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?	☐	☐	☐	☒

b) Project activities will not result in the loss of availability of a locally important mineral resource recovery stie. **No impact.**

NOISE

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project result in generation of 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 in other applicable local, state, or federal standards?	☐	☐	☒	☐

a) The project will not result in any permanent sources of noise. The project will generate short-term increases in ambient noise levels in the project vicinity from the operation of mechanical equipment (masticators, chippers, and chainsaws) and minor increased vehicle traffic. The project impacts on individual sites will be short as hazard vegetation is removed from the parcel and the operations moved onto the next parcel. Short-term noise generated by the project will be transitory.

The following BMPs contained in the FEMA *Programmatic Environmental Assessment, Recurring Actions in Arizona, California, and Nevada* (December 2014) will be implemented for the project:

- Provide advance notification to surrounding land uses disclosing the treatment schedule, including the various types of activities that would be occurring throughout the duration of the treatment period.
- Noise-generating treatment activities, including truck traffic coming to and from the site for any purpose, shall be limited to the hours of 7:00 a.m. to 7:00 p.m. during weekdays and 8:00 a.m. to 5:00 p.m. on Saturday and Sunday.
- All noise-producing project equipment and vehicles using internal combustion engines shall be equipped with mufflers, air-inlet silencers where appropriate, and any other shrouds, shields, or other noise-reducing features in good operating condition that meet or exceed original factory specification. Mobile or fixed "package" equipment shall be equipped with shrouds and noise control features that are readily available for that type of equipment.
- Contractor shall be responsible for maintaining equipment in best possible working condition.
- Mobile equipment staging, parking, and maintenance areas shall be located as far as practicable from noise-sensitive receivers.

- Locate equipment as far as possible from nearby noise-sensitive receptors.
- The use of noise-producing signals, including horns, whistles, alarms, and bells shall be for safety warning purposes only. No project-related public address or music system shall be audible at any adjacent noise-sensitive receptor.
- The contractor shall notify adjacent property owners, property managers, and business owners of adjacent parcels of the schedule in writing and in advance of the work. The notification shall include the name and phone number of a project representative or site supervisor.
- The onsite supervisor shall have the responsibility and authority to receive and resolve noise complaints. A clearappeals process to the Owner shall be established prior to commencement of treatment that shall allow for resolution of noise problems that cannot be immediately solved by the site supervisor.

The project is not anticipated to result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the Shasta County General Plan or applicable standards of other agencies. **Less-than-significant impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project result in generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐

b) The project does not include equipment or processes that would result in significant levels of vibration or groundborne noise, such as pile driving or blasting. Mechanical equipment such as grinders and masticators will result in low levels of ground vibration perceptible in the immediate vicinity of the equipment. Equipment will not operate in a single location for an extended period of time. The project will not generate excessive levels of vibration that could result in structural damage or annoyance levels. **Less-than-significant impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
c) For a project 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 or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

c) Portions of the Fall River Cassell Road PAA are within two miles of the Fall River Mills Airport. The project does not include construction of housing or an increase in the number of people residing within the vicinity of the Fall River Mills Airport. The project does not include increased airport operations that would expose existing residents to excessive noise levels from the airport.

The project would not expose project contractors temporarily working the area to excessive noise levels from aircraft. **Less-than-significant impact.**

POPULATION AND HOUSING

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project 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)?	☐	☐	☐	☒

a) The project will not induce substantial population growth. The project does not include expansion of any roads or infrastructure. The project does not include construction of new homes or businesses that would result in unplanned population growth. **No impact**.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

b) The project would not displace people or housing requiring the construction of replacement housing elsewhere. **No impact**.

PUBLIC SERVICES

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for fire protection?	☐	☐	☐	☒

a) The project does not include construction of new structures or involve activities that would adversely affect fire protection service ratios, response times, or other objectives. The project will not include or require new or physically altered governmental facilities for fire protection. **No impact**.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for police protection?	☐	☐	☐	☒

b) The project will not require the construction of new or altered facilities to maintain acceptable police service ratios, response times, or other performance objectives for police response. **No impact**.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for schools?	☐	☐	☐	☒

c) The project will not result in the need for new or physically altered schools. **No impact**.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for parks?	☐	☐	☐	☒

d) The project will not increase the use of local parks or require construction of new or altered parks to maintain acceptable service rations or other performance objectives. **No impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
e) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically	☐	☐	☐	☒

altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for other public facilities?	

e) The project will not result in the need for new or physically altered other public facilities. **No impact.**

RECREATION

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒

a) The project will have no impact on recreation. No new demand will be generated for the use of existing area parks or recreational facilities. **No impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	☐	☐	☐	☒

b) The project does not include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment. **No impact.**

TRANSPORTATION

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	☐	☐	☒	☐

a) The project will not conflict with any program, plan, ordinance or policy addressing the circulation system including transit, roadway, bicycle and pedestrian facilities. The project may result in a minor temporary increase in traffic in the specific location of project activities, however project activities will be transitory and will not occur in a single area for an extended time period. The following BMPs including applicable BMPs contained in the FEMA *Programmatic Environmental Assessment, Recurring Actions in Arizona, California, and Nevada* (December 2014) will be implemented for the project:

- When possible, crews will travel outside of peak hour traffic times, thereby minimizing peak traffic time impacts.
- All vehicles related to project, including contractor vehicles and trucks, will use designated Truck Routes where those are available.
- Detour signs shall be used when necessary for vehicles, bicycle and pedestrian ways.
- All detour sings during the project would be designed to meet the responsible agency standards.
- A Traffic Control Plan will be developed and submitted to Shasta County Public Works (County road) or Caltrans (State Highway) if the project is expected to require road closures.

With these practices in place, a **less-than-significant impact** is anticipated.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project conflict or be inconsistent with CEQA Guidelines § 15064.3(b)?	☐	☐	☒	☐

b) Shasta County has not adopted VMT-based transportation significance thresholds. The project will result in a short-term increase in vehicle miles traveled that will cease upon project completion. The project will not result in a long-term increase in VMT and will not conflict or be inconsistent with CEQA guidelines 15064.3(b). **Less-than-significant impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Would the project substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒

c) There will be no change in road design or construction. As discussed in a) above, a Traffic Control Plan will be developed for the project if a road closure is required. **No impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Would the project result in inadequate emergency access?	☐	☐	☐	☒

d) Emergency access will not be impaired by the project. The project is proposed to improve ingress and egress in the event of a wildfire. **No impact.**

TRIBAL CULTURAL RESOURCES

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code § 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, and that is listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code § 5020.1(k)?	☐	☒	☐	☐

a) AB 52 was enacted on July 1, 2015, and establishes that "a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment" (Public Resources Code Section 21084.2). It further states that the lead agency shall establish measures to avoid impacts that would alter the significant characteristics of a tribal cultural resource when feasible (PRC Section 21084.3).

Public Resources Code Section 21074 (a)(1)(A) and (B) defines tribal cultural resources as "sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe" and meets either of the following criteria:

- Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or
- A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying these criteria, the lead agency shall consider the significance of the resource to a California Native American tribe.

AB 52 also establishes a formal consultation process for California cities, counties, and tribes regarding tribal cultural resources. Under AB 52, lead agencies are required to "begin consultation with a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project." Native American tribes to be included in the process are those that have requested notice of projects proposed within the jurisdiction of the lead agency.

Tribal notification letters for the project were sent on December 2, 2022. Records search area Figures and Tribal consultation documents are included in Attachment C. The search of the information center identified 105 resources and 188 studies within the search area.

Mitigation Measure 12 included in the Cultural Resources section of this document will be implemented to avoid impacts to all known cultural resources within the project area, including

those eligible for listing in the CRHR. In addition, BMPs will be implemented during the project for unanticipated discovery of cultural resources and human remains. Impacts to tribal cultural resources will be **less than significant with mitigation incorporation.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code § 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, and that is: A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code § 5024.1? In applying the criteria set forth in subdivision (c) of Public Resource Code § 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☒	☐	☐

b) All prehistoric resources will be avoided during project implementation. Resources will be flagged by a Certified Archeologist prior to ground disturbing activities. Historical resources will be evaluated for significance by a Certified Archeologist and flagged for avoidance prior to ground disturbing activities. **Less than significant with mitigation incorporated.**

UTILITIES AND SERVICE SYSTEMS

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project 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?	☐	☐	☐	☒

a) The project will not result in the construction of new or relocated water, wastewater treatment, stormwater drainage, electric power, natural gas, or telecommunications facilities. **No impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	☐	☐	☒	☐

b) The project is a short-duration project. The project will require water for dust suppression during biomass removal activities. The source of water for the project will depend on the location within the project area and the treatment contractor. The project is not anticipated to require significant quantities of water for dust suppression, and the need for water will cease upon completion of biomass removal activities. **Less-than-significant impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Would the project result in a determination by the wastewater treatment provider that 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?	☐	☐	☐	☒

c) The project will not require wastewater treatment. **No impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Would the project generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	☐	☐	☐	☒

d) Small quantities of solid waste generated by the project will be bagged, removed from the site, and transported to the city/county transfer site for disposal. **No impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
e) Would the project comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	☐	☐	☐	☒

e) The project will comply with all federal state and local statues and regulations relating to solid waste and disposal. **No impact.**

WILDFIRE

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project substantially impair an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒

a) The project site is within state responsibility areas classified as very high fire hazard severity zones (FRAP 2007). The project will reduce fire behavior and intensity and provide safer

emergency ingress and egress. The project will not impair an adopted emergency response plan or emergency evacuation plan. **No impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
b) If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project 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?	☐	☐	☐	☒

b) The project could temporarily increase wildfire risk due to operation of vehicles and mechanized equipment and increased human presence in the project area during project activities. BMPs listed in the Hazards and Hazardous Materials section of this document include the following that will also reduce the risk of wildfire caused by project activities:

- Vehicles and equipment will be inspected and approved before use to ensure that they will not leak hazardous materials such as oil, hydraulic fluid, or fuel. All equipment will be equipped with spark arrestors and fire extinguishers.
- The contractor will prepare a Spill Prevention and Response Plan and have emergency cleanup gear for spills (spill containment and absorption materials) and fire-suppression equipment available onsite at all times.
- No smoking will be allowed in work areas.

Upon completion, reduction of fuel loads and interruption of fuel continuity will decrease the likelihood of ignition, increase the probability of success of fire suppression activities, reduce severity of a fire and provide safer ingress and egress for evacuation and fire response. **No impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
c) If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project 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?	☐	☐	☐	☒

c) The project will not require installation or maintenance of associated infrastructure or fire breaks not described in this document that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment. **No impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
d) If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project 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?	☐	☐	☐	☒

d) The project will not 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. **No impact.**

MANDATORY FINDINGS OF SIGNIFICANCE

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project have the potential to substantially degrade the quality of the environment, 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, substantially reduce the number or restrict the range of an endangered, rare, or threatened species, or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐

a) All impacts associated with the project have been identified in this document. Potential project impacts to biological resources, cultural resources, and tribal cultural resources are discussed in the Biological Resources, Cultural Resources, and Tribal Cultural Resources sections of this document. The project will not substantially degrade the quality of the environment, 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, substantially reduce the number or restrict the range of an endangered, rare, or threatened species, or eliminate important examples of the major periods of California history or prehistory with implementation of Mitigation Measures and BMPs included in the Cultural Resources, Tribal Cultural Resources and Biological Resources sections of this document. **Less than significant with mitigation incorporation.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of	☐	☐	☒	☐

other current projects, and the effects of probable future projects.)	

b) Potential impacts of the project including air quality, greenhouse gas, traffic, noise, hazardous materials, geology and soils, and hydrology are short-term and will cease upon completion of project activities. Since these impacts will cease upon completion of the project and project-level impacts are less than significant, they will not be cumulatively considerable with past, current, or future projects.

Project impacts to cultural resources, tribal cultural resources, biological resources, timberland, and aesthetics are cumulatively considerable with other projects including multiple planned fuel reduction projects within Shasta County. Aesthetic and habitat impacts of the project will be limited to the area 100 to 400 feet from either side of the roadway centerlines and will not combine with other projects to result in a significant cumulative impact. There will be no negative impacts to forest resource areas or timberland resources. The project is designed to improve fire resiliency within these resources. Project impacts to cultural resources, tribal cultural resources and direct biological resource impacts of the project will be avoided through implementation of BMPs and mitigation measures and will not result in a cumulatively significant impact. **Less-than-significant impact.**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Would the project have environmental effects that would cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☐	☒

c) The project will not have any adverse environmental effects on human beings either directly or indirectly. **No impact.**

APPENDIX B

Mitigation Monitoring and Reporting Plan

In accordance with CEQA Guidelines § 15074(d), when adopting a mitigated negative declaration, the lead agency will adopt a mitigation monitoring and reporting plan (MMRP) that ensures compliance with mitigation measures required for project approval. CAL FIRE is the lead agency for the above-listed project and has developed this MMRP as a part of the final IS-MND supporting the project. This MMRP lists the mitigation measures developed in the IS-MND that were designed to reduce environmental impacts to a less-than-significant level. This MMRP also identifies the party responsible for implementing the measure, defines when the mitigation measure must be implemented, and which party or public agency is responsible for ensuring compliance with the measure.

POTENTIALLY SIGNIFICANT EFFECTS AND MITIGATION MEASURES

The following is a list of the resources that will be potentially affected by the project and the mitigation measures made part of the Initial Study-Mitigated Negative Declaration.

Mitigation Measure 1: Pre-Treatment Botanical Surveys (All PAAs)
As part of the preliminary site assessment (PSA) conducted on each eligible parcel potential habitat for special-status plants with potential occur within the treatment area will be identified along with species included in any sensitive natural communities. If potential habitat for special-status plants or sensitive natural communities are identified, protocol-level surveys of the eligible parcels shall be conducted by a qualified biologist during the flowering window for special-status plant species with potential to occur within the treatment area. Surveys shall comply with survey protocols for plants species listed under the CDFW *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities* (2018). If no special-status plants are found, no further measures pertaining to special-status plants are necessary. If special-status plant species are identified during the botanical surveys, the individuals will be avoided. The treatment prescription (TP) for the parcel will be modified to exclude activities within the 25 feet of the individual and exclusionary fencing will be placed around the plants prior to operations on the parcel to establish the avoidance area during project implementation.
Schedule:
Responsible Party:
Verification of Compliance:
Monitoring Party: CAL FIRE
Initials: _____
Date: _____

Mitigation Measure 2: Herbicide Treatment Buffers (Anadromous Fish-Bearing Streams)
Herbicide treatment buffer will coincide with the prescribed treatment buffer for perennial and ephemeral streams for any anadromous fish bearing streams. In order to limit the effect of herbicides on anadromous fish. Herbicides with the potential to harm aquatic life shall not be applied within 150 feet of anadromous fish bearing streams. If conditions necessitate that

herbicides are applied within the 150-foot buffer, then the application shall be completed in the dry season when no precipitation is forecasted.
Schedule:
Responsible Party:
Verification of Compliance:
Monitoring Party: CAL FIRE
Initials: _____
Date: _____

Mitigation Measure 3: Riparian and Wetland Identification and Exclusion (All PAAs)
During the preliminary site assessment of each eligible parcel, eligible parcels will be surveyed for aquatic resources. The treatment prescription (TP) will exclude activities within 75 feet of perennial streams and wetlands (including vernal pools) as well as a 50-feet from ephemeral and intermittent streams. The exclusion area will be marked with flagging. Biomass removal, herbicide application, equipment staging, operation of mechanical equipment, and on-site disposal of removed biomass shall not occur within the marked buffers.
Schedule:
Responsible Party:
Verification of Compliance:
Monitoring Party: CAL FIRE
Initials: _____
Date: _____

Mitigation Measure 4: Surveys for Special-Status Amphibians and Reptiles (All PAAs)
During the Preliminary Site Assessment of each eligible parcel, work areas within 150 feet of flowing watercourses will be evaluated to determine if suitable upland dispersal habitat for potentially occurring special-status amphibians and reptiles are present. If no potential suitable upland dispersal habitat is identified, no further action is required. If suitable upland habitat is identified, no more than two days prior to the start of ground disturbing activities, focused pretreatment surveys for special status amphibians, reptiles, and their eggs will be completed by a qualified biologist in all suitable upland dispersal habitat areas within 150 feet of flowing watercourses. If a special status species is found, CDFW will be notified. If an adult individual is observed within the survey area, then the animal shall be avoided until it is no longer in harm's way, or it may be relocated by a qualified biologist if an area offsite that has appropriate habitat for the species is available. If relocating, the animal should be moved to a nearby area with habitat similar to the environment in which it was found.

If a nest, eggs, hatchlings, or an aestivating adult are observed within the survey area, then an avoidance buffer of 50 to 100 feet shall be applied to heavy equipment access, ground disturbing activities, and herbicide application. The qualified biologist shall consider the topography and vegetation onsite, as well as the treatments proposed onsite and the potential for disturbance when determining the buffer distance. Additionally, to avoid impacts to hatchlings' dispersal from the nest site, no woody debris or other barrier shall be placed in between the nest site and the nearest body of water. **Schedule**:
Responsible Party:

Verification of Compliance:
Monitoring Party: CAL FIRE
Initials: _____
Date: _____

Mitigation Measure 5: Bat Roost Humane Exclusion (All PAAs)
During the Preliminary Site Assessment of eligible parcels, trees with maternity roost structures (i.e. cavities in the trunk or branches, woodpecker holes, loose bark, cracks) will be identified. If no trees with maternity roost structures are identified, no further measures are necessary. If removal of trees identified to have bat roost structure occurs from September 1 to October 30, no measures for special-status bats are required.

If removal of trees identified to have bat roost structure potential will occur during the bat maternity season, when young are non-volant (March 1- August 31), or during the bat hibernacula (November 1-March 1), when bats have limited ability to safely relocate roosts, humane exclusions should be implemented which consist of a two-day removal process by which the non-habitat trees and brush are removed along with smaller tree limbs on the first day, and the remainder of the tree limbs and the tree truck on the second day.
Schedule:
Responsible Party:
Verification of Compliance:
Monitoring Party: CAL FIRE
Initials: _____
Date: _____

Mitigation Measure 6: Artificial Lighting Standards (All PAAs)
To minimize impacts of lighting to bats and other nocturnal species, any artificial lighting associated with short-term and long-term project activities should be downward facing, fully shielded, and designed and installed to minimize photo pollution of adjacent wildlife habitat.
Schedule:
Responsible Party:
Verification of Compliance:
Monitoring Party: CAL FIRE
Initials: _____
Date: _____

Mitigation Measure 7: Bat Roost Habitat Avoidance (All PAAs)
During the Preliminary Site Assessment of each eligible parcel the presence of caves or bridges within the treatment area will be noted. If no caves or bridges are located within the project area, no further measures are necessary. If present within 50 feet of project activities, caves and bridges in the project area will be assessed during the Preliminary Site Assessment for potential bat roost structures (crevice roosts tend to be approximately 3/4 to 1 1/2 inches across and at least 18 inches deep. In most cases, they run from one side of the bridge to the other, and between three and several hundred meters above ground). If found, a qualified biologist will assess the structure for signs of bat presence (i.e., guano, insect pieces, etc.). If no roost is present, then no buffer is needed. If a

roost is present, then a 50-foot non-disturbance buffer shall be implemented around the roost structure to prevent changes to the thermal stability and protective cover surrounding the roost structure that could result from tree removal.
Schedule:
Responsible Party:
Verification of Compliance:
Monitoring Party: CAL FIRE
Initials: _____
Date: _____

Mitigation Measure 8: Mammal Den Surveys (Big Bend Road, Fall River Cassel Road, Gilman Road, Highway 89 Cassel Road, McArthur Road, Platina Road, Rainbow Lake Road, Oak Run Road, Oak Run to Fern Road, Philips Road PAAs)
During the Preliminary Site Assessment of each eligible parcel, the project area will be evaluated for suitable mammal den habitat. If potential den habitat for American badger (*Taxidea taxus*), fisher (*Pekania pennaniti*), Oregon snowshoe hare (*Lepus americanus; klamathensis*), wolverine (*Gulo gulo*), or Sierra Nevada red fox (*Vulpes culpes necator*) is identified, pretreatment surveys shall be completed within three days prior to ground disturbing activities to determine if any terrestrial mammal (e.g., American wolverine, fisher, American badger) den structures are present within the work area. If potential dens are located within the work area and cannot be avoided during project activities, a qualified biologist will determine if the dens are occupied. If occupied dens are present within the work area, their disturbance and destruction will be avoided by stopping operations until an appropriate buffer approved by CDFW or USFWS.
Schedule:
Responsible Party:
Verification of Compliance:
Monitoring Party: CAL FIRE
Initials: _____
Date: _____

Mitigation Measure 9: NSO/CSO Surveys (Big Bend Road, and McArthur Road PAAs)
Surveys will be completed in areas where NSO or CSO have been previously identified. Where the project area falls within any 1.3-mile Activity center buffer, operations will take place outside of nesting season (March – August) or after surveys confirm no presence. The treatment prescription will also be modified to leave all trees >20 DBH or larger un-cut within a half mile of the confirmed Activity Center. To promote a diverse canopy that supports NSO roosting and foraging, some mature oaks will also be retained at the discretion of the landowner.
Schedule:
Responsible Party:
Verification of Compliance:
Monitoring Party: CAL FIRE
Initials: _____
Date: _____

Mitigation Measure 10: Native Milkweed Buffer (All PAAs)
Surveys will be completed to determine if native milkweed (*Asclepias spp.)* are present within work areas. If milkweed is identified onsite, disturbance to the plant would be avoided by implementing a 25-foot buffer around identified individuals.
Schedule:
Responsible Party:
Verification of Compliance:
Monitoring Party: CAL FIRE
Initials: _____
Date: _____

Mitigation Measure 11: Invasive Species Management (All PAAs)
An invasive species management plan (ISMP) shall be prepared to provide guidance that prevents the spread of noxious weeds. If a significant population of Cal-IPC listed invasive species is observed, then equipment shall be cleaned at the contaminated site before proceeding to any other sites.
Schedule:
Responsible Party:
Verification of Compliance:
Monitoring Party: CAL FIRE
Initials: _____
Date: _____

Mitigation Measure 12: Implement Management Recommendations in Archaeological Survey Report

Management Recommendations included in the Archaeological Survey Report prepared for the project shall be implemented to ensure that cultural resources are not adversely affected by the project which include the following:

Special Conditions
Archaeological resources within the Project Area are designated for Special Conditions where fuel reduction activities may be performed within the site limits. In some instances, removal of hazard trees is beneficial to site preservation. Special Conditions of cultural resources includes the following actions:

1. Prior to the commencement of operations, the Project Manager will ensure that all Special Treatment Zones (STZ) are clearly described and illustrated in plans, and specifications.
2. All parties (CAL FIRE, Project Manager, Registered Professional Forester [RPF], or Licensed Timber Operator [LTO]) will review the plans.
3. Prior to commencement of operations, a CAL FIRE Certified Archaeological Surveyor or professional archaeologist familiar with the site, shall demarcate all sites with STZ flagging. Exclusionary flagging will be based on the site sketch map. No buffer around the

site boundary is required for Special Condition sites. STZ flagging that is older than six months will be inspected and refreshed prior to operations.
4. Fuel reduction work utilizing hand tools (including chainsaws) may occur within the STZ area given the following conditions.
5. No skidding of logs shall occur within the STZ.
6. Timber shall be directionally felled away from the site.
7. Mechanized equipment shall be restricted to existing roads or disturbed areas within the STZ.
8. No tree planting will occur within STZ.
9. A CAL FIRE Certified Archaeological Surveyor or professional archaeologist will periodically inspect sites to ensure that BMPs are effective and the STZ has not been breached.

Unanticipated Discovery of Cultural Resources

If previously unidentified cultural resources are encountered during project implementation, avoid altering the materials and their stratigraphic context. A qualified professional archaeologist should be contacted to evaluate the situation. Project personnel should not collect cultural resources. Prehistoric resources include, but are not limited to, chert or obsidian flakes, projectile points, mortars, pestles, and dark friable soil containing shell and bone dietary debris, heat-affected rock, or human burials. Historic resources include stone or abode foundations or walls; structures and remains with square nails; and refuse deposits or bottle dumps, often located in old wells or privies.

Encountering Native American Remains

Although unlikely, if human remains are encountered, all work must stop in the immediate vicinity of the discovered remains and the County Coroner and a qualified archaeologist must be notified immediately so that an evaluation can be performed. If the remains are deemed to be Native American and prehistoric, the Native American Heritage Commission must be contacted by the Coroner so that a "Most Likely Descendant" can be designated and further recommendations regarding treatment of the remains is provided.

Schedule:
Responsible Party:
Verification of Compliance:
Monitoring Party: CAL FIRE
Initials: _____
Date: _____

A copy of the completed MMRP will be forwarded to: CAL FIRE Environmental Protection Program, P.O. Box 944246, Sacramento, CA 94244.

PREPARERS OF THIS DOCUMENT

This document was prepared by VESTRA Resources, Inc., for The McConnell Foundation with input and support from CAL FIRE.

LIST OF PREPARERS OF THIS DOCUMENT

Wendy Johnston	RPF No. 2032 Vice President VESTRA Resources, Inc. (530) 223-2585
Kristine Cloward	Senior Regulatory Compliance Specialist VESTRA Resources, Inc. (530) 223-2585
Nicolaas VanOoyen	Regulatory Compliance Specialist VESTRA Resources, Inc. (530) 223-2585

EXPERTS CONSULTED

LIST OF EXPERTS CONSULTED

Air Quality
John Waldrop
Shasta County Air Quality District Manager
1955 Placer Street, Suite 101
Redding, CA 96001
(530) 225-5674

Biological
Anna Prang
Regulatory Biologist
VESTRA Resources, Inc.
5300 Aviation Drive
Redding, CA 96002
(530) 223-2585

Cultural Resources
ALTA Archaeological Consulting
Alex DeGeorgey, M.A., RPA
Risa DeGeorgey
Kevin Dalton, M.A., RPA
Alta Archaeological Consulting
15 Third Street
Santa Rosa, CA 95401

Greenhouse Gas Emissions Analysis
Wendy L. Johnston
RPF No. 2032
VESTRA Resources, Inc.
5300 Aviation Drive
Redding, CA 96002
(530) 223-2585

Timberland
Benjamin Rowe
Shasta-Trinity Unit Forester
875 Cypress Street
Redding, CA 96001
(530) 225-2432

Water Quality
Angela Wilson
Program Manager Timber Activities RWQCB
364 Knollcrest Drive, #205
Redding, CA 96002
(530) 224-4856
Angela.wilson@waterboard.ca.gov

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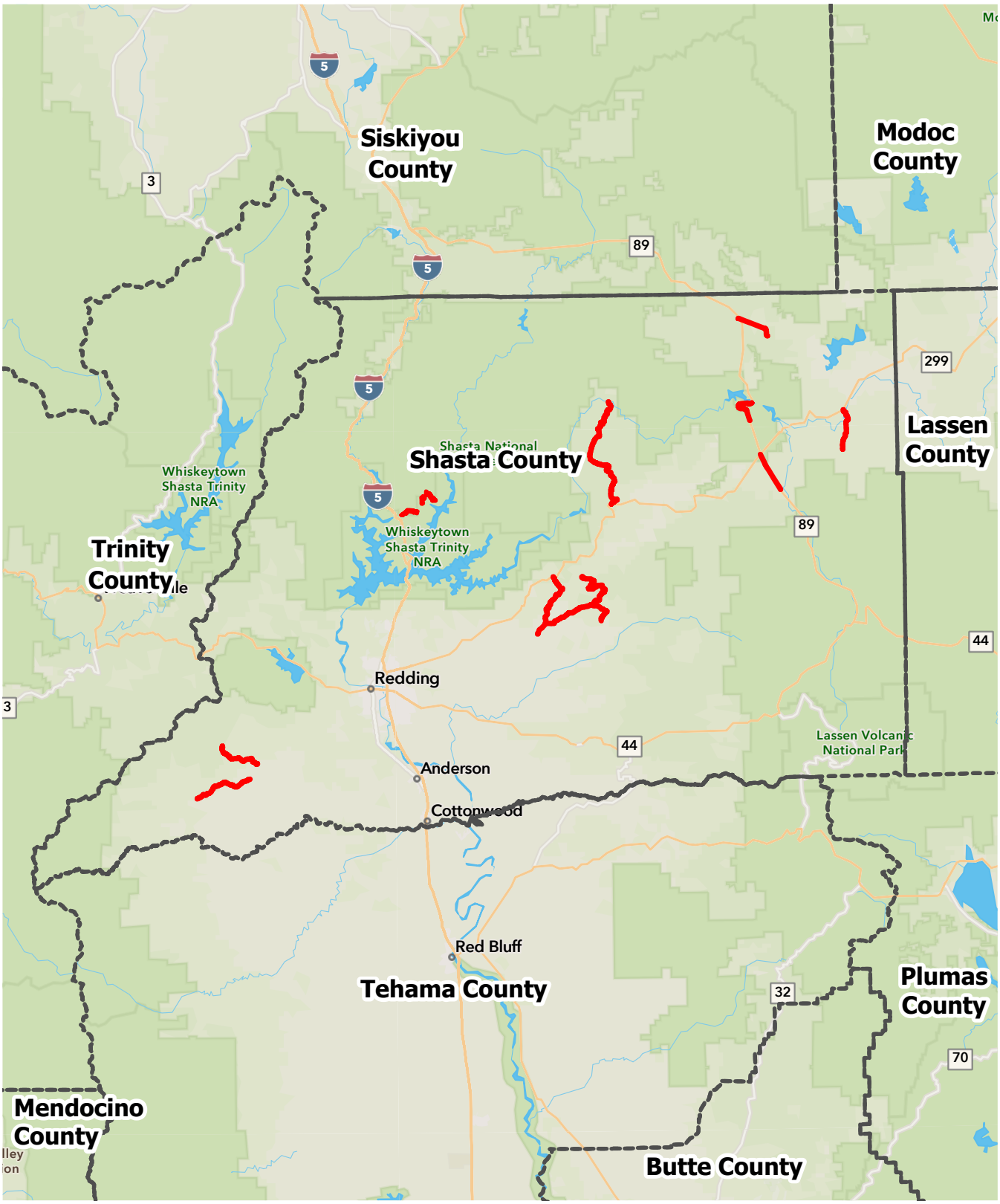
Attachment A

Figures



VESTRA

FIGURE 1
PROJECT LOCATION
WILDFIRE MITIGTAION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

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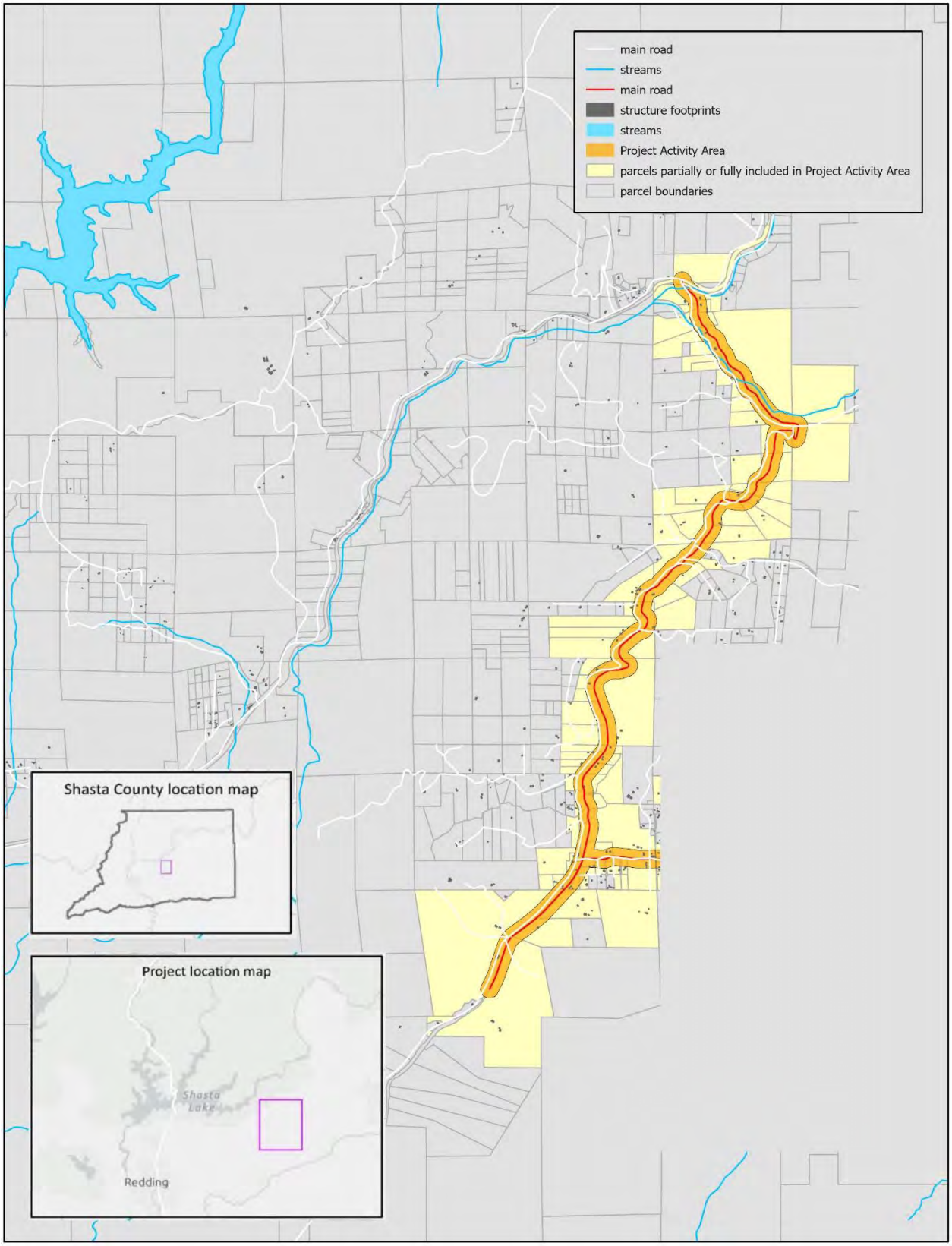

FIGURE 2
OAK RUN ROAD PAA
WILDFIRE MITIGTAION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

VESTRA

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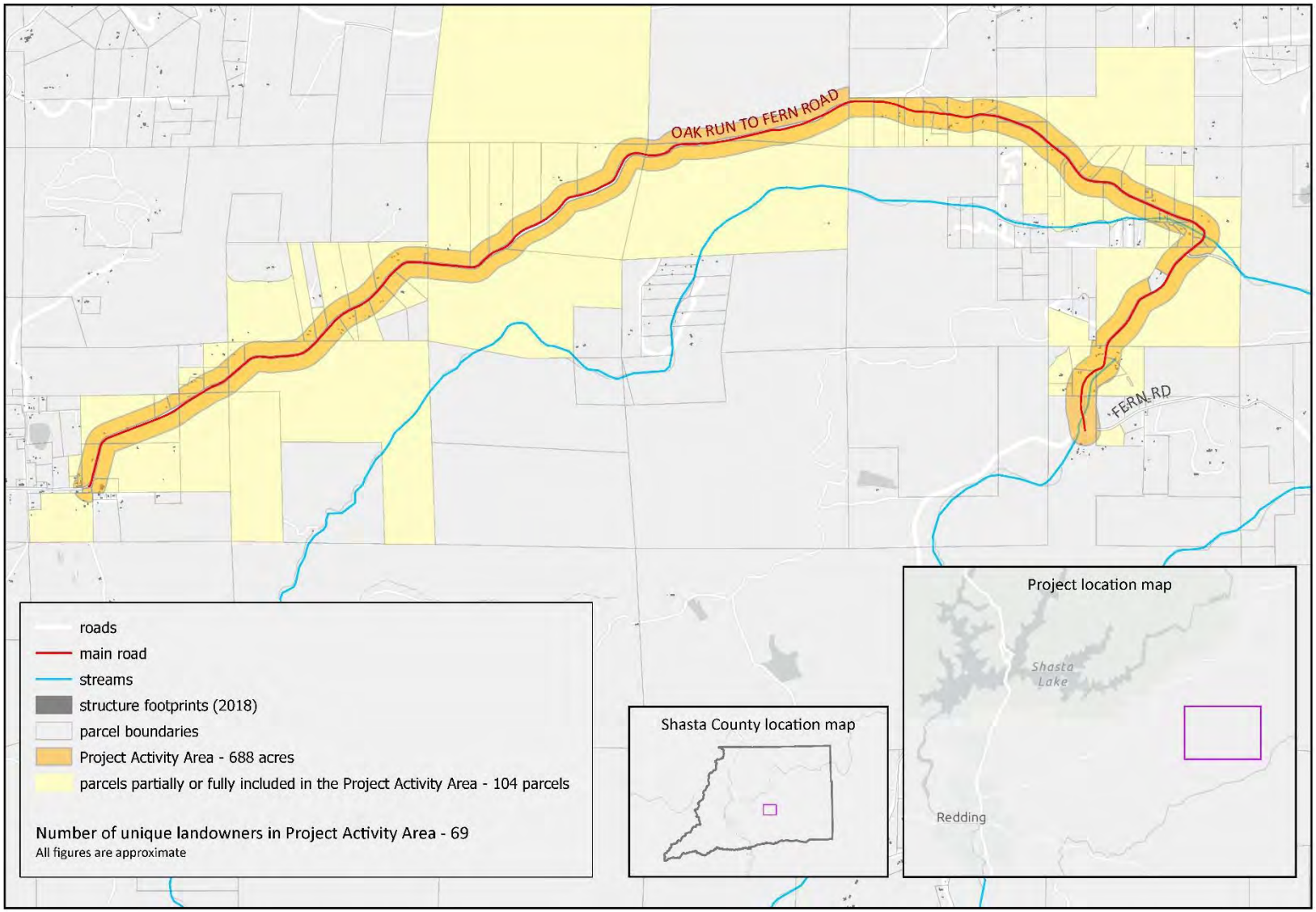

FIGURE 3
OAK RUN TO FERN ROAD PAA
WILDFIRE MITIGTAION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

VESTRA

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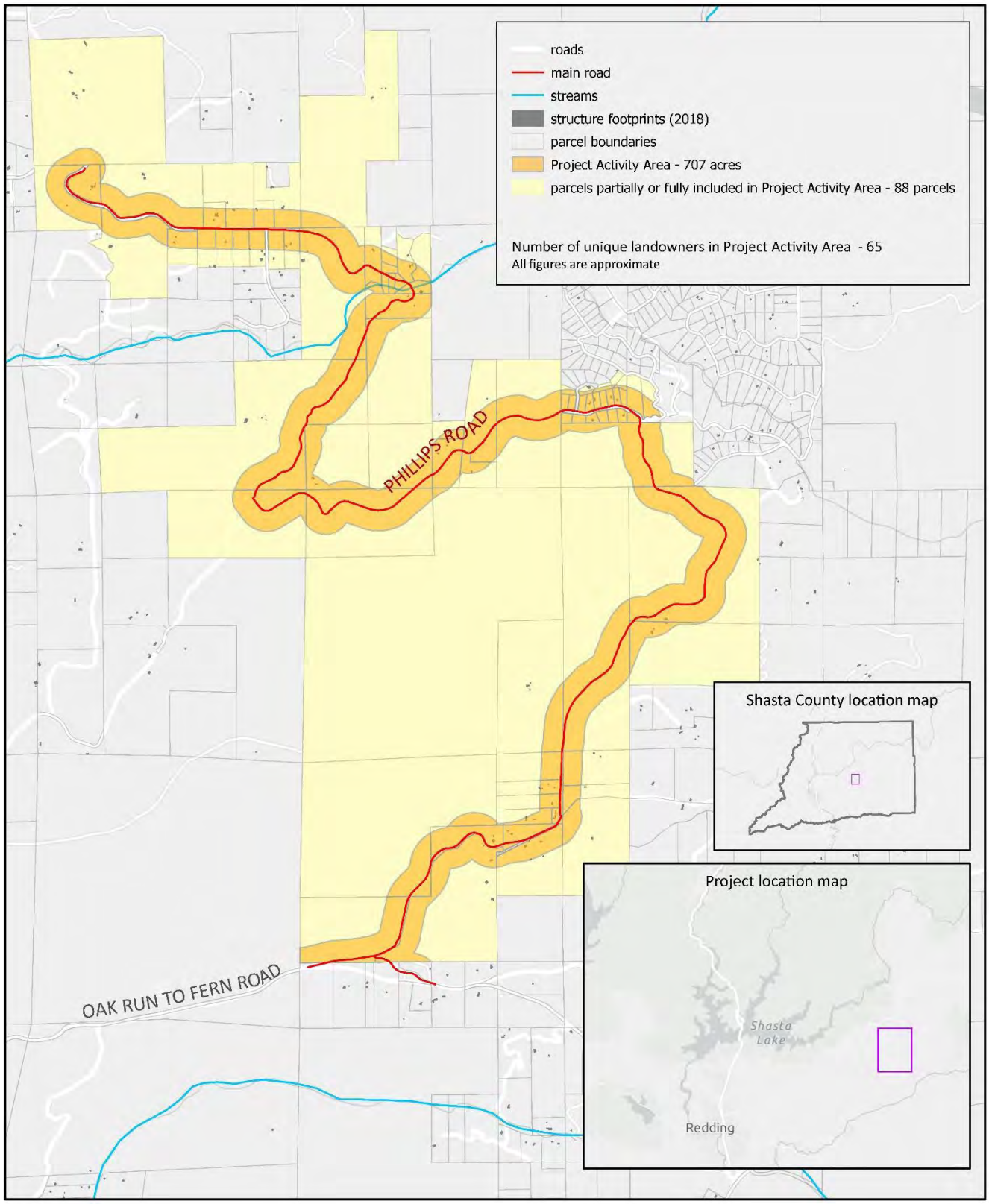

FIGURE 4
PHILLIPS ROAD PAA
WILDFIRE MITIGTAION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

VESTRA

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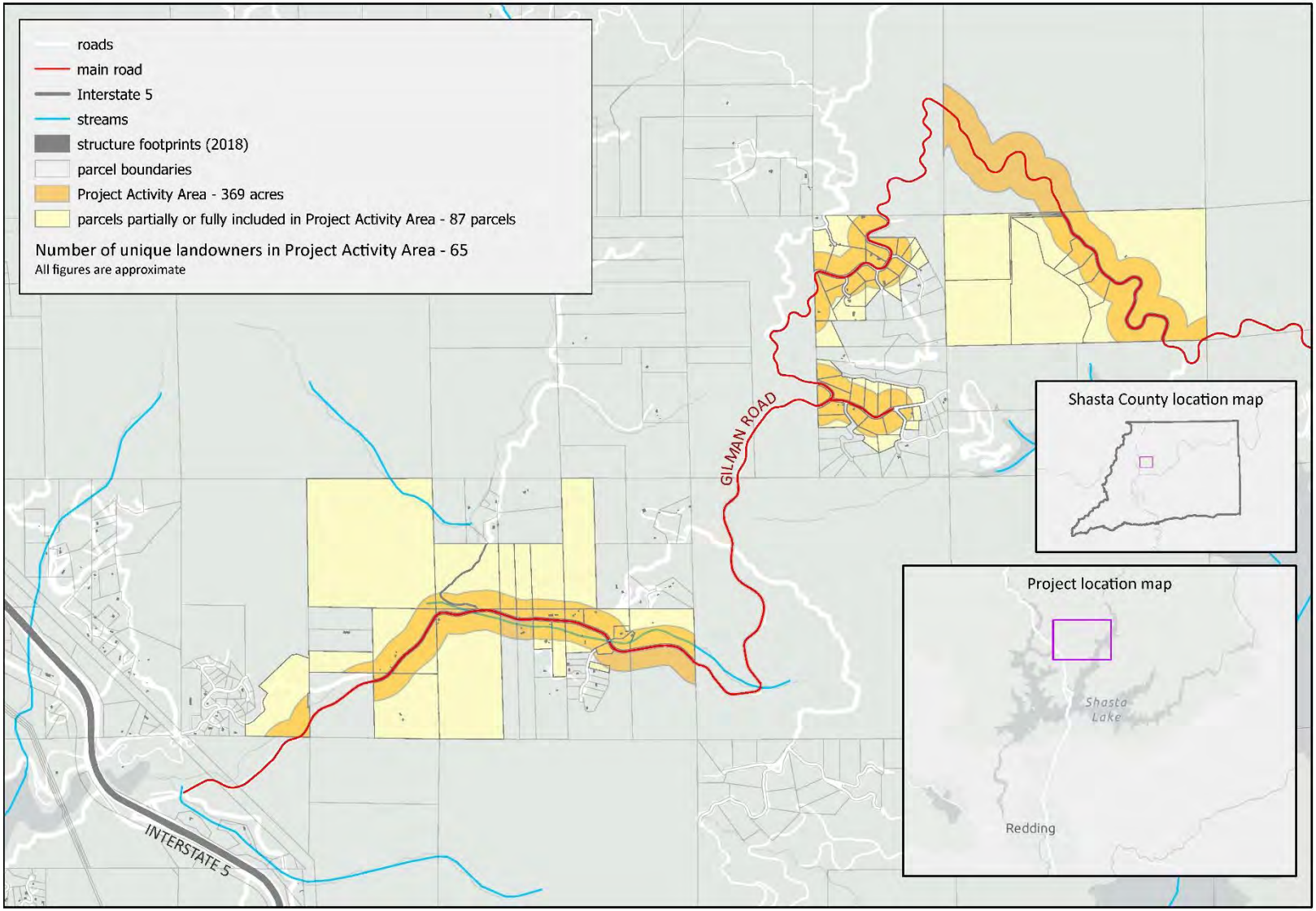

FIGURE 5
GILMAN ROAD PAA
WILDFIRE MITIGTAION/HAZARDOUS
FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

VESTRA

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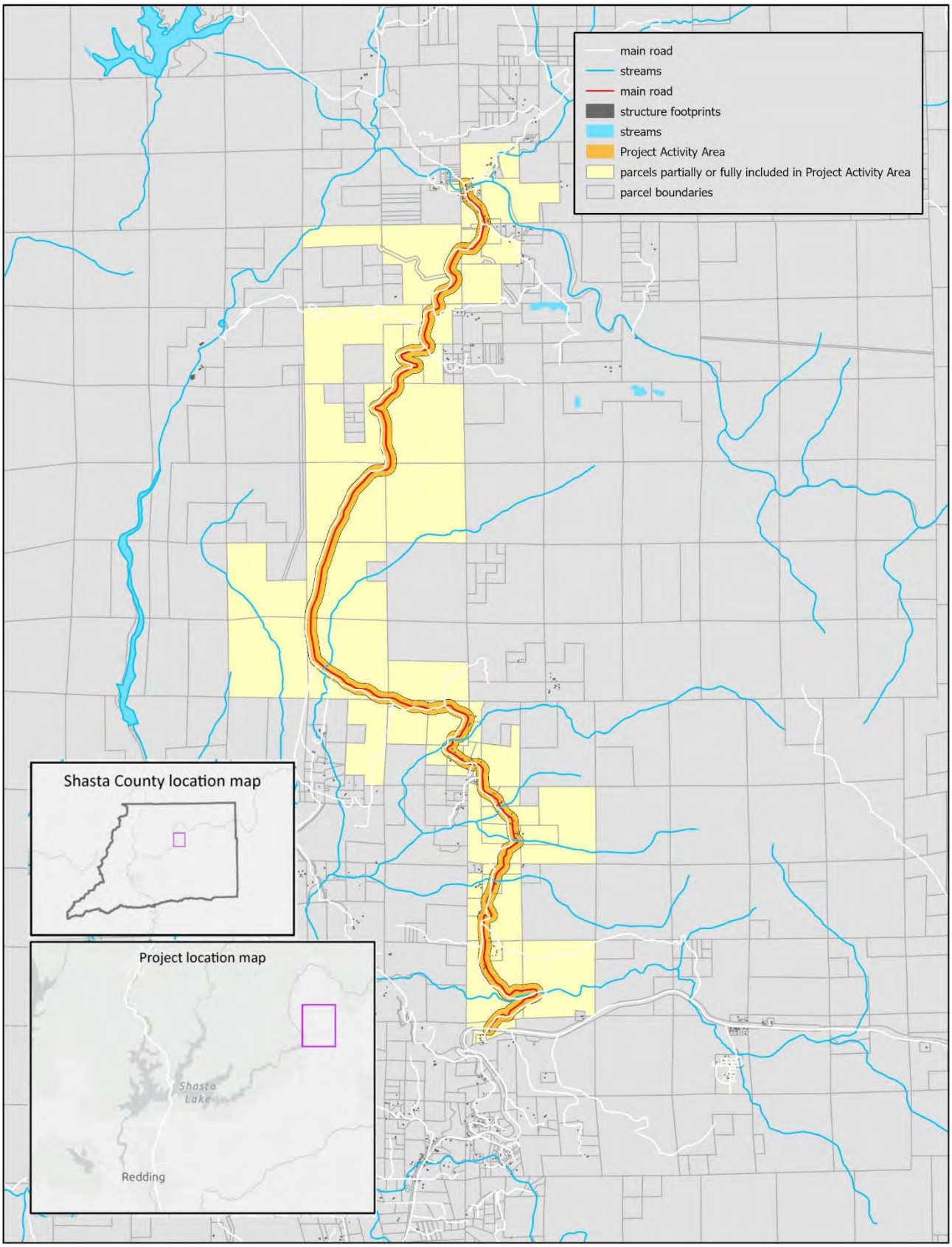

FIGURE 6
BIG BEND ROAD PAA
WILDFIRE MITIGTAION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

VESTRA

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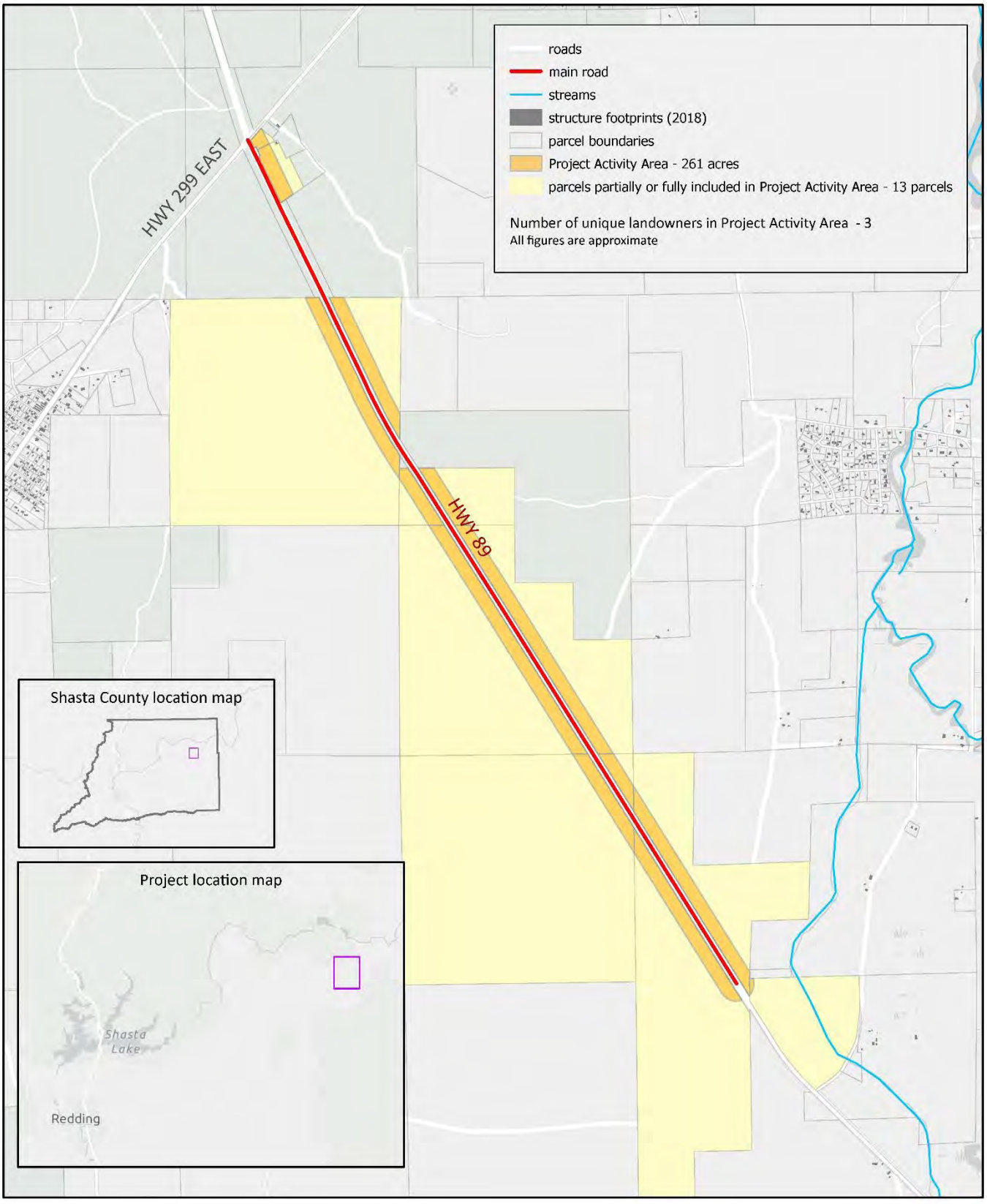

FIGURE 7
HIGHWAY 89 CASSEL ROAD PAA
WILDFIRE MITIGTAION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

VESTRA

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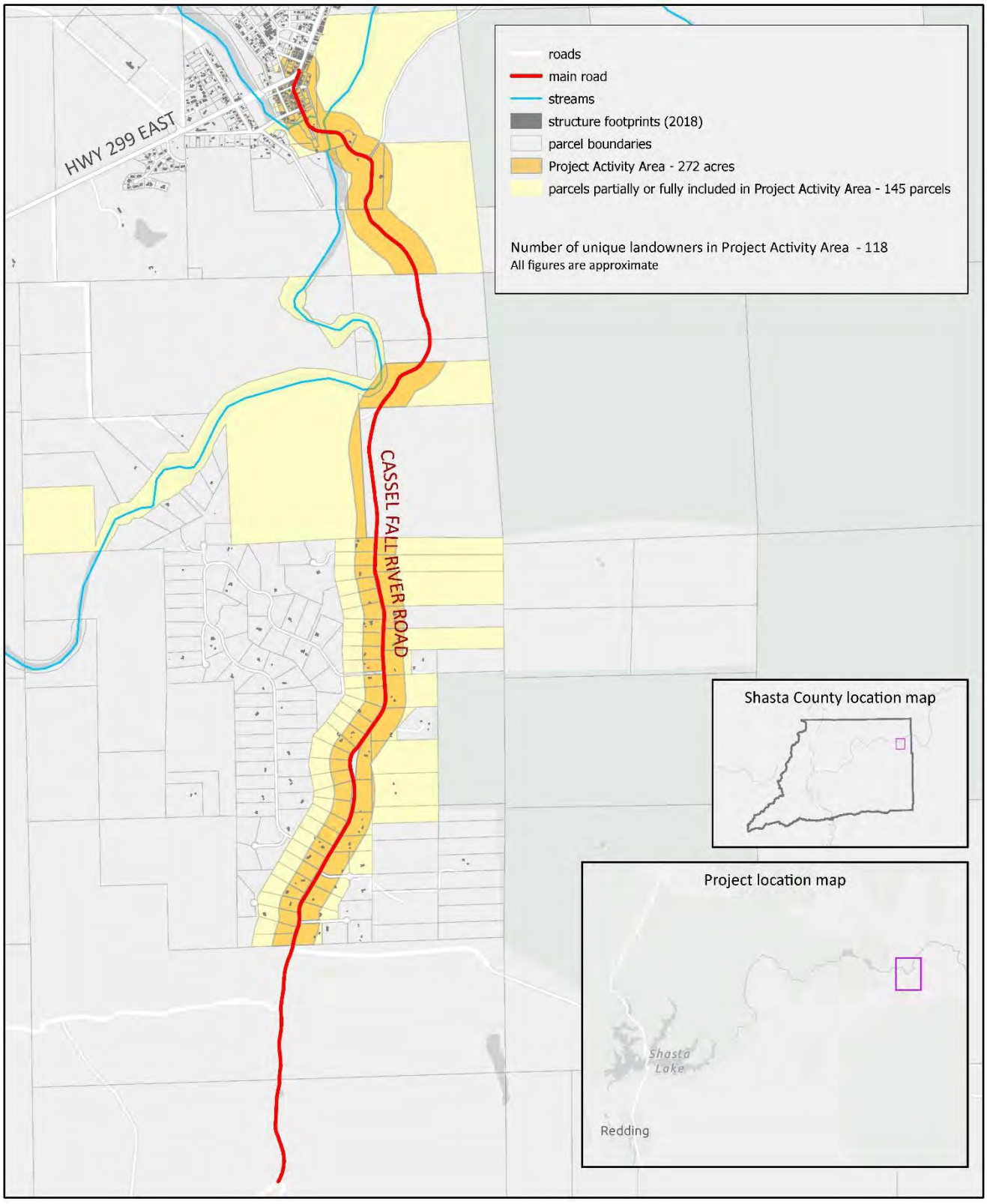

FIGURE 8
CASSEL FALL RIVER ROAD PAA
WILDFIRE MITIGTAION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

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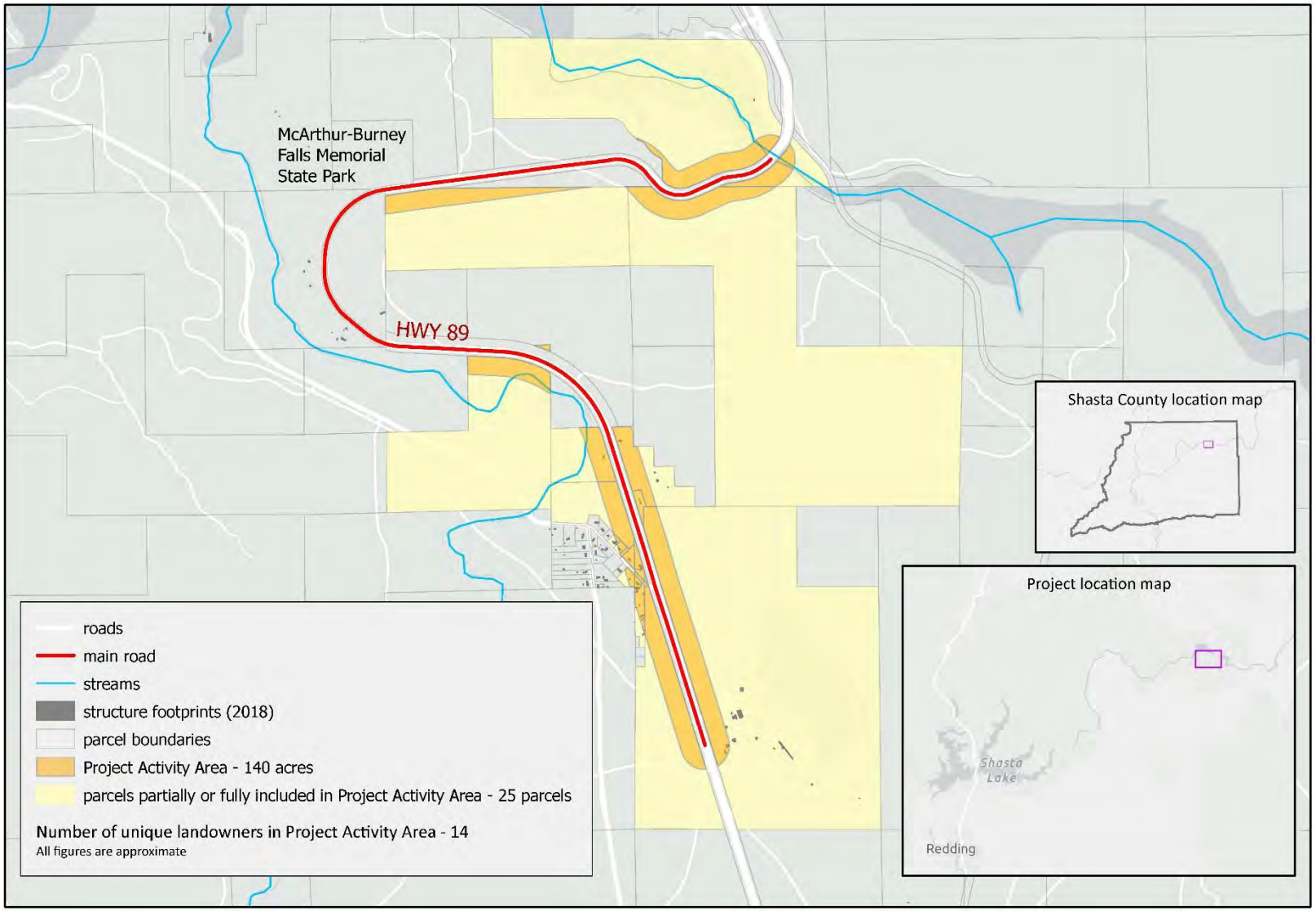

FIGURE 9
STATE ROUTE 89 PAA
WILDFIRE MITIGTAION/HAZARDOUS
FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

VESTRA

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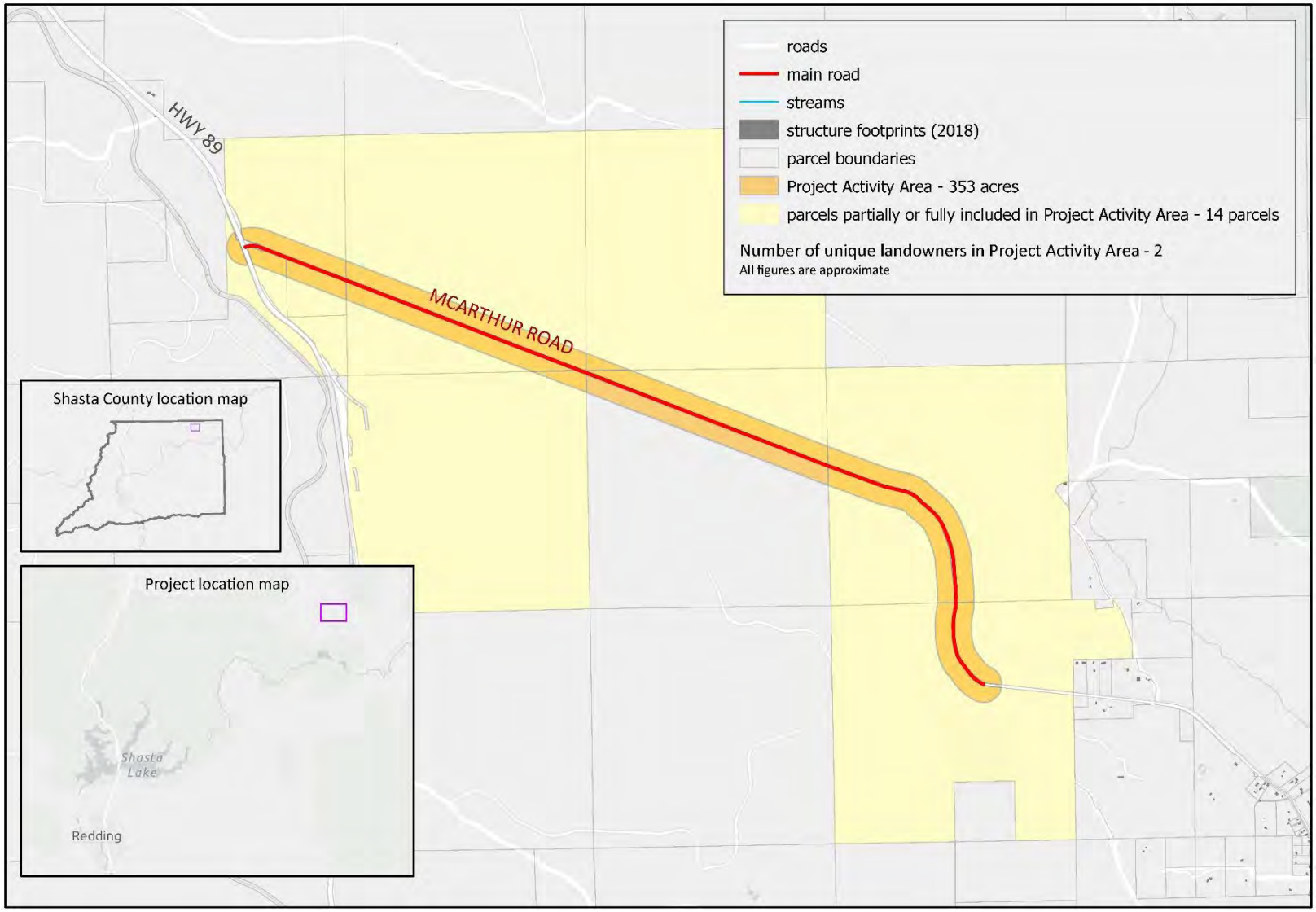

FIGURE 10
MCARTHUR ROAD PAA
WILDFIRE MITIGTAION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

VESTRA

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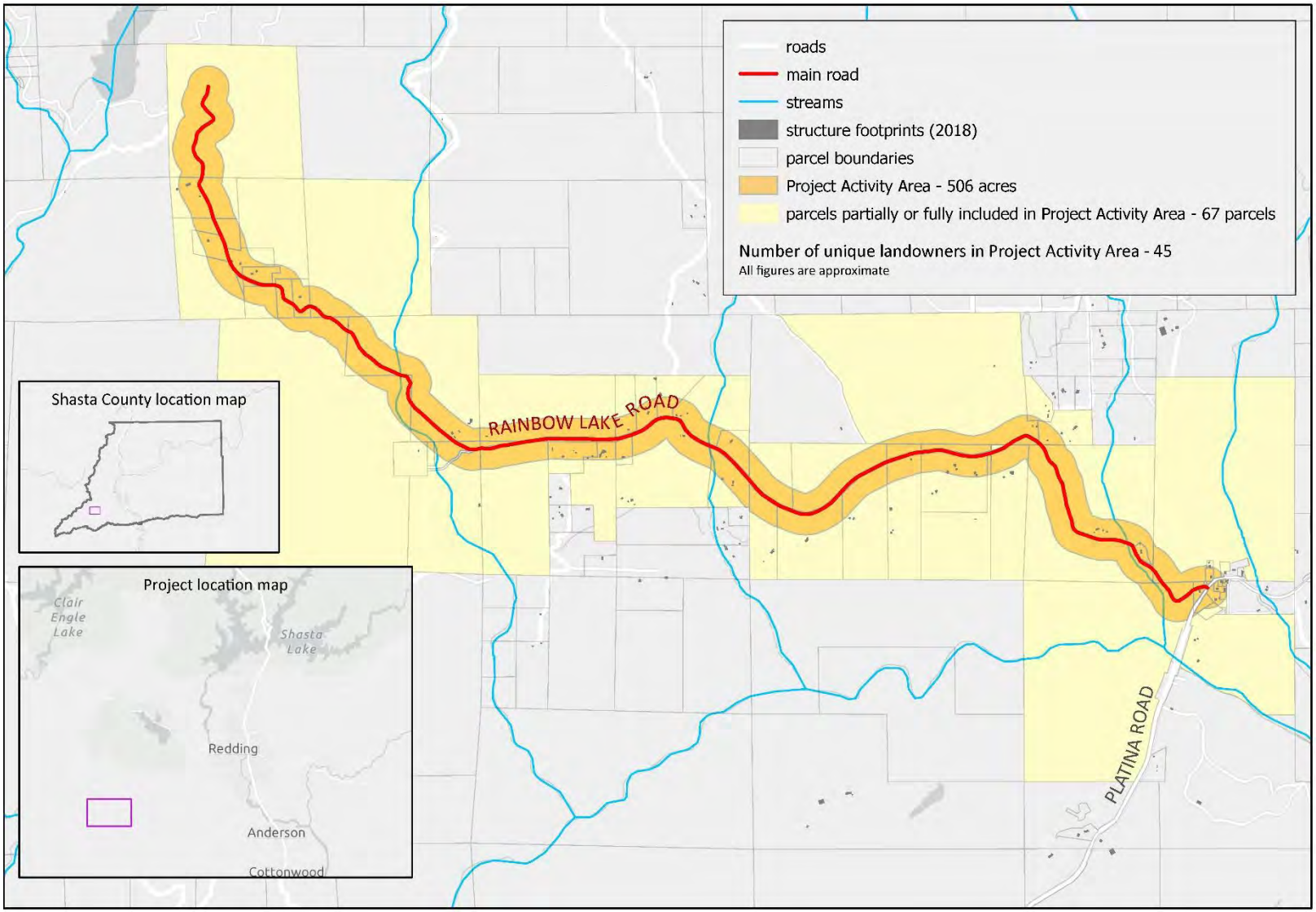

FIGURE 11
RAINBOW LAKE ROAD PAA
WILDFIRE MITIGTAION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

VESTRA

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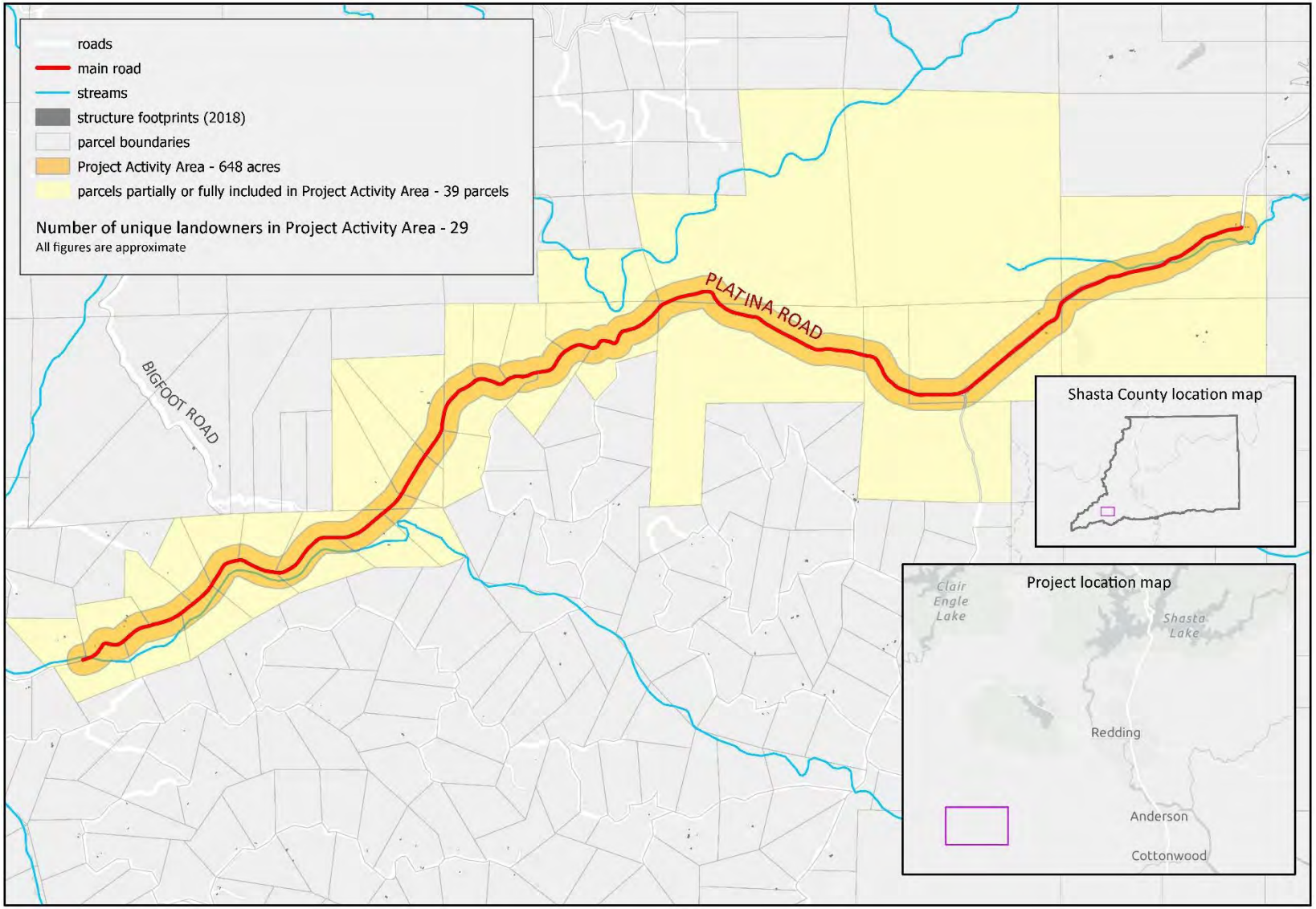

FIGURE 12
PLATINA ROAD PAA
WILDFIRE MITIGTAION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

VESTRA

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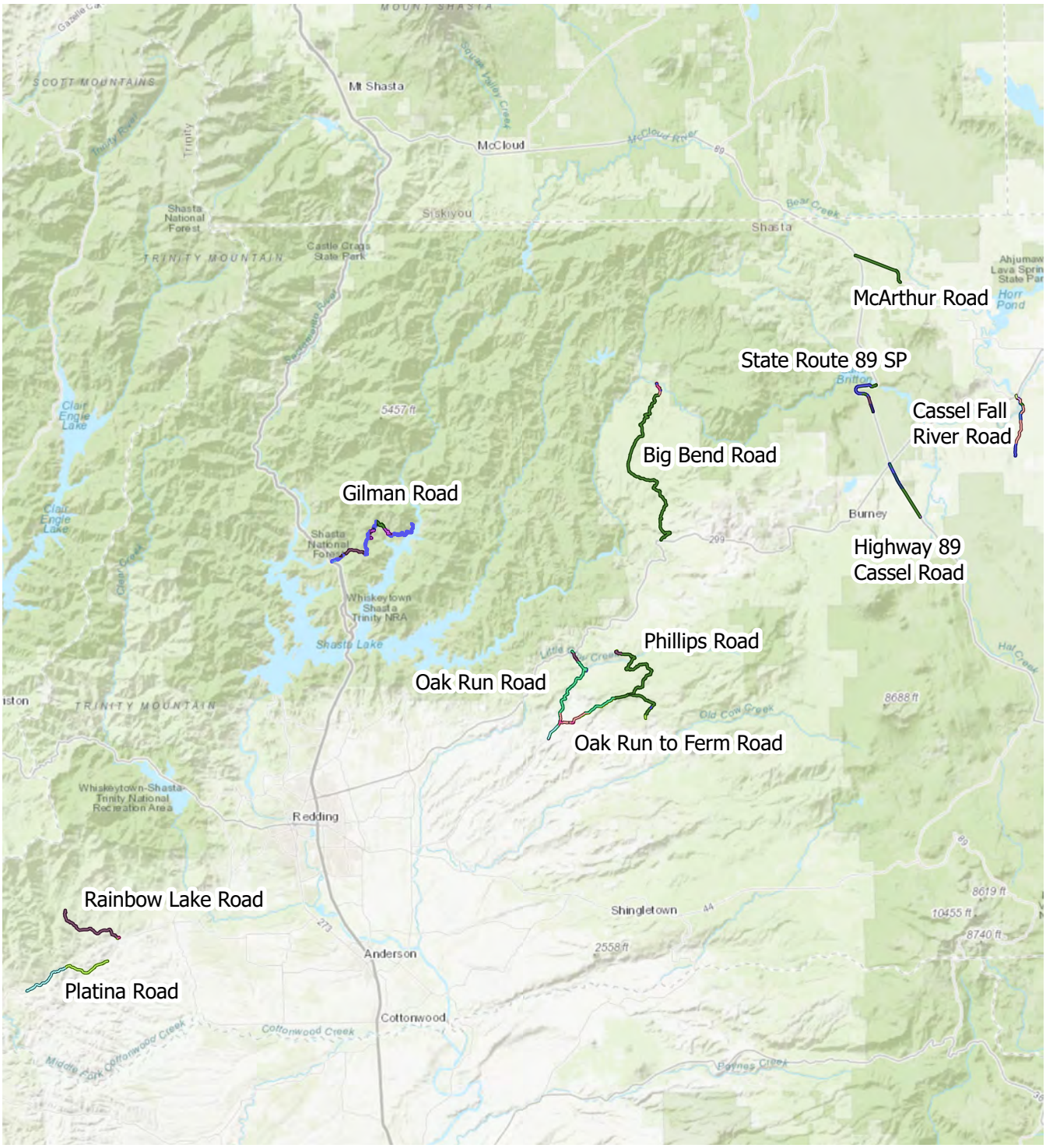

A-C: Agricultural Croplands
A-G: Agricultural Grazing
C: Commercial
CH: Commercial Highway
I: Industrial
MR: Mineral Resource
MU: Mixed Use
N-H-40: Habitat Resource 40-Acre Density
N-H-80: Habitat Resource 80-Acre Density
N-O: Open Space
N-R: Recreation Resource
PUB: Public Land
RA: Rural Residential A
RB: Rural Residential B
T: Timber
T-MRB: Timber-Mining Resource Buffer
UR: Urban Residential
Project Treatment Boundary

N

VESTRA

SOURCE: SHASTA COUNTY 2022

0 5 10 20 Miles

FIGURE 13
LAND USE DESIGNATIONS
WILDFIRE MITIGATION/HAZARDOUS/
FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

P:\GIS\72231\ProProjects\CEQA processing - 5293\CEQA processing - 5293.aprx\Figures\CEQA\Land Use Layout

A-1-BA-10: Limited Agriculture - 10-acre minimum

A-1-BA-4: Limited Agriculture - 4-acre minimum

A-1-BA-5: Limited Agriculture - 5-acre minimum

A-1-BSM: Limited Agriculture Building Site Minimum

A-1-T-BA-10: Limited Agriculture - Mobile Home District - 10-acre minimum

A-1-T-BA-40: Limited Agriculture - Mobile Home District - 40-acre minimum

C-1-BSM: Local Convenience Center District - Buidling Site Minimum

C-2: Community Commercial

C-M: Commercial-Light Industrial

C-M-DR: Commercial-Light Industrial - Design Review District

C-R: Commercial Recreation

C-R-NRA-S-BA-2.5: Commercial Recreation - National Recreation Area, Shasta Unit - 2.5-acre minimum

EA: Exclusive Agricultural District

EA-AP: Exclusive Agricultural Distrct - Agricultural Preserve District

EA-AP-MRB: Exclusive Agricultural District - Agricultural Preserve District - Mineral Resource Buffer

EA-BA-40: Exclusive Agricultural District - 40-acre minimum

EA-BA-40-MRB: Exclusive Agricultural District - 40-acre miminum - Mineral Resource Buffer

HP-BA-40: Habitat Protection District - 40-acre minimum

HP-BA-80: Habitat Protection District - 80-acre minimum

HP-BSM: Habitat Protection District - Building Site Minimum

HP-T-BA-40: Habitat Protection District - Mobile Home District - 40-acre minimum

HP-T-BA-54: Habitat Protection District - Mobile Home District - 54-acre minimum

HP-T-BA-62: Habitat Protection District - Mobile Home District - 62-acre minimum

M: General Industrial District

MR: Mineral Resource District

MU: Mixed Use District

NRA-S: National Recreation Area, Shasta Unit District

NRA-S-PD: National Recreation Area, Shasta Unit - Planned Development

NRA-S-T-BSM: National Recreation Area, Shasta Unit - Mobile Home District - Building Site Minimum

OS: Open Space

PD: Planned Development

PF: Public Facilities

R-L: Limited Residential

R-L-BA-10: Limited Residential - 10-acre minimum

R-L-BA-15: Limited Residential - 15-acre minimum

R-L-BA-20: Limited Residential - 20-acre minimum

R-L-BSM: Limited Residential - Building Site Minumum

R-L-NRA-S: Limited Residential - National Recreation Area, Shasta Unit

R-L-T: Limited Residentia - Mobile Home District

R-R: Rural Residential

R-R-BA-10: Rural Residential - 10-acre minimum

R-R-BA-2.5-NRA-S: Rural Residential - 2.5-acre minimum - National Recreation Area, Shasta Unit

R-R-BA-7: Rural Residential - 7-acre minimum

R-R-BSM: Rural Residential - Building Site Minimum

R-R-BSM-NRA-S

R-R-T: Rural Residential - Mobile Home District

R-R-T-BA-40: Rural Residential - Mobile Home District - 40-acre minimum

R-R-T-BA-5: Rural Residential - Mobile Home District - 5-acre minimum

R-R-T-BSM: Rural Residential - Mobile Home District - Building Site Minimum

TL: Timberland

TP: Timber Production

TP-MRB: Timber Production - Mineral Resource Buffer

U: Unclassified

U-IMR: Unclassified - Interim Mineral Resource

U-MRB: Unclassified - Mineral Resource Buffer

N

0 3.75 7.5 15 Miles

VESTRA

SOURCE: SHASTA COUNTY 2022

FIGURE 14
ZONING
WILDFIRE MITIGATION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

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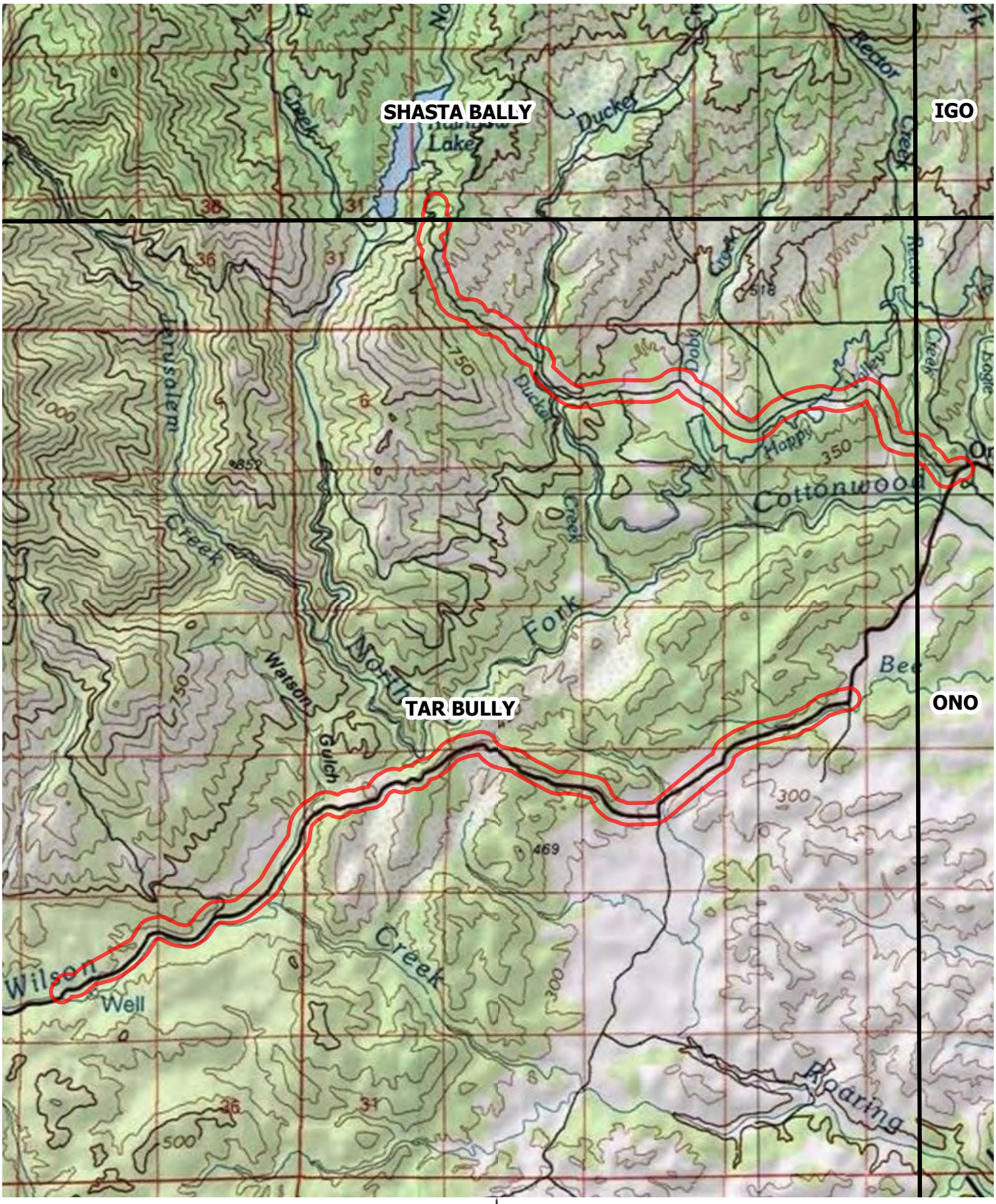


7.5' Quadrangle Boundary

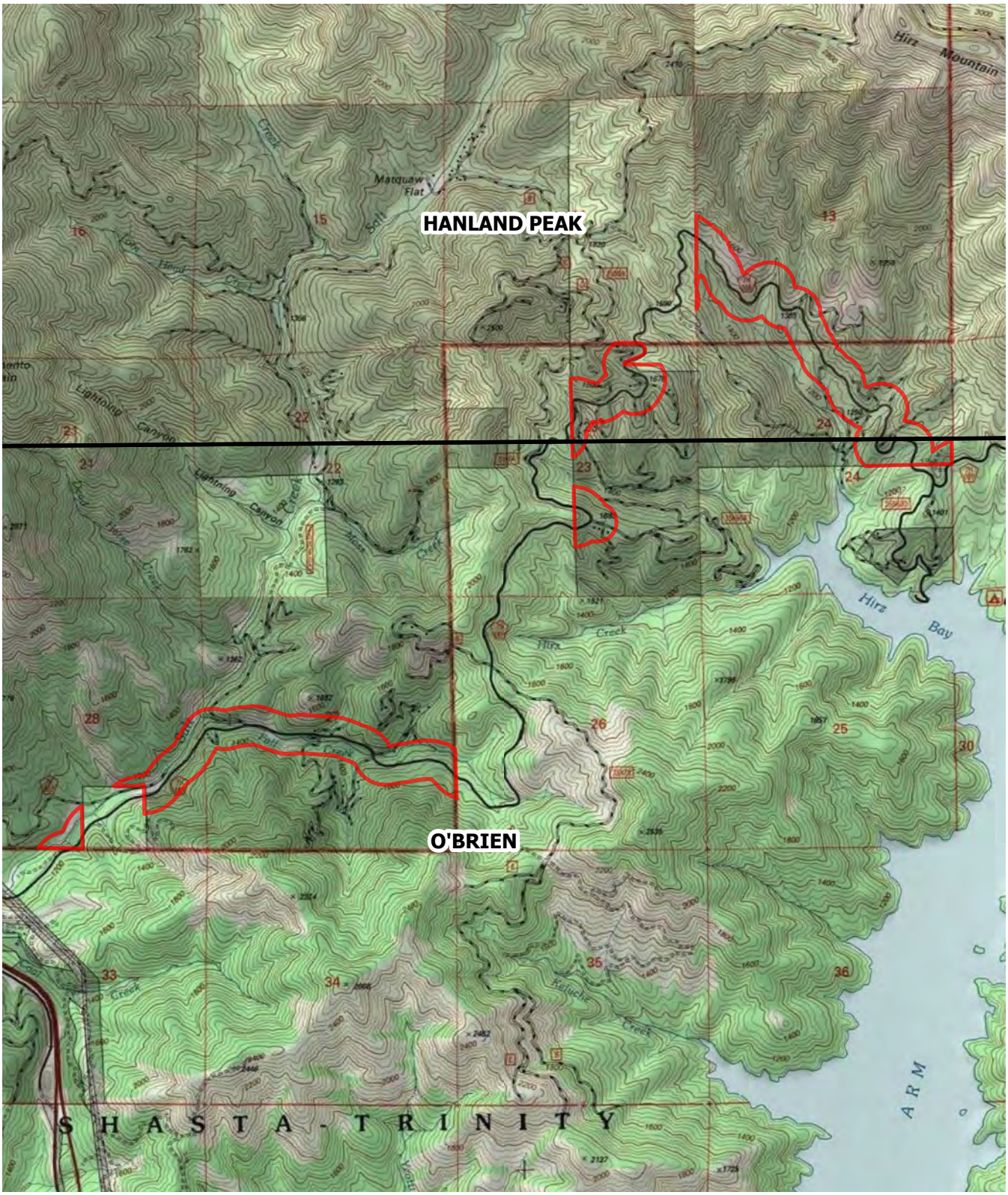
Project Treatment Boundary

VESTRA

SOURCE: USGS TOPOGRAPHIC MAPS

FIGURE 15A
USGS TOPOGRAPHIC MAPS
WILDFIRE MITIGATION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

P:\GIS\72231\ProProjects\CEQA processing - 5293\CEQA processing - 5293.aprx\Figures\CEQA\Topos Layout A



7.5' Quadrangle Boundary

Project Treatment Boundary

N

0 1,500 3,000 6,000 Feet

VESTRA

SOURCE: USGS TOPOGRAPHIC MAPS

FIGURE 15B
USGS TOPOGRAPHIC MAPS
WILDFIRE MITIGATION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

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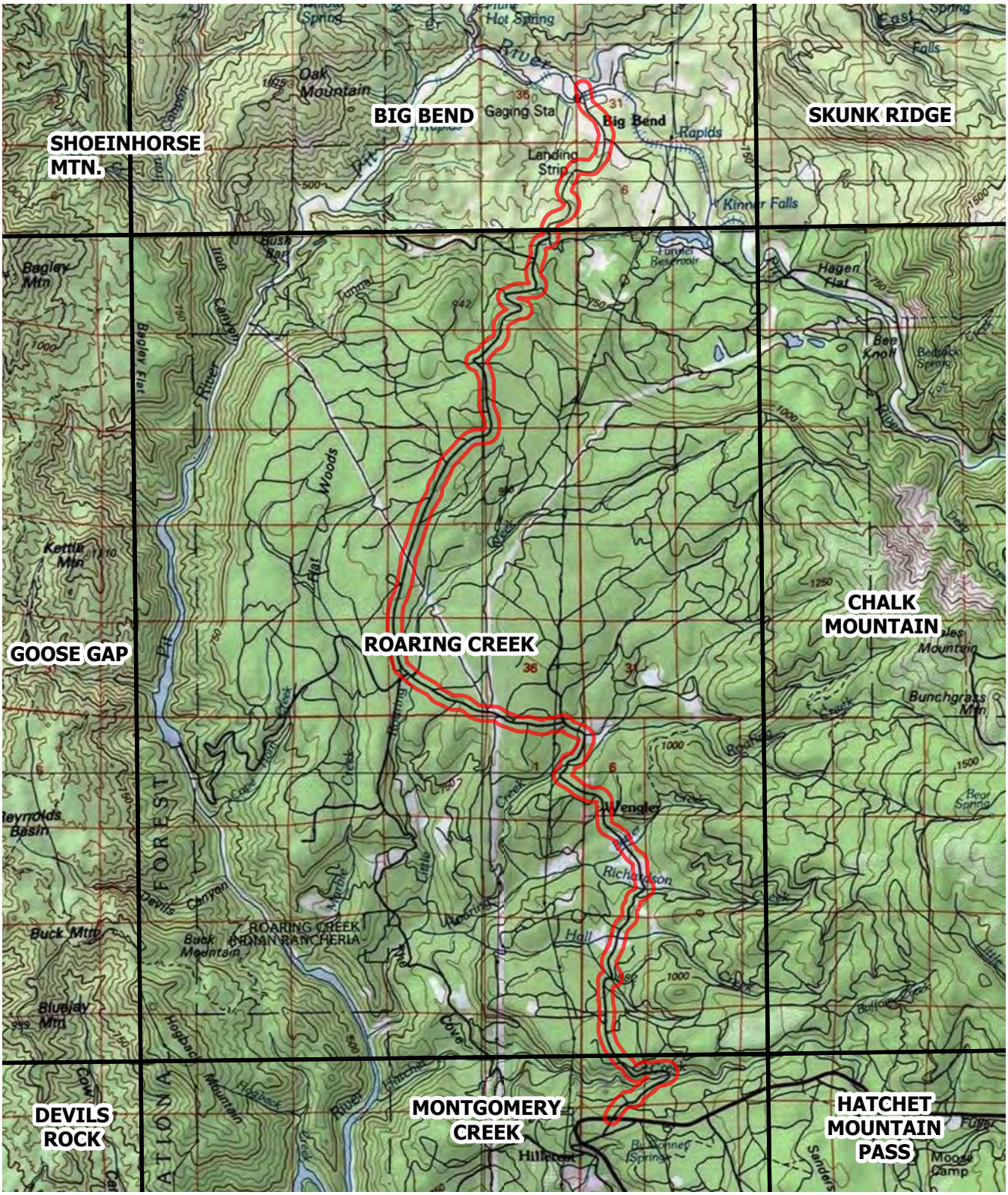

7.5' Quadrangle Boundary

Project Treatment Boundary

N

0 0.75 1.5 3 Miles

VESTRA

SOURCE: USGS TOPOGRAPHIC MAPS

FIGURE 15C
USGS TOPOGRAPHIC MAPS
WILDFIRE MITIGATION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

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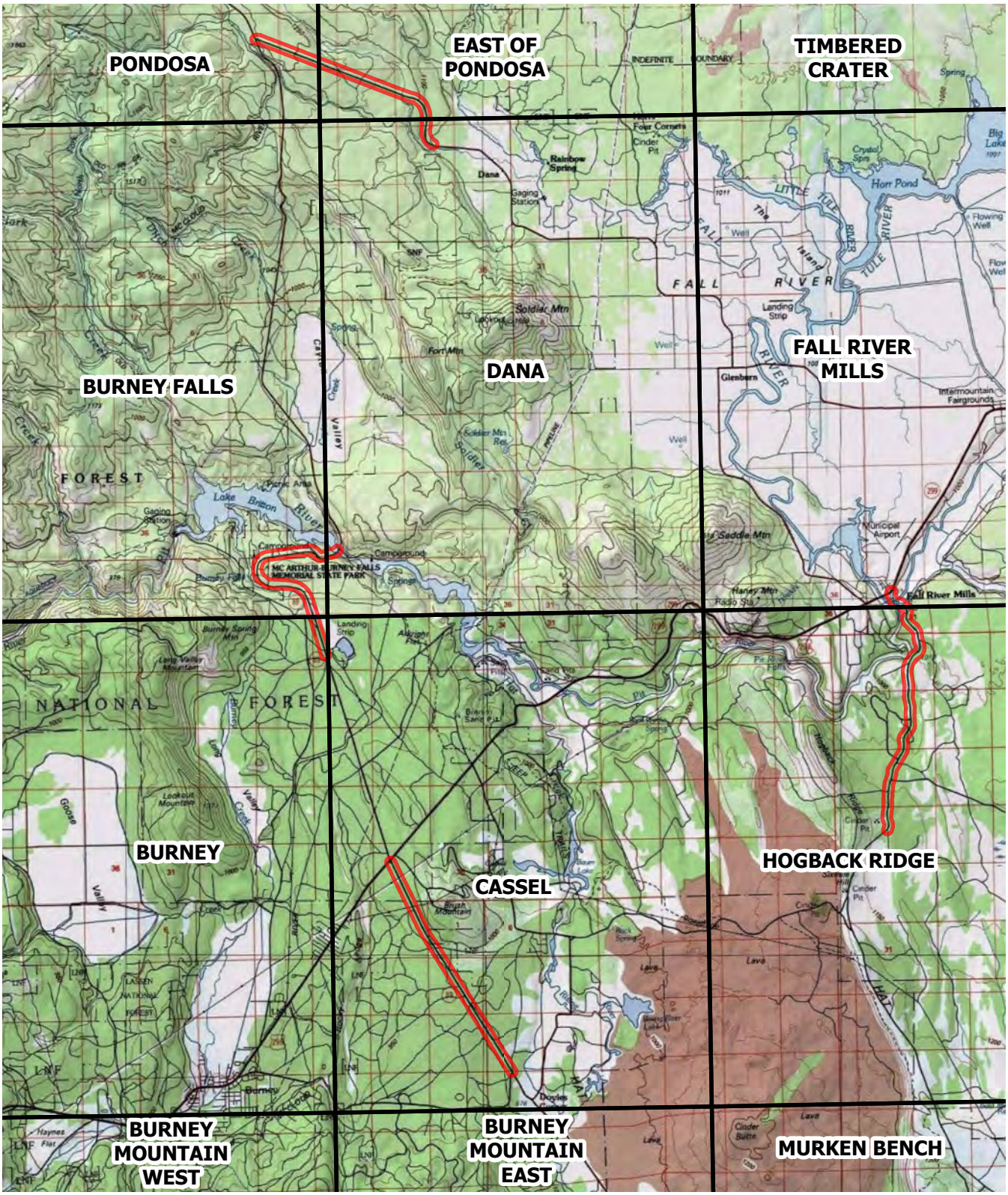

VESTRA

SOURCE: USGS TOPOGRAPHIC MAPS

FIGURE 15D
USGS TOPOGRAPHIC MAPS
WILDFIRE MITIGATION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

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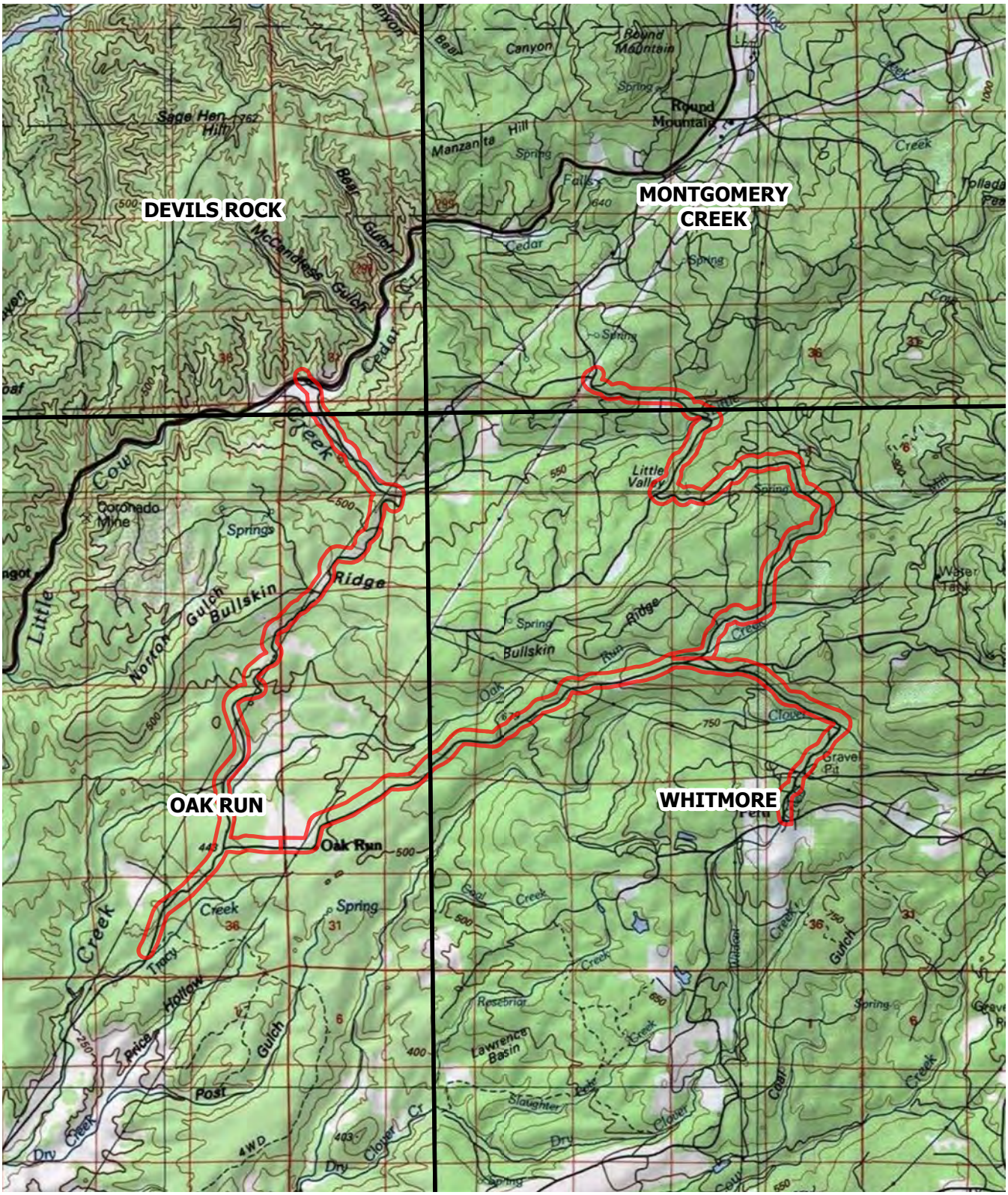


7.5' Quadrangle Boundary

Project Treatment Boundary

N

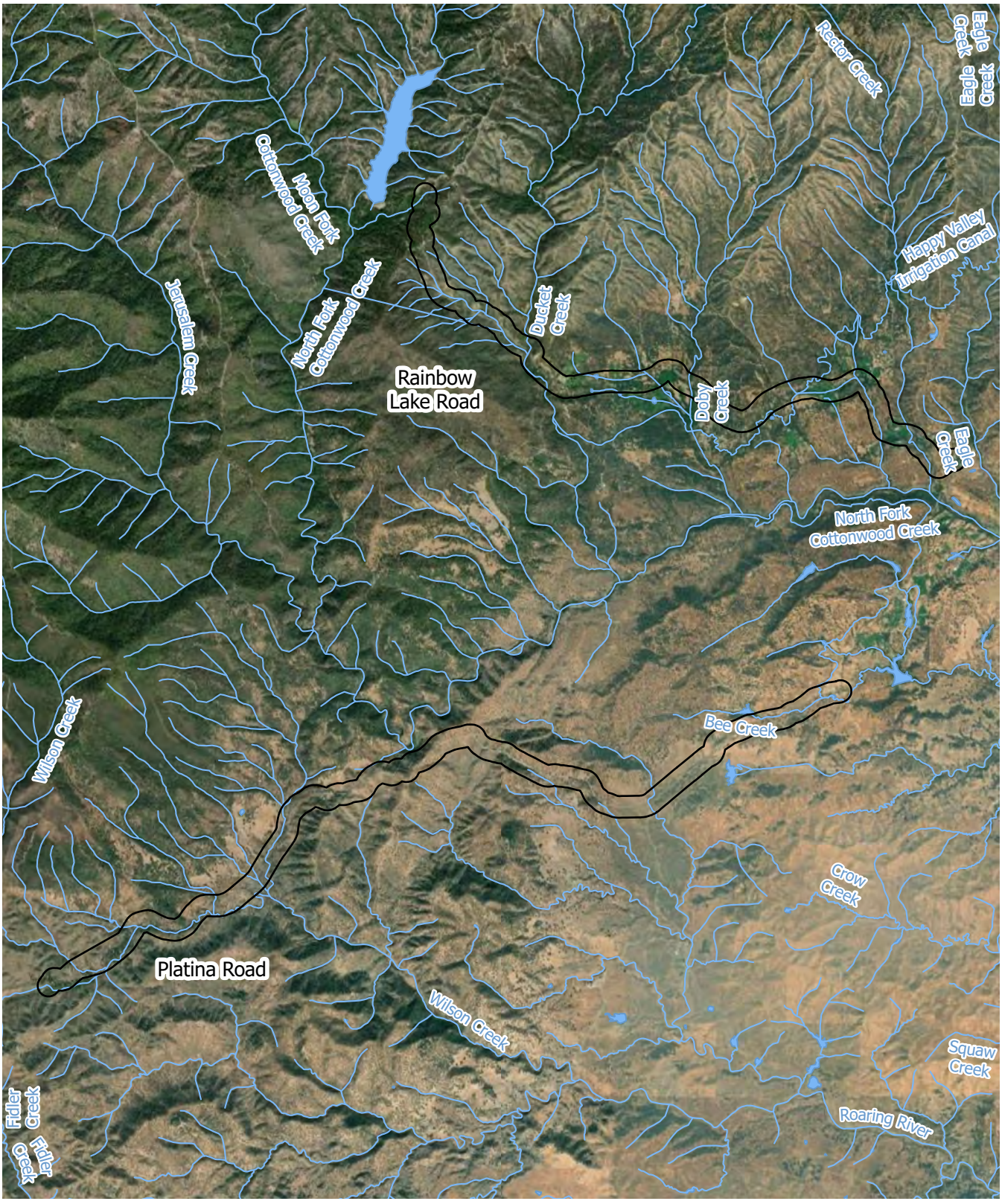
0 0.75 1.5 3 Miles

VESTRA

SOURCE: USGS TOPOGRAPHIC MAPS

FIGURE 15E
USGS TOPOGRAPHIC MAPS
WILDFIRE MITIGATION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

P:\GIS\72231\ProProjects\CEQA processing - 5293\CEQA processing - 5293.aprx\Figures\CEQA\Topos Layout E



Watercourse

Waterbody

Project Treatment Boundary

N

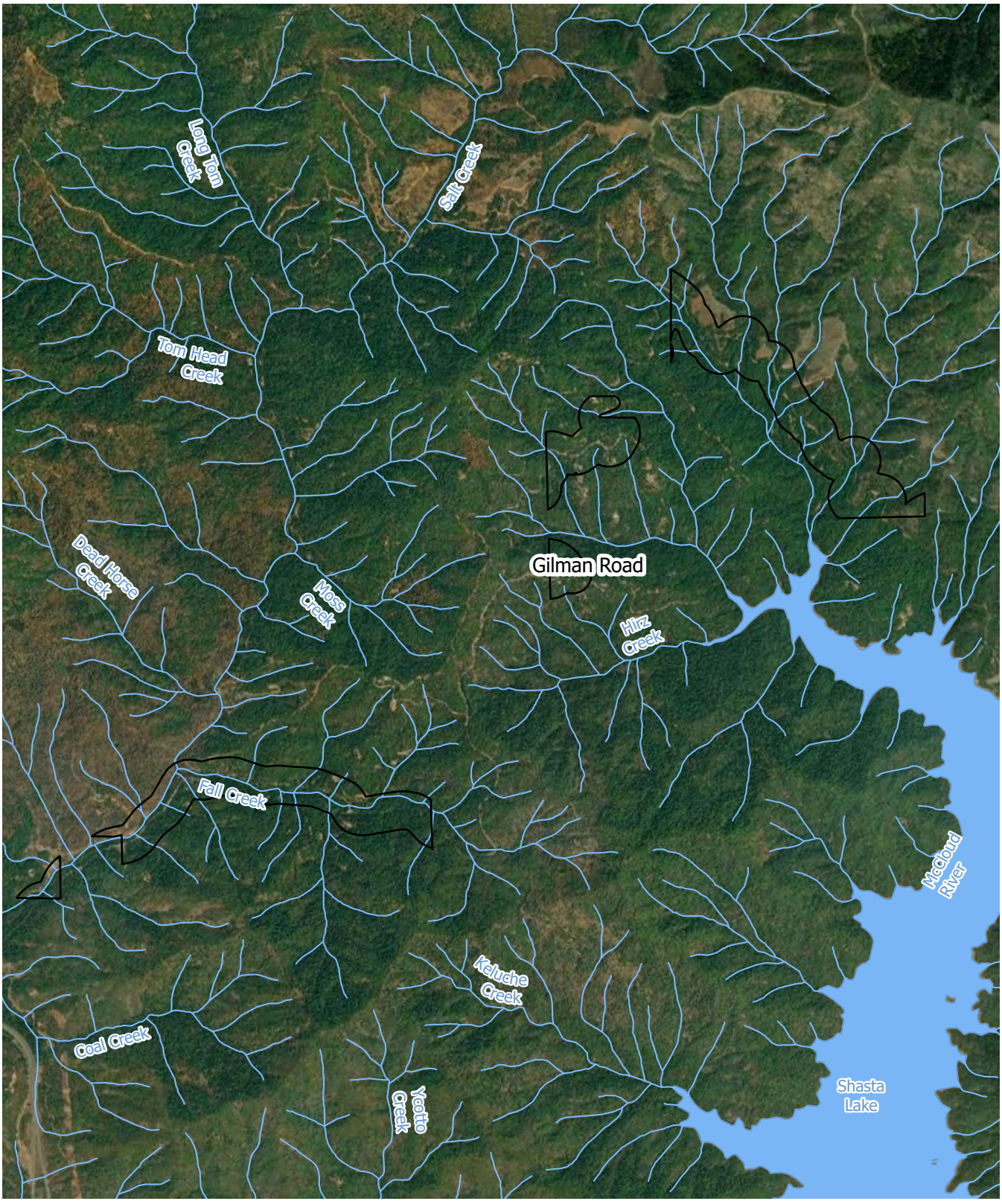
0 0.5 1 2 Miles

VESTRA

SOURCE: USGS NHD 2020

FIGURE 16A
HYDROLOGY
WILDFIRE MITIGATION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

P:\GIS\72231\ProProjects\CEQA processing - 5293\CEQA processing - 5293.aprx\Figures\CEQA\Hydrology Layout A



Watercourse
Waterbody
Project Treatment Boundary

N

Feet
0 1,500 3,000 6,000

VESTRA

SOURCE: USGS NHD 2020

FIGURE 16B
HYDROLOGY
WILDFIRE MITIGATION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

P:\GIS\72231\ProProjects\CEQA processing - 5293\CEQA processing - 5293.aprx\Figures\CEQA\Hydrology Layout B

Watercourse

Waterbody

Project Treatment Boundary

N

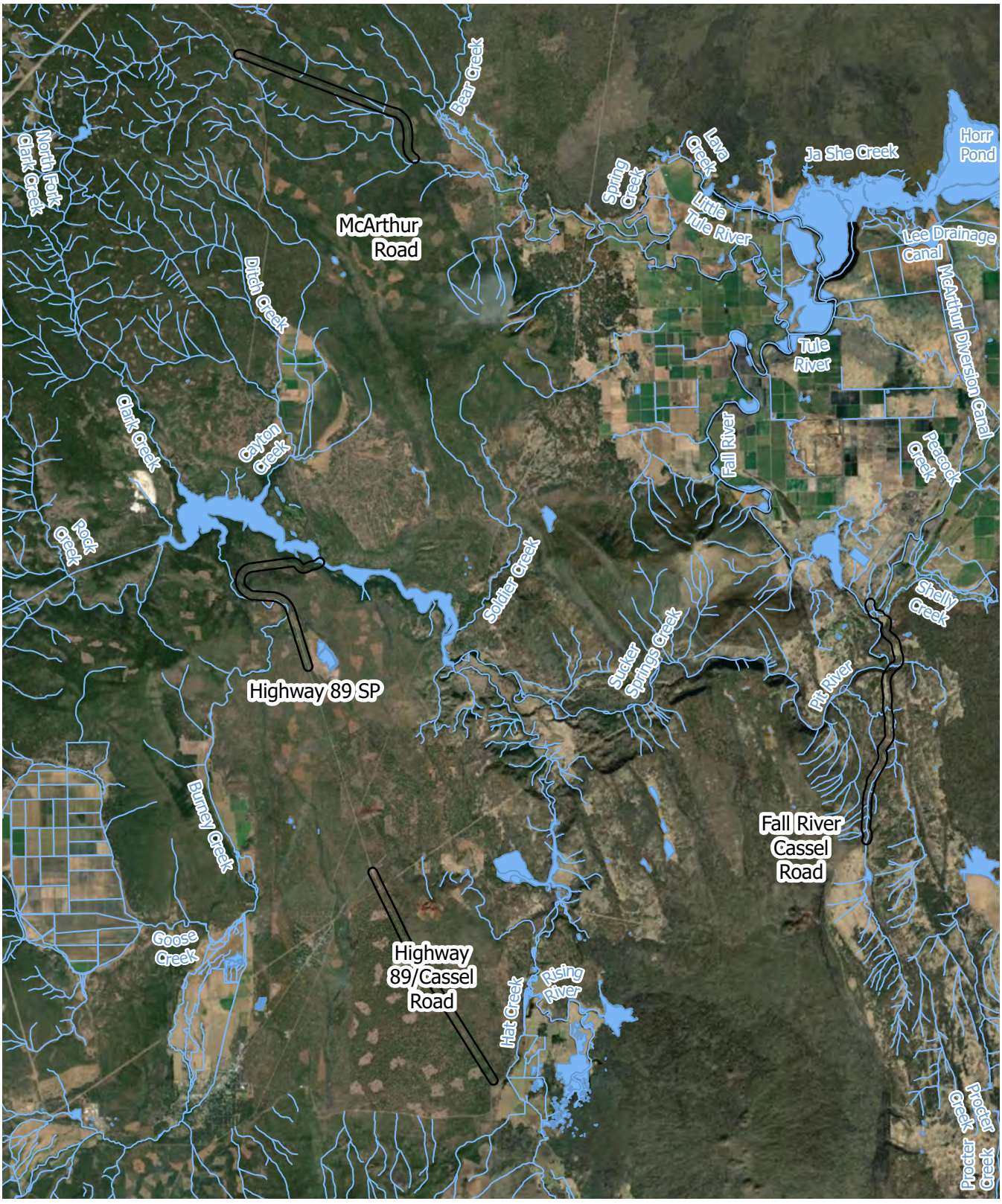
0 0.75 1.5 3 Miles

VESTRA

SOURCE: USGS NHD 2020

FIGURE 16C
HYDROLOGY
WILDFIRE MITIGATION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

P:\GIS\72231\ProProjects\CEQA processing - 5293\CEQA processing - 5293.aprx\Figures\CEQA\Hydrology Layout C



Watercourse

Waterbody

Project Treatment Boundary

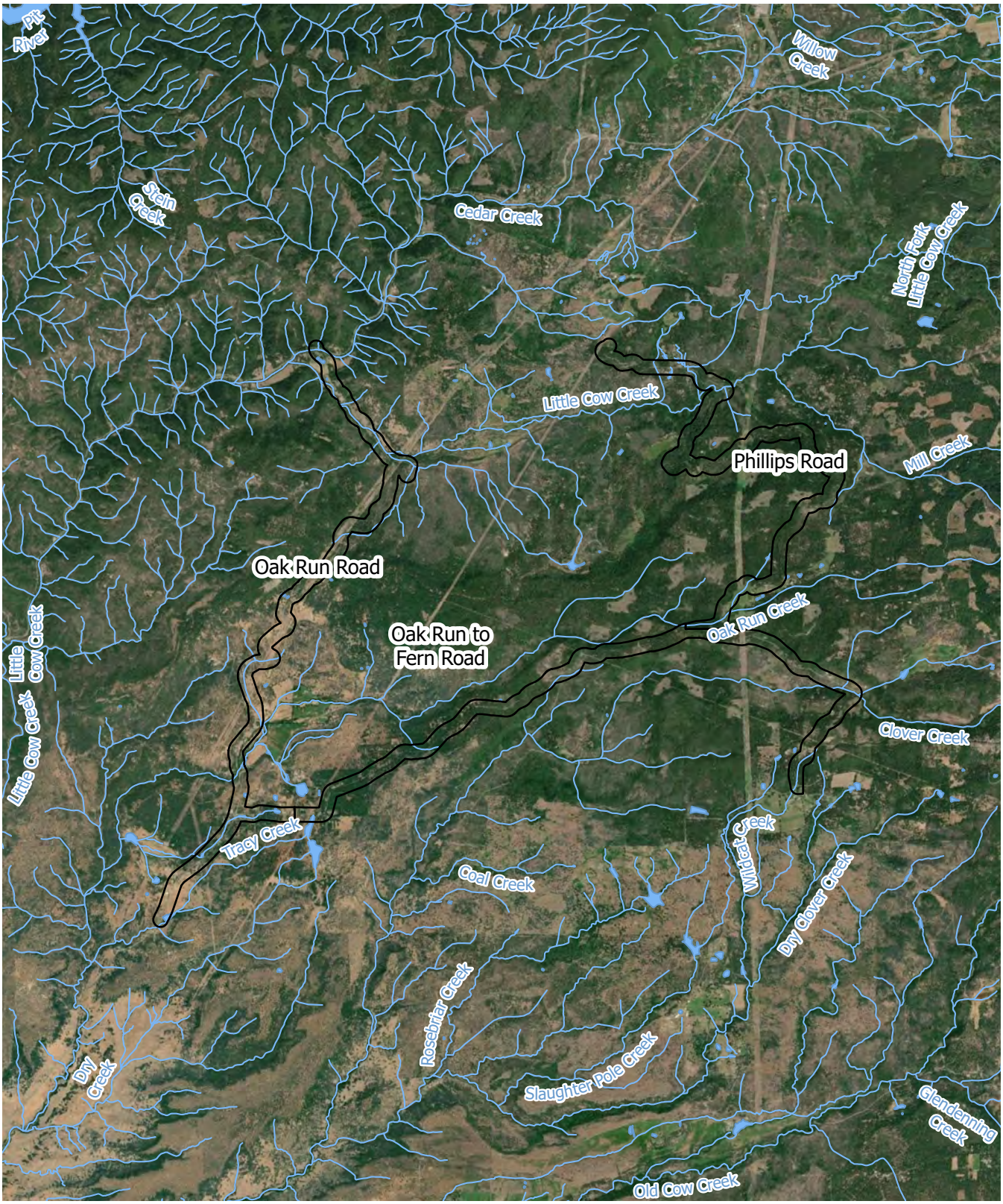
VESTRA

SOURCE: USGS NHD 2020

0 1.25 2.5 5 Miles

FIGURE 16D
HYDROLOGY
WILDFIRE MITIGATION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

P:\GIS\72231\ProProjects\CEQA processing - 5293\CEQA processing - 5293.aprx\Figures\CEQA\Hydrology Layout D



Watercourse

Waterbody

Project Treatment Boundary

N

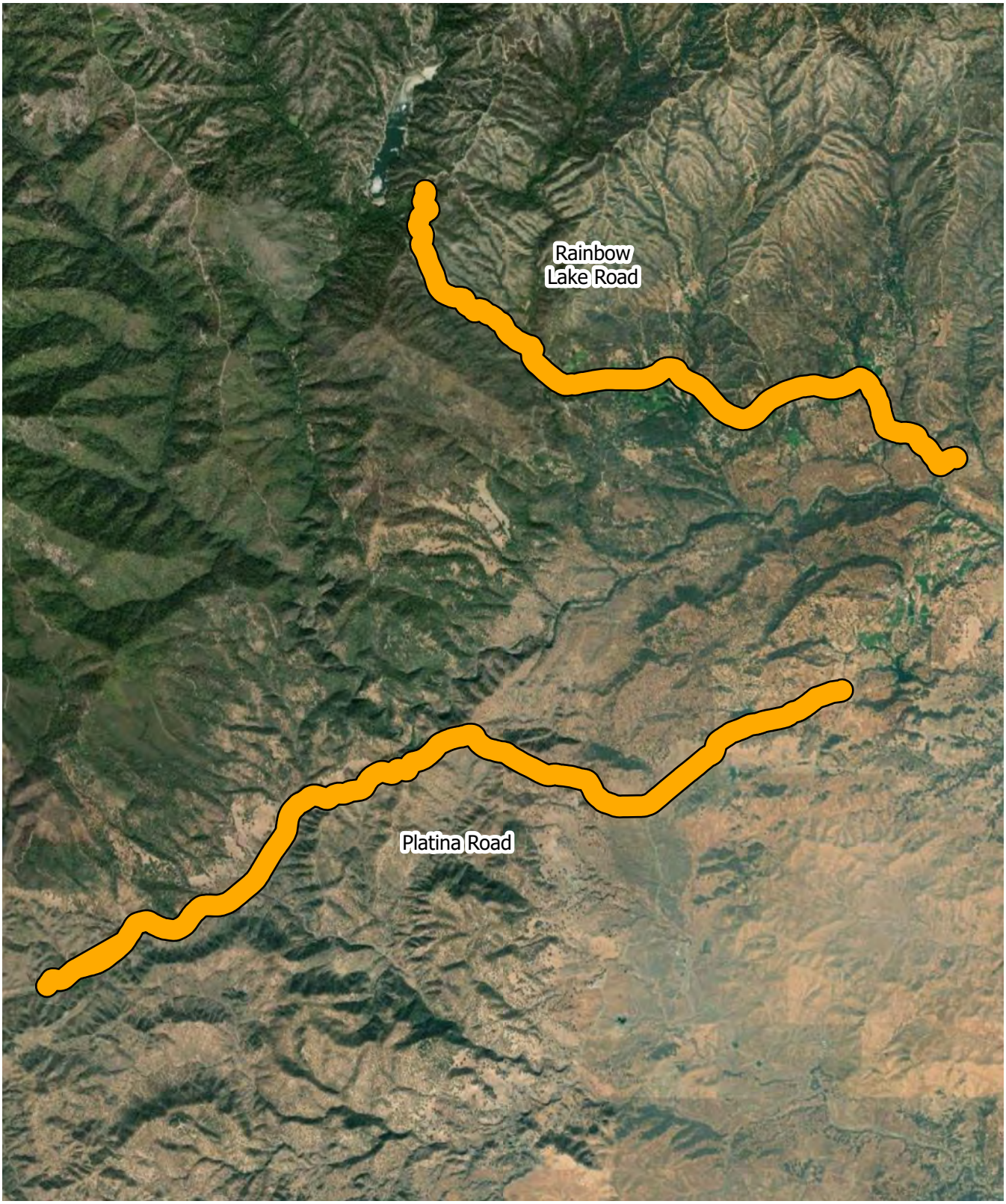
0 0.75 1.5 3 Miles

VESTRA

SOURCE: USGS NHD 2020

FIGURE 16E
HYDROLOGY
WILDFIRE MITIGATION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

P:\GIS\72231\ProProjects\CEQA processing - 5293\CEQA processing - 5293.aprx\Figures\CEQA\Hydrology Layout E



Project Treatment Boundary
Zone A: Area Subject to Inundation
Zone D: Flood Hazards Undetermined
Zone X: Area of Minimal Flood Hazard

N

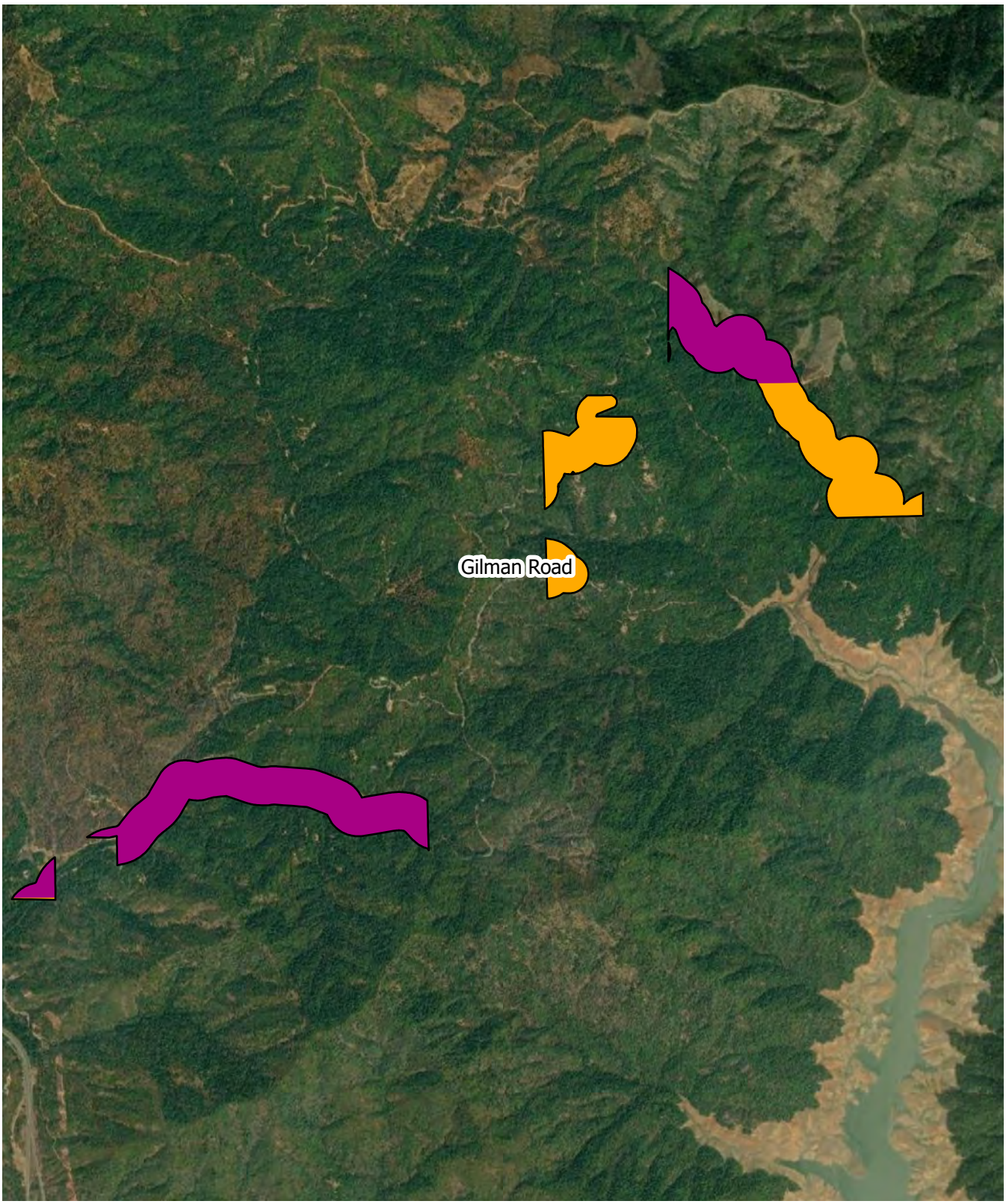
VESTRA

0 0.5 1 2 Miles

SOURCE: FEMA NFHL 2020

FIGURE 17A
FEMA FLOOD HAZARD ZONE
WILDFIRE MITIGATION/HAZARDOUS
FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

P:\GIS\72231\ProProjects\CEQA processing - 5293\CEQA processing - 5293.aprx\Figures\CEQA\FEMA Flood Layout A



Project Treatment Boundary
Zone A: Area Subject to Inundation
Zone D: Flood Hazards Undetermined
Zone X: Area of Minimal Flood Hazard

N

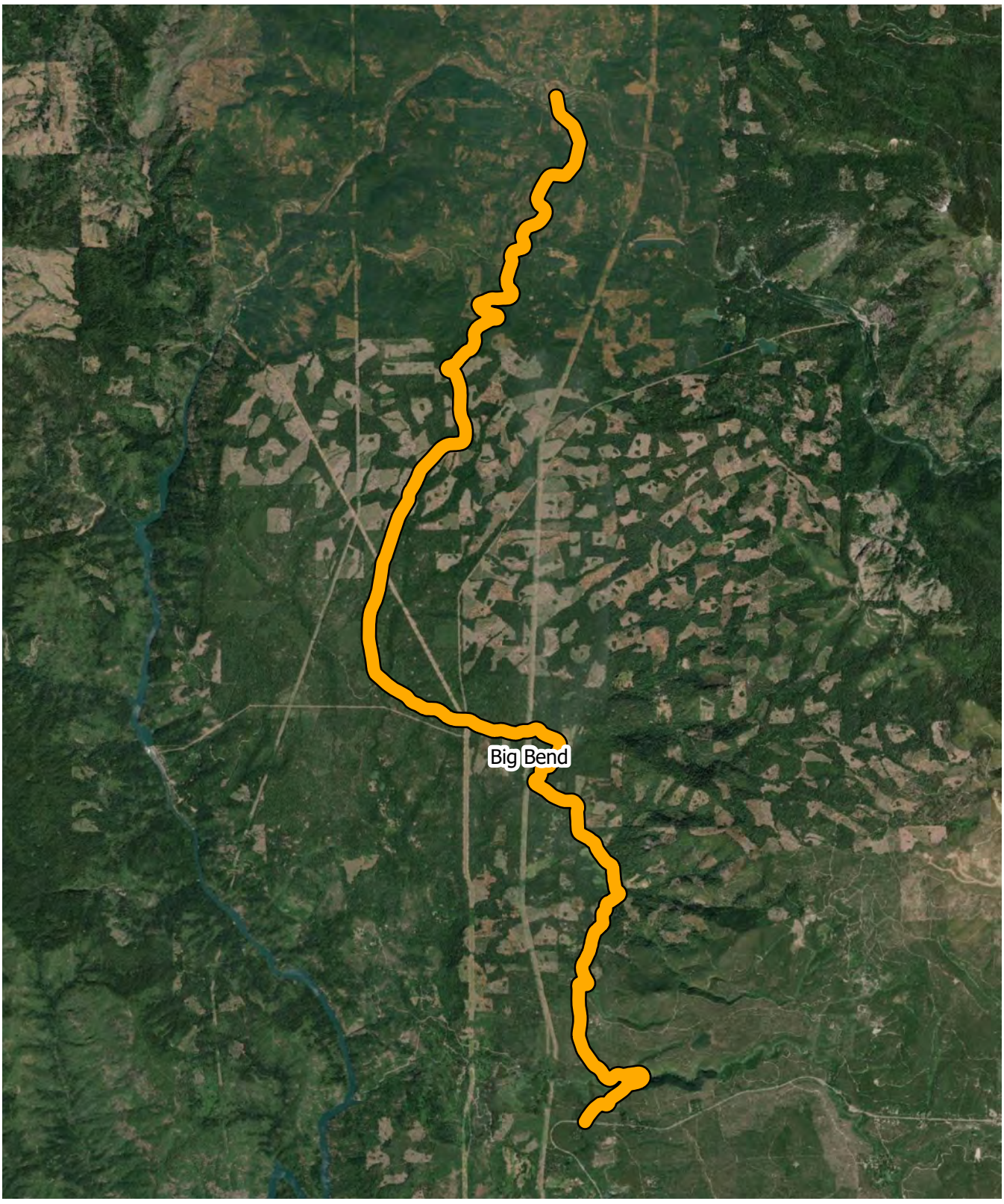
0 1,500 3,000 6,000 Feet

VESTRA

SOURCE: FEMA NFHL 2020

FIGURE 17B
FEMA FLOOD HAZARD ZONE
WILDFIRE MITIGATION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

P:\GIS\72231\ProProjects\CEQA processing - 5293\CEQA processing - 5293.aprx\Figures\CEQA\FEMA Flood Layout B



Project Treatment Boundary
Zone A: Area Subject to Inundation
Zone D: Flood Hazards Undetermined
Zone X: Area of Minimal Flood Hazard

N

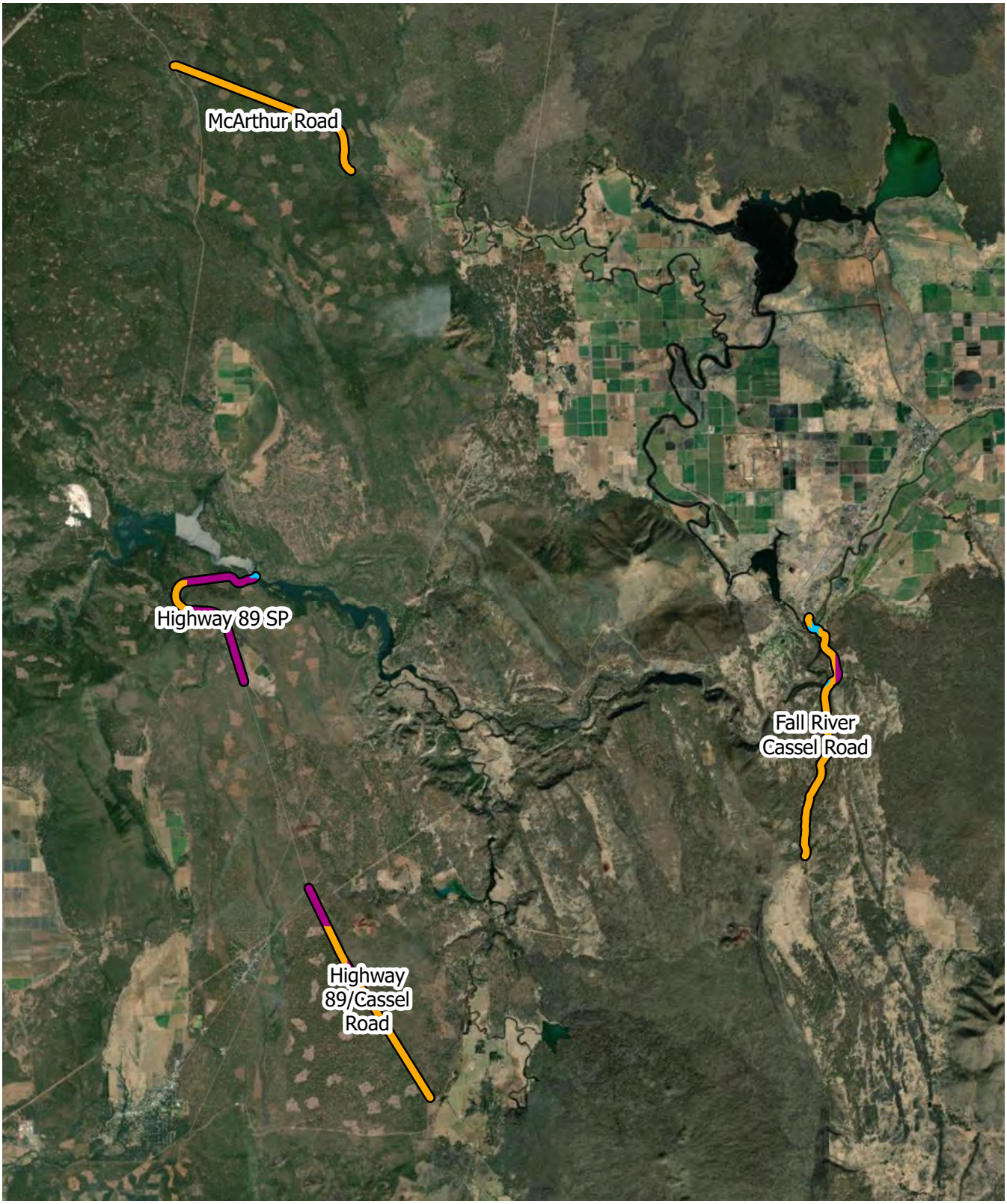
0 0.75 1.5 3 Miles

VESTRA

SOURCE: FEMA NFHL 2020

FIGURE 17C
FEMA FLOOD HAZARD ZONE
WILDFIRE MITIGATION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

P:\GIS\72231\ProProjects\CEQA processing - 5293\CEQA processing - 5293.aprx\Figures\CEQA\FEMA Flood Layout C



Project Treatment Boundary
Zone A: Area Subject to Inundation
Zone D: Flood Hazards Undetermined
Zone X: Area of Minimal Flood Hazard

N

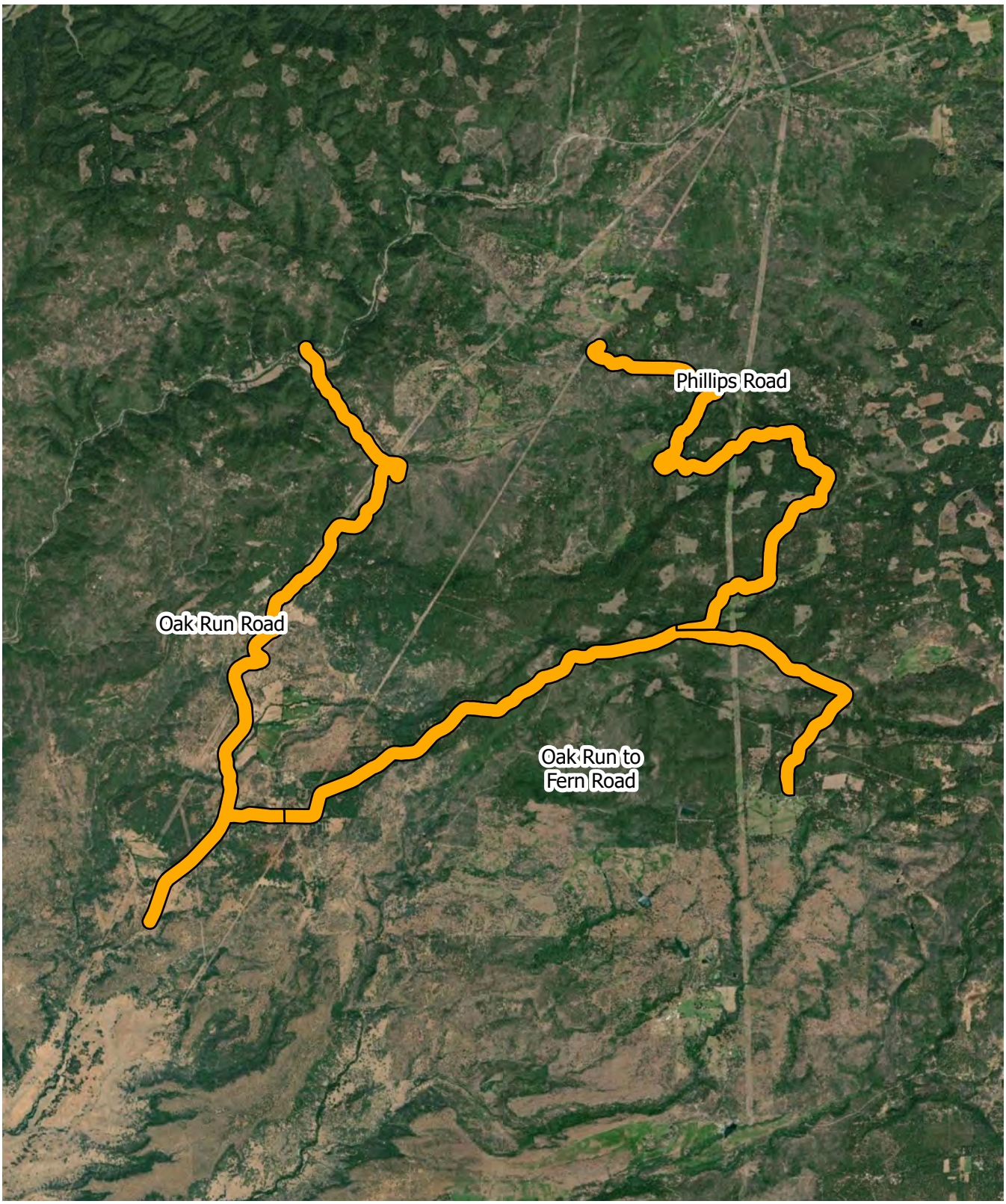
0 1.25 2.5 5 Miles

VESTRA

SOURCE: FEMA NFHL 2020

FIGURE 17D
FEMA FLOOD HAZARD ZONE
WILDFIRE MITIGATION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

P:\GIS\72231\ProProjects\CEQA processing - 5293\CEQA processing - 5293.aprx\Figures\CEQA\FEMA Flood Layout D



Project Treatment Boundary
Zone A: Area Subject to Inundation
Zone D: Flood Hazards Undetermined
Zone X: Area of Minimal Flood Hazard

N

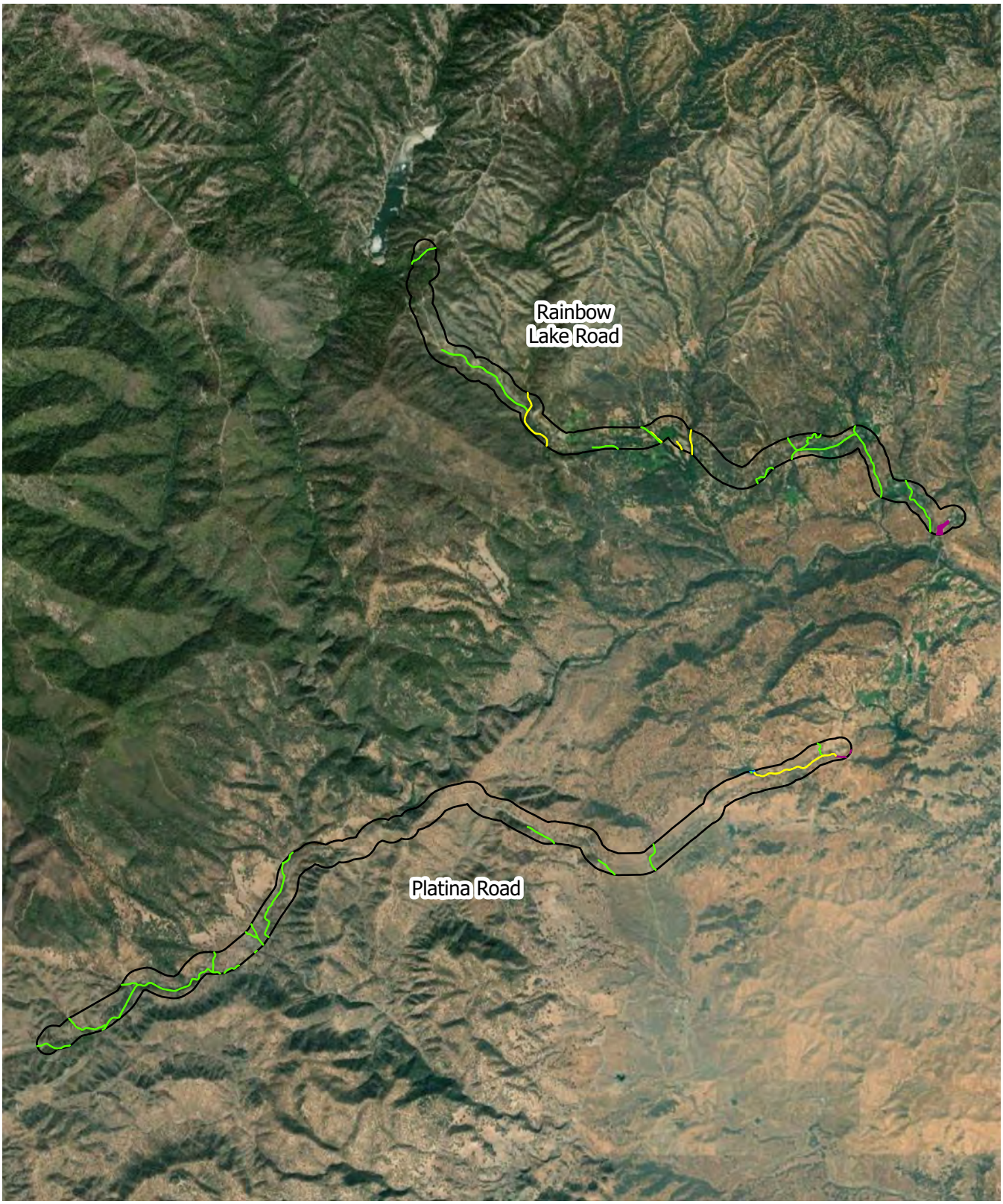
VESTRA

0 0.75 1.5 3 Miles

SOURCE: FEMA NFHL 2020

FIGURE 17E
FEMA FLOOD HAZARD ZONE
WILDFIRE MITIGATION/HAZARDOUS
FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

P:\GIS\72231\ProProjects\CEQA processing - 5293\CEQA processing - 5293.aprx\Figures\CEQA\FEMA Flood Layout E



Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland
Freshwater Pond
Riverine
Project Treatment Boundary

VESTRA

0 0.5 1 2 Miles

N

SOURCE: USFWS NATIONAL WETLANDS INVENTORY 2022

FIGURE 18A
USFWS WETLANDS
WILDFIRE MITIGATION/HAZARDOUS
FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

P:\GIS\72231\ProProjects\CEQA processing - 5293\CEQA processing - 5293.aprx\Figures\CEQA\Wetlands Layout A

Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland
Freshwater Pond
Riverine
Project Treatment Boundary

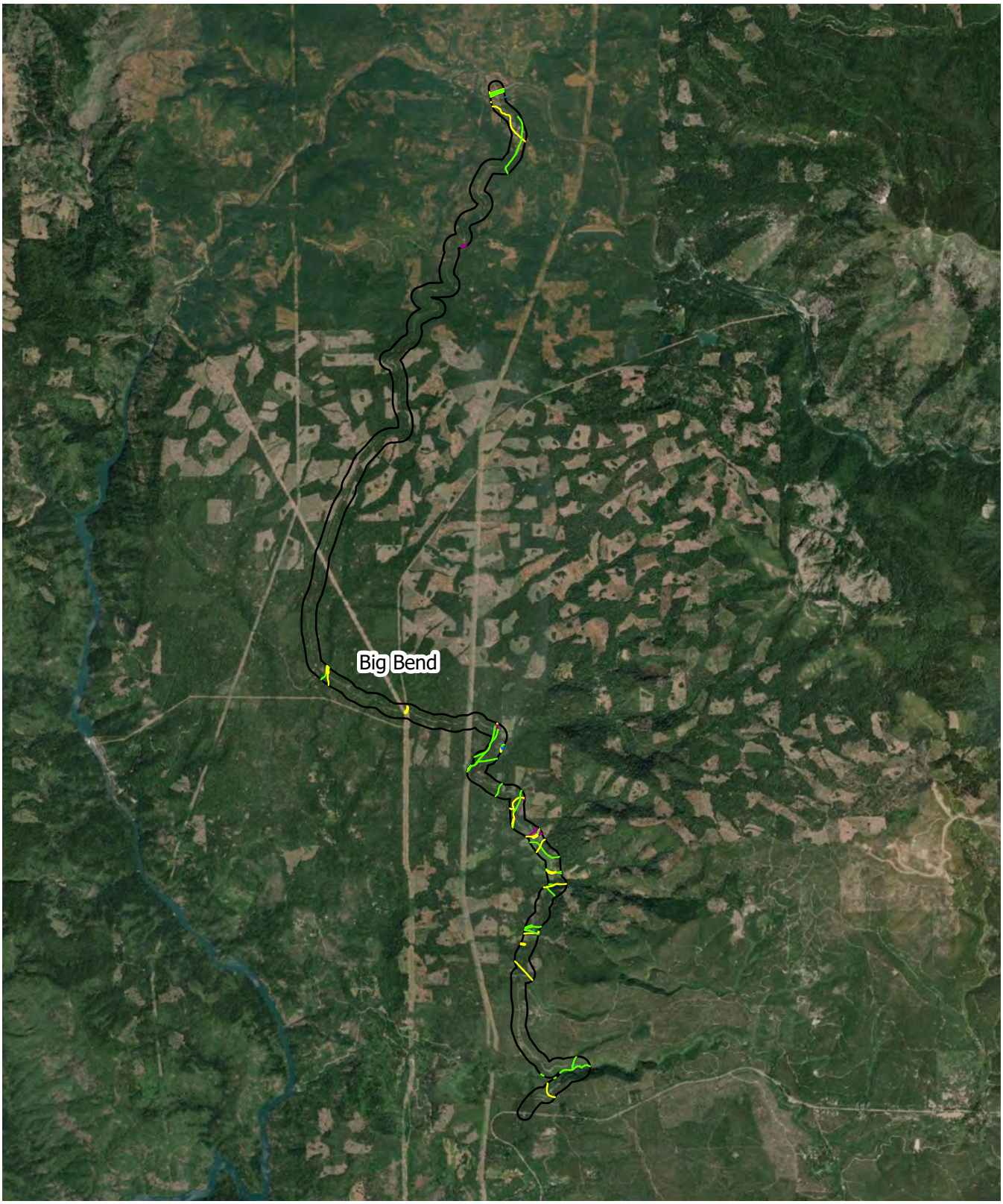
VESTRA

0 0.38 0.75 1.5 Miles

SOURCE: USFWS NATIONAL WETLANDS INVENTORY 2022

FIGURE 18B
USFWS WETLANDS
WILDFIRE MITIGATION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

P:\GIS\72231\ProProjects\CEQA processing - 5293\CEQA processing - 5293.aprx\Figures\CEQA\Wetlands Layout B



Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland
Freshwater Pond
Riverine
Project Treatment Boundary

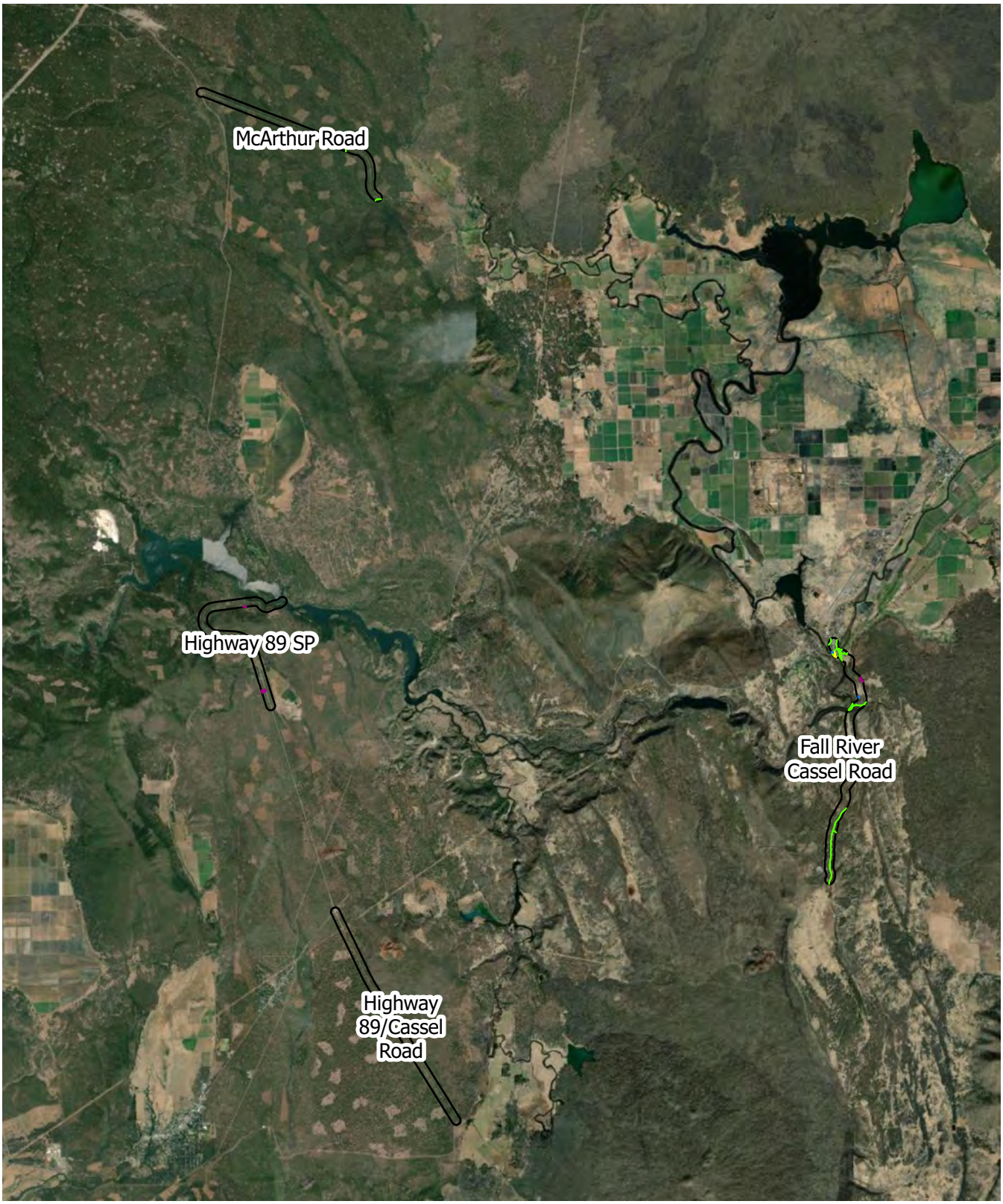
VESTRA

0 0.75 1.5 3 Miles

SOURCE: USFWS NATIONAL WETLANDS INVENTORY 2022

FIGURE 18C
USFWS WETLANDS
WILDFIRE MITIGATION/HAZARDOUS
FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

P:\GIS\72231\ProProjects\CEQA processing - 5293\CEQA processing - 5293.aprx\Figures\CEQA\Wetlands Layout C



Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland
Freshwater Pond
Riverine
Project Treatment Boundary

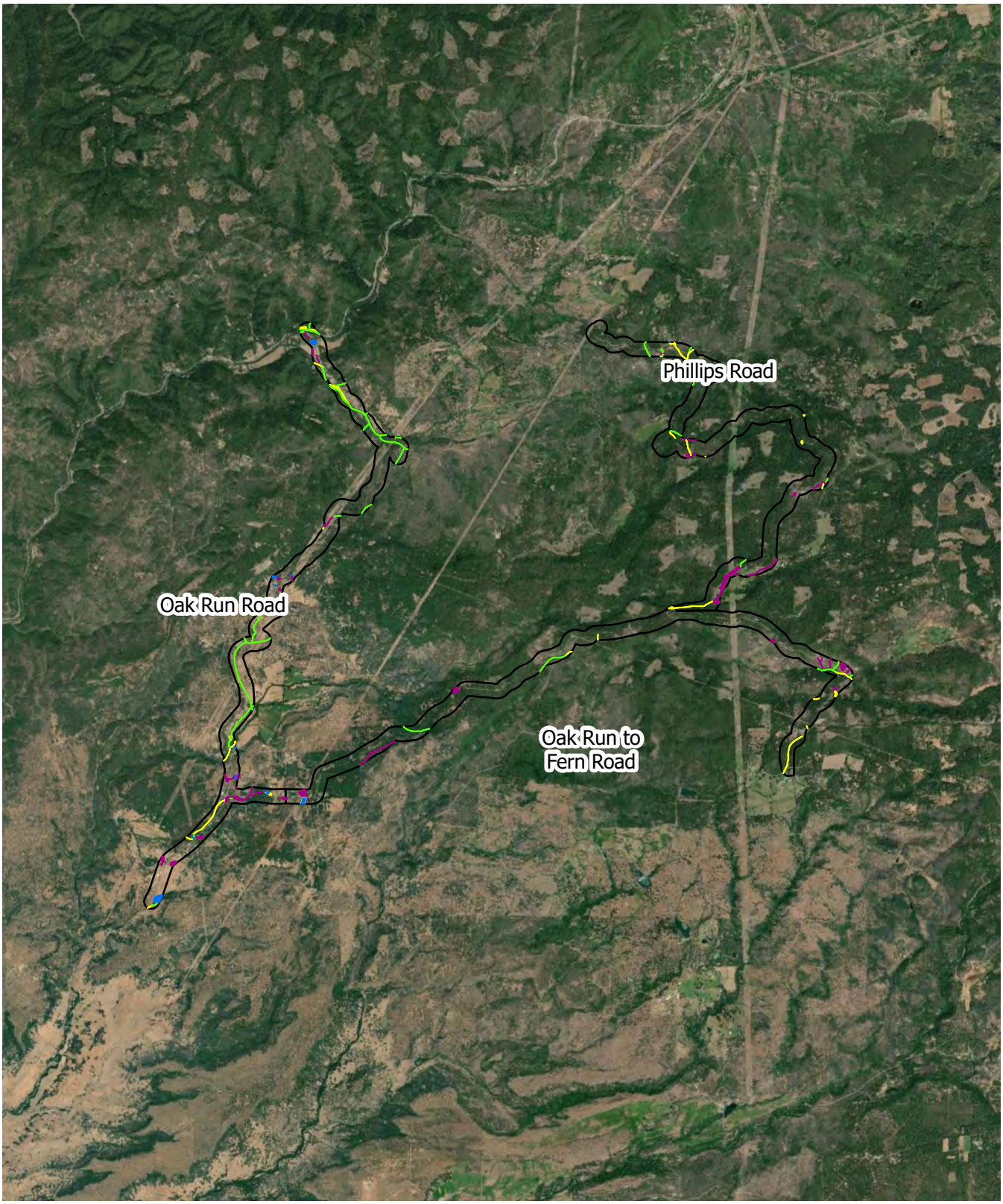
VESTRA

0 1.25 2.5 5 Miles

SOURCE: USFWS NATIONAL WETLANDS INVENTORY 2022

FIGURE 18D
USFWS WETLANDS
WILDFIRE MITIGATION/HAZARDOUS
FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

P:\GIS\72231\ProProjects\CEQA processing - 5293\CEQA processing - 5293.aprx\Figures\CEQA\Wetlands Layout D



Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland
Freshwater Pond
Riverine
Project Treatment Boundary

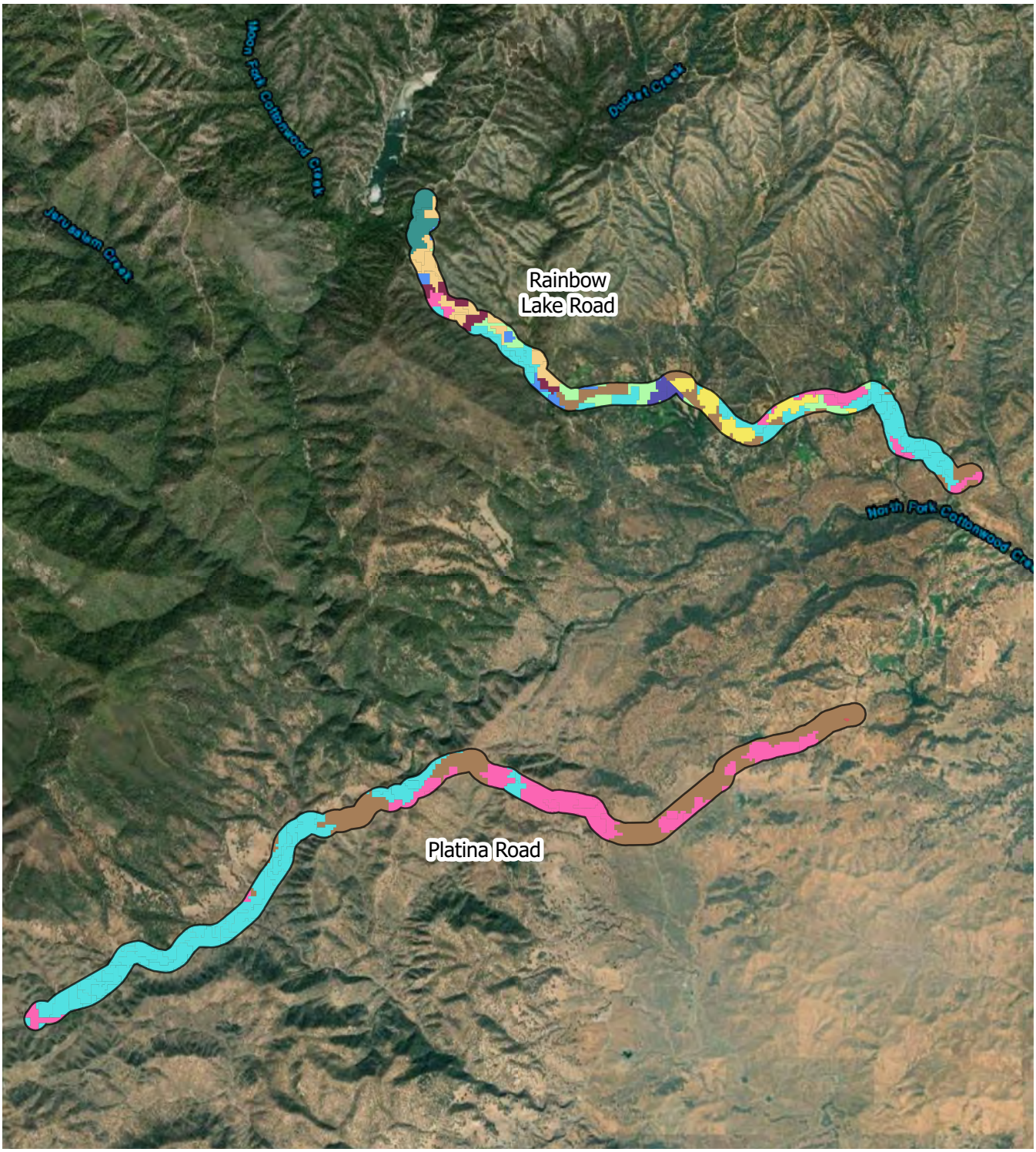
VESTRA

0 0.75 1.5 3 Miles

SOURCE: USFWS NATIONAL WETLANDS INVENTORY 2022

FIGURE 18E
USFWS WETLANDS
WILDFIRE MITIGATION/HAZARDOUS
FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

P:\GIS\72231\ProProjects\CEQA processing - 5293\CEQA processing - 5293.aprx\Figures\CEQA\Wetlands Layout E



- Project Treatment Boundary
- AGS: Annual Grassland
- BAR: Barren
- BBR: Bitterbrush
- BOP: Blue Oak-Foothill Pine
- BOW: Blue Oak Woodland
- CPC: Closed-Cone Pine-Cypress
- CRC: Chamise-Redshank Chaparral
- CRP: Cropland
- DFR: Douglas Fir
- EPN: Eastside Pine
- LAC: Lacustrine
- MCH: Mixed Chaparral
- MCP: Montane Chaparral
- MHC: Montane Hardwood-Conifer
- MHW: Montane Hardwood
- MRI: Montane Riparian
- PAS: Pasture
- PGS: Perennial Grassland
- PPN: Ponderosa Pine
- RIV: Riverine
- SMC: Sierran Mixed Conifer
- URB: Urban
- VOW: Valley Oak Woodland
- VRI: VAlley Foothill Riparian
- WTM: Wet Meadow

N

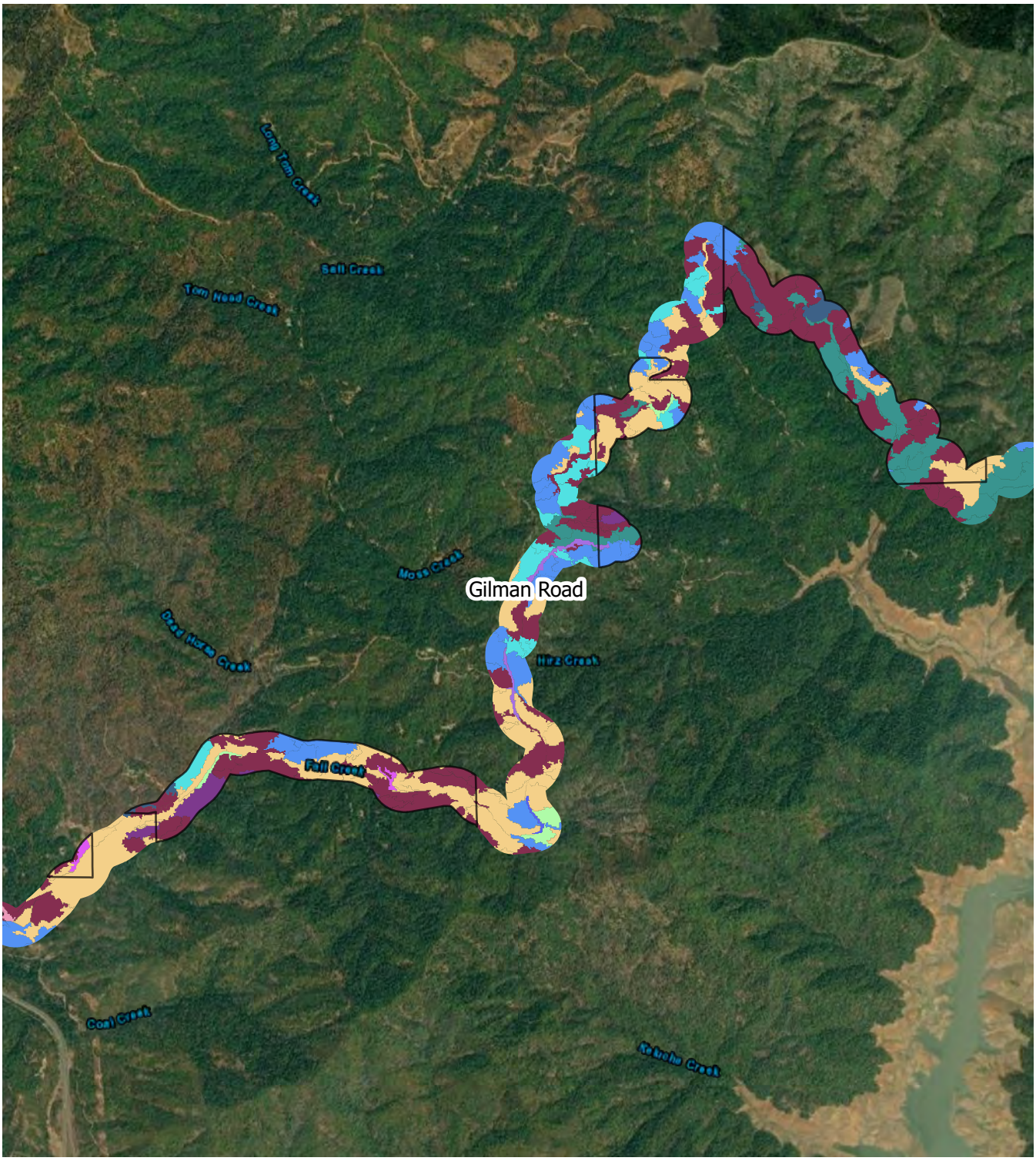
0 0.5 1 2 Miles

VESTRA

SOURCE: CALVEG 2022; CDFW VEGCAMP 2022

FIGURE19A
VEGETATION TYPES
WILDFIRE MITIGATION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

P:\GIS\72231\ProProjects\CEQA processing - 5293\CEQA processing - 5293.aprx\Figures\CEQA\Vegetation Layout A



- Project Treatment Boundary
- AGS: Annual Grassland
- BAR: Barren
- BBR: Bitterbrush
- BOP: Blue Oak-Foothill Pine
- BOW: Blue Oak Woodland
- CPC: Closed-Cone Pine-Cypress
- CRC: Chamise-Redshank Chaparral
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- LAC: Lacustrine
- MCH: Mixed Chaparral
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- MHC: Montane Hardwood-Conifer
- MHW: Montane Hardwood
- MRI: Montane Riparian
- PAS: Pasture
- PGS: Perennial Grassland
- PPN: Ponderosa Pine
- RIV: Riverine
- SMC: Sierran Mixed Conifer
- URB: Urban
- VOW: Valley Oak Woodland
- VRI: VAlley Foothill Riparian
- WTM: Wet Meadow

N

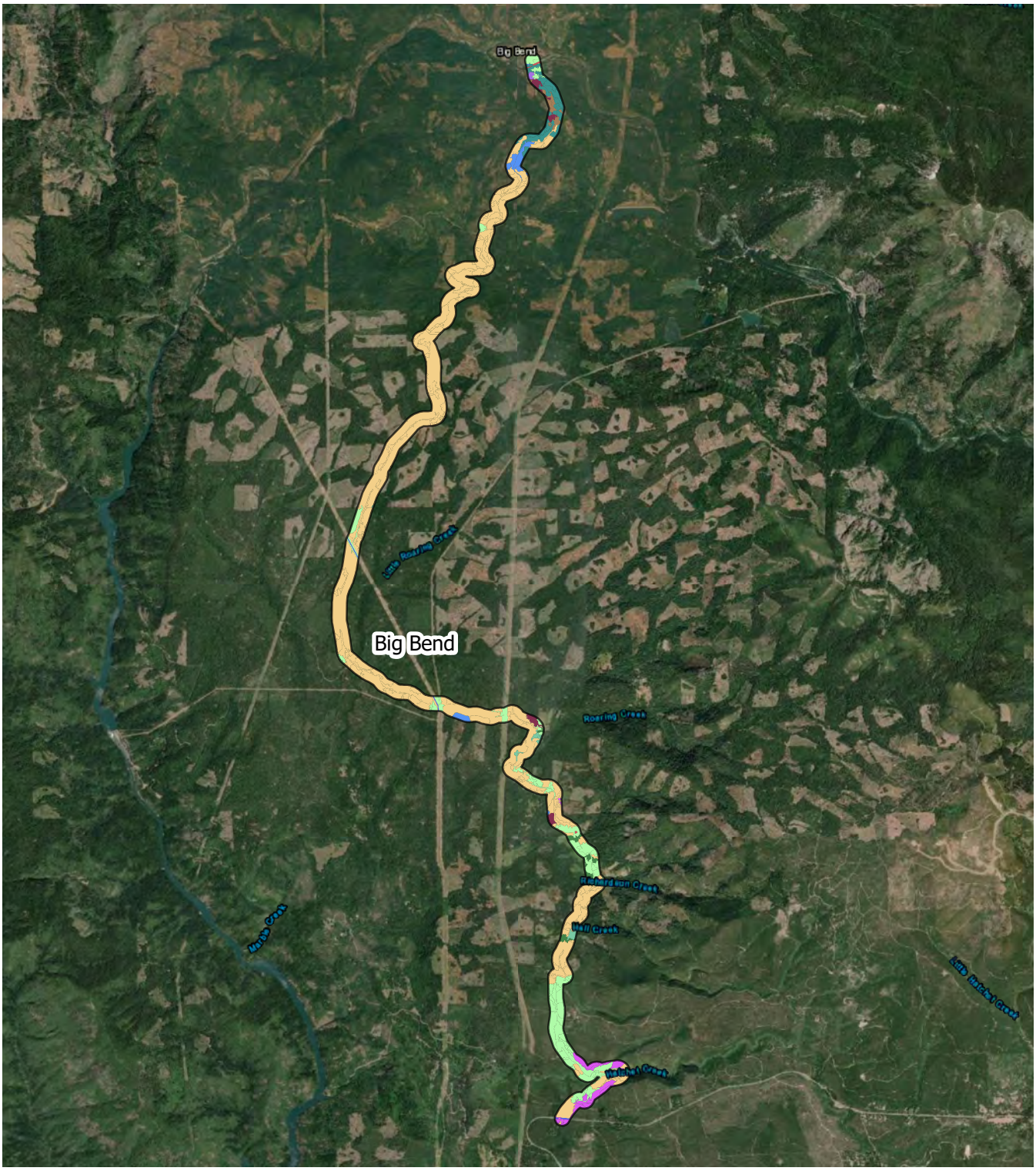
VESTRA

0 1,500 3,000 6,000 Feet

SOURCE: CALVEG 2022; CDFW VEGCAMP 2022

FIGURE19B
VEGETATION TYPES
WILDFIRE MITIGATION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

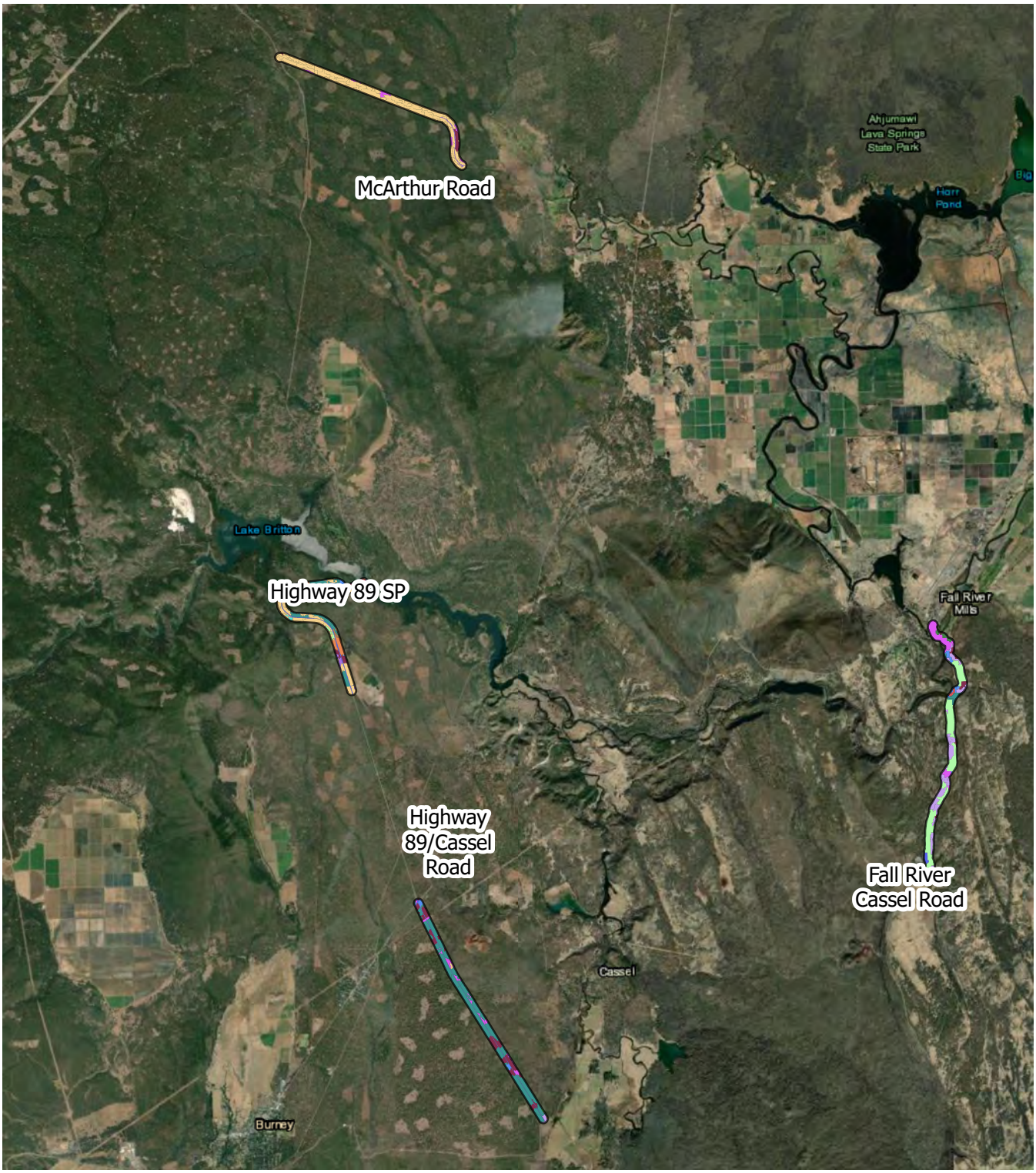
P:\GIS\72231\ProProjects\CEQA processing - 5293\CEQA processing - 5293.aprx\Figures\CEQA\Vegetation Layout B



SOURCE: CALVEG 2022; CDFW VEGCAMP 2022

FIGURE19C
VEGETATION TYPES
WILDFIRE MITIGATION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

P:\GIS\72231\ProProjects\CEQA processing - 5293\CEQA processing - 5293.aprx\Figures\CEQA\Vegetation Layout C



Project Treatment Boundary
AGS: Annual Grassland
BAR: Barren
BBR: Bitterbrush
BOP: Blue Oak-Foothill Pine
BOW: Blue Oak Woodland
CPC: Closed-Cone Pine-Cypress
CRC: Chamise-Redshank Chaparral
CRP: Cropland
DFR: Douglas Fir
EPN: Eastside Pine
LAC: Lacustrine
MCH: Mixed Chaparral
MCP: Montane Chaparral
MHC: Montane Hardwood-Conifer
MHW: Montane Hardwood
MRI: Montane Riparian
PAS: Pasture
PGS: Perennial Grassland
PPN: Ponderosa Pine
RIV: Riverine
SMC: Sierran Mixed Conifer
URB: Urban
VOW: Valley Oak Woodland
VRI: VAlley Foothill Riparian
WTM: Wet Meadow

VESTRA

0 1.25 2.5 5 Miles

SOURCE: CALVEG 2022; CDFW VEGCAMP 2022

FIGURE19D
VEGETATION TYPES
WILDFIRE MITIGATION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

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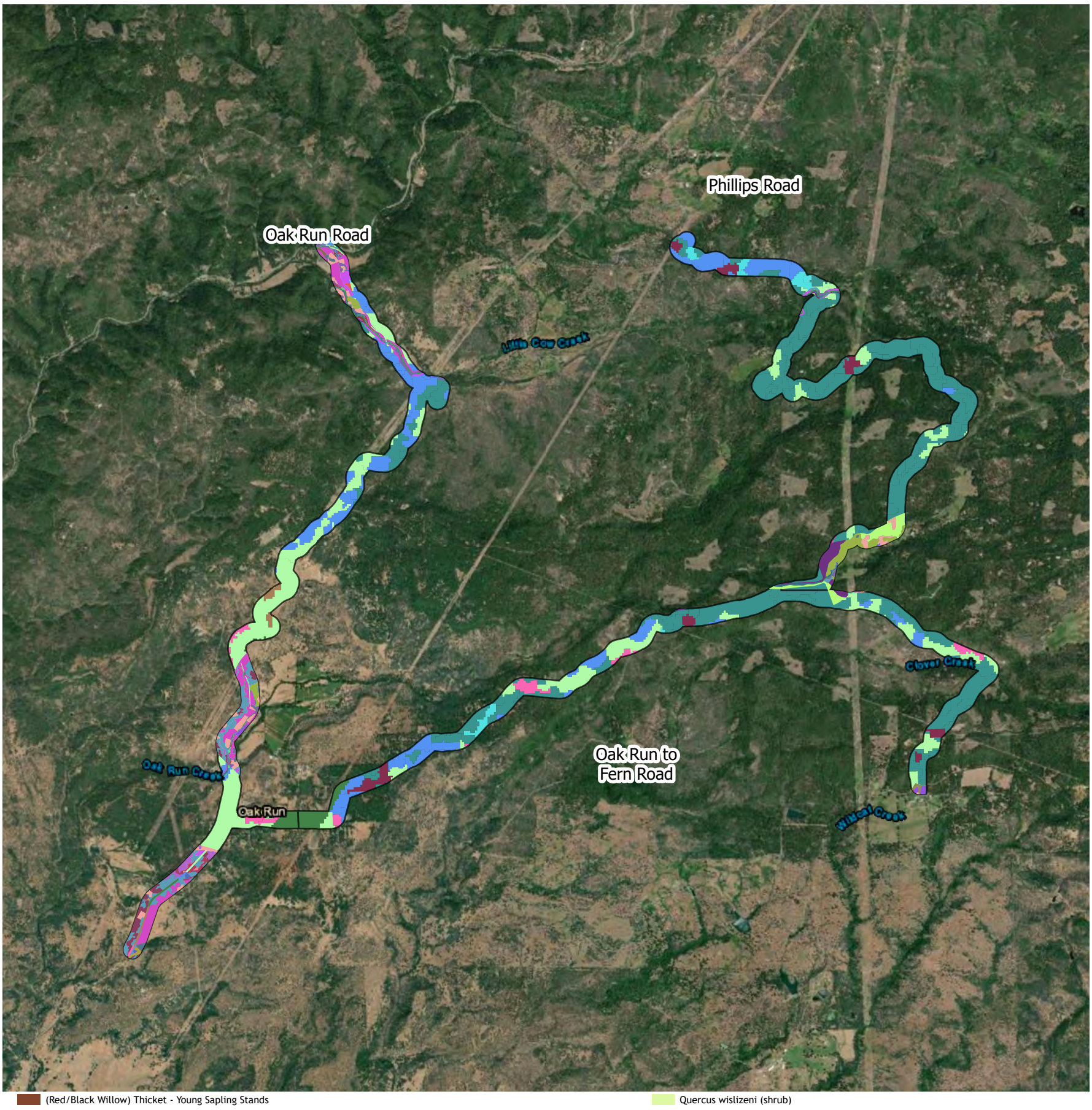

- (Red/Black Willow) Thicket - Young Sapling Stands
- Agriculture (Without fallow annual grasses dominating)
- Agriculture, excluding fallow and irrigated pasture
- Alnus rhombifolia
- Alnus rhombifolia (White Alder)
- Arctostaphylos manzanita
- Arctostaphylos viscida
- Arctostaphylos viscida (Sticky Whiteleaf Manzanita)
- Built up and Urban Disturbance
- Built-up and Urban Disturbance
- California Annual and Perennial Grassland
- California Mixed Perennial and Annual Grassland and Meadow Macrogroup (Native Component)
- Californian Warm Temperate Marsh/Seep Group
- Calocedrus decurrens
- Ceanothus cuneatus
- Ceanothus cuneatus (Buckbrush)
- Ceanothus integerrimus
- Cliffs and Rock Outcroppings
- Irrigated Pasture Lands
- Mediterranean California Naturalized Annual and Perennial Grasslands and Meadow Macrogroup (weedy)
- Mediterranean California naturalized annual and perennial grassland
- Naturalized non-native perennial grassland and Meadow Macrogroup (Irrigated Pasture Lands) Temperate and Boreal Freshwater Marsh
- North American Arid West Freshwater Marsh - (Marsh Vegetation)
- Perennial Stream Channel
- Pinus ponderosa (Ponderosa Pine)
- Pinus ponderosa - Calocedrus decurrens
- Pinus ponderosa - Pseudotsuga menziesii (Ponderosa - Doug-fir)
- Pinus ponderosa-Calocedrus decurrens
- Pinus sabiniana
- Pinus sabiniana (Foothill Pine)
- Pseudotsuga menziesii (Douglas-fir)
- Quercus chrysolepis (Canyon Live Oak)
- Quercus chrysolepis (tree)
- Quercus douglasii
- Quercus douglasii (Blue Oak)
- Quercus kelloggii
- Quercus kelloggii (Black Oak)
- Quercus lobata
- Quercus lobata (Valley Oak)
- Quercus wislizeni
- Quercus wislizeni (Interior Live Oak Tree)
- Quercus wislizeni (shrub)
- River and Lacustrine Flats and Streambeds
- Rubus armeniacus
- Rubus discolor (Himalayan Blackberry)
- Salix exigua (Narrowleaf willow)
- Salix laevigata (Red Willow)
- Salix lasiolepis (Arroyo Willow)
- Schoenoplectus - (Bulrush)
- Small Earthen Dam Ponds and Natural Lakes
- Southwestern Riparian Evergn. and Decid. Woodlands
- Toxicodendron diversilobum
- Undefined areas with little or no vegetation (Human Disturbance)
- Vernal Pool & Californian Annual and Perennial Grassland Matrix
- Western North American Temperate Marsh and Wet Meadow Macro Group (Meadow Vegetation)
- Project Treatment Boundary
- AGS: Annual Grassland
- BAR: Barren
- BBR: Bitterbrush
- BOP: Blue Oak-Foothill Pine
- BOW: Blue Oak Woodland
- CPC: Closed-Cone Pine-Cypress
- CRC: Chamise-Redshank Chaparral
- CRP: Cropland
- DFR: Douglas Fir
- EPN: Eastside Pine
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- MHW: Montane Hardwood
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- PGS: Perennial Grassland
- PPN: Ponderosa Pine
- RIV: Riverine
- SMC: Sierran Mixed Conifer
- URB: Urban
- VOW: Valley Oak Woodland
- VRI: VAlley Foothill Riparian
- WTM: Wet Meadow

N

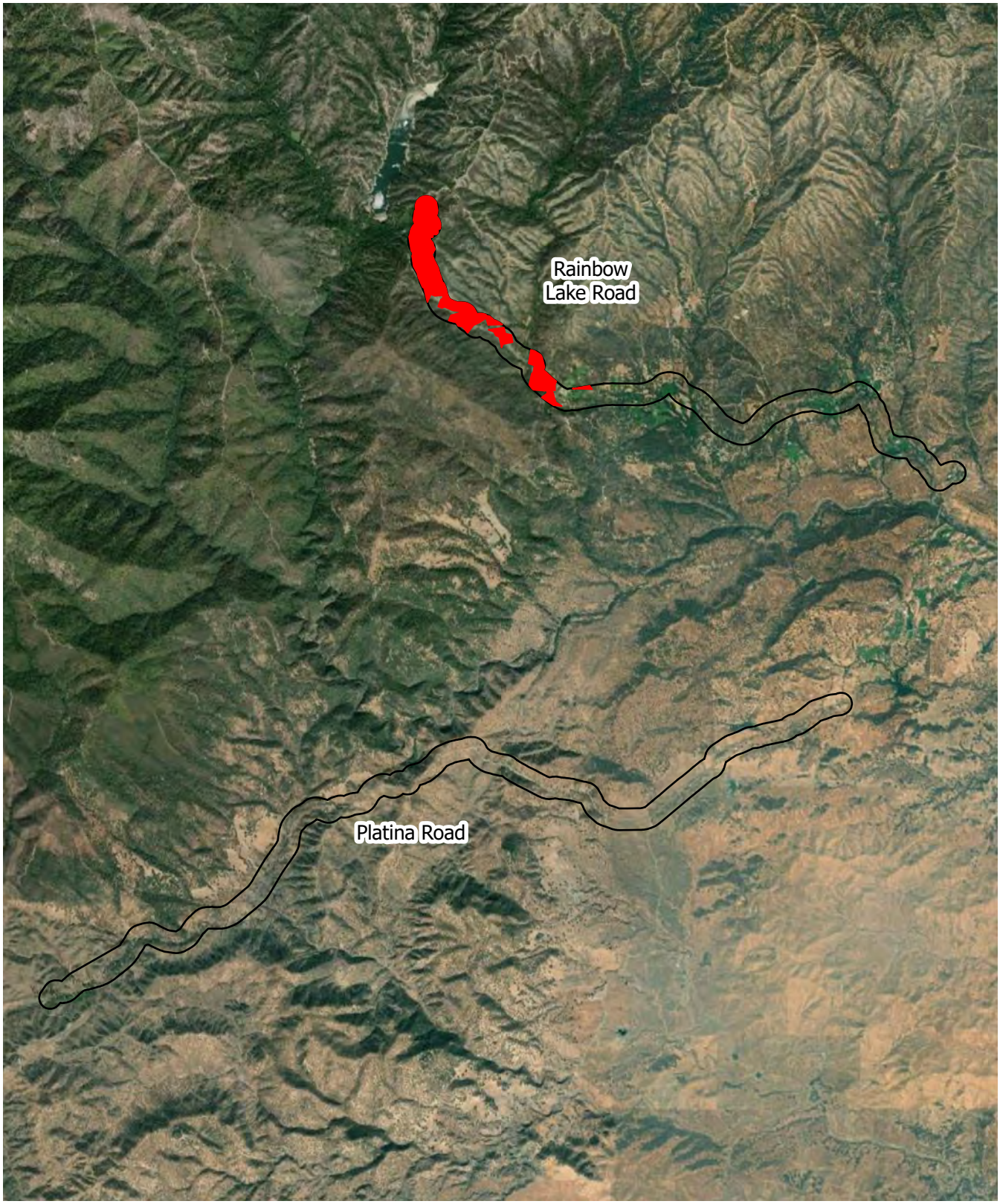
VESTRA

0 0.5 1 2 Miles

SOURCE: CALVEG 2022; CDFW VEGCAMP 2022

FIGURE19E
VEGETATION TYPES
WILDFIRE MITIGATION/HAZARDOUS
FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

P:\GIS\72231\ProProjects\CEQA processing - 5293\CEQA processing - 5293.aprx\Figures\CEQA\Vegetation Layout E



Commercial Timberland

Project Treatment Boundary

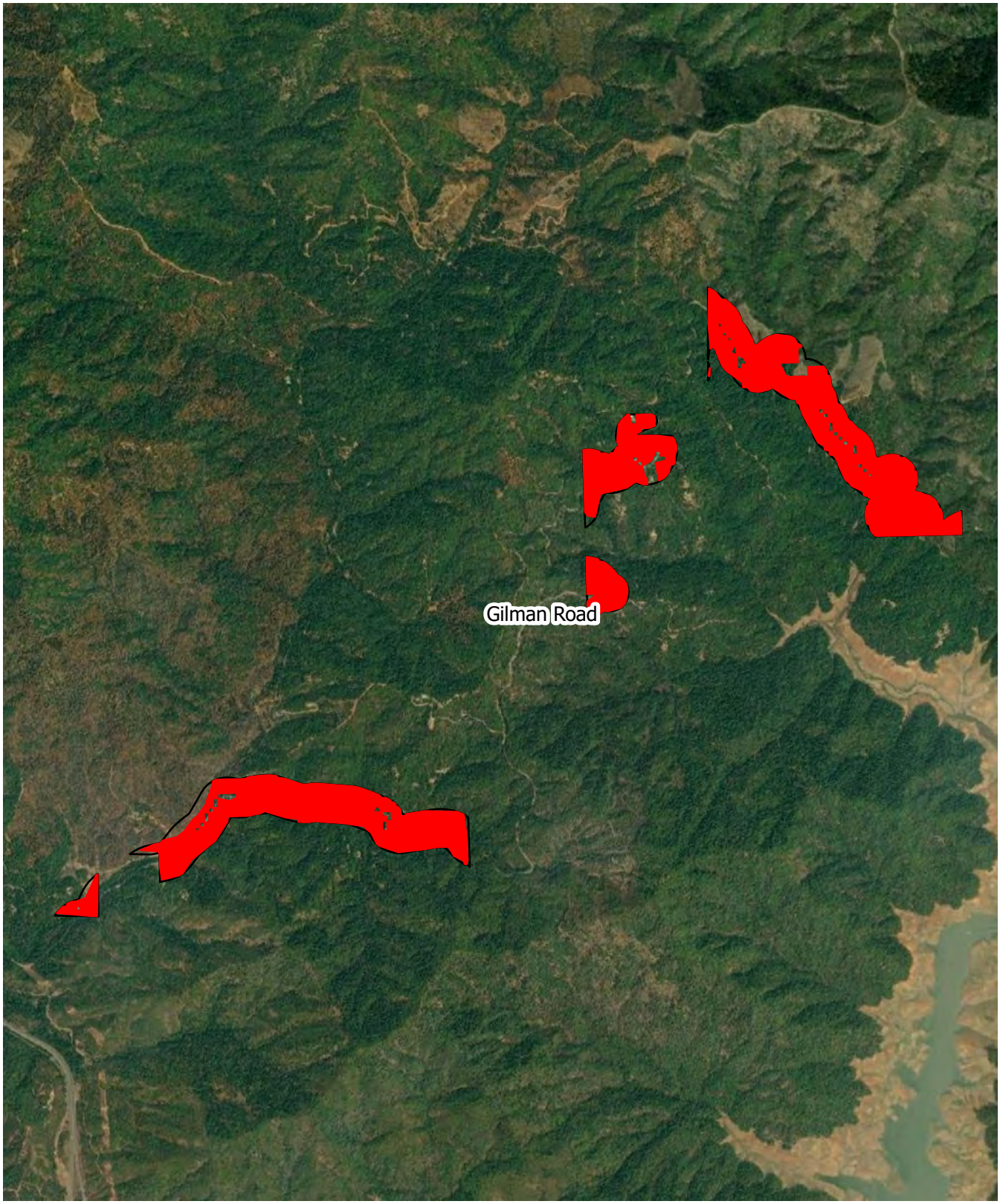
VESTRA

SOURCE: SHASTA COUNTY 2022

0 0.5 1 2 Miles

FIGURE 20A
COMMERCIAL TIMBERLAND
WILDFIRE MITIGATION/HAZARDOUS
FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

P:\GIS\72231\ProProjects\CEQA processing - 5293\CEQA processing - 5293.aprx\Figures\CEQA\Commercial Timber Layout A



Commercial Timberland

Project Treatment Boundary

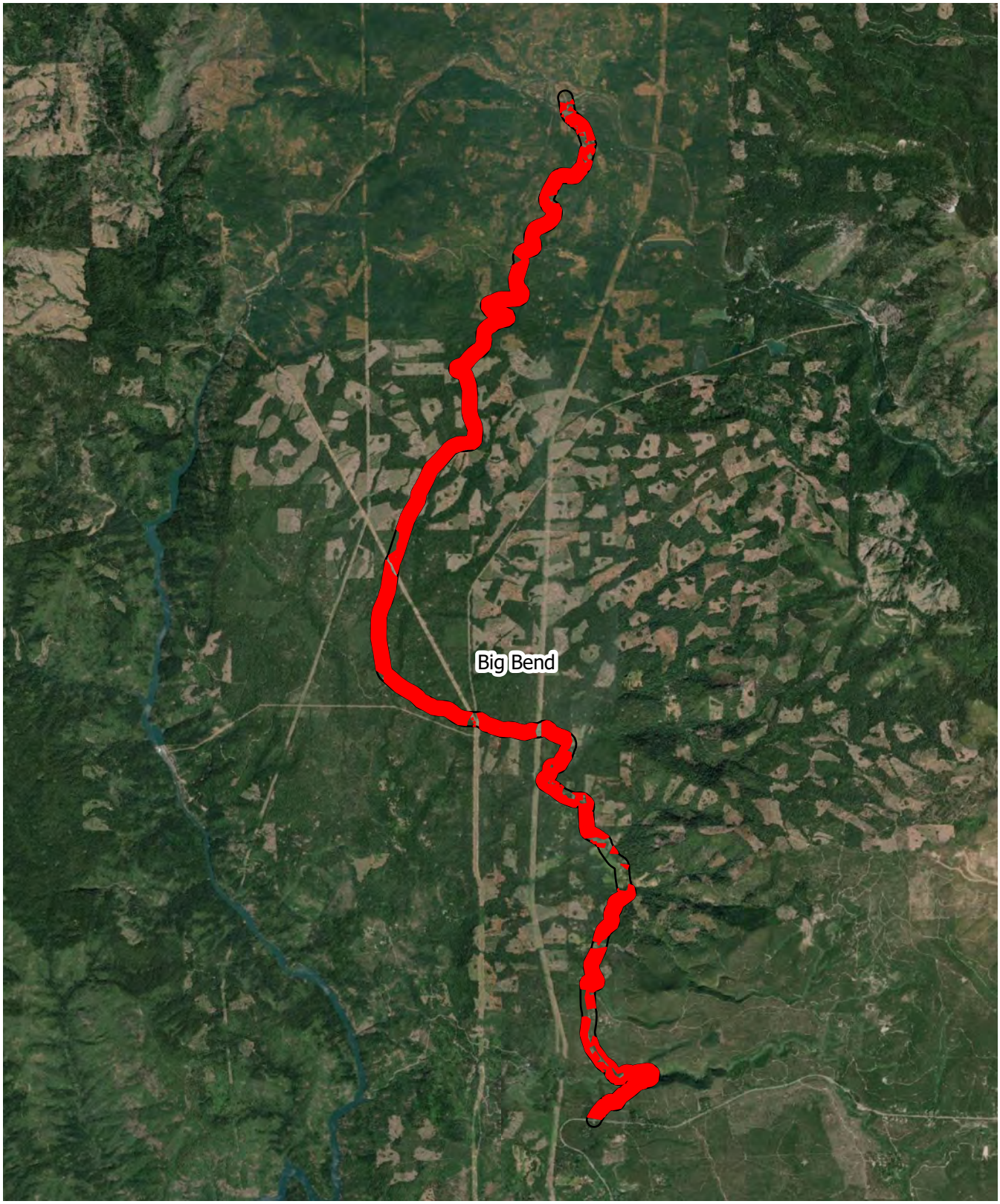
VESTRA

SOURCE: SHASTA COUNTY 2022

0 1,500 3,000 6,000 Feet

FIGURE 20B
COMMERCIAL TIMBERLAND
WILDFIRE MITIGATION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

P:\GIS\72231\ProProjects\CEQA processing - 5293\CEQA processing - 5293.aprx\Figures\CEQA\Commercial Timber Layout A



Commercial Timberland

Project Treatment Boundary

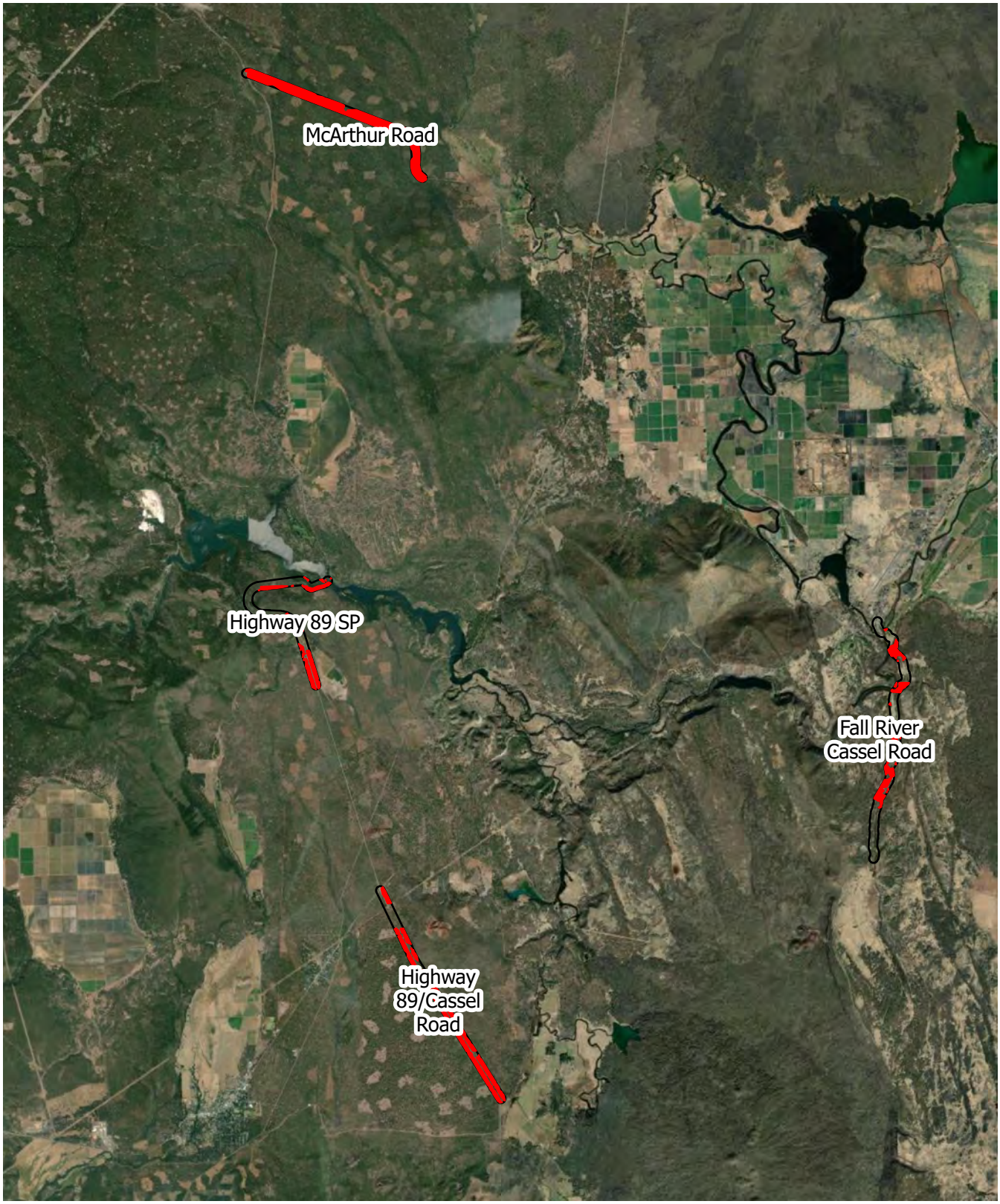
VESTRA

SOURCE: SHASTA COUNTY 2022

0 0.75 1.5 3 Miles

FIGURE 20C
COMMERCIAL TIMBERLAND
WILDFIRE MITIGATION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

P:\GIS\72231\ProProjects\CEQA processing - 5293\CEQA processing - 5293.aprx\Figures\CEQA\Commercial Timber Layout A



Commercial Timberland

Project Treatment Boundary

N

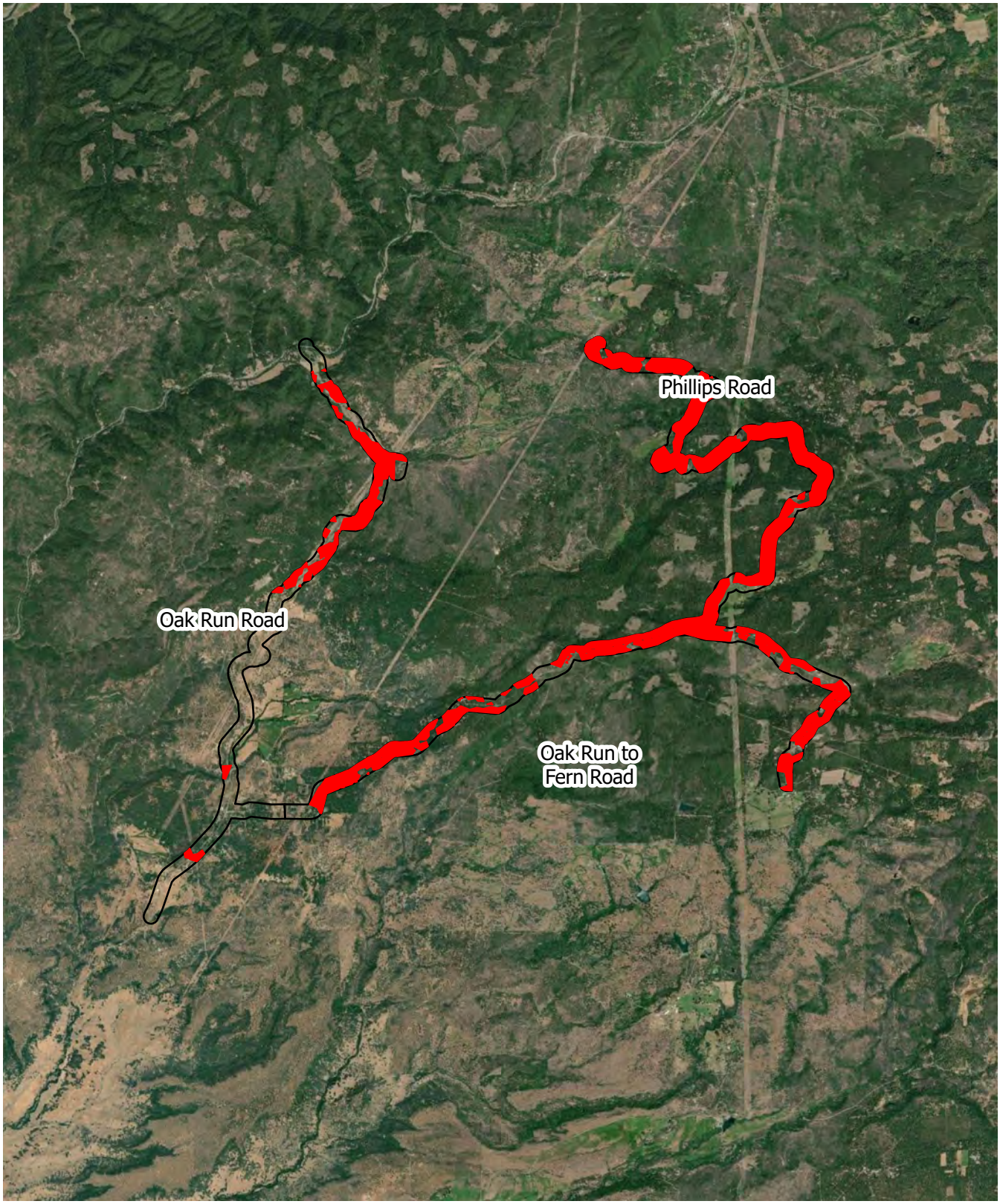
0 1.25 2.5 5 Miles

VESTRA

SOURCE: SHASTA COUNTY 2022

FIGURE 20D
COMMERCIAL TIMBERLAND
WILDFIRE MITIGATION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

P:\GIS\72231\ProProjects\CEQA processing - 5293\CEQA processing - 5293.aprx\Figures\CEQA\Commercial Timber Layout A



Commercial Timberland

Project Treatment Boundary

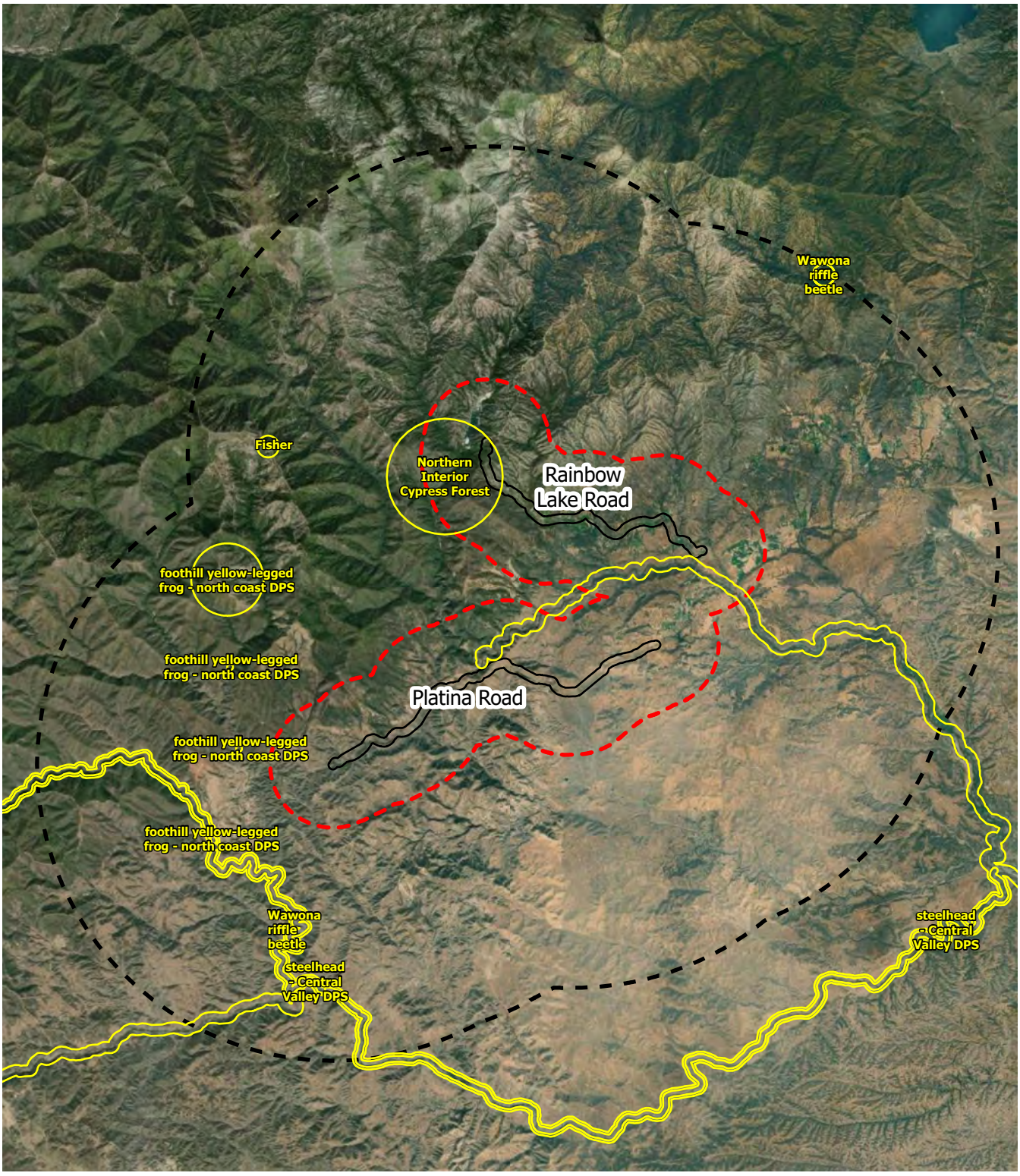
VESTRA

SOURCE: SHASTA COUNTY 2022

0 0.75 1.5 3 Miles

FIGURE 20E
COMMERCIAL TIMBERLAND
WILDFIRE MITIGATION/HAZARDOUS
FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

P:\GIS\72231\ProProjects\CEQA processing - 5293\CEQA processing - 5293.aprx\Figures\CEQA\Commercial Timber Layout A

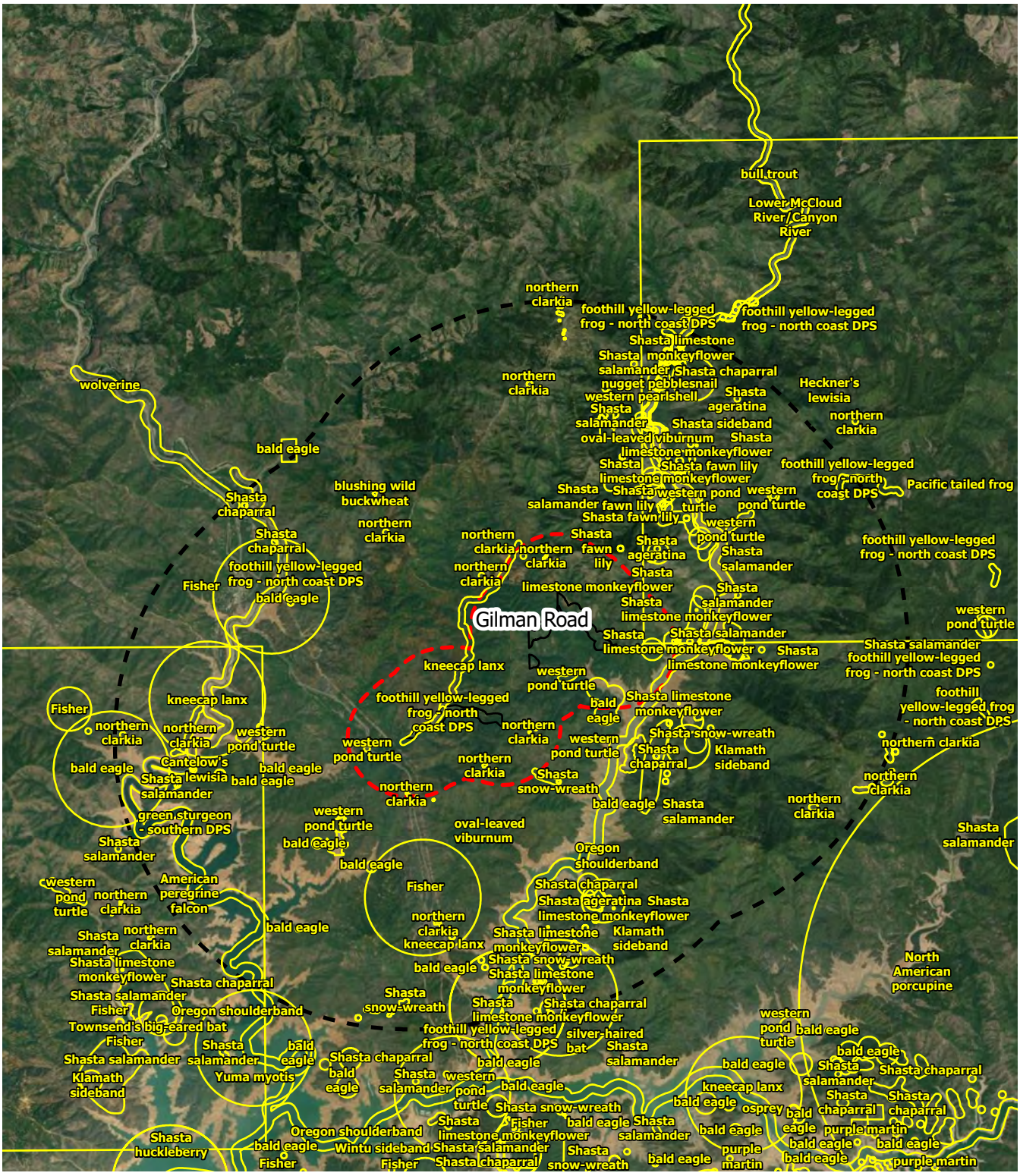


VESTRA

SOURCE: SHASTA COUNTY 2022; CDFW CNDDB OCTOBER 2022

FIGURE 21A
CNDDB OCCURRENCES
WILDFIRE MITIGATION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

P:\GIS\72231\ProProjects\CEQA processing - 5293\CEQA processing - 5293.aprx\Figures\CEQA\CNDDB Layout A



California Spotted Owl Observation Location

Northern Spotted Owl Observation Location

CNDDB Occurrence

Project Treatment Boundary

1-Mile Buffer Around Project Treatment Boundary

5-Mile Buffer Around Project Treatment Boundary

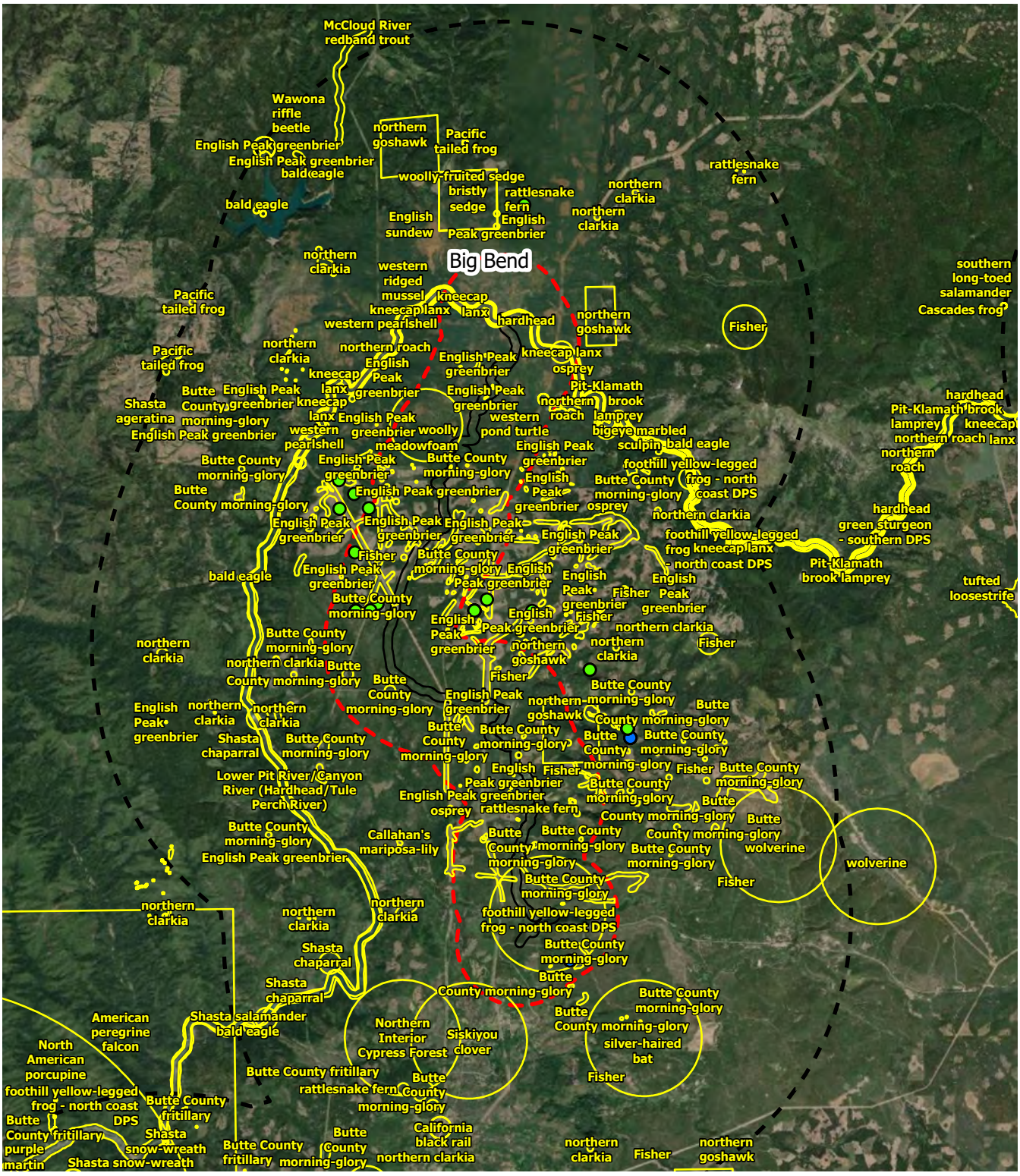
0 1.25 2.5 5 Miles

FIGURE 21B
CNDDB OCCURRENCES
WILDFIRE MITIGATION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

VESTRA

SOURCE: SHASTA COUNTY 2022; CDFW CNDDB OCTOBER 2022

P:\GIS\72231\ProProjects\CEQA processing - 5293\CEQA processing - 5293.aprx\Figures\CEQA\CNDDB Layout B



California Spotted Owl Observation Location

Northern Spotted Owl Observation Location

CNDDB Occurrence

Project Treatment Boundary

1-Mile Buffer Around Project Treatment Boundary

5-Mile Buffer Around Project Treatment Boundary

N

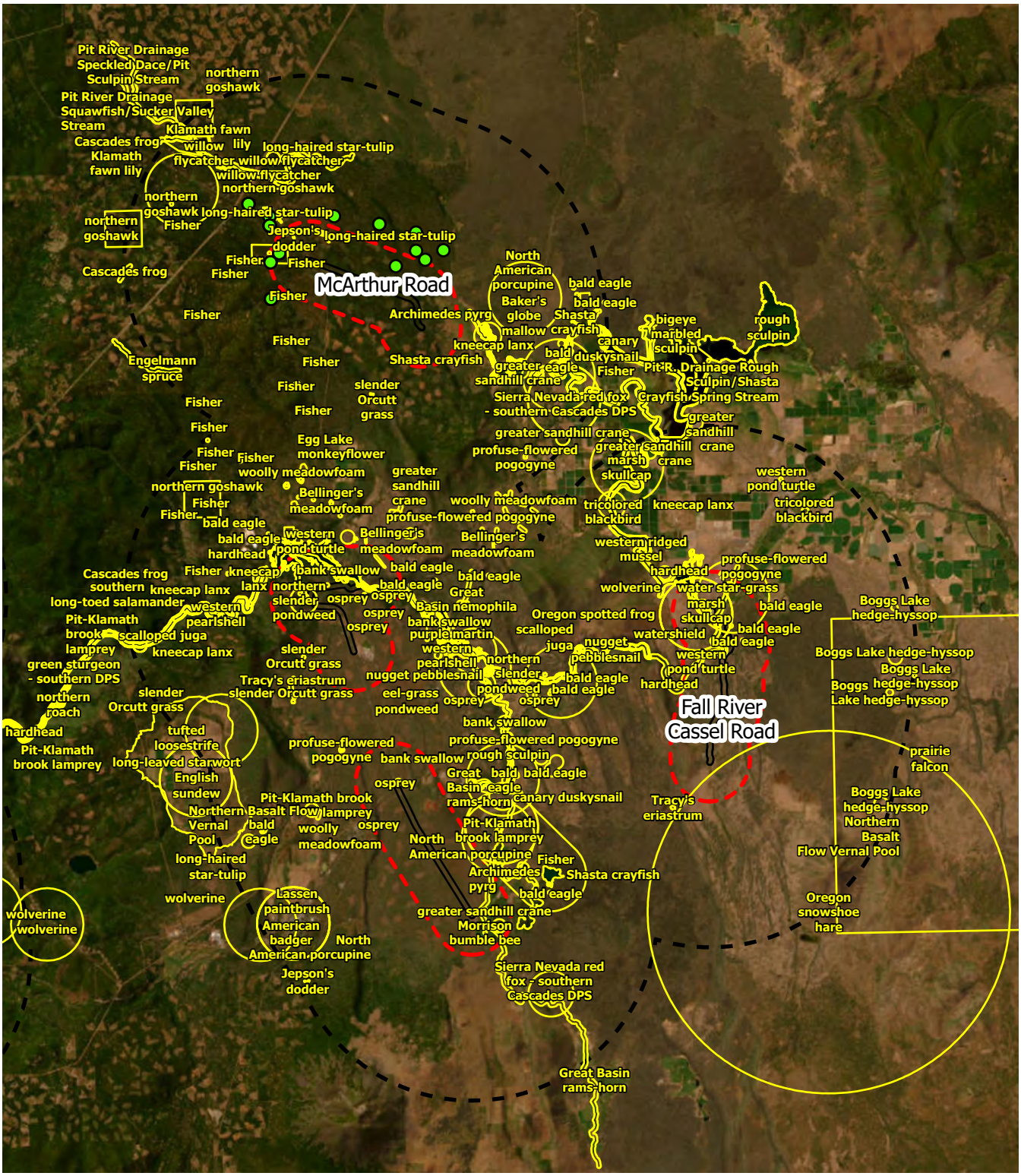
0 1.25 2.5 5 Miles

VESTRA

SOURCE: SHASTA COUNTY 2022; CDFW CNDDB OCTOBER 2022

FIGURE 21C
CNDDB OCCURRENCES
WILDFIRE MITIGATION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

P:\GIS\72231\ProProjects\CEQA processing - 5293\CEQA processing - 5293.aprx\Figures\CEQA\CNDDB Layout C



California Spotted Owl Observation Location

Northern Spotted Owl Observation Location

CNDDB Occurrence

Project Treatment Boundary

1-Mile Buffer Around Project Treatment Boundary

5-Mile Buffer Around Project Treatment Boundary

FIGURE 21D
CNDDB OCCURRENCES
WILDFIRE MITIGATION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

VESTRA

SOURCE: SHASTA COUNTY 2022; CDFW CNDDB OCTOBER 2022

P:\GIS\72231\ProProjects\CEQA processing - 5293\CEQA processing - 5293.aprx\Figures\CEQA\CNDDB Layout D

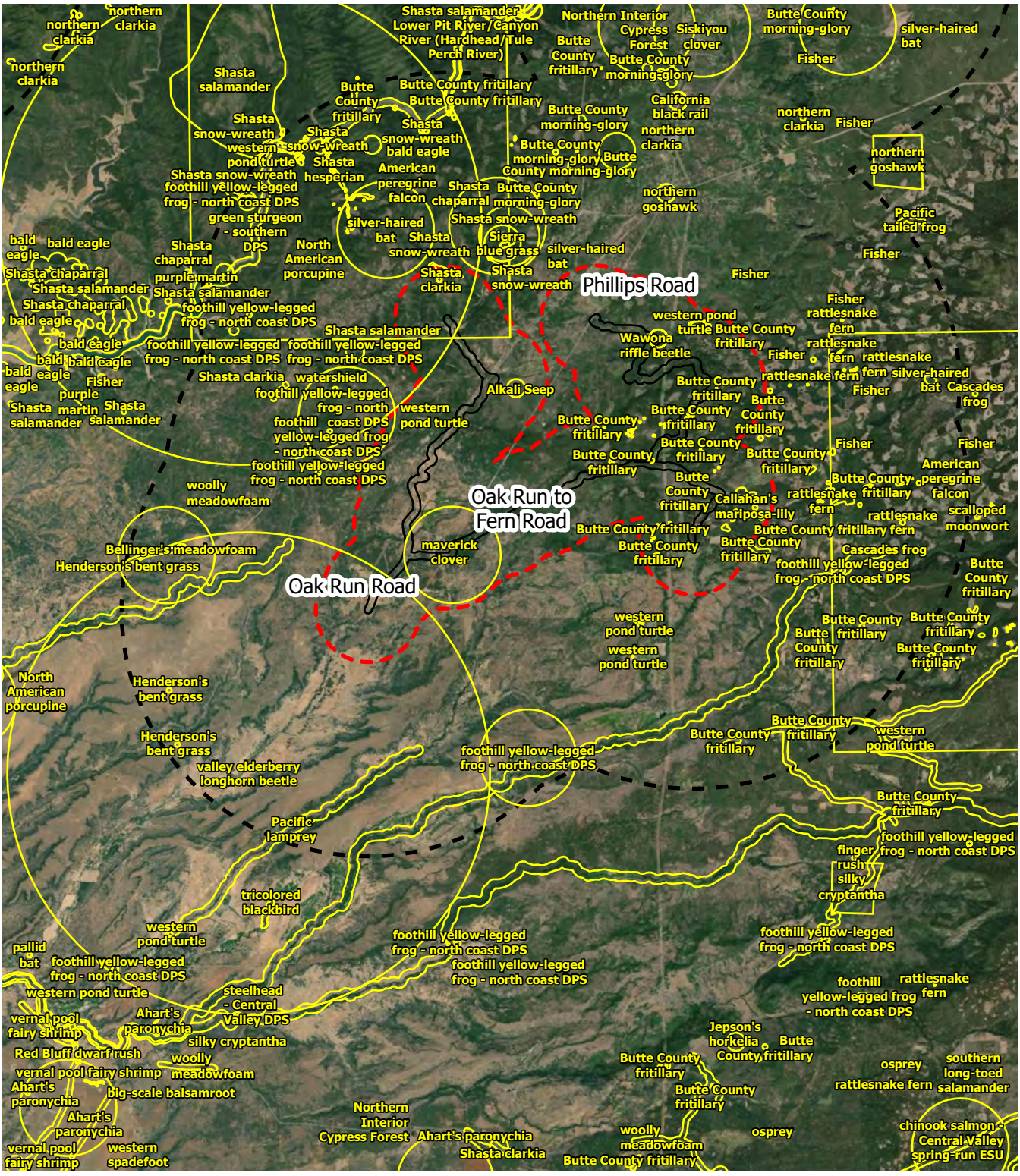
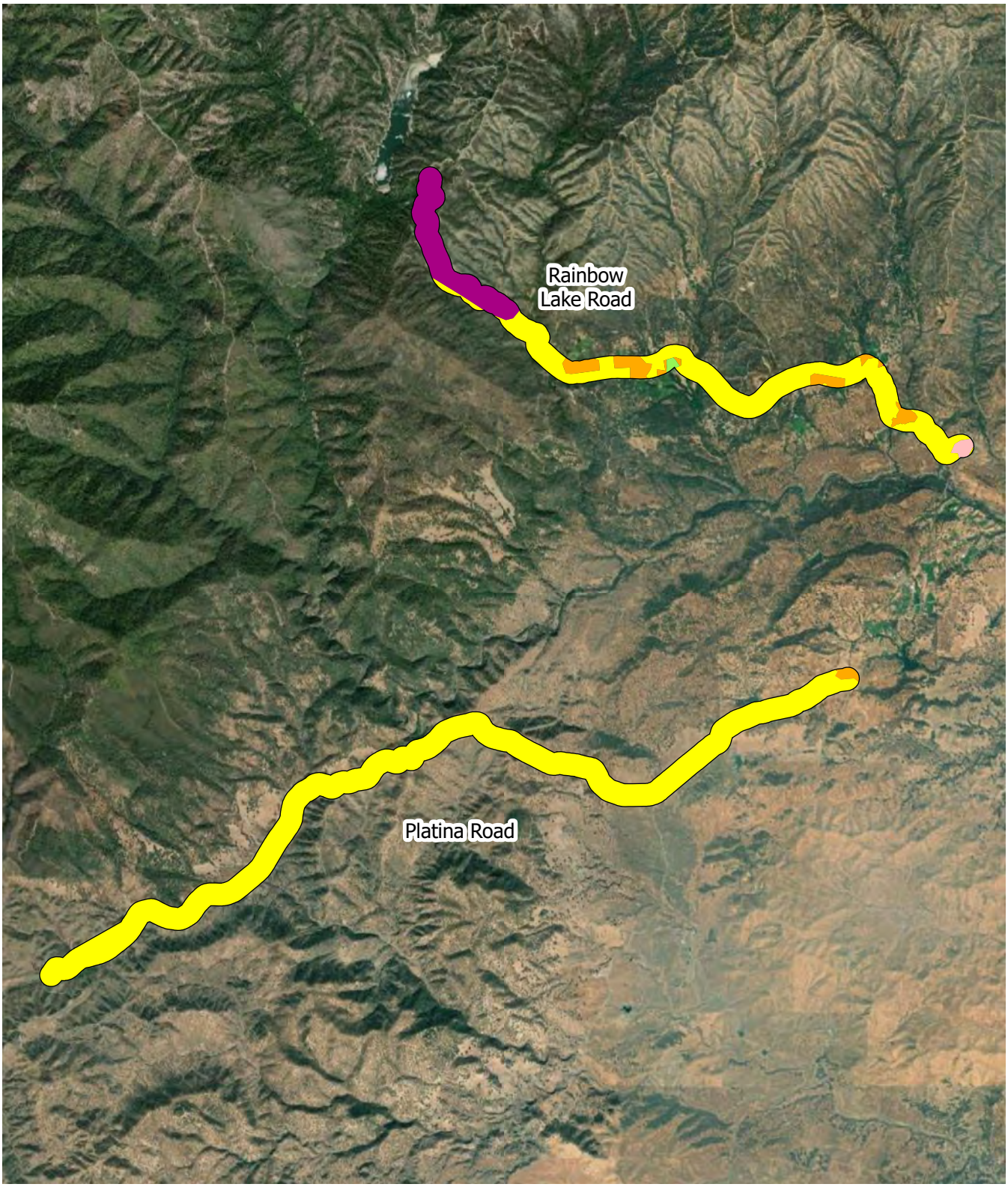


FIGURE 21E
CNDDB OCCURRENCES
WILDFIRE MITIGATION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

VESTRA

SOURCE: SHASTA COUNTY 2022; CDFW CNDDB OCTOBER 2022

P:\GIS\72231\ProProjects\CEQA processing - 5293\CEQA processing - 5293.aprx\Figures\CEQA\CNDDB Layout E



D: Urban and Built-Up Land
G: Grazing Land
L: Farmland of Local Importance
P: Prime Farmland
S: Farmland of Statewide Importance
U: Unique Farmland
X: Other Land
Z: Unclassified
Project Treatment Boundary

VESTRA

0 0.5 1 2 Miles

SOURCE: CALIFORNIA DEPARTMENT OF CONSERVATION 2020

FIGURE 22A
IMPORTANT FARMLAND
WILDFIRE MITIGATION/HAZARDOUS
FUELS REDUCTION PROJECT
SHASTA COUNTY, CALIFORNIA

P:\GIS\72231\ProProjects\CEQA processing - 5293\CEQA processing - 5293.aprx\Figures\CEQA\Important Farmland Layout A

D: Urban and Built-Up Land
G: Grazing Land
L: Farmland of Local Importance
P: Prime Farmland
S: Farmland of Statewide Importance
U: Unique Farmland
X: Other Land
Z: Unclassified
Project Treatment Boundary

VESTRA

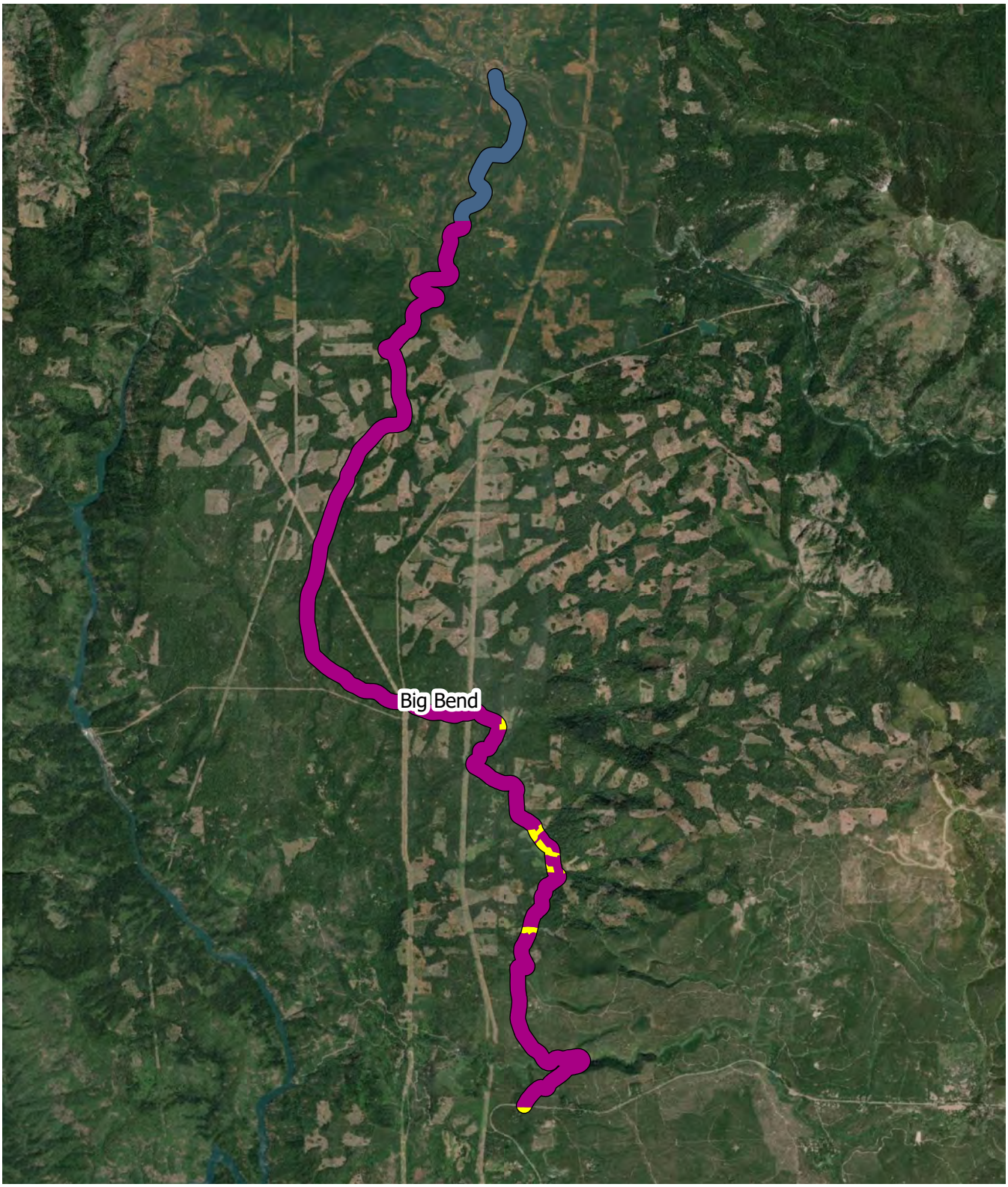
0 1,500 3,000 6,000 Feet

N

SOURCE: CALIFORNIA DEPARTMENT OF CONSERVATION 2020

FIGURE 22B
IMPORTANT FARMLAND
WILDFIRE MITIGATION/HAZARDOUS FUELS REDUCTION PROJECT
SHASTA COUNTY, CALIFORNIA

P:\GIS\72231\ProProjects\CEQA processing - 5293\CEQA processing - 5293.aprx\Figures\CEQA\Important Farmland Layout A



D: Urban and Built-Up Land
G: Grazing Land
L: Farmland of Local Importance
P: Prime Farmland
S: Farmland of Statewide Importance
U: Unique Farmland
X: Other Land
Z: Unclassified
Project Treatment Boundary

VESTRA

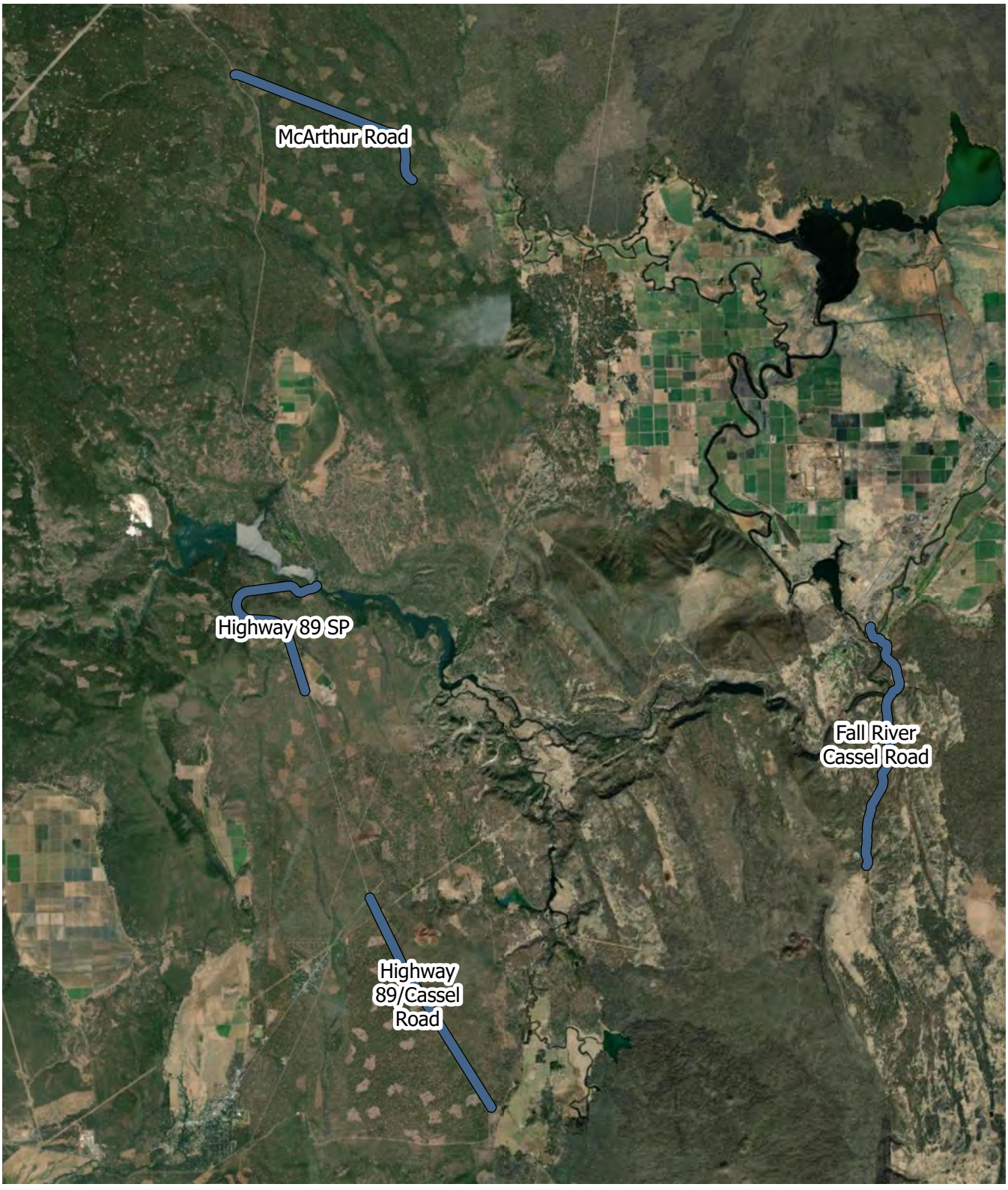
0 0.75 1.5 3 Miles

N

SOURCE: CALIFORNIA DEPARTMENT OF CONSERVATION 2020

FIGURE 22C
IMPORTANT FARMLAND
WILDFIRE MITIGATION/HAZARDOUS FUELS REDUCTION PROJECT
SHASTA COUNTY, CALIFORNIA

P:\GIS\72231\ProProjects\CEQA processing - 5293\CEQA processing - 5293.aprx\Figures\CEQA\Important Farmland Layout A



D: Urban and Built-Up Land
G: Grazing Land
L: Farmland of Local Importance
P: Prime Farmland
S: Farmland of Statewide Importance
U: Unique Farmland
X: Other Land
Z: Unclassified
Project Treatment Boundary

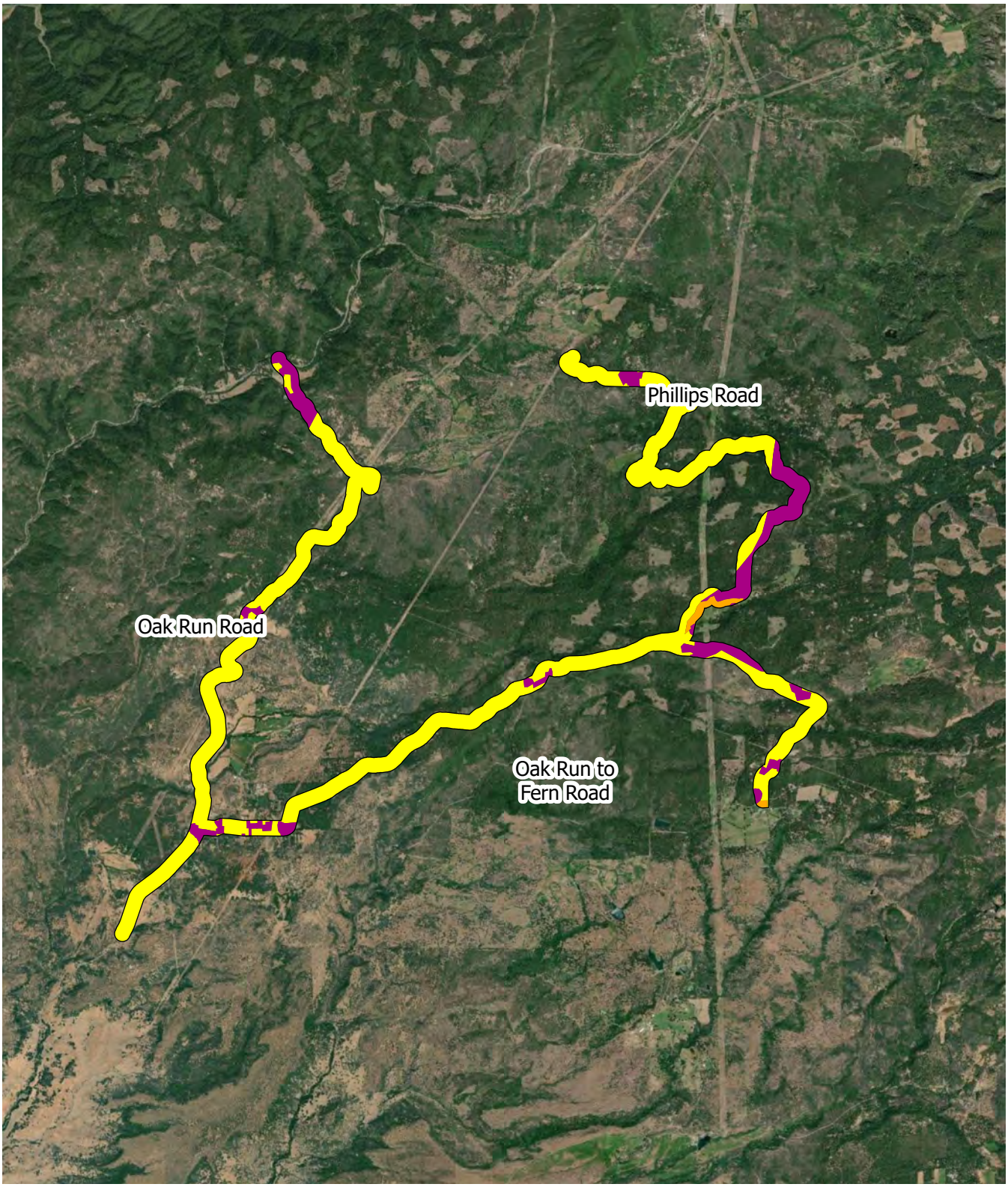
VESTRA

0 1.25 2.5 5 Miles

SOURCE: CALIFORNIA DEPARTMENT OF CONSERVATION 2020

FIGURE 22D
IMPORTANT FARMLAND
WILDFIRE MITIGATION/HAZARDOUS FUELS REDUCTION PROJECT
SHASTA COUNTY, CALIFORNIA

P:\GIS\72231\ProProjects\CEQA processing - 5293\CEQA processing - 5293.aprx\Figures\CEQA\Important Farmland Layout A



D: Urban and Built-Up Land
G: Grazing Land
L: Farmland of Local Importance
P: Prime Farmland
S: Farmland of Statewide Importance
U: Unique Farmland
X: Other Land
Z: Unclassified
Project Treatment Boundary

VESTRA

0 0.75 1.5 3 Miles

SOURCE: CALIFORNIA DEPARTMENT OF CONSERVATION 2020

FIGURE 22E
IMPORTANT FARMLAND
WILDFIRE MITIGATION/HAZARDOUS
FUELS REDUCTION PROJECT
SHASTA COUNTY, CALIFORNIA

P:\GIS\72231\ProProjects\CEQA processing - 5293\CEQA processing - 5293.aprx\Figures\CEQA\Important Farmland Layout A

Attachment B

NRCS Soils Report

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Intermountain Area, Parts of Lassen, Modoc, Shasta, and Siskiyou Counties, California; Shasta County Area, California; and Shasta-Trinity National Forest Area, Parts of Humboldt, Siskiyou, Shasta, Tehama, and Trinity Counties, California

December 30, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

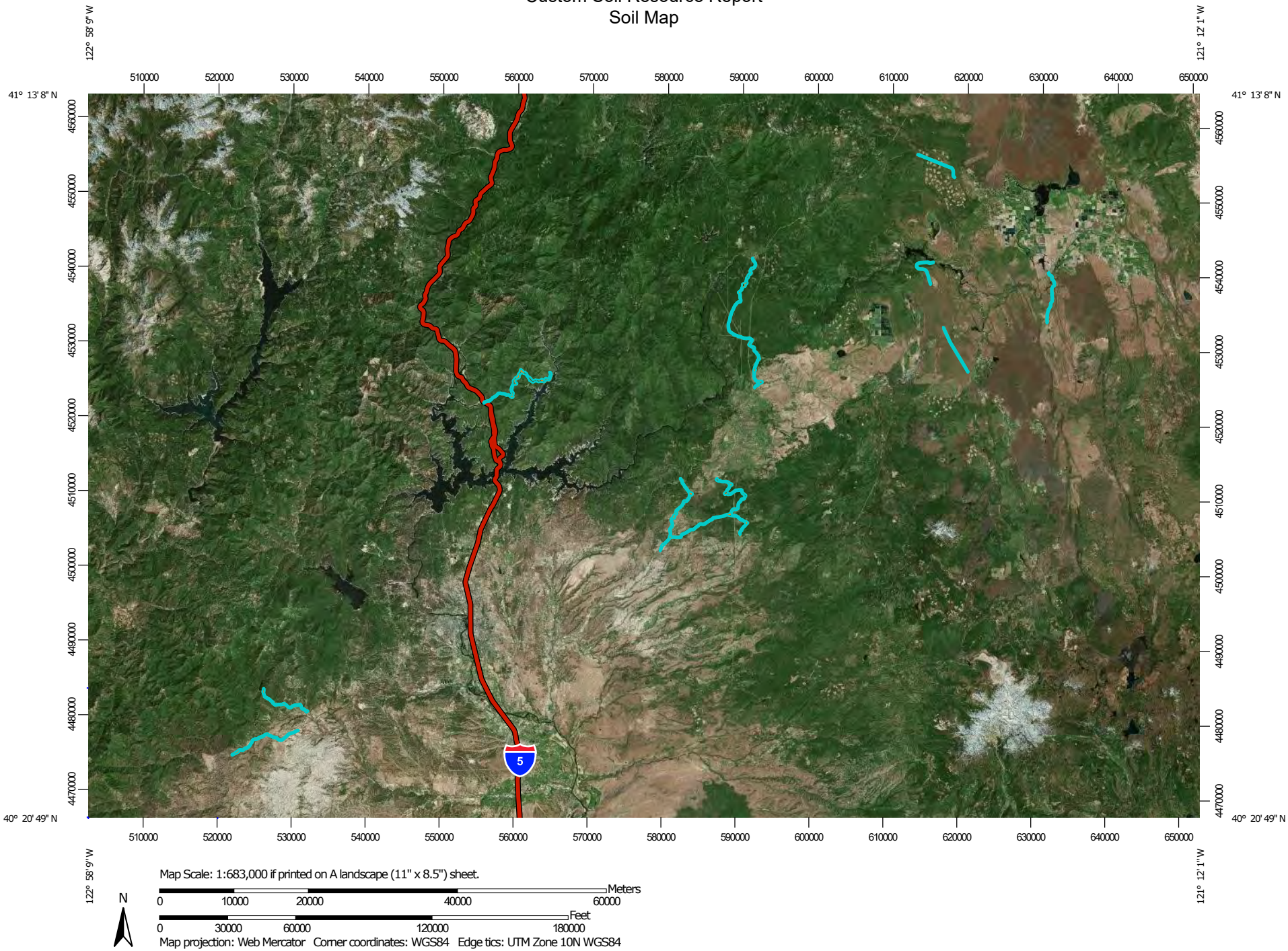
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:20,000 to 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Intermountain Area, Parts of Lassen, Modoc, Shasta, and Siskiyou Counties, California
Survey Area Data: Version 17, Sep 2, 2022

Soil Survey Area: Shasta County Area, California
Survey Area Data: Version 18, Sep 2, 2022

Soil Survey Area: Shasta-Trinity National Forest Area, Parts of Humboldt, Siskiyou, Shasta, Tehama, and Trinity Counties, California
Survey Area Data: Version 13, Sep 7, 2022

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

MAP LEGEND

MAP INFORMATION

Date(s) aerial images were photographed: Jan 1, 1999—Dec 31, 2003

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1hvdk	Water	1.8	0.0%
20qtt	Water	6.3	0.1%
2kr6b	Water	1.5	0.0%
2srj9	Tehama loam, 0 to 3 percent slopes, MLRA 17	10.8	0.1%
2srjh	Tehama loam, 3 to 8 percent slopes, bedrock substratum, MLRA 15	79.7	1.0%
2t7qq	Millsholm gravelly loam, 30 to 50 percent slopes, MLRA 15	133.3	1.7%
2w8b8	Vina loam, flood-plain steps, 0 to 5 percent slopes, MLRA 17	16.5	0.2%
2w8bv	Cohasset stony loam, 10 to 50 percent slopes, MLRA 22B	174.7	2.3%
2x29g	Sites loam, 15 to 30 percent slopes, low ffd	162.5	2.1%
2x8ky	Aiken loam, 2 to 9 percent slopes, low ffd	9.6	0.1%
2z5kx	Sierra sandy loam, 9 to 15 percent slopes, LRU 15XF	179.7	2.3%
2z5l2	Sierra sandy loam, 2 to 9 percent slopes, LRU 15XF	19.3	0.2%
2z5l7	Sierra sandy loam, 15 to 30 percent slopes, LRU 15XF	29.3	0.4%
hfl6	Aiken loam, 8 to 15 percent slopes	109.1	1.4%
hfl8	Aiken stony loam, 0 to 8 percent slopes	217.2	2.8%
hfl9	Aiken stony loam, 8 to 15 percent slopes	463.0	6.0%
hflb	Aiken stony loam, 15 to 30 percent	361.6	4.7%
hflf	Anderson gravelly sandy loam, moderately deep	1.6	0.0%
hflh	Anita very cobbly clay, 0 to 8 percent slopes	4.1	0.1%
hfly	Boomer gravelly loam, 15 to 30 percent slopes	6.2	0.1%
hfm3	Chaix coarse sandy loam, 30 to 50 percent slopes, severely eroded	56.0	0.7%
hfm4	Chaix coarse sandy loam, 50 to 70 percent slopes, severely eroded	37.9	0.5%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
hfm6	Chaix sandy loam, 30 to 50 percent slopes	15.5	0.2%
hfmc	Churn gravelly loam, 0 to 3 percent slopes	0.1	0.0%
hfmj	Cobbly alluvial land	27.0	0.3%
hfml	Cobbly alluvial land, frequently flooded	33.4	0.4%
hfmm	Cohasset loam, 0 to 30 percent slopes	57.7	0.7%
hfmn	Cohasset stony loam, 0 to 30 percent slopes	598.5	7.7%
hfmq	Cohasset very stony loam, 50 to 70 percent slopes	15.4	0.2%
hfmr	Cohasset very stony loam, moderaterately deep, 8 to 50 percent slopes	10.8	0.1%
hfms	Cohasset-Aiken stony loams, 0 to 30 percent slopes	384.0	5.0%
hfmt	Cohasset-McCarthy complex, 0 to 30 percent slopes	17.4	0.2%
hfnh	Gaviota very rocky sandy loam, 0 to 30 percent slopes	3.6	0.0%
hfnj	Gaviota very rocky sandy loam, 30 to 50 percent slopes, eroded	1.5	0.0%
hfnk	Goulding very stony loam, 10 to 30 percent slopes	55.4	0.7%
hfnp	Guenoc very stony loam, 0 to 30 percent slopes	78.1	1.0%
hfnq	Guenoc very rocky loam, 0 to 30 percent slopes	36.4	0.5%
hfnr	Guenoc very rocky loam, 30 to 50 percent slopes	8.6	0.1%
hfns	Henneke very rocky loam, 15 to 60 percent slopes	34.1	0.4%
hfnt	Hillgate loam	0.8	0.0%
hfnv	Holland sandy loam, 15 to 50 percent slopes	13.0	0.2%
hfp4	Inks gravelly loam, 8 to 30 percent slopes	22.9	0.3%
hfp9	Josephine gravelly loam, 10 to 30 percent slopes	11.9	0.2%
hfpb	Josephine gravelly loam, 30 to 50 percent slopes	104.9	1.4%
hfpc	Josephine gravelly loam, 50 to 70 percent slopes	3.4	0.0%
hfpm	Kanaka rocky sandy loam, 5 to 30 percent slopes	1.7	0.0%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
hfpn	Kanaka rocky sandy loam, 30 to 50 percent slopes	7.4	0.1%
hfpp	Kanaka rocky sandy loam, 50 to 70 percent slopes, eroded	8.3	0.1%
hfps	Keefers cobbly loam, channeled, 1 to 5 percent slopes	40.9	0.5%
hfpw	Kilarc sandy clay loam, 15 to 30 percent slopes	30.3	0.4%
hfpy	Kilarc very stony sandy clay loam, 10 to 30 percent slopes	109.0	1.4%
hfq2	Lodo shaly loam, 10 to 50 percent slopes	216.6	2.8%
hfq6	Los Robles loam, seeped, 0 to 3 percent slopes	21.0	0.3%
hfqd	Marpa gravelly loam, 30 to 50 percent slopes	15.8	0.2%
hfqf	Marpa gravelly loam, 50 to 75 percent slopes	40.1	0.5%
hfqh	Millsap loam, 5 to 30 percent slopes	6.5	0.1%
hfqm	Millsholm gravelly loam, 3 to 30 percent slopes	139.2	1.8%
hfqn	Millsholm gravelly loam, 3 to 30 percent slopes, eroded	20.7	0.3%
hfqq	Millsholm gravelly loam, 50 to 75 percent slopes	48.9	0.6%
hfqr	Millsholm very rocky loam, 30 to 50 percent slopes, eroded	15.3	0.2%
hfrc	Parrish loam, 8 to 30 percent slopes	42.9	0.6%
hfrd	Parrish loam, 30 to 50 percent slopes	27.7	0.4%
hfs2	Reiff fine sandy loam, 0 to 3 percent slopes	14.5	0.2%
hfsb	Riverwash	5.1	0.1%
hfsc	Rockland	0.7	0.0%
hfsl	Sehorn silty clay, moderately deep, 30 to 50 percent slopes	0.2	0.0%
hfsx	Sierra sandy loam, 15 to 30 percent slopes, severely eroded	4.9	0.1%
hfsy	Sierra sandy loam, 30 to 50 percent slopes	5.9	0.1%
hfsz	Sites loam, 5 to 15 percent slopes	16.4	0.2%
hft3	Sites stony loam, 8 to 30 percent slopes	310.2	4.0%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
hftd	Supan very stony loam, 0 to 30 percent slopes	38.8	0.5%
hftk	Tehama loam, 8 to 15 percent slopes	67.5	0.9%
hftl	Toomes very rocky loam, 0 to 50 percent slopes	6.0	0.1%
hftm	Toomes very stony loam, 0 to 30 percent slopes	80.2	1.0%
hftw	Wet alluvial land	1.5	0.0%
hftx	Windy and McCarthy stony sandy loams, 0 to 30 percent slopes	34.3	0.4%
hftz	Windy and McCarthy very stony sandy loams, 50 to 75 percent slopes	0.0	0.0%
hsrk	Etsel family, 40 to 80 percent slopes.	17.9	0.2%
hss5	Goulding family, 40 to 60 percent slopes.	11.4	0.1%
hss6	Goulding family, 60 to 80 percent slopes	3.5	0.0%
hssw	Holland-Goulding families association, 40 to 60 percent slopes.	88.3	1.1%
hssz	Holland family-Holland family, deep complex, 40 to 60 percent slopes.	21.7	0.3%
hst9	Holland family, deep, 0 to 20 percent slopes.	1.7	0.0%
hstb	Holland family, deep, 20 to 40 percent slopes.	3.7	0.0%
hstc	Holland family, deep, 40 to 60 percent slopes.	74.6	1.0%
hstf	Holland family, deep-Holland families complex, 20 to 40 percent slopes.	114.6	1.5%
hsw6	Marpa family, 20 to 40 percent slopes.	339.1	4.4%
hsw7	Marpa family, 40 to 60 percent slopes.	72.3	0.9%
hswc	Marpa-Goulding families association, 40 to 60 percent slopes.	220.1	2.8%
hsyn	Rock outcrop, limestone.	67.0	0.9%
ht35	Brownlee-Bobbitt families association, 0 to 35 percent slopes.	77.1	1.0%
jbkm	Bollibokka loam, 2 to 15 percent slopes	275.9	3.6%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
jbkw	Britton silty clay loam, 15 to 30 percent slopes	1.3	0.0%
jbky	Britton silty clay loam, 30 to 50 percent slopes	33.6	0.4%
jbl4	Bundora-Goulder complex, 30 to 50 percent slopes	0.3	0.0%
jblb	Burney-Arkright complex, 2 to 9 percent slopes	604.5	7.8%
jbm1	Chirpchatter-Hunsinger complex, 2 to 15 percent slopes	4.6	0.1%
jbmc	Cupvar silty clay, 0 to 2 percent slopes	1.5	0.0%
jbph	Gasper-Scarface complex, 30 to 50 percent slopes	3.7	0.0%
jbpk	Gasper-Scarface complex, moist, 2 to 15 percent slopes	52.4	0.7%
jbpr	Gooval cobbly loam, 2 to 9 percent slopes	30.0	0.4%
jbq8	Hambone-Boardburn complex, 30 to 50 percent slopes	3.5	0.0%
jbqb	Henhill silt loam, partially drained, 0 to 2 percent slopes	9.0	0.1%
jbqz	Jellico-Lava flows complex, 5 to 15 percent slopes	31.2	0.4%
jbrf	Jellycamp-Ollierivas complex, 2 to 9 percent slopes	17.6	0.2%
jbrt	Jimmerson loam-Jimmerson stony sandy loam complex, 2 to 15 percent slopes	282.5	3.7%
jbrw	Jimmerson loam-Jimmerson stony sandy loam complex, 15 to 30 percent slopes	67.5	0.9%
jbry	Jimmerson stony loam-Jimmerson loam complex, 30 to 50 percent slopes	3.3	0.0%
jbt7	Lava flows-Gassaway complex, 2 to 15 percent slopes	22.2	0.3%
jbxf	Pit silty clay, drained, 0 to 2 percent slopes	10.1	0.1%
jbxm	Pittville sandy loam, 0 to 5 percent slopes	22.7	0.3%
jbxt	Pittville sandy loam, 15 to 30 percent slopes	5.6	0.1%
jbyx	Rubble land-Argixerolls-Rock outcrop complex, 30 to 75 percent slopes	44.0	0.6%
jbz3	Rubble land-Xerorthents complex, 50 to 70 precent slopes	5.6	0.1%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
jc0p	Winnibulli loam, 0 to 2 percent slopes	31.6	0.4%
jc0t	Winnibulli-Burman complex, 0 to 5 percent slopes	9.4	0.1%
jc10	Wyntoon sandy loam, 2 to 15 percent slopes	29.6	0.4%
jc2x	Water	15.4	0.2%
Totals for Area of Interest		**7,726.2**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Intermountain Area, Parts of Lassen, Modoc, Shasta, and Siskiyou Counties, California; Shasta County Area, California; and Shasta-Trinity National Forest Area, Parts of Humboldt, Siskiyou, Shasta, Tehama, and Trinity Counties, California

1hvdk—Water

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

20qtt—Water

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

2kr6b—Water

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

2srj9—Tehama loam, 0 to 3 percent slopes, MLRA 17

Map Unit Setting

National map unit symbol: 2srj9
Elevation: 60 to 2,160 feet
Mean annual precipitation: 19 to 41 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 225 to 280 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Tehama and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tehama

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine-silty alluvium derived from sedimentary rock

Typical profile

Ap - 0 to 8 inches: loam
A - 8 to 19 inches: loam
Bt1 - 19 to 42 inches: clay loam
Bt2 - 42 to 50 inches: loam
Bt3 - 50 to 60 inches: very gravelly silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: C
Ecological site: R017XY905CA - Dry Alluvial Fans and Terraces
Other vegetative classification: LOAMY (015XD047CA_1)
Hydric soil rating: No

Minor Components

Hillgate

Percent of map unit: 5 percent
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Arbuckle

Percent of map unit: 5 percent
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Maywood

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

2srjh—Tehama loam, 3 to 8 percent slopes, bedrock substratum, MLRA 15

Map Unit Setting

National map unit symbol: 2srjh
Elevation: 490 to 1,570 feet
Mean annual precipitation: 27 to 37 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 225 to 250 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Tehama and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tehama

Setting

Landform: Strath terraces
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Fine-loamy alluvium derived from metamorphic and sedimentary rock

Typical profile

Ap - 0 to 7 inches: loam
A - 7 to 13 inches: loam
AB - 13 to 30 inches: loam
BAt - 30 to 39 inches: silty clay loam
Bt1 - 39 to 45 inches: silty clay loam
Bt2 - 45 to 60 inches: very gravelly clay loam
Cr - 60 to 70 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 48 to 79 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): 2e

Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R015XY006CA - Loamy Terrace >20"ppt
Hydric soil rating: No

Minor Components

Sehorn
Percent of map unit: 15 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

2t7qq—Millsholm gravelly loam, 30 to 50 percent slopes, MLRA 15

Map Unit Setting
National map unit symbol: 2t7qq
Elevation: 690 to 3,540 feet
Mean annual precipitation: 28 to 45 inches
Mean annual air temperature: 57 to 63 degrees F
Frost-free period: 200 to 320 days
Farmland classification: Not prime farmland

Map Unit Composition
Millsholm and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Millsholm

Setting
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Residuum weathered from sedimentary rock

Typical profile
A - 0 to 2 inches: gravelly loam
AB - 2 to 7 inches: gravelly loam
Bw - 7 to 16 inches: gravelly loam
R - 16 to 26 inches: bedrock

Properties and qualities
Slope: 30 to 50 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained

Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.28 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.3 to 0.5 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 2.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: R015XF008CA - Shallow Gravelly Foothills
Hydric soil rating: No

Minor Components

Gaviota

Percent of map unit: 8 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Millsap

Percent of map unit: 7 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

2w8b8—Vina loam, flood-plain steps, 0 to 5 percent slopes, MLRA 17

Map Unit Setting

National map unit symbol: 2w8b8
Elevation: 360 to 2,340 feet
Mean annual precipitation: 26 to 54 inches
Mean annual air temperature: 57 to 63 degrees F
Frost-free period: 250 to 325 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Vina and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Vina

Setting

Landform: Flood-plain steps
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile

Ap - 0 to 3 inches: loam
A1 - 3 to 12 inches: loam
A2 - 12 to 24 inches: loam
A3 - 24 to 34 inches: loam
C1 - 34 to 49 inches: loam
C2 - 49 to 63 inches: loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Maximum salinity: Nonsaline (0.2 to 0.5 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: B
Ecological site: R017XY903CA - Stream Channels and Floodplains
Hydric soil rating: No

Minor Components

Cobbly alluvial land

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Honn

Percent of map unit: 5 percent
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Los robles

Percent of map unit: 5 percent
Landform: Stream terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

2w8bv—Cohasset stony loam, 10 to 50 percent slopes, MLRA 22B

Map Unit Setting

National map unit symbol: 2w8bv
Elevation: 1,200 to 6,440 feet
Mean annual precipitation: 36 to 80 inches
Mean annual air temperature: 44 to 61 degrees F
Frost-free period: 150 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Cohasset and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cohasset

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum and/or colluvium derived from volcanic rock

Typical profile

Oi - 0 to 3 inches: slightly decomposed plant material
A - 3 to 7 inches: stony loam
AB - 7 to 17 inches: stony loam
BAt - 17 to 32 inches: stony clay loam
Bt1 - 32 to 43 inches: stony clay loam
Bt2 - 43 to 58 inches: stony clay
Cr - 58 to 63 inches: cemented bedrock

Properties and qualities

Slope: 10 to 50 percent
Surface area covered with cobbles, stones or boulders: 4.0 percent
Depth to restrictive feature: 39 to 60 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.01 to 0.14 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.2 to 0.5 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: F022BG201CA - Mesic Ash-Influenced Mountains
Hydric soil rating: No

Minor Components

Mccarthy

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Aiken

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Lyonsville

Percent of map unit: 4 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Nanny

Percent of map unit: 1 percent
Landform: Fan remnants
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

2x29g—Sites loam, 15 to 30 percent slopes, low ffd

Map Unit Setting

National map unit symbol: 2x29g
Elevation: 1,840 to 3,250 feet
Mean annual precipitation: 55 to 79 inches
Mean annual air temperature: 55 to 59 degrees F
Frost-free period: 200 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Sites and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sites

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from metamorphic and sedimentary rock

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 7 inches: loam
AB - 7 to 15 inches: loam
Bt1 - 15 to 28 inches: clay loam
Bt2 - 28 to 42 inches: clay
BCt - 42 to 64 inches: clay loam
C - 64 to 79 inches: sandy loam

Properties and qualities

Slope: 15 to 30 percent
Surface area covered with cobbles, stones or boulders: 0.0 percent
Depth to restrictive feature: 39 to 79 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.5 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C

Ecological site: F022BG201CA - Mesic Ash-Influenced Mountains
Hydric soil rating: No

Minor Components

Jocal
Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Kilarc
Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Millsholm
Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

2x8ky—Aiken loam, 2 to 9 percent slopes, low ffd

Map Unit Setting
National map unit symbol: 2x8ky
Elevation: 1,640 to 3,390 feet
Mean annual precipitation: 37 to 75 inches
Mean annual air temperature: 55 to 61 degrees F
Frost-free period: 205 to 275 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Aiken and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Aiken

Setting
Landform: Lava flows

Landform position (two-dimensional): Summit
Landform position (three-dimensional): Mountaintop
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium over residuum weathered from andesitic tuff breccia

Typical profile

Oi - 0 to 0 inches: slightly decomposed plant material
A - 0 to 11 inches: loam
BAt - 11 to 24 inches: clay loam
Bt - 24 to 91 inches: clay

Properties and qualities

Slope: 2 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.9 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F022BG201CA - Mesic Ash-Influenced Mountains
Hydric soil rating: No

Minor Components

Cohasset

Percent of map unit: 8 percent
Landform: Lava flows
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Mountaintop
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Mccarthy

Percent of map unit: 4 percent
Landform: Lava flows
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Guenoc

Percent of map unit: 3 percent
Landform: Lava flows
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex

Across-slope shape: Convex
Hydric soil rating: No

2z5kx—Sierra sandy loam, 9 to 15 percent slopes, LRU 15XF

Map Unit Setting

National map unit symbol: 2z5kx
Elevation: 1,020 to 1,510 feet
Mean annual precipitation: 39 to 44 inches
Mean annual air temperature: 59 to 63 degrees F
Frost-free period: 260 to 320 days
Farmland classification: Not prime farmland

Map Unit Composition

Sierra and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sierra

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope, summit
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from granodiorite

Typical profile

A1 - 0 to 4 inches: sandy loam
A2 - 4 to 10 inches: loam
Bt - 10 to 32 inches: clay loam
BCt - 32 to 43 inches: clay loam
Cr - 43 to 53 inches: bedrock

Properties and qualities

Slope: 9 to 15 percent
Depth to restrictive feature: 39 to 79 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.6 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C

Ecological site: R017XD085CA - GRANITIC
Hydric soil rating: No

Minor Components

Auberry
Percent of map unit: 10 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Caperton
Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

2z5l2—Sierra sandy loam, 2 to 9 percent slopes, LRU 15XF

Map Unit Setting
National map unit symbol: 2z5l2
Elevation: 1,070 to 1,390 feet
Mean annual precipitation: 40 to 44 inches
Mean annual air temperature: 61 to 63 degrees F
Frost-free period: 245 to 335 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Sierra and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sierra

Setting
Landform: Hillslopes
Landform position (two-dimensional): Footslope, backslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from granodiorite

Typical profile
A1 - 0 to 4 inches: sandy loam
A2 - 4 to 10 inches: loam

Bt - 10 to 32 inches: clay loam
BCt - 32 to 43 inches: clay loam
Cr - 43 to 53 inches: bedrock

Properties and qualities

Slope: 2 to 9 percent
Depth to restrictive feature: 39 to 79 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.6 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R017XD085CA - GRANITIC
Hydric soil rating: No

Minor Components

Auberry

Percent of map unit: 10 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Caperton

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

2z5l7—Sierra sandy loam, 15 to 30 percent slopes, LRU 15XF

Map Unit Setting

National map unit symbol: 2z5l7
Elevation: 890 to 1,740 feet
Mean annual precipitation: 42 to 55 inches
Mean annual air temperature: 59 to 63 degrees F
Frost-free period: 245 to 320 days

Farmland classification: Not prime farmland

Map Unit Composition

Sierra and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sierra

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear
Parent material: Residuum weathered from granodiorite

Typical profile

A1 - 0 to 4 inches: sandy loam
A2 - 4 to 10 inches: loam
Bt - 10 to 32 inches: clay loam
BCt - 32 to 43 inches: clay loam
Cr - 43 to 53 inches: bedrock

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: 39 to 79 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.6 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R017XD085CA - GRANITIC
Hydric soil rating: No

Minor Components

Auberry

Percent of map unit: 10 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Caperton

Percent of map unit: 5 percent
Landform: Hillslopes

Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

hfl6—Aiken loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: hfl6
Elevation: 1,200 to 1,500 feet
Mean annual precipitation: 30 to 65 inches
Mean annual air temperature: 50 to 61 degrees F
Frost-free period: 150 to 225 days
Farmland classification: Not prime farmland

Map Unit Composition

Aiken and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Aiken

Setting

Landform: Lava flows
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Mountaintop
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from volcanic rock

Typical profile

H1 - 0 to 10 inches: loam
H2 - 10 to 24 inches: clay loam
H3 - 24 to 90 inches: clay

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.7 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: C
Ecological site: F005XZ024CA - Ridges
Hydric soil rating: No

Minor Components

Cohasset
Percent of map unit: 8 percent
Landform: Lava flows
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Mountaintop
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Mccarthy
Percent of map unit: 4 percent
Landform: Lava flows
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Guenoc
Percent of map unit: 3 percent
Landform: Lava flows
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

hfl8—Aiken stony loam, 0 to 8 percent slopes

Map Unit Setting
National map unit symbol: hfl8
Elevation: 1,200 to 1,500 feet
Mean annual precipitation: 30 to 65 inches
Mean annual air temperature: 50 to 61 degrees F
Frost-free period: 150 to 225 days
Farmland classification: Not prime farmland

Map Unit Composition
Aiken and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Aiken

Setting

Landform: Lava flows
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Mountaintop, mountainbase
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from volcanic rock

Typical profile

H1 - 0 to 10 inches: stony loam
H2 - 10 to 24 inches: stony clay loam
H3 - 24 to 90 inches: stony clay

Properties and qualities

Slope: 2 to 8 percent
Surface area covered with cobbles, stones or boulders: 2.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.1 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: F005XZ024CA - Ridges
Hydric soil rating: No

Minor Components

Cohasset

Percent of map unit: 8 percent
Landform: Lava flows
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Mountaintop, mountainbase
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Mccarthy

Percent of map unit: 4 percent
Landform: Lava flows
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Mountaintop, mountainbase
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Guenoc

Percent of map unit: 3 percent

Landform: Lava flows
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Mountaintop, mountainbase
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

hfl9—Aiken stony loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: hfl9
Elevation: 1,200 to 1,500 feet
Mean annual precipitation: 30 to 65 inches
Mean annual air temperature: 50 to 61 degrees F
Frost-free period: 150 to 225 days
Farmland classification: Not prime farmland

Map Unit Composition

Aiken and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Aiken

Setting

Landform: Lava flows
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Mountaintop
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from volcanic rock

Typical profile

H1 - 0 to 10 inches: stony loam
H2 - 10 to 24 inches: stony clay loam
H3 - 24 to 90 inches: stony clay

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 2.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.1 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: F022BG201CA - Mesic Ash-Influenced Mountains
Hydric soil rating: No

Minor Components

Cohasset

Percent of map unit: 8 percent
Landform: Lava flows
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Mountaintop
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Mccarthy

Percent of map unit: 4 percent
Landform: Lava flows
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Guenoc

Percent of map unit: 3 percent
Landform: Lava flows
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

hflb—Aiken stony loam, 15 to 30 percent

Map Unit Setting

National map unit symbol: hflb
Elevation: 1,200 to 1,500 feet
Mean annual precipitation: 30 to 65 inches
Mean annual air temperature: 50 to 61 degrees F
Frost-free period: 150 to 225 days
Farmland classification: Not prime farmland

Map Unit Composition

Aiken and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Aiken

Setting

Landform: Lava flows
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Upper third of mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from volcanic rock

Typical profile

H1 - 0 to 10 inches: stony loam
H2 - 10 to 24 inches: stony clay loam
H3 - 24 to 90 inches: stony clay

Properties and qualities

Slope: 15 to 30 percent
Surface area covered with cobbles, stones or boulders: 2.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.1 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: F005XZ024CA - Ridges
Hydric soil rating: No

Minor Components

Cohasset

Percent of map unit: 8 percent
Landform: Lava flows
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Upper third of mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Mccarthy

Percent of map unit: 4 percent
Landform: Lava flows
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Upper third of mountainflank
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Guenoc

Percent of map unit: 3 percent

Landform: Lava flows
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Upper third of mountainflank
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

hflf—Anderson gravelly sandy loam, moderately deep

Map Unit Setting

National map unit symbol: hflf
Elevation: 350 to 1,500 feet
Mean annual precipitation: 25 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 225 to 300 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Anderson and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Anderson

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

H1 - 0 to 14 inches: gravelly sandy loam
H2 - 14 to 20 inches: gravelly sandy loam
H3 - 20 to 60 inches: stratified sandy loam to clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: RareNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.7 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: B

Ecological site: R017XY903CA - Stream Channels and Floodplains
Hydric soil rating: No

Minor Components

Honcut
Percent of map unit: 7 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Perkins
Percent of map unit: 6 percent
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Cobbly alluvial land
Percent of map unit: 2 percent
Landform: Channels
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

hflh—Anita very cobbly clay, 0 to 8 percent slopes

Map Unit Setting
National map unit symbol: hflh
Elevation: 150 to 1,500 feet
Mean annual precipitation: 30 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 200 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition
Anita and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Anita

Setting
Landform: Strath terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear

Parent material: Alluvium derived from andesite

Typical profile

H1 - 0 to 2 inches: very cobbly clay
H2 - 2 to 22 inches: gravelly clay
H3 - 22 to 26 inches: indurated

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 22 to 26 inches to paralithic bedrock
Drainage class: Somewhat poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): 4w
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: D
Ecological site: R017XY902CA - Duripan Vernal Pools
Hydric soil rating: Yes

Minor Components

Toomes

Percent of map unit: 6 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Unnamed

Percent of map unit: 5 percent
Landform: Strath terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Guenoc

Percent of map unit: 3 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Unnamed, organic soils

Percent of map unit: 1 percent
Landform: Strath terraces

Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

hfly—Boomer gravelly loam, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: hfly
Elevation: 600 to 5,500 feet
Mean annual precipitation: 30 to 60 inches
Mean annual air temperature: 54 to 59 degrees F
Frost-free period: 120 to 260 days
Farmland classification: Not prime farmland

Map Unit Composition

Boomer and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Boomer

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from metavolcanics

Typical profile

H1 - 0 to 3 inches: gravelly loam
H2 - 3 to 23 inches: gravelly sandy clay loam
H3 - 23 to 45 inches: clay loam
H4 - 45 to 49 inches: weathered bedrock

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: 45 to 49 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): 4e

Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: F015XY015CA - Loamy Mountains >40"ppt
Hydric soil rating: No

Minor Components

Goulding
Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Neuns
Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Stonyford
Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

hfm3—Chaix coarse sandy loam, 30 to 50 percent slopes, severely eroded

Map Unit Setting
National map unit symbol: hfm3
Elevation: 1,200 to 6,500 feet
Mean annual precipitation: 25 to 55 inches
Mean annual air temperature: 48 to 57 degrees F
Frost-free period: 100 to 225 days
Farmland classification: Not prime farmland

Map Unit Composition
Chaix and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chaix

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from granite

Typical profile

H1 - 0 to 5 inches: coarse sandy loam
H2 - 5 to 26 inches: coarse sandy loam
H3 - 26 to 30 inches: weathered bedrock

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: 26 to 30 inches to paralithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: F005XZ019CA - Deep Mesic Mountains 40-60"ppt
Hydric soil rating: No

Minor Components

Holland

Percent of map unit: 6 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Kanaka

Percent of map unit: 6 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Sierra

Percent of map unit: 3 percent
Landform: Hillslopes

Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

hfm4—Chaix coarse sandy loam, 50 to 70 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: hfm4
Elevation: 1,200 to 6,500 feet
Mean annual precipitation: 25 to 55 inches
Mean annual air temperature: 48 to 57 degrees F
Frost-free period: 100 to 225 days
Farmland classification: Not prime farmland

Map Unit Composition

Chaix and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chaix

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from granite

Typical profile

H1 - 0 to 5 inches: coarse sandy loam
H2 - 5 to 26 inches: coarse sandy loam
H3 - 26 to 30 inches: weathered bedrock

Properties and qualities

Slope: 50 to 70 percent
Depth to restrictive feature: 26 to 30 inches to paralithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: F005XZ019CA - Deep Mesic Mountains 40-60"ppt
Hydric soil rating: No

Minor Components

Kanaka
Percent of map unit: 6 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Holland
Percent of map unit: 6 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Sierra
Percent of map unit: 3 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

hfm6—Chaix sandy loam, 30 to 50 percent slopes

Map Unit Setting
National map unit symbol: hfm6
Elevation: 1,200 to 6,500 feet
Mean annual precipitation: 25 to 55 inches
Mean annual air temperature: 48 to 57 degrees F
Frost-free period: 100 to 225 days
Farmland classification: Not prime farmland

Map Unit Composition
Chaix and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chaix

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from granite

Typical profile

H1 - 0 to 9 inches: sandy loam
H2 - 9 to 26 inches: sandy loam
H3 - 26 to 30 inches: weathered bedrock

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: 26 to 30 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: F005XZ019CA - Deep Mesic Mountains 40-60"ppt
Hydric soil rating: No

Minor Components

Kanaka

Percent of map unit: 6 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Holland

Percent of map unit: 6 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Sierra

Percent of map unit: 3 percent
Landform: Hillslopes

Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

hfmc—Churn gravelly loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: hfmc
Elevation: 400 to 800 feet
Mean annual precipitation: 35 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 250 to 275 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Churn and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Churn

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

H1 - 0 to 13 inches: gravelly loam
H2 - 13 to 60 inches: gravelly loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.2 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: C
Ecological site: R017XY904CA - Subirrigated Deep Alluvial Fans

Hydric soil rating: No

Minor Components

Cobbly alluvial land
Percent of map unit: 5 percent
Landform: Channels
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Honcut
Percent of map unit: 4 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Perkins
Percent of map unit: 3 percent
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Tehama
Percent of map unit: 3 percent
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

hfmj—Cobbly alluvial land

Map Unit Setting
National map unit symbol: hfmj
Elevation: 20 to 2,400 feet
Mean annual precipitation: 30 inches
Mean annual air temperature: 57 degrees F
Frost-free period: 200 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition
Cobbly alluvial land: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cobbly Alluvial Land

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Gravelly alluvium

Typical profile

H1 - 0 to 12 inches: very cobbly sand
H2 - 12 to 60 inches: very cobbly loamy sand

Properties and qualities

Slope: 1 to 5 percent
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Frequency of flooding: Rare
Available water supply, 0 to 60 inches: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydric soil rating: No

Minor Components

Cobbly alluvial land

Percent of map unit: 10 percent
Landform: Channels
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

hfml—Cobbly alluvial land, frequently flooded

Map Unit Setting

National map unit symbol: hfml
Elevation: 20 to 2,400 feet
Mean annual precipitation: 30 inches
Mean annual air temperature: 57 degrees F
Frost-free period: 200 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition

Cobbly alluvial land, frequently flooded: 90 percent
Minor components: 10 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cobbly Alluvial Land, Frequently Flooded

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Gravelly alluvium

Typical profile

H1 - 0 to 12 inches: very cobbly loamy sand
H2 - 12 to 60 inches: very cobbly loamy sand

Properties and qualities

Slope: 0 to 5 percent
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Frequency of flooding: Frequent
Available water supply, 0 to 60 inches: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydric soil rating: Yes

Minor Components

Unnamed

Percent of map unit: 10 percent
Landform: Channels
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

hfmm—Cohasset loam, 0 to 30 percent slopes

Map Unit Setting

National map unit symbol: hfmm
Elevation: 2,000 to 5,000 feet
Mean annual precipitation: 50 inches
Mean annual air temperature: 55 degrees F
Frost-free period: 150 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Cohasset and similar soils: 85 percent

Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cohasset

Setting

Landform: Lava flows
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Mountaintop
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from volcanic rock

Typical profile

H1 - 0 to 18 inches: loam
H2 - 18 to 27 inches: loam
H3 - 27 to 53 inches: gravelly loam
H4 - 53 to 68 inches: very cobbly clay loam
H5 - 68 to 72 inches: weathered bedrock

Properties and qualities

Slope: 2 to 30 percent
Depth to restrictive feature: 68 to 72 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: F022BG201CA - Mesic Ash-Influenced Mountains
Hydric soil rating: No

Minor Components

Aiken

Percent of map unit: 6 percent
Landform: Lava flows
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Mountaintop
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Mccarthy

Percent of map unit: 4 percent
Landform: Lava flows
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Mountaintop
Down-slope shape: Linear
Across-slope shape: Linear

Hydric soil rating: No

Lyonsville

Percent of map unit: 3 percent
Landform: Lava flows
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Nanny

Percent of map unit: 2 percent
Landform: Fan remnants
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

hfmn—Cohasset stony loam, 0 to 30 percent slopes

Map Unit Setting

National map unit symbol: hfmn
Elevation: 2,000 to 5,000 feet
Mean annual precipitation: 50 inches
Mean annual air temperature: 55 degrees F
Frost-free period: 150 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Cohasset and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cohasset

Setting

Landform: Lava flows
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Mountaintop, mountainflank, mountainbase
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from volcanic rock

Typical profile

H1 - 0 to 18 inches: stony loam
H2 - 18 to 60 inches: stony clay loam
H3 - 60 to 79 inches: weathered bedrock

Properties and qualities

Slope: 2 to 30 percent
Surface area covered with cobbles, stones or boulders: 2.0 percent
Depth to restrictive feature: 60 to 64 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: F022BG201CA - Mesic Ash-Influenced Mountains
Hydric soil rating: No

Minor Components

Aiken

Percent of map unit: 6 percent
Landform: Lava flows
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Mountaintop, mountainflank, mountainbase
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Mccarthy

Percent of map unit: 4 percent
Landform: Lava flows
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Mountainbase, mountainflank, mountaintop
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Lyonsville

Percent of map unit: 3 percent
Landform: Lava flows
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Mountaintop, mountainflank, mountainbase
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Nanny

Percent of map unit: 2 percent
Landform: Fan remnants
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear

Hydric soil rating: No

hfmq—Cohasset very stony loam, 50 to 70 percent slopes

Map Unit Setting

National map unit symbol: hfmq
Elevation: 2,000 to 5,000 feet
Mean annual precipitation: 50 inches
Mean annual air temperature: 55 degrees F
Frost-free period: 150 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Cohasset and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cohasset

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from volcanic rock

Typical profile

H1 - 0 to 15 inches: very stony loam
H2 - 15 to 55 inches: stony clay loam
H3 - 55 to 59 inches: weathered bedrock

Properties and qualities

Slope: 50 to 60 percent
Surface area covered with cobbles, stones or boulders: 5.0 percent
Depth to restrictive feature: 55 to 59 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: F022BG201CA - Mesic Ash-Influenced Mountains
Hydric soil rating: No

Minor Components

Mccarthy

Percent of map unit: 6 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Unnamed

Percent of map unit: 4 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Nanny

Percent of map unit: 3 percent
Landform: Fan remnants
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Aiken

Percent of map unit: 1 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Lyonsville

Percent of map unit: 1 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

hfmr—Cohasset very stony loam, moderaterately deep, 8 to 50 percent slopes

Map Unit Setting

National map unit symbol: hfmr
Elevation: 2,000 to 5,500 feet
Mean annual precipitation: 45 inches
Mean annual air temperature: 55 degrees F
Frost-free period: 150 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Cohasset and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cohasset

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from volcanic rock

Typical profile

H1 - 0 to 16 inches: very stony loam
H2 - 16 to 36 inches: stony clay loam
H3 - 36 to 40 inches: weathered bedrock

Properties and qualities

Slope: 8 to 50 percent
Surface area covered with cobbles, stones or boulders: 5.0 percent
Depth to restrictive feature: 36 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Ecological site: F022BG201CA - Mesic Ash-Influenced Mountains
Hydric soil rating: No

Minor Components

Lyonsville

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Aiken

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Mccarthy

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

hfms—Cohasset-Aiken stony loams, 0 to 30 percent slopes

Map Unit Setting

National map unit symbol: hfms
Elevation: 1,200 to 5,000 feet
Mean annual precipitation: 30 to 65 inches
Mean annual air temperature: 50 to 61 degrees F
Frost-free period: 150 to 225 days
Farmland classification: Not prime farmland

Map Unit Composition

Cohasset and similar soils: 60 percent
Aiken and similar soils: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cohasset

Setting

Landform: Lava flows
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Mountaintop

Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from volcanic rock

Typical profile

H1 - 0 to 18 inches: stony loam
H2 - 18 to 60 inches: stony clay loam
H3 - 60 to 64 inches: weathered bedrock

Properties and qualities

Slope: 2 to 30 percent
Surface area covered with cobbles, stones or boulders: 2.0 percent
Depth to restrictive feature: 60 to 64 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.2 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: F022BG201CA - Mesic Ash-Influenced Mountains
Hydric soil rating: No

Description of Aiken

Setting

Landform: Lava flows
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Mountaintop
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from volcanic rock

Typical profile

H1 - 0 to 10 inches: stony loam
H2 - 10 to 24 inches: stony clay loam
H3 - 24 to 60 inches: stony clay

Properties and qualities

Slope: 2 to 30 percent
Surface area covered with cobbles, stones or boulders: 2.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.1 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: F022BG201CA - Mesic Ash-Influenced Mountains
Hydric soil rating: No

hfmt—Cohasset-McCarthy complex, 0 to 30 percent slopes

Map Unit Setting

National map unit symbol: hfmt
Elevation: 2,000 to 6,000 feet
Mean annual precipitation: 35 to 70 inches
Mean annual air temperature: 50 to 57 degrees F
Frost-free period: 140 to 225 days
Farmland classification: Not prime farmland

Map Unit Composition

Cohasset and similar soils: 60 percent
Mccarthy and similar soils: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cohasset

Setting

Landform: Lava flows
Landform position (two-dimensional): Shoulder, summit, backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Residuum weathered from volcanic rock

Typical profile

H1 - 0 to 18 inches: stony loam
H2 - 18 to 60 inches: stony clay loam
H3 - 60 to 64 inches: weathered bedrock

Properties and qualities

Slope: 2 to 30 percent
Depth to restrictive feature: 60 to 64 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: F022BG201CA - Mesic Ash-Influenced Mountains
Hydric soil rating: No

Description of Mccarthy

Setting

Landform: Lava flows
Landform position (two-dimensional): Shoulder, summit, backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from basalt

Typical profile

H1 - 0 to 20 inches: stony sandy loam
H2 - 20 to 44 inches: very cobbly sandy loam
H3 - 44 to 48 inches: unweathered bedrock

Properties and qualities

Slope: 0 to 30 percent
Depth to restrictive feature: 44 to 48 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.03 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: F022BG201CA - Mesic Ash-Influenced Mountains
Hydric soil rating: No

hfnh—Gaviota very rocky sandy loam, 0 to 30 percent slopes

Map Unit Setting

National map unit symbol: hfnh
Elevation: 100 to 4,000 feet
Mean annual precipitation: 20 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 200 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Gaviota and similar soils: 65 percent
Rock outcrop: 20 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gaviota

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder, footslope, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from sandstone

Typical profile

H1 - 0 to 17 inches: sandy loam
H2 - 17 to 21 inches: unweathered bedrock

Properties and qualities

Slope: 5 to 30 percent
Depth to restrictive feature: 17 to 21 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R015XF008CA - Shallow Gravelly Foothills
Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from sandstone

Typical profile

H1 - 0 to 4 inches: unweathered bedrock

Properties and qualities

Slope: 5 to 30 percent
Depth to restrictive feature: 0 to 4 inches to lithic bedrock
Drainage class: Excessively drained

Capacity of the most limiting layer to transmit water (Ksat): Low to very high (0.01 to 19.98 in/hr)
Available water supply, 0 to 60 inches: Very low (about 0.0 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Minor Components

Millsholm
Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, footslope, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Millsap
Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Lodo
Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

hfnj—Gaviota very rocky sandy loam, 30 to 50 percent slopes, eroded

Map Unit Setting
National map unit symbol: hfnj
Elevation: 100 to 4,000 feet
Mean annual precipitation: 20 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 200 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition
Gaviota and similar soils: 65 percent

Rock outcrop: 20 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gaviota

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from sandstone

Typical profile

H1 - 0 to 15 inches: sandy loam
H2 - 15 to 19 inches: unweathered bedrock

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: 15 to 19 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: R015XF008CA - Shallow Gravelly Foothills
Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from sandstone

Typical profile

H1 - 0 to 4 inches: unweathered bedrock

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: 0 to 4 inches to lithic bedrock
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Low to very high (0.01 to 19.98 in/hr)
Available water supply, 0 to 60 inches: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Minor Components

Millsap

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Lodo

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Millsholm

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

hfnk—Goulding very stony loam, 10 to 30 percent slopes

Map Unit Setting

National map unit symbol: hfnk
Elevation: 1,500 to 5,000 feet
Mean annual precipitation: 30 inches
Mean annual air temperature: 55 degrees F
Frost-free period: 150 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Goulding and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Goulding

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from greenstone

Typical profile

H1 - 0 to 5 inches: very stony loam
H2 - 5 to 16 inches: gravelly loam
H3 - 16 to 20 inches: unweathered bedrock

Properties and qualities

Slope: 10 to 30 percent
Surface area covered with cobbles, stones or boulders: 5.0 percent
Depth to restrictive feature: 16 to 20 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Ecological site: R015XD096CA - STEEP GRAVELLY LOAM
Hydric soil rating: No

Minor Components

Auburn

Percent of map unit: 10 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Diamond springs

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

hfnp—Guenoc very stony loam, 0 to 30 percent slopes

Map Unit Setting

National map unit symbol: hfnp
Elevation: 400 to 3,000 feet
Mean annual precipitation: 25 to 50 inches
Mean annual air temperature: 57 degrees F
Frost-free period: 200 to 225 days
Farmland classification: Not prime farmland

Map Unit Composition

Guenoc and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Guenoc

Setting

Landform: Lava flows
Landform position (two-dimensional): Shoulder, backslope, summit, footslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from volcanic rock

Typical profile

H1 - 0 to 5 inches: very stony loam
H2 - 5 to 23 inches: very cobbly clay
H3 - 23 to 25 inches: unweathered bedrock

Properties and qualities

Slope: 2 to 30 percent
Surface area covered with cobbles, stones or boulders: 5.0 percent
Depth to restrictive feature: 23 to 25 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R018XA103CA - Shallow Thermic Volcanic Ridges
Hydric soil rating: No

Minor Components

Supan

Percent of map unit: 7 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope, summit, footslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Unnamed

Percent of map unit: 5 percent
Landform: Lava flows
Landform position (two-dimensional): Footslope, summit, backslope, shoulder
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Aiken

Percent of map unit: 3 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

hfnq—Guenoc very rocky loam, 0 to 30 percent slopes

Map Unit Setting

National map unit symbol: hfnq
Elevation: 400 to 3,000 feet
Mean annual precipitation: 25 to 50 inches
Mean annual air temperature: 57 degrees F
Frost-free period: 200 to 225 days
Farmland classification: Not prime farmland

Map Unit Composition

Guenoc and similar soils: 70 percent
Rock outcrop: 15 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Guenoc

Setting

Landform: Lava flows
Landform position (two-dimensional): Shoulder, backslope, summit, footslope

Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from volcanic rock

Typical profile

H1 - 0 to 5 inches: very stony loam
H2 - 5 to 23 inches: very cobbly clay
H3 - 23 to 27 inches: unweathered bedrock

Properties and qualities

Slope: 2 to 30 percent
Depth to restrictive feature: 23 to 27 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Ecological site: R018XA103CA - Shallow Thermic Volcanic Ridges
Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Lava flows
Landform position (two-dimensional): Backslope, footslope, summit, shoulder
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from volcanic rock

Typical profile

H1 - 0 to 10 inches: unweathered bedrock

Properties and qualities

Slope: 2 to 30 percent
Depth to restrictive feature: 0 to 4 inches to lithic bedrock
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Low to very high (0.01 to 19.98 in/hr)
Available water supply, 0 to 60 inches: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Minor Components

Toomes

Percent of map unit: 7 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope, summit, footslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Supan

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope, summit, footslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Aiken

Percent of map unit: 3 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope, summit, footslope
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

hfnr—Guenoc very rocky loam, 30 to 50 percent slopes

Map Unit Setting

National map unit symbol: hfnr
Elevation: 400 to 3,000 feet
Mean annual precipitation: 25 to 50 inches
Mean annual air temperature: 57 degrees F
Frost-free period: 200 to 225 days
Farmland classification: Not prime farmland

Map Unit Composition

Guenoc and similar soils: 70 percent
Rock outcrop: 15 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Guenoc

Setting

Landform: Lava flows

Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from volcanic rock

Typical profile

H1 - 0 to 5 inches: very stony loam
H2 - 5 to 23 inches: very cobbly clay
H3 - 23 to 27 inches: unweathered bedrock

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: 23 to 27 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Ecological site: R018XA103CA - Shallow Thermic Volcanic Ridges
Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Lava flows
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from volcanic rock

Typical profile

H1 - 0 to 4 inches: unweathered bedrock

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: 0 to 4 inches to lithic bedrock
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Low to very high (0.01 to 19.98 in/hr)
Available water supply, 0 to 60 inches: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Minor Components

Aiken

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Supan

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Toomes

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

hfns—Henneke very rocky loam, 15 to 60 percent slopes

Map Unit Setting

National map unit symbol: hfns
Elevation: 500 to 4,000 feet
Mean annual precipitation: 16 to 55 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 125 to 260 days
Farmland classification: Not prime farmland

Map Unit Composition

Henneke and similar soils: 65 percent
Rock outcrop: 20 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Henneke

Setting

Landform: Hillslopes

Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from serpentinite

Typical profile

H1 - 0 to 10 inches: gravelly loam
H2 - 10 to 16 inches: very stony clay loam
H3 - 16 to 20 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 60 percent
Depth to restrictive feature: 16 to 20 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: R015XD135CA - VERY SHALLOW LOAMY
Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from serpentinite

Typical profile

H1 - 0 to 10 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 60 percent
Depth to restrictive feature: 0 to 4 inches to lithic bedrock
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Low to very high (0.01 to 19.98 in/hr)
Available water supply, 0 to 60 inches: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 10 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Landslides

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

hfnt—Hillgate loam

Map Unit Setting

National map unit symbol: hfnt
Elevation: 2,000 feet
Mean annual precipitation: 22 inches
Mean annual air temperature: 64 degrees F
Frost-free period: 200 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Hillgate and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hillgate

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

H1 - 0 to 8 inches: loam
H2 - 8 to 65 inches: clay loam
H3 - 65 to 80 inches: clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.2 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: D
Ecological site: R017XY905CA - Dry Alluvial Fans and Terraces
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 8 percent
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Tehama

Percent of map unit: 7 percent
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

hfnv—Holland sandy loam, 15 to 50 percent slopes

Map Unit Setting

National map unit symbol: hfnv
Elevation: 1,800 to 5,600 feet
Mean annual precipitation: 30 to 60 inches
Mean annual air temperature: 54 to 57 degrees F
Frost-free period: 150 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Holland and similar soils: 85 percent
Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Holland

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from granite

Typical profile

H1 - 0 to 6 inches: sandy loam
H2 - 6 to 34 inches: sandy clay loam
H3 - 34 to 60 inches: sandy loam

Properties and qualities

Slope: 15 to 50 percent
Depth to restrictive feature: 34 to 60 inches to abrupt textural change
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: F005XZ006CA - Mesic Hills <40"ppt
Hydric soil rating: No

Minor Components

Chaix

Percent of map unit: 7 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Unnamed

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Auburn

Percent of map unit: 3 percent

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

hfp4—Inks gravelly loam, 8 to 30 percent slopes

Map Unit Setting

National map unit symbol: hfp4
Elevation: 200 to 2,000 feet
Mean annual precipitation: 30 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 175 to 225 days
Farmland classification: Not prime farmland

Map Unit Composition

Inks and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Inks

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from volcanic rock

Typical profile

H1 - 0 to 14 inches: gravelly loam
H2 - 14 to 19 inches: very gravelly loam
H3 - 19 to 23 inches: unweathered bedrock

Properties and qualities

Slope: 8 to 30 percent
Depth to restrictive feature: 19 to 23 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.2 inches)

Interpretive groups

Land capability classification (irrigated): 7e

Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: R017XD086CA - SHALLOW LOAMY
Hydric soil rating: No

Minor Components

Tuscan
Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Crest
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Supan
Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Pentz
Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Nose slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

hfp9—Josephine gravelly loam, 10 to 30 percent slopes

Map Unit Setting
National map unit symbol: hfp9
Elevation: 1,200 to 5,000 feet
Mean annual precipitation: 50 inches
Mean annual air temperature: 55 degrees F
Frost-free period: 125 to 260 days
Farmland classification: Not prime farmland

Map Unit Composition
Josephine and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Josephine

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from metasedimentary rock

Typical profile

H1 - 0 to 4 inches: gravelly loam
H2 - 4 to 45 inches: gravelly clay loam
H3 - 45 to 60 inches: very stony clay loam
H4 - 60 to 64 inches: weathered bedrock

Properties and qualities

Slope: 10 to 30 percent
Depth to restrictive feature: 60 to 64 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: F005XZ024CA - Ridges
Hydric soil rating: No

Minor Components

Marpa

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Sheetiron

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Sites

Percent of map unit: 5 percent

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

hfpb—Josephine gravelly loam, 30 to 50 percent slopes

Map Unit Setting

National map unit symbol: hfpb
Elevation: 1,200 to 5,000 feet
Mean annual precipitation: 50 inches
Mean annual air temperature: 55 degrees F
Frost-free period: 125 to 260 days
Farmland classification: Not prime farmland

Map Unit Composition

Josephine and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Josephine

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from metasedimentary rock

Typical profile

H1 - 0 to 4 inches: gravelly loam
H2 - 4 to 45 inches: gravelly clay loam
H3 - 45 to 60 inches: very stony clay loam
H4 - 60 to 64 inches: weathered bedrock

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: 60 to 64 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: F005XZ024CA - Ridges
Hydric soil rating: No

Minor Components

Sheetiron

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Sites

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Marpa

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

hfpc—Josephine gravelly loam, 50 to 70 percent slopes

Map Unit Setting

National map unit symbol: hfpc
Elevation: 1,200 to 5,000 feet
Mean annual precipitation: 50 inches
Mean annual air temperature: 55 degrees F
Frost-free period: 125 to 260 days
Farmland classification: Not prime farmland

Map Unit Composition

Josephine and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Josephine

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from metasedimentary rock

Typical profile

H1 - 0 to 4 inches: gravelly loam
H2 - 4 to 45 inches: gravelly clay loam
H3 - 45 to 60 inches: very stony clay loam
H4 - 60 to 64 inches: weathered bedrock

Properties and qualities

Slope: 50 to 70 percent
Depth to restrictive feature: 60 to 64 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: F005XZ024CA - Ridges
Hydric soil rating: No

Minor Components

Marpa

Percent of map unit: 7 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Sheetiron

Percent of map unit: 6 percent
Landform: Mountain slopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Sites

Percent of map unit: 2 percent

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

hfpm—Kanaka rocky sandy loam, 5 to 30 percent slopes

Map Unit Setting

National map unit symbol: hfpm
Elevation: 500 to 1,000 feet
Mean annual precipitation: 50 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 200 to 225 days
Farmland classification: Not prime farmland

Map Unit Composition

Kanaka and similar soils: 70 percent
Rock outcrop: 15 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kanaka

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from metavolcanics

Typical profile

H1 - 0 to 9 inches: sandy loam
H2 - 9 to 48 inches: sandy loam
H3 - 48 to 52 inches: weathered bedrock

Properties and qualities

Slope: 5 to 30 percent
Depth to restrictive feature: 48 to 52 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: R015XD124CA - GRANITIC
Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Nose slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from metavolcanics

Properties and qualities

Depth to restrictive feature: 0 to 4 inches to lithic bedrock
Drainage class: Excessively drained

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Minor Components

Diamond springs

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Auberry

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Chaix

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

hfpn—Kanaka rocky sandy loam, 30 to 50 percent slopes

Map Unit Setting

National map unit symbol: hfpn
Elevation: 500 to 1,000 feet
Mean annual precipitation: 50 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 200 to 225 days
Farmland classification: Not prime farmland

Map Unit Composition

Kanaka and similar soils: 70 percent
Rock outcrop: 15 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kanaka

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from metavolcanics

Typical profile

H1 - 0 to 9 inches: sandy loam
H2 - 9 to 48 inches: sandy loam
H3 - 48 to 52 inches: weathered bedrock

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: 48 to 52 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: R015XD124CA - GRANITIC
Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from metavolcanics

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: 0 to 4 inches to lithic bedrock
Drainage class: Excessively drained

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Minor Components

Auberry

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Chaix

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Diamond springs

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

hfpp—Kanaka rocky sandy loam, 50 to 70 percent slopes, eroded

Map Unit Setting

National map unit symbol: hfpp
Elevation: 500 to 1,000 feet
Mean annual precipitation: 50 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 200 to 225 days
Farmland classification: Not prime farmland

Map Unit Composition

Kanaka and similar soils: 70 percent
Rock outcrop: 15 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kanaka

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from metavolcanics

Typical profile

H1 - 0 to 9 inches: sandy loam
H2 - 9 to 48 inches: sandy loam
H3 - 48 to 52 inches: weathered bedrock

Properties and qualities

Slope: 50 to 70 percent
Depth to restrictive feature: 48 to 52 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: R015XD124CA - GRANITIC
Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from metavolcanics

Typical profile

H1 - 0 to 10 inches: unweathered bedrock

Properties and qualities

Slope: 50 to 70 percent
Depth to restrictive feature: 0 to 4 inches to lithic bedrock
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Low to very high (0.01 to 19.98 in/hr)
Available water supply, 0 to 60 inches: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Minor Components

Auberry

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Diamond springs

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Chaix

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

hfps—Keefers cobbly loam, channeled, 1 to 5 percent slopes

Map Unit Setting

National map unit symbol: hfps
Elevation: 200 to 1,000 feet
Mean annual precipitation: 25 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 230 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

Keefers and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Keefers

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from volcanic rock

Typical profile

H1 - 0 to 14 inches: cobbly loam
H2 - 14 to 21 inches: clay loam
H3 - 21 to 60 inches: very gravelly clay

Properties and qualities

Slope: 1 to 5 percent
Depth to restrictive feature: 21 to 60 inches to duripan
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): 4w
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C
Ecological site: R017XY902CA - Duripan Vernal Pools
Hydric soil rating: Yes

Minor Components

Unnamed

Percent of map unit: 10 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Cobbly alluvial land

Percent of map unit: 5 percent
Landform: Channels
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

hfpw—Kilarc sandy clay loam, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: hfpw
Elevation: 1,000 to 3,600 feet
Mean annual precipitation: 30 to 65 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 120 to 225 days
Farmland classification: Not prime farmland

Map Unit Composition

Kilarc and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kilarc

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from sedimentary rock

Typical profile

H1 - 0 to 9 inches: sandy clay loam
H2 - 9 to 22 inches: clay
H3 - 22 to 44 inches: clay loam
H4 - 44 to 48 inches: weathered bedrock

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: More than 80 inches; 44 to 48 inches to paralithic bedrock
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: F022BG201CA - Mesic Ash-Influenced Mountains
Hydric soil rating: No

Minor Components

Parrish

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Sites

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Supan

Percent of map unit: 3 percent
Landform: Mountain slopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Mountaintop
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Inks

Percent of map unit: 2 percent
Landform: Mountain slopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Convex

Hydric soil rating: No

hfpy—Kilarc very stony sandy clay loam, 10 to 30 percent slopes

Map Unit Setting

National map unit symbol: hfpy
Elevation: 1,000 to 3,600 feet
Mean annual precipitation: 30 to 65 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 120 to 225 days
Farmland classification: Not prime farmland

Map Unit Composition

Kilarc and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kilarc

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from sedimentary rock

Typical profile

H1 - 0 to 9 inches: very stony sandy clay loam
H2 - 9 to 22 inches: clay
H3 - 22 to 44 inches: clay loam
H4 - 44 to 48 inches: weathered bedrock

Properties and qualities

Slope: 10 to 30 percent
Surface area covered with cobbles, stones or boulders: 5.0 percent
Depth to restrictive feature: More than 80 inches; 44 to 48 inches to paralithic bedrock
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C

Ecological site: F022BG201CA - Mesic Ash-Influenced Mountains
Hydric soil rating: No

Minor Components

Parrish
Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Sites
Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Supan
Percent of map unit: 3 percent
Landform: Mountain slopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Mountaintop
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Inks
Percent of map unit: 2 percent
Landform: Mountain slopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

hfq2—Lodo shaly loam, 10 to 50 percent slopes

Map Unit Setting
National map unit symbol: hfq2
Elevation: 300 to 3,500 feet
Mean annual precipitation: 12 to 35 inches
Mean annual air temperature: 59 to 64 degrees F
Frost-free period: 200 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Lodo and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lodo

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from shale

Typical profile

H1 - 0 to 10 inches: channery loam
H2 - 10 to 14 inches: unweathered bedrock

Properties and qualities

Slope: 10 to 50 percent
Depth to restrictive feature: 10 to 14 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: R015XF016CA - Very Shallow Steep Foothills
Hydric soil rating: No

Minor Components

Gaviota

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Millsholm

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear

Ecological site: R015XF016CA - Very Shallow Steep Foothills
Hydric soil rating: No

Sehorn

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

hfq6—Los Robles loam, seeped, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: hfq6
Elevation: 100 to 1,000 feet
Mean annual precipitation: 25 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 200 to 250 days
Farmland classification: Prime farmland if irrigated and drained

Map Unit Composition

Los robles and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Los Robles

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

H1 - 0 to 8 inches: loam
H2 - 8 to 54 inches: loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.6 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Ecological site: R017XY904CA - Subirrigated Deep Alluvial Fans
Hydric soil rating: Yes

Minor Components

Honn

Percent of map unit: 5 percent
Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Vina

Percent of map unit: 4 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Cobbly alluvial land

Percent of map unit: 2 percent
Landform: Channels
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Molinos, seeped

Percent of map unit: 2 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Molinos

Percent of map unit: 2 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

hfqd—Marpa gravelly loam, 30 to 50 percent slopes

Map Unit Setting

National map unit symbol: hfqd
Elevation: 1,500 to 5,000 feet
Mean annual precipitation: 20 to 50 inches
Mean annual air temperature: 48 to 57 degrees F
Frost-free period: 100 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Marpa and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Marpa

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from shale

Typical profile

H1 - 0 to 13 inches: gravelly loam
H2 - 13 to 26 inches: very gravelly clay loam
H3 - 26 to 30 inches: unweathered bedrock

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: 26 to 30 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: F005XZ018CA - Moderately Deep Gravelly Mesic Mountains 40-60"ppt
Hydric soil rating: No

Minor Components

Josephine

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Maymen

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Sheetiron

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

hfqf—Marpa gravelly loam, 50 to 75 percent slopes

Map Unit Setting

National map unit symbol: hfqf
Elevation: 1,500 to 5,000 feet
Mean annual precipitation: 20 to 50 inches
Mean annual air temperature: 48 to 57 degrees F
Frost-free period: 100 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Marpa and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Marpa

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank

Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from shale

Typical profile

H1 - 0 to 13 inches: gravelly loam
H2 - 13 to 26 inches: very gravelly clay loam
H3 - 26 to 30 inches: unweathered bedrock

Properties and qualities

Slope: 50 to 75 percent
Depth to restrictive feature: 26 to 30 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: F005XZ018CA - Moderately Deep Gravelly Mesic Mountains 40-60"ppt
Hydric soil rating: No

Minor Components

Maymen

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Josephine

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Sheetiron

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

hfqh—Millsap loam, 5 to 30 percent slopes

Map Unit Setting

National map unit symbol: hfqh
Elevation: 80 to 3,000 feet
Mean annual precipitation: 16 to 30 inches
Mean annual air temperature: 55 to 63 degrees F
Frost-free period: 200 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Millsap and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Millsap

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from sedimentary rock

Typical profile

H1 - 0 to 11 inches: loam
H2 - 11 to 33 inches: clay
H3 - 33 to 37 inches: unweathered bedrock

Properties and qualities

Slope: 5 to 30 percent
Depth to restrictive feature: 33 to 37 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: R017XD045CA - LOAMY
Hydric soil rating: No

Minor Components

Gaviota

Percent of map unit: 8 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Parrish

Percent of map unit: 7 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

hfqm—Millsholm gravelly loam, 3 to 30 percent slopes

Map Unit Setting

National map unit symbol: hfqm
Elevation: 300 to 3,400 feet
Mean annual precipitation: 20 inches
Mean annual air temperature: 57 to 63 degrees F
Frost-free period: 200 to 320 days
Farmland classification: Not prime farmland

Map Unit Composition

Millsholm and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Millsholm

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from sedimentary rock

Typical profile

H1 - 0 to 16 inches: gravelly loam
H2 - 16 to 20 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 30 percent
Depth to restrictive feature: 16 to 20 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R015XD093CA - SHALLOW LOAMY
Hydric soil rating: No

Minor Components

Gaviota

Percent of map unit: 8 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Millsap

Percent of map unit: 7 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

hfqn—Millsholm gravelly loam, 3 to 30 percent slopes, eroded

Map Unit Setting

National map unit symbol: hfqn
Elevation: 300 to 3,400 feet
Mean annual precipitation: 20 inches
Mean annual air temperature: 57 to 63 degrees F
Frost-free period: 200 to 320 days
Farmland classification: Not prime farmland

Map Unit Composition

Millsholm and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Millsholm

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from sedimentary rock

Typical profile

H1 - 0 to 14 inches: gravelly loam
H2 - 14 to 18 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 30 percent
Depth to restrictive feature: 14 to 18 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R015XD093CA - SHALLOW LOAMY
Hydric soil rating: No

Minor Components

Gaviota

Percent of map unit: 10 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex

Millsap

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave

hfqq—Millsholm gravelly loam, 50 to 75 percent slopes

Map Unit Setting

National map unit symbol: hfqq
Elevation: 300 to 3,400 feet
Mean annual precipitation: 20 inches
Mean annual air temperature: 57 to 63 degrees F
Frost-free period: 200 to 320 days
Farmland classification: Not prime farmland

Map Unit Composition

Millsholm and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Millsholm

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from sedimentary rock

Typical profile

H1 - 0 to 16 inches: gravelly loam
H2 - 16 to 20 inches: unweathered bedrock

Properties and qualities

Slope: 50 to 75 percent
Depth to restrictive feature: 16 to 20 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: R015XF008CA - Shallow Gravelly Foothills
Hydric soil rating: No

Minor Components

Gaviota

Percent of map unit: 8 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Millsap

Percent of map unit: 7 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

hfqr—Millsholm very rocky loam, 30 to 50 percent slopes, eroded

Map Unit Setting

National map unit symbol: hfqr
Elevation: 300 to 3,400 feet
Mean annual precipitation: 20 inches
Mean annual air temperature: 57 to 63 degrees F
Frost-free period: 200 to 320 days
Farmland classification: Not prime farmland

Map Unit Composition

Millsholm and similar soils: 65 percent
Rock outcrop: 20 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Millsholm

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from sedimentary rock

Typical profile

H1 - 0 to 14 inches: gravelly loam
H2 - 14 to 18 inches: unweathered bedrock

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: 14 to 18 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: R015XF008CA - Shallow Gravelly Foothills
Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from sedimentary rock

Typical profile

H1 - 0 to 4 inches: unweathered bedrock

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: 0 to 4 inches to lithic bedrock
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Low to very high (0.01 to 19.98 in/hr)
Available water supply, 0 to 60 inches: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Minor Components

Gaviota

Percent of map unit: 8 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Millsap

Percent of map unit: 7 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

hfrc—Parrish loam, 8 to 30 percent slopes

Map Unit Setting

National map unit symbol: hfrc
Elevation: 1,200 to 4,000 feet
Mean annual precipitation: 30 inches
Mean annual air temperature: 55 degrees F
Frost-free period: 150 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition

Parrish and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Parrish

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from metamorphic and sedimentary rock

Typical profile

H1 - 0 to 9 inches: loam
H2 - 9 to 30 inches: gravelly clay loam
H3 - 30 to 38 inches: gravelly loam
H4 - 38 to 42 inches: unweathered bedrock

Properties and qualities

Slope: 8 to 30 percent
Depth to restrictive feature: 38 to 42 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None

Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: R017XD045CA - LOAMY
Hydric soil rating: No

Minor Components

Millsholm
Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Gaviota
Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Auburn
Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

hfrd—Parrish loam, 30 to 50 percent slopes

Map Unit Setting
National map unit symbol: hfrd
Elevation: 1,200 to 4,000 feet
Mean annual precipitation: 30 inches
Mean annual air temperature: 55 degrees F
Frost-free period: 150 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition
Parrish and similar soils: 85 percent

Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Parrish

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Residuum weathered from metamorphic and sedimentary rock

Typical profile

H1 - 0 to 9 inches: loam
H2 - 9 to 30 inches: gravelly clay loam
H3 - 30 to 38 inches: gravelly loam
H4 - 38 to 42 inches: unweathered bedrock

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: 38 to 42 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R015XY014CA - Loamy Mountains 20-40"ppt
Other vegetative classification: LOAMY (015XD047CA_1)
Hydric soil rating: No

Minor Components

Auburn

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Gaviota

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex

Hydric soil rating: No

Millsholm

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

hfs2—Reiff fine sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: hfs2
Elevation: 30 to 500 feet
Mean annual precipitation: 10 to 20 inches
Mean annual air temperature: 61 to 63 degrees F
Frost-free period: 240 to 275 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Reiff and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Reiff

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

H1 - 0 to 18 inches: fine sandy loam
H2 - 18 to 43 inches: stratified sandy loam to loam
H3 - 43 to 60 inches: stratified loamy sand to sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.2 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: A
Ecological site: R017XY904CA - Subirrigated Deep Alluvial Fans
Hydric soil rating: No

Minor Components

Tujunga

Percent of map unit: 10 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Anderson

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

hfsb—Riverwash

Map Unit Setting

National map unit symbol: hfsb
Elevation: 700 to 2,900 feet
Mean annual precipitation: 8 to 15 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 110 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Riverwash: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Riverwash

Setting

Landform: Channels
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Gravelly alluvium

Typical profile

H1 - 0 to 6 inches: very gravelly sand

H2 - 6 to 60 inches: stratified very gravelly coarse sand to gravelly sand

Properties and qualities

Slope: 0 to 5 percent
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: FrequentNone
Available water supply, 0 to 60 inches: Very low (about 1.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Ecological site: R017XY903CA - Stream Channels and Floodplains
Hydric soil rating: Yes

hfsc—Rockland

Map Unit Setting

National map unit symbol: hfsc
Elevation: 650 to 4,000 feet
Mean annual precipitation: 8 to 15 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 110 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Rock land: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rock Land

Setting

Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Residuum

Typical profile

H1 - 0 to 10 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 70 percent
Depth to restrictive feature: 0 to 10 inches to lithic bedrock
Drainage class: Excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Low to very high (0.01 to 19.98 in/hr)
Available water supply, 0 to 60 inches: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s

Hydric soil rating: No

hfsl—Sehorn silty clay, moderately deep, 30 to 50 percent slopes

Map Unit Setting

National map unit symbol: hfsl
Elevation: 100 to 2,000 feet
Mean annual precipitation: 15 to 35 inches
Mean annual air temperature: 57 to 64 degrees F
Frost-free period: 200 to 340 days
Farmland classification: Not prime farmland

Map Unit Composition

Sehorn and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sehorn

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from sedimentary rock

Typical profile

H1 - 0 to 15 inches: silty clay
H2 - 15 to 20 inches: clay
H3 - 20 to 24 inches: unweathered bedrock

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: 20 to 24 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R015XD091CA - GRAZEABLE WOODLAND
Hydric soil rating: No

Minor Components

Tehama

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Millsap

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Lodo

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Nose slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

hfsx—Sierra sandy loam, 15 to 30 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: hfsx
Elevation: 200 to 3,500 feet
Mean annual precipitation: 20 to 38 inches
Mean annual air temperature: 59 to 63 degrees F
Frost-free period: 200 to 225 days
Farmland classification: Not prime farmland

Map Unit Composition

Sierra and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sierra

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope

Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Residuum weathered from granite

Typical profile

H1 - 0 to 4 inches: sandy loam
H2 - 4 to 40 inches: clay loam
H3 - 40 to 44 inches: weathered bedrock

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: 40 to 44 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R015XD124CA - GRANITIC
Hydric soil rating: No

Minor Components

Auberry

Percent of map unit: 10 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Caperton

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

hfsy—Sierra sandy loam, 30 to 50 percent slopes

Map Unit Setting

National map unit symbol: hfsy
Elevation: 200 to 3,500 feet
Mean annual precipitation: 20 to 38 inches
Mean annual air temperature: 59 to 63 degrees F
Frost-free period: 200 to 225 days
Farmland classification: Not prime farmland

Map Unit Composition

Sierra and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sierra

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Residuum weathered from granite

Typical profile

H1 - 0 to 10 inches: sandy loam
H2 - 10 to 43 inches: loam
H3 - 43 to 47 inches: weathered bedrock

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: 43 to 47 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R015XD124CA - GRANITIC
Hydric soil rating: No

Minor Components

Auberry

Percent of map unit: 10 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Caperton

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

hfsz—Sites loam, 5 to 15 percent slopes

Map Unit Setting

National map unit symbol: hfsz
Elevation: 600 to 5,000 feet
Mean annual precipitation: 30 to 85 inches
Mean annual air temperature: 50 to 57 degrees F
Frost-free period: 130 to 260 days
Farmland classification: Not prime farmland

Map Unit Composition

Sites and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sites

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Mountainbase
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from metamorphic and sedimentary rock

Typical profile

H1 - 0 to 14 inches: loam
H2 - 14 to 41 inches: clay
H3 - 41 to 63 inches: clay loam

Properties and qualities

Slope: 5 to 15 percent
Depth to restrictive feature: 39 to 63 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.3 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F022BG201CA - Mesic Ash-Influenced Mountains
Hydric soil rating: No

Minor Components

Millsholm

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Mountainbase
Down-slope shape: Convex
Across-slope shape: Linear

Kilarc

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Mountainbase
Down-slope shape: Linear
Across-slope shape: Convex

Josephine

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Mountainbase
Down-slope shape: Linear
Across-slope shape: Concave

hft3—Sites stony loam, 8 to 30 percent slopes

Map Unit Setting

National map unit symbol: hft3
Elevation: 600 to 5,000 feet

Mean annual precipitation: 30 to 70 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 130 to 260 days
Farmland classification: Not prime farmland

Map Unit Composition

Sites and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sites

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from metamorphic and sedimentary rock

Typical profile

H1 - 0 to 14 inches: stony loam
H2 - 14 to 41 inches: clay
H3 - 41 to 65 inches: clay loam

Properties and qualities

Slope: 8 to 30 percent
Surface area covered with cobbles, stones or boulders: 2.0 percent
Depth to restrictive feature: 39 to 65 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: F022BG201CA - Mesic Ash-Influenced Mountains
Hydric soil rating: No

Minor Components

Kilarc

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Josephine

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Millsholm

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

hftd—Supan very stony loam, 0 to 30 percent slopes

Map Unit Setting

National map unit symbol: hftd
Elevation: 800 to 4,000 feet
Mean annual precipitation: 35 inches
Mean annual air temperature: 54 to 57 degrees F
Frost-free period: 175 to 260 days
Farmland classification: Not prime farmland

Map Unit Composition

Supan and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Supan

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from tuff breccia

Typical profile

H1 - 0 to 10 inches: very stony loam
H2 - 10 to 33 inches: clay loam
H3 - 33 to 43 inches: unweathered bedrock

Properties and qualities

Slope: 5 to 30 percent

Surface area covered with cobbles, stones or boulders: 5.0 percent
Depth to restrictive feature: 33 to 37 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Ecological site: F018XA202CA - Deep Mesic Mountain Slopes & Summits
Hydric soil rating: No

Minor Components

Toomes

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Pentz

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Cohasset

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

hftk—Tehama loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: hftk

Elevation: 50 to 1,000 feet
Mean annual precipitation: 15 to 35 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 225 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Tehama and similar soils: 85 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tehama

Setting

Landform: Strath terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, riser
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

H1 - 0 to 30 inches: loam
H2 - 30 to 45 inches: silty clay loam
H3 - 45 to 60 inches: stratified very gravelly loam to very gravelly clay loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.8 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R017XY905CA - Dry Alluvial Fans and Terraces
Hydric soil rating: No

Minor Components

Sehorn

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

hftl—Toomes very rocky loam, 0 to 50 percent slopes

Map Unit Setting

National map unit symbol: hftl
Elevation: 600 to 3,500 feet
Mean annual precipitation: 25 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 250 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition

Toomes and similar soils: 70 percent
Rock outcrop: 20 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Toomes

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from tuff breccia

Typical profile

H1 - 0 to 11 inches: very stony loam
H2 - 11 to 21 inches: unweathered bedrock

Properties and qualities

Slope: 2 to 50 percent
Depth to restrictive feature: 11 to 15 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: R018XA103CA - Shallow Thermic Volcanic Ridges
Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from tuff breccia

Typical profile

H1 - 0 to 10 inches: unweathered bedrock

Properties and qualities

Slope: 2 to 50 percent
Depth to restrictive feature: 0 to 4 inches to lithic bedrock
Drainage class: Excessively drained
Available water supply, 0 to 60 inches: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Minor Components

Supan

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Guenoc

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Interfluve, side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

hftm—Toomes very stony loam, 0 to 30 percent slopes

Map Unit Setting

National map unit symbol: hftm
Elevation: 600 to 3,500 feet
Mean annual precipitation: 25 inches

Mean annual air temperature: 61 degrees F
Frost-free period: 250 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition

Toomes and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Toomes

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder, summit, backslope
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from tuff breccia

Typical profile

H1 - 0 to 11 inches: very stony loam
H2 - 11 to 15 inches: unweathered bedrock

Properties and qualities

Slope: 2 to 30 percent
Surface area covered with cobbles, stones or boulders: 15.0 percent
Depth to restrictive feature: 11 to 15 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: R018XA103CA - Shallow Thermic Volcanic Ridges
Hydric soil rating: No

Minor Components

Guenoc

Percent of map unit: 10 percent
Landform: Hillslopes
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Supan

Percent of map unit: 5 percent
Landform: Hillslopes

Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

hftw—Wet alluvial land

Map Unit Setting

National map unit symbol: hftw
Elevation: 200 to 800 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 59 to 61 degrees F
Frost-free period: 200 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Wet alluvial land: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wet Alluvial Land

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Alluvium

Typical profile

H1 - 0 to 10 inches: clay loam
H2 - 10 to 60 inches: stratified loam to clay

Properties and qualities

Slope: 0 to 2 percent
Drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 36 to 48 inches
Frequency of flooding: OccasionalNone
Available water supply, 0 to 60 inches: High (about 10.2 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 3w
Hydric soil rating: Yes

hftx—Windy and McCarthy stony sandy loams, 0 to 30 percent slopes

Map Unit Setting

National map unit symbol: hftx
Elevation: 2,000 to 9,000 feet
Mean annual precipitation: 35 to 70 inches
Mean annual air temperature: 43 to 57 degrees F
Frost-free period: 45 to 225 days
Farmland classification: Not prime farmland

Map Unit Composition

Windy and similar soils: 41 percent
Mccarthy and similar soils: 39 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Windy

Setting

Landform: Lava flows
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Mountaintop, mountainflank
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from volcanic rock

Typical profile

H1 - 0 to 14 inches: stony sandy loam
H2 - 14 to 48 inches: very gravelly sandy loam
H3 - 48 to 58 inches: unweathered bedrock

Properties and qualities

Slope: 5 to 30 percent
Depth to restrictive feature: 48 to 52 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: F022BF202CA - West-Side, Steep (15% or greater), Ash-influenced, Frigid Gravelley (FFD<100) Mountains
Hydric soil rating: No

Description of Mccarthy

Setting

Landform: Lava flows
Landform position (two-dimensional): Backslope, summit
Landform position (three-dimensional): Mountaintop
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from basalt

Typical profile

H1 - 0 to 20 inches: stony sandy loam
H2 - 20 to 44 inches: very cobbly sandy loam
H3 - 44 to 54 inches: unweathered bedrock

Properties and qualities

Slope: 2 to 30 percent
Depth to restrictive feature: 44 to 48 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: F022BG201CA - Mesic Ash-Influenced Mountains
Hydric soil rating: No

Minor Components

Cohasset

Percent of map unit: 10 percent
Landform: Lava flows
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Mountaintop
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Lydon

Percent of map unit: 10 percent
Landform: Lava flows
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

hftz—Windy and McCarthy very stony sandy loams, 50 to 75 percent slopes

Map Unit Setting

National map unit symbol: hftz
Elevation: 2,000 to 9,000 feet
Mean annual precipitation: 35 to 70 inches
Mean annual air temperature: 43 to 57 degrees F
Frost-free period: 45 to 225 days
Farmland classification: Not prime farmland

Map Unit Composition

Windy and similar soils: 41 percent
Mccarthy and similar soils: 39 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Windy

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Residuum weathered from volcanic rock

Typical profile

H1 - 0 to 14 inches: very stony sandy loam
H2 - 14 to 48 inches: very gravelly sandy loam
H3 - 48 to 58 inches: unweathered bedrock

Properties and qualities

Slope: 50 to 75 percent
Surface area covered with cobbles, stones or boulders: 5.0 percent
Depth to restrictive feature: 48 to 52 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: A
Ecological site: F022BF202CA - West-Side, Steep (15% or greater), Ash-influenced, Frigid Gravelley (FFD<100) Mountains
Hydric soil rating: No

Description of Mccarthy

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from basalt

Typical profile

H1 - 0 to 20 inches: very cobbly sandy loam
H2 - 20 to 44 inches: very cobbly sandy loam
H3 - 44 to 54 inches: unweathered bedrock

Properties and qualities

Slope: 50 to 75 percent
Surface area covered with cobbles, stones or boulders: 5.0 percent
Depth to restrictive feature: 44 to 48 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: F022BG201CA - Mesic Ash-Influenced Mountains
Hydric soil rating: No

Minor Components

Cohasset

Percent of map unit: 10 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Lydon

Percent of map unit: 10 percent
Landform: Mountain slopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex

Across-slope shape: Linear
Hydric soil rating: No

hsrk—Etsel family, 40 to 80 percent slopes.

Map Unit Setting

National map unit symbol: hsrk
Elevation: 1,500 to 4,500 feet
Mean annual precipitation: 35 to 70 inches
Mean annual air temperature: 52 to 55 degrees F
Frost-free period: 130 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Etsel family and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Etsel Family

Setting

Landform: Mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from metasedimentary rock

Typical profile

H1 - 0 to 9 inches: very gravelly loam
H2 - 9 to 13 inches: unweathered bedrock

Properties and qualities

Slope: 40 to 80 percent
Depth to restrictive feature: 9 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: R005XZ015CA - Very Shallow Mesic Mountains 40-60"ppt
Hydric soil rating: No

Minor Components

Rock outcrop, metamorphic
Percent of map unit: 10 percent
Hydric soil rating: No

Rubble land
Percent of map unit: 5 percent
Hydric soil rating: No

Goulding family
Percent of map unit: 5 percent
Hydric soil rating: No

Deadwood family
Percent of map unit: 5 percent
Hydric soil rating: No

hss5—Goulding family, 40 to 60 percent slopes.

Map Unit Setting
National map unit symbol: hss5
Elevation: 2,000 to 4,500 feet
Mean annual precipitation: 30 to 50 inches
Mean annual air temperature: 55 to 59 degrees F
Frost-free period: 130 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition
Goulding family and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Goulding Family

Setting
Landform: Mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from metasedimentary rock and/or residuum weathered from metavolcanics

Typical profile
H1 - 0 to 7 inches: very gravelly loam
H2 - 7 to 15 inches: very gravelly loam
H3 - 15 to 19 inches: unweathered bedrock

Properties and qualities
Slope: 40 to 60 percent

Depth to restrictive feature: 15 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: F005XZ014CA - Mesic Mountains <40"ppt
Hydric soil rating: No

Minor Components

Typic xerorthents

Percent of map unit: 10 percent
Hydric soil rating: No

Chawanakee family

Percent of map unit: 5 percent
Hydric soil rating: No

Etsel family

Percent of map unit: 5 percent
Hydric soil rating: No

Rock outcrop, metamorphic

Percent of map unit: 5 percent
Hydric soil rating: No

hss6—Goulding family, 60 to 80 percent slopes

Map Unit Setting

National map unit symbol: hss6
Elevation: 2,000 to 4,500 feet
Mean annual precipitation: 30 to 50 inches
Mean annual air temperature: 55 to 59 degrees F
Frost-free period: 130 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Goulding family and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Goulding Family

Setting

Landform: Mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from metavolcanics and/or residuum weathered from metasedimentary rock

Typical profile

H1 - 0 to 7 inches: very gravelly loam
H2 - 7 to 15 inches: very gravelly loam
H3 - 15 to 19 inches: unweathered bedrock

Properties and qualities

Slope: 60 to 80 percent
Depth to restrictive feature: 15 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: F005XZ014CA - Mesic Mountains <40"ppt
Hydric soil rating: No

Minor Components

Rubble land

Percent of map unit: 5 percent
Hydric soil rating: No

Etsel family

Percent of map unit: 5 percent
Hydric soil rating: No

Deadwood family

Percent of map unit: 5 percent
Hydric soil rating: No

Typic xerorthents

Percent of map unit: 5 percent
Hydric soil rating: No

Rock outcrop, metamorphic

Percent of map unit: 5 percent
Hydric soil rating: No

hssw—Holland-Goulding families association, 40 to 60 percent slopes.

Map Unit Setting

National map unit symbol: hssw
Elevation: 2,000 to 4,580 feet
Mean annual precipitation: 30 to 50 inches
Mean annual air temperature: 54 to 59 degrees F
Frost-free period: 130 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Holland family and similar soils: 60 percent
Goulding family and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Holland Family

Setting

Landform: Mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from granite and/or residuum weathered from metavolcanics and/or residuum weathered from metasedimentary rock

Typical profile

H1 - 0 to 3 inches: gravelly loam
H2 - 3 to 26 inches: gravelly clay loam
H3 - 26 to 59 inches: weathered bedrock

Properties and qualities

Slope: 40 to 60 percent
Depth to restrictive feature: 26 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Hydric soil rating: No

Description of Goulding Family

Setting

Landform: Mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from metavolcanics and/or residuum weathered from metasedimentary rock

Typical profile

H1 - 0 to 7 inches: very gravelly loam
H2 - 7 to 15 inches: very gravelly loam
H3 - 15 to 19 inches: unweathered bedrock

Properties and qualities

Slope: 40 to 60 percent
Depth to restrictive feature: 15 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: F005XZ014CA - Mesic Mountains <40"ppt
Hydric soil rating: No

Minor Components

Rock outcrop, metamorphic

Percent of map unit: 3 percent
Hydric soil rating: No

Deadwood family

Percent of map unit: 3 percent
Hydric soil rating: No

Rubble land

Percent of map unit: 3 percent
Hydric soil rating: No

Neuns family

Percent of map unit: 1 percent
Hydric soil rating: No

hssz—Holland family-Holland family, deep complex, 40 to 60 percent slopes.

Map Unit Setting

National map unit symbol: hssz
Elevation: 1,500 to 5,500 feet
Mean annual precipitation: 35 to 70 inches
Mean annual air temperature: 52 to 55 degrees F
Frost-free period: 130 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Holland family and similar soils: 60 percent
Holland family, deep, and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Holland Family

Setting

Landform: Mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from metasedimentary rock and/or residuum weathered from metavolcanics and/or residuum weathered from granite

Typical profile

H1 - 0 to 3 inches: gravelly loam
H2 - 3 to 26 inches: gravelly clay loam
H3 - 26 to 59 inches: weathered bedrock

Properties and qualities

Slope: 40 to 60 percent
Depth to restrictive feature: 26 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Hydric soil rating: No

Description of Holland Family, Deep

Setting

Landform: Mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from metasedimentary rock and/or residuum weathered from metavolcanics and/or residuum weathered from granite

Typical profile

H1 - 0 to 3 inches: gravelly loam
H2 - 3 to 46 inches: gravelly clay loam
H3 - 46 to 50 inches: extremely cobbly clay loam
H4 - 50 to 59 inches: weathered bedrock

Properties and qualities

Slope: 40 to 60 percent
Depth to restrictive feature: 39 to 59 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Hugo family

Percent of map unit: 4 percent
Hydric soil rating: No

Marpa family

Percent of map unit: 3 percent
Hydric soil rating: No

Neuns family

Percent of map unit: 3 percent
Hydric soil rating: No

hst9—Holland family, deep, 0 to 20 percent slopes.

Map Unit Setting

National map unit symbol: hst9
Elevation: 1,500 to 5,500 feet
Mean annual precipitation: 35 to 70 inches
Mean annual air temperature: 52 to 55 degrees F
Frost-free period: 130 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Holland family, deep, and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Holland Family, Deep

Setting

Landform: Mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from granite and/or residuum weathered from metasedimentary rock and/or residuum weathered from metavolcanics

Typical profile

H1 - 0 to 3 inches: gravelly loam
H2 - 3 to 46 inches: gravelly clay loam
H3 - 46 to 50 inches: extremely cobbly clay loam
H4 - 50 to 59 inches: weathered bedrock

Properties and qualities

Slope: 0 to 20 percent
Depth to restrictive feature: 39 to 59 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Hugo family
Percent of map unit: 10 percent
Hydric soil rating: No

Marpa family
Percent of map unit: 5 percent
Hydric soil rating: No

Holland family
Percent of map unit: 5 percent
Hydric soil rating: No

Marpa family, deep
Percent of map unit: 5 percent
Hydric soil rating: No

hstb—Holland family, deep, 20 to 40 percent slopes.

Map Unit Setting
National map unit symbol: hstb
Elevation: 1,500 to 5,500 feet
Mean annual precipitation: 35 to 70 inches
Mean annual air temperature: 52 to 55 degrees F
Frost-free period: 130 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition
Holland family, deep, and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Holland Family, Deep

Setting
Landform: Mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from metavolcanics and/or residuum weathered from metasedimentary rock and/or residuum weathered from granite

Typical profile
H1 - 0 to 3 inches: gravelly loam
H2 - 3 to 46 inches: gravelly clay loam
H3 - 46 to 50 inches: extremely cobbly clay loam
H4 - 50 to 59 inches: weathered bedrock

Properties and qualities

Slope: 20 to 40 percent
Depth to restrictive feature: 39 to 59 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Holland family

Percent of map unit: 10 percent
Hydric soil rating: No

Marpa family, deep

Percent of map unit: 10 percent
Hydric soil rating: No

Marpa family

Percent of map unit: 5 percent
Hydric soil rating: No

hstc—Holland family, deep, 40 to 60 percent slopes.

Map Unit Setting

National map unit symbol: hstc
Elevation: 1,500 to 5,500 feet
Mean annual precipitation: 35 to 70 inches
Mean annual air temperature: 52 to 55 degrees F
Frost-free period: 130 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Holland family, deep, and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Holland Family, Deep

Setting

Landform: Mountains

Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from metasedimentary rock and/or residuum weathered from metavolcanics and/or residuum weathered from granite

Typical profile

H1 - 0 to 3 inches: gravelly loam
H2 - 3 to 46 inches: gravelly clay loam
H3 - 46 to 50 inches: extremely cobbly clay loam
H4 - 50 to 59 inches: weathered bedrock

Properties and qualities

Slope: 40 to 60 percent
Depth to restrictive feature: 39 to 59 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Marpa family, deep

Percent of map unit: 5 percent
Hydric soil rating: No

Hugo family

Percent of map unit: 5 percent
Hydric soil rating: No

Ovall family

Percent of map unit: 5 percent
Hydric soil rating: No

Marpa family

Percent of map unit: 5 percent
Hydric soil rating: No

Holland family, moderately deep

Percent of map unit: 5 percent
Hydric soil rating: No

hstf—Holland family, deep-Holland families complex, 20 to 40 percent slopes.

Map Unit Setting

National map unit symbol: hstf
Elevation: 1,500 to 5,500 feet
Mean annual precipitation: 35 to 70 inches
Mean annual air temperature: 52 to 55 degrees F
Frost-free period: 130 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Holland family, deep, and similar soils: 60 percent
Holland family and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Holland Family, Deep

Setting

Landform: Mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from metasedimentary rock and/or residuum weathered from metavolcanics and/or residuum weathered from granite

Typical profile

H1 - 0 to 3 inches: gravelly loam
H2 - 3 to 46 inches: gravelly clay loam
H3 - 46 to 50 inches: extremely cobbly clay loam
H4 - 50 to 59 inches: weathered bedrock

Properties and qualities

Slope: 20 to 40 percent
Depth to restrictive feature: 39 to 59 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: C
Hydric soil rating: No

Description of Holland Family

Setting

Landform: Mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from metasedimentary rock and/or residuum weathered from metavolcanics and/or residuum weathered from granite

Typical profile

H1 - 0 to 3 inches: gravelly loam
H2 - 3 to 26 inches: gravelly clay loam
H3 - 26 to 59 inches: weathered bedrock

Properties and qualities

Slope: 20 to 40 percent
Depth to restrictive feature: 26 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Neuns family, deep

Percent of map unit: 4 percent
Hydric soil rating: No

Marpa family, deep

Percent of map unit: 3 percent
Hydric soil rating: No

Marpa family

Percent of map unit: 3 percent
Hydric soil rating: No

hsw6—Marpa family, 20 to 40 percent slopes.

Map Unit Setting

National map unit symbol: hsw6
Elevation: 1,000 to 5,500 feet
Mean annual precipitation: 40 to 70 inches
Mean annual air temperature: 55 to 59 degrees F
Frost-free period: 130 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Marpa family and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Marpa Family

Setting

Landform: Mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from metamorphic and sedimentary rock

Typical profile

H1 - 0 to 13 inches: gravelly loam
H2 - 13 to 26 inches: very gravelly clay loam
H3 - 26 to 36 inches: unweathered bedrock

Properties and qualities

Slope: 20 to 40 percent
Depth to restrictive feature: 26 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: F005XZ018CA - Moderately Deep Gravelly Mesic Mountains 40-60"ppt
Hydric soil rating: No

Minor Components

Neuns family
Percent of map unit: 10 percent
Hydric soil rating: No

Holland family
Percent of map unit: 5 percent
Hydric soil rating: No

Holland family, deep
Percent of map unit: 5 percent
Hydric soil rating: No

Rock outcrop, metamorphic
Percent of map unit: 5 percent
Hydric soil rating: No

hsw7—Marpa family, 40 to 60 percent slopes.

Map Unit Setting
National map unit symbol: hsw7
Elevation: 1,000 to 5,500 feet
Mean annual precipitation: 40 to 70 inches
Mean annual air temperature: 55 to 59 degrees F
Frost-free period: 130 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition
Marpa family and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Marpa Family

Setting
Landform: Mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from metamorphic and sedimentary rock

Typical profile
H1 - 0 to 13 inches: gravelly loam
H2 - 13 to 26 inches: very gravelly clay loam
H3 - 26 to 36 inches: unweathered bedrock

Properties and qualities
Slope: 40 to 60 percent
Depth to restrictive feature: 26 inches to lithic bedrock

Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: F005XZ018CA - Moderately Deep Gravelly Mesic Mountains 40-60"ppt
Hydric soil rating: No

Minor Components

Neuns family

Percent of map unit: 10 percent
Hydric soil rating: No

Holland family

Percent of map unit: 5 percent
Hydric soil rating: No

Deadwood family

Percent of map unit: 5 percent
Hydric soil rating: No

Rock outcrop, metamorphic

Percent of map unit: 5 percent
Hydric soil rating: No

hswc—Marpa-Goulding families association, 40 to 60 percent slopes.

Map Unit Setting

National map unit symbol: hswc
Elevation: 2,000 to 4,500 feet
Mean annual precipitation: 30 to 50 inches
Mean annual air temperature: 55 to 59 degrees F
Frost-free period: 130 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Marpa family and similar soils: 60 percent
Goulding family and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Marpa Family

Setting

Landform: Mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from metamorphic and sedimentary rock

Typical profile

H1 - 0 to 13 inches: gravelly loam
H2 - 13 to 26 inches: very gravelly clay loam
H3 - 26 to 36 inches: unweathered bedrock

Properties and qualities

Slope: 40 to 60 percent
Depth to restrictive feature: 26 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: F005XZ018CA - Moderately Deep Gravelly Mesic Mountains 40-60"ppt
Hydric soil rating: No

Description of Goulding Family

Setting

Landform: Mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from metavolcanics and/or residuum weathered from metasedimentary rock

Typical profile

H1 - 0 to 7 inches: very gravelly loam
H2 - 7 to 15 inches: very gravelly loam
H3 - 15 to 19 inches: unweathered bedrock

Properties and qualities

Slope: 40 to 60 percent
Depth to restrictive feature: 15 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: F005XZ014CA - Mesic Mountains <40"ppt
Hydric soil rating: No

Minor Components

Neuns family

Percent of map unit: 4 percent
Hydric soil rating: No

Rock outcrop, metamorphic

Percent of map unit: 4 percent
Hydric soil rating: No

Deadwood family

Percent of map unit: 2 percent
Hydric soil rating: No

hsyn—Rock outcrop, limestone.

Map Unit Setting

National map unit symbol: hsyn
Elevation: 1,500 to 5,000 feet
Mean annual precipitation: 50 to 70 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 50 to 80 days
Farmland classification: Not prime farmland

Map Unit Composition

Rock outcrop, limestone: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rock Outcrop, Limestone

Setting

Landform: Mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex

Across-slope shape: Convex

Typical profile

H1 - 0 to 4 inches: unweathered bedrock

Properties and qualities

Slope: 60 to 90 percent
Depth to restrictive feature: 0 to 4 inches to lithic bedrock
Drainage class: Excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Unnamed, shallow soils

Percent of map unit: 10 percent
Hydric soil rating: No

ht35—Brownlee-Bobbitt families association, 0 to 35 percent slopes.

Map Unit Setting

National map unit symbol: ht35
Elevation: 3,500 to 5,200 feet
Mean annual precipitation: 20 to 35 inches
Mean annual air temperature: 46 to 59 degrees F
Farmland classification: Not prime farmland

Map Unit Composition

Brownlee and similar soils: 65 percent
Bobbitt and similar soils: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Brownlee

Setting

Landform: Mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from basalt

Typical profile

H1 - 0 to 16 inches: loam
H2 - 16 to 45 inches: gravelly clay loam
H3 - 45 to 60 inches: weathered bedrock

Properties and qualities

Slope: 0 to 35 percent
Depth to restrictive feature: 45 to 49 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: F022BG201CA - Mesic Ash-Influenced Mountains
Hydric soil rating: No

Description of Bobbitt

Setting

Landform: Mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Residuum weathered from andesite

Typical profile

H1 - 0 to 12 inches: gravelly loam
H2 - 12 to 22 inches: extremely gravelly loam
H3 - 22 to 44 inches: very gravelly sandy loam
H4 - 44 to 60 inches: weathered bedrock

Properties and qualities

Slope: 0 to 35 percent
Depth to restrictive feature: 44 to 48 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: F022BG201CA - Mesic Ash-Influenced Mountains
Hydric soil rating: No

jbkm—Bollibokka loam, 2 to 15 percent slopes

Map Unit Setting

National map unit symbol: jbkm
Elevation: 3,200 to 5,000 feet
Mean annual precipitation: 16 to 25 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 80 to 100 days
Farmland classification: Not prime farmland

Map Unit Composition

Bollibokka and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bollibokka

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium derived from volcanic sandstone

Typical profile

H1 - 0 to 5 inches: loam
H2 - 5 to 9 inches: clay loam
H3 - 9 to 15 inches: gravelly clay loam
H4 - 15 to 19 inches: bedrock

Properties and qualities

Slope: 2 to 15 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: F022BG200CA - Mesic Lava Plateaus, Low Sloping (15% or less), <25 inch precip
Hydric soil rating: No

Minor Components

Longcreek

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Unnamed

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Pittville

Percent of map unit: 5 percent
Landform: Stream terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

jbkw—Britton silty clay loam, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: jbkw
Elevation: 2,700 to 3,200 feet
Mean annual precipitation: 16 to 35 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 80 to 100 days
Farmland classification: Not prime farmland

Map Unit Composition

Britton and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Britton

Setting

Landform: Lake terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread

Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Slope alluvium from diatomaceous earth

Typical profile

H1 - 0 to 3 inches: silty clay loam
H2 - 3 to 8 inches: silty clay loam
H3 - 8 to 15 inches: gravelly silty clay loam
H4 - 15 to 25 inches: weathered bedrock

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: F022BG202CA - Mesic, Cool (FFD<100) Ash-Influenced Mountains
Hydric soil rating: No

Minor Components

Coneward

Percent of map unit: 5 percent
Landform: Lake terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Unnamed, moderately deep

Percent of map unit: 5 percent
Landform: Lake terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Unnamed, soils without a clay increase

Percent of map unit: 3 percent
Landform: Lake terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Linear

Hydric soil rating: No

Unnamed, 5 to 15 percent slopes

Percent of map unit: 2 percent
Landform: Lake terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

jbky—Britton silty clay loam, 30 to 50 percent slopes

Map Unit Setting

National map unit symbol: jbky
Elevation: 2,700 to 3,200 feet
Mean annual precipitation: 16 to 35 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 80 to 100 days
Farmland classification: Not prime farmland

Map Unit Composition

Britton and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Britton

Setting

Landform: Lake terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Slope alluvium from diatomaceous earth

Typical profile

H1 - 0 to 3 inches: silty clay loam
H2 - 3 to 8 inches: silty clay loam
H3 - 8 to 15 inches: gravelly silty clay loam
H4 - 15 to 19 inches: weathered bedrock

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None

Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R021XG912CA - Wet Shallow Loamy
Hydric soil rating: No

Minor Components

Unnamed, areas with slopes 15 to 30% or 50 to 75%

Percent of map unit: 5 percent
Landform: Lake terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Neer

Percent of map unit: 5 percent
Landform: Lake terraces
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Unnamed, soils 20 to 40 inches deep

Percent of map unit: 3 percent
Landform: Lake terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Riser
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Unnamed, soils without a clay increase

Percent of map unit: 2 percent
Landform: Lake terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

jbl4—Bundora-Goulder complex, 30 to 50 percent slopes

Map Unit Setting

National map unit symbol: jbl4
Elevation: 4,000 to 6,800 feet
Mean annual precipitation: 35 to 50 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 50 to 80 days
Farmland classification: Not prime farmland

Map Unit Composition

Bundora and similar soils: 45 percent
Goulder and similar soils: 35 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bundora

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Slope alluvium derived from tuff

Typical profile

H1 - 0 to 14 inches: sandy loam
H2 - 14 to 29 inches: sandy loam
H3 - 29 to 63 inches: very gravelly loam

Properties and qualities

Slope: 30 to 50 percent
Surface area covered with cobbles, stones or boulders: 7.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very high (about 16.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Ecological site: F022BF202CA - West-Side, Steep (15% or greater), Ash-influenced, Frigid Gravelley (FFD<100) Mountains

Hydric soil rating: No

Description of Goulder

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Tephra over andesitic lava tephra

Typical profile

H1 - 0 to 7 inches: gravelly sandy loam
H2 - 7 to 17 inches: cobbly sandy loam
H3 - 17 to 27 inches: cobbly loam
H4 - 27 to 41 inches: very cobbly clay loam
H5 - 41 to 58 inches: very gravelly clay loam
H6 - 58 to 64 inches: very bouldery clay loam

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 10.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: F022BF203CA - East Side, Steep (15% or greater), Ash-Influenced, Frigid Gravelly (FFD<100) Mountains
Hydric soil rating: No

Minor Components

Unnamed, soils < 60 inches deep, on side slopes

Percent of map unit: 20 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

jblb—Burney-Arkright complex, 2 to 9 percent slopes

Map Unit Setting

National map unit symbol: jblb
Elevation: 3,000 to 3,300 feet
Mean annual precipitation: 16 to 25 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 80 to 100 days
Farmland classification: Not prime farmland

Map Unit Composition

Burney and similar soils: 41 percent
Arkright and similar soils: 39 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Burney

Setting

Landform: Lava flows
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Slope alluvium derived from basalt

Typical profile

H1 - 0 to 8 inches: gravelly loam
H2 - 8 to 38 inches: gravelly clay loam
H3 - 38 to 59 inches: very stony clay loam
H4 - 59 to 69 inches: weathered bedrock

Properties and qualities

Slope: 2 to 9 percent
Depth to restrictive feature: 40 to 60 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C

Ecological site: F022BG200CA - Mesic Lava Plateaus, Low Sloping (15% or less), <25 inch precip
Hydric soil rating: No

Description of Arkright

Setting

Landform: Lava flows
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Slope alluvium derived from basalt

Typical profile

H1 - 0 to 10 inches: gravelly loam
H2 - 10 to 14 inches: gravelly loam
H3 - 14 to 24 inches: cobbly clay loam
H4 - 24 to 28 inches: weathered bedrock

Properties and qualities

Slope: 2 to 9 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: F022BG200CA - Mesic Lava Plateaus, Low Sloping (15% or less), <25 inch precip
Hydric soil rating: No

Minor Components

Unnamed, similar to burney but > 35% clay

Percent of map unit: 5 percent
Landform: Lava flows
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Jimmerson

Percent of map unit: 5 percent
Landform: Lava flows
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear

Across-slope shape: Linear
Hydric soil rating: No

Hambone

Percent of map unit: 5 percent
Landform: Lava flows
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Unnamed, similar to arkright but < 20 inches deep

Percent of map unit: 5 percent
Landform: Lava flows
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

jbm1—Chirpchatter-Hunsinger complex, 2 to 15 percent slopes

Map Unit Setting

National map unit symbol: jbm1
Elevation: 3,100 to 5,000 feet
Mean annual precipitation: 16 to 25 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 80 to 100 days
Farmland classification: Not prime farmland

Map Unit Composition

Chirpchatter and similar soils: 55 percent
Hunsinger and similar soils: 25 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chirpchatter

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Older volcanic ash

Typical profile

H1 - 0 to 7 inches: sandy loam
H2 - 7 to 32 inches: sandy clay loam

H3 - 32 to 70 inches: gravelly sandy loam

Properties and qualities

Slope: 2 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: F022BG202CA - Mesic, Cool (FFD<100) Ash-Influenced Mountains
Hydric soil rating: No

Description of Hunsinger

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium derived from igneous rock

Typical profile

H1 - 0 to 13 inches: gravelly sandy loam
H2 - 13 to 26 inches: very gravelly sandy clay loam
H3 - 26 to 42 inches: cobbly sandy clay loam
H4 - 42 to 60 inches: weathered bedrock

Properties and qualities

Slope: 2 to 15 percent
Depth to restrictive feature: 40 to 60 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately low (0.01 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: F022BG200CA - Mesic Lava Plateaus, Low Sloping (15% or less), <25 inch precip
Hydric soil rating: No

Minor Components

Unnamed, slopes > 15%

Percent of map unit: 6 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Jellico

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Winnibulli

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Unnamed, fault line escarpments

Percent of map unit: 4 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Free face
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

jbmc—Cupvar silty clay, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: jbmc
Elevation: 3,300 to 4,500 feet
Mean annual precipitation: 14 to 20 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 100 to 120 days
Farmland classification: Not prime farmland

Map Unit Composition

Cupvar and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cupvar

Setting

Landform: Basin floors
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous rock

Typical profile

H1 - 0 to 21 inches: silty clay
H2 - 21 to 25 inches: cemented
H3 - 25 to 64 inches: fine sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 20 to 40 inches to duripan
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: FrequentNone
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): 4w
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: D
Ecological site: R021XG909CA - Clayey
Hydric soil rating: No

Minor Components

Esperanza

Percent of map unit: 4 percent
Landform: Stream terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Unnamed, soils > 40" deep to hardpan

Percent of map unit: 3 percent
Landform: Basin floors
Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Pittville

Percent of map unit: 3 percent
Landform: Stream terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

jbph—Gasper-Scarface complex, 30 to 50 percent slopes

Map Unit Setting

National map unit symbol: jbph
Elevation: 3,000 to 5,100 feet
Mean annual precipitation: 25 to 50 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 80 to 100 days
Farmland classification: Not prime farmland

Map Unit Composition

Gasper and similar soils: 60 percent
Scarface and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gasper

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Tephra

Typical profile

H1 - 0 to 4 inches: gravelly sandy loam
H2 - 4 to 16 inches: gravelly sandy loam
H3 - 16 to 38 inches: very cobbly sandy loam
H4 - 38 to 60 inches: very cobbly sandy clay loam

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: F022BG202CA - Mesic, Cool (FFD<100) Ash-Influenced Mountains
Hydric soil rating: No

Description of Scarface

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Tephra

Typical profile

H1 - 0 to 16 inches: sandy loam
H2 - 16 to 24 inches: sandy loam
H3 - 24 to 37 inches: gravelly sandy clay loam
H4 - 37 to 52 inches: gravelly sandy clay loam
H5 - 52 to 84 inches: gravelly clay loam

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very high (about 14.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: F022BG202CA - Mesic, Cool (FFD<100) Ash-Influenced Mountains
Hydric soil rating: No

Minor Components

Boardburn

Percent of map unit: 5 percent
Landform: Hillslopes

Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Hambone

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

jbpk—Gasper-Scarface complex, moist, 2 to 15 percent slopes

Map Unit Setting

National map unit symbol: jbpk
Elevation: 3,000 to 5,100 feet
Mean annual precipitation: 25 to 50 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 80 to 100 days
Farmland classification: Not prime farmland

Map Unit Composition

Gasper and similar soils: 50 percent
Scarface and similar soils: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gasper

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Tephra

Typical profile

H1 - 0 to 5 inches: gravelly sandy loam
H2 - 5 to 44 inches: very cobbly sandy loam
H3 - 44 to 61 inches: very cobbly sandy clay loam

Properties and qualities

Slope: 2 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained

Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: F022BG202CA - Mesic, Cool (FFD<100) Ash-Influenced Mountains
Hydric soil rating: No

Description of Scarface

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Tephra

Typical profile

H1 - 0 to 5 inches: sandy loam
H2 - 5 to 30 inches: sandy loam
H3 - 30 to 45 inches: gravelly sandy clay loam
H4 - 45 to 61 inches: gravelly sandy clay loam

Properties and qualities

Slope: 2 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very high (about 12.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: F022BG202CA - Mesic, Cool (FFD<100) Ash-Influenced Mountains
Hydric soil rating: No

Minor Components

Chatterdown

Percent of map unit: 5 percent
Landform: Hillslopes

Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Nikal

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Unnamed, similar to gasper but < 40" deep

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

jbpr—Gooval cobbly loam, 2 to 9 percent slopes

Map Unit Setting

National map unit symbol: jbpr
Elevation: 3,100 to 3,600 feet
Mean annual precipitation: 16 to 25 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 80 to 100 days
Farmland classification: Not prime farmland

Map Unit Composition

Gooval and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gooval

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Tephra over basalt

Typical profile

H1 - 0 to 8 inches: cobbly loam
H2 - 8 to 14 inches: very gravelly clay loam
H3 - 14 to 23 inches: very gravelly clay
H4 - 23 to 27 inches: weathered bedrock

Properties and qualities

Slope: 2 to 9 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: D
Ecological site: F022BG200CA - Mesic Lava Plateaus, Low Sloping (15% or less), <25 inch precip
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 7 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Arkright

Percent of map unit: 4 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Unnamed, slopes 9 to 25 percent

Percent of map unit: 4 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

jbq8—Hambone-Boardburn complex, 30 to 50 percent slopes

Map Unit Setting

National map unit symbol: jbq8
Elevation: 4,000 to 4,800 feet
Mean annual precipitation: 20 to 30 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 80 to 100 days
Farmland classification: Not prime farmland

Map Unit Composition

Hambone and similar soils: 70 percent
Boardburn and similar soils: 20 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hambone

Setting

Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Slope alluvium derived from igneous rock

Typical profile

H1 - 0 to 8 inches: gravelly sandy loam
H2 - 8 to 22 inches: very gravelly sandy clay loam
H3 - 22 to 45 inches: very cobbly sandy clay loam
H4 - 45 to 55 inches: weathered bedrock

Properties and qualities

Slope: 30 to 50 percent
Surface area covered with cobbles, stones or boulders: 15.0 percent
Depth to restrictive feature: 40 to 60 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C

Ecological site: F022BG202CA - Mesic, Cool (FFD<100) Ash-Influenced Mountains
Hydric soil rating: No

Description of Boardburn

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Colluvium derived from igneous rock

Typical profile

H1 - 0 to 9 inches: sandy loam
H2 - 9 to 22 inches: loam
H3 - 22 to 40 inches: sandy clay loam
H4 - 40 to 50 inches: very gravelly sandy clay loam
H5 - 50 to 60 inches: weathered bedrock

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: 40 to 60 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: F022BG202CA - Mesic, Cool (FFD<100) Ash-Influenced Mountains
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 4 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Rock outcrop

Percent of map unit: 3 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Free face

Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Chirpchatter

Percent of map unit: 3 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

jbqb—Henhill silt loam, partially drained, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: jbqb
Elevation: 3,300 to 4,600 feet
Mean annual precipitation: 12 to 20 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 100 to 130 days
Farmland classification: Prime farmland if irrigated and drained

Map Unit Composition

Henhill and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Henhill

Setting

Landform: Stream terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous rock

Typical profile

H1 - 0 to 21 inches: silt loam
H2 - 21 to 46 inches: silty clay loam
H3 - 46 to 62 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)

Depth to water table: About 18 to 60 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 11.3 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C
Ecological site: R021XG910CA - Loamy
Hydric soil rating: No

Minor Components

Lunsford

Percent of map unit: 2 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Pastolla

Percent of map unit: 2 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Dotta

Percent of map unit: 2 percent
Landform: Stream terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Unnamed, h2o table closer to surface than henhill

Percent of map unit: 2 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Unnamed

Percent of map unit: 2 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread

Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

jbqz—Jellico-Lava flows complex, 5 to 15 percent slopes

Map Unit Setting

National map unit symbol: jbqz
Elevation: 2,500 to 5,700 feet
Mean annual precipitation: 12 to 45 inches
Mean annual air temperature: 39 to 50 degrees F
Frost-free period: 80 to 120 days
Farmland classification: Not prime farmland

Map Unit Composition

Jellico and similar soils: 40 percent
Lava flows: 35 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Jellico

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Tephra

Typical profile

H1 - 0 to 5 inches: very stony silt loam
H2 - 5 to 27 inches: very stony silt loam
H3 - 27 to 33 inches: very stony silt loam
H4 - 33 to 37 inches: bedrock

Properties and qualities

Slope: 5 to 15 percent
Surface area covered with cobbles, stones or boulders: 25.0 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to low (0.00 to 0.01 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Ecological site: R021XG910CA - Loamy
Hydric soil rating: No

Description of Lava Flows

Setting

Landform: Lava flows
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex

Typical profile

H1 - 0 to 60 inches: unweathered bedrock

Properties and qualities

Slope: 5 to 15 percent
Depth to restrictive feature: 0 inches to lithic bedrock

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Minor Components

Rubble land

Percent of map unit: 7 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Coneward

Percent of map unit: 6 percent
Landform: Lava trenches
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Gassaway

Percent of map unit: 6 percent
Landform: Escarpments
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Free face
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Splawn

Percent of map unit: 6 percent
Landform: Hillslopes

Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

jbrf—Jellycamp-Ollierivas complex, 2 to 9 percent slopes

Map Unit Setting

National map unit symbol: jbrf
Elevation: 3,400 to 5,800 feet
Mean annual precipitation: 12 to 18 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 50 to 110 days
Farmland classification: Not prime farmland

Map Unit Composition

Jellycamp and similar soils: 40 percent
Ollierivas and similar soils: 35 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Jellycamp

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, base slope
Microfeatures of landform position: Swales
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Parent material: Alluvium derived from igneous rock

Typical profile

H1 - 0 to 3 inches: very cobbly loam
H2 - 3 to 6 inches: loam
H3 - 6 to 11 inches: clay
H4 - 11 to 16 inches: indurated
H5 - 16 to 26 inches: bedrock

Properties and qualities

Slope: 2 to 9 percent
Surface area covered with cobbles, stones or boulders: 35.0 percent
Depth to restrictive feature: More than 80 inches; 10 to 20 inches to duripan; 12 to 60 inches to lithic bedrock
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to low (0.00 to 0.01 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 0.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: R021XG909CA - Clayey
Hydric soil rating: No

Description of Ollierivas

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Microfeatures of landform position: Mounds
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Parent material: Alluvium derived from igneous rock

Typical profile

H1 - 0 to 5 inches: loam
H2 - 5 to 23 inches: clay loam
H3 - 23 to 31 inches: indurated
H4 - 31 to 41 inches: bedrock

Properties and qualities

Slope: 2 to 9 percent
Depth to restrictive feature: 20 to 40 inches to duripan; 30 to 50 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to low (0.00 to 0.01 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D
Ecological site: R021XG909CA - Clayey
Hydric soil rating: No

Minor Components

Longcreek

Percent of map unit: 8 percent
Landform: Escarpments
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear

Across-slope shape: Linear
Hydric soil rating: No

Oxendine

Percent of map unit: 7 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, base slope
Microfeatures of landform position: Swales
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Hydric soil rating: No

Unnamed

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Microfeatures of landform position: Mounds
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Vansickle

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, base slope
Microfeatures of landform position: Swales
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Hydric soil rating: No

jbrt—Jimmerson loam-Jimmerson stony sandy loam complex, 2 to 15 percent slopes

Map Unit Setting

National map unit symbol: jbrt
Elevation: 3,300 to 4,500 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 80 to 100 days
Farmland classification: Not prime farmland

Map Unit Composition

Jimmerson and similar soils: 60 percent
Jimmerson and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Jimmerson

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Old tephra deposits and material from lava flows

Typical profile

H1 - 0 to 5 inches: loam
H2 - 5 to 24 inches: loam
H3 - 24 to 36 inches: clay loam
H4 - 36 to 50 inches: clay loam
H5 - 50 to 62 inches: cobbly clay loam
H6 - 62 to 70 inches: clay loam

Properties and qualities

Slope: 2 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F022BG202CA - Mesic, Cool (FFD<100) Ash-Influenced Mountains
Hydric soil rating: No

Description of Jimmerson

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Old tephra deposits and material from lava flows

Typical profile

H1 - 0 to 12 inches: stony sandy loam
H2 - 12 to 20 inches: cobbly loam
H3 - 20 to 38 inches: clay loam
H4 - 38 to 60 inches: clay loam

Properties and qualities

Slope: 2 to 15 percent
Surface area covered with cobbles, stones or boulders: 3.0 percent

Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 10.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: F022BG202CA - Mesic, Cool (FFD<100) Ash-Influenced Mountains
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 7 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Unnamed, soils shallow over weathered bedrock

Percent of map unit: 3 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

jbrw—Jimmerson loam-Jimmerson stony sandy loam complex, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: jbrw
Elevation: 3,300 to 4,500 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 80 to 100 days
Farmland classification: Not prime farmland

Map Unit Composition

Jimmerson and similar soils: 50 percent
Jimmerson and similar soils: 40 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Jimmerson

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Old tephra deposits and material from lava flows

Typical profile

H1 - 0 to 5 inches: loam
H2 - 5 to 24 inches: loam
H3 - 24 to 36 inches: clay loam
H4 - 36 to 50 inches: clay loam
H5 - 50 to 62 inches: cobbly clay loam
H6 - 62 to 70 inches: clay loam

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: F022BG202CA - Mesic, Cool (FFD<100) Ash-Influenced Mountains
Hydric soil rating: No

Description of Jimmerson

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Old tephra deposits and material from lava flows

Typical profile

H1 - 0 to 12 inches: stony sandy loam

H2 - 12 to 20 inches: cobbly loam
H3 - 20 to 38 inches: clay loam
H4 - 38 to 60 inches: clay loam

Properties and qualities

Slope: 15 to 30 percent
Surface area covered with cobbles, stones or boulders: 3.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 10.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: F022BG202CA - Mesic, Cool (FFD<100) Ash-Influenced Mountains
Hydric soil rating: No

Minor Components

Rock outcrop

Percent of map unit: 7 percent
Landform: Escarpments
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Unnamed

Percent of map unit: 3 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

jbry—Jimmerson stony loam-Jimmerson loam complex, 30 to 50 percent slopes

Map Unit Setting

National map unit symbol: jbry
Elevation: 3,300 to 4,500 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 80 to 100 days
Farmland classification: Not prime farmland

Map Unit Composition

Jimmerson and similar soils: 60 percent
Jimmerson and similar soils: 20 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Jimmerson

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Old tephra deposits and material from lava flows

Typical profile

H1 - 0 to 12 inches: stony sandy loam
H2 - 12 to 20 inches: cobbly loam
H3 - 20 to 38 inches: clay loam
H4 - 38 to 60 inches: clay loam

Properties and qualities

Slope: 30 to 50 percent
Surface area covered with cobbles, stones or boulders: 7.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 10.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: F022BG202CA - Mesic, Cool (FFD<100) Ash-Influenced Mountains
Hydric soil rating: No

Description of Jimmerson

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Old tephra deposits and material from lava flows

Typical profile

H1 - 0 to 5 inches: loam
H2 - 5 to 24 inches: loam
H3 - 24 to 36 inches: clay loam
H4 - 36 to 50 inches: clay loam
H5 - 50 to 62 inches: cobbly clay loam
H6 - 62 to 70 inches: clay loam

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: F022BG202CA - Mesic, Cool (FFD<100) Ash-Influenced Mountains
Hydric soil rating: No

Minor Components

Rock outcrop

Percent of map unit: 7 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Unnamed, fault escarpments

Percent of map unit: 7 percent

Landform: Escarpments
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Unnamed

Percent of map unit: 6 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

jbt7—Lava flows-Gassaway complex, 2 to 15 percent slopes

Map Unit Setting

National map unit symbol: jbt7
Elevation: 2,500 to 5,700 feet
Mean annual precipitation: 12 to 45 inches
Mean annual air temperature: 39 to 50 degrees F
Frost-free period: 80 to 120 days
Farmland classification: Not prime farmland

Map Unit Composition

Lava flows: 60 percent
Gassaway and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lava Flows

Setting

Landform: Lava flows
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear

Typical profile

H1 - 0 to 10 inches: unweathered bedrock

Properties and qualities

Slope: 2 to 15 percent
Depth to restrictive feature: 0 inches to lithic bedrock

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Description of Gassaway

Setting

Landform: Lava flows
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian deposits derived from igneous rock

Typical profile

H1 - 0 to 3 inches: cobbly loam
H2 - 3 to 12 inches: gravelly loam
H3 - 12 to 22 inches: bedrock

Properties and qualities

Slope: 2 to 15 percent
Surface area covered with cobbles, stones or boulders: 15.0 percent
Depth to restrictive feature: 11 to 14 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to low (0.00 to 0.01 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: R021XG907CA - Shallow Loamy
Hydric soil rating: No

Minor Components

Bollibokka

Percent of map unit: 8 percent
Landform: Lava flows
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Pastolla

Percent of map unit: 2 percent
Landform: Stream terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

jbxf—Pit silty clay, drained, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: jbxf
Elevation: 2,500 to 5,300 feet
Mean annual precipitation: 8 to 18 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 60 to 130 days
Farmland classification: Not prime farmland

Map Unit Composition

Pit and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pit

Setting

Landform: Basin floors
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine textured alluvium derived from igneous rock

Typical profile

H1 - 0 to 4 inches: silty clay
H2 - 4 to 40 inches: clay
H3 - 40 to 45 inches: silty clay loam
H4 - 45 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 60 to 72 inches
Frequency of flooding: FrequentNone
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 30.0
Available water supply, 0 to 60 inches: High (about 10.4 inches)

Interpretive groups

Land capability classification (irrigated): 4w
Land capability classification (nonirrigated): 7w

Hydrologic Soil Group: C
Ecological site: R021XG909CA - Clayey
Hydric soil rating: Yes

Minor Components

Pastolla
Percent of map unit: 5 percent
Landform: Basin floors
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Henhill
Percent of map unit: 3 percent
Landform: Basin floors
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Cupvar
Percent of map unit: 2 percent
Landform: Basin floors
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

jbxm—Pittville sandy loam, 0 to 5 percent slopes

Map Unit Setting
National map unit symbol: jbxm
Elevation: 3,250 to 3,550 feet
Mean annual precipitation: 16 to 20 inches
Mean annual air temperature: 50 to 52 degrees F
Frost-free period: 120 to 130 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Pittville and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pittville

Setting

Landform: Stream terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous rock

Typical profile

H1 - 0 to 9 inches: sandy loam
H2 - 9 to 41 inches: sandy clay loam
H3 - 41 to 84 inches: stratified sand to sandy loam
H4 - 84 to 94 inches: cemented

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: 40 to 60 inches to cemented horizon; 60 to 84 inches to duripan
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.1 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R021XG910CA - Loamy
Hydric soil rating: No

Minor Components

Pit

Percent of map unit: 3 percent
Landform: Stream terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Unnamed

Percent of map unit: 2 percent
Landform: Stream terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Dudgen

Percent of map unit: 2 percent
Landform: Stream terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Microfeatures of landform position: Swales
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Hydric soil rating: No

Esperanza

Percent of map unit: 2 percent
Landform: Stream terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Graven

Percent of map unit: 1 percent
Landform: Stream terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Microfeatures of landform position: Mounds
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

jbxt—Pittville sandy loam, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: jbxt
Elevation: 3,250 to 3,550 feet
Mean annual precipitation: 16 to 20 inches
Mean annual air temperature: 50 to 52 degrees F
Frost-free period: 120 to 130 days
Farmland classification: Not prime farmland

Map Unit Composition

Pittville and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pittville

Setting

Landform: Stream terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser

Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous rock

Typical profile

H1 - 0 to 9 inches: sandy loam
H2 - 9 to 41 inches: sandy clay loam
H3 - 41 to 84 inches: stratified sand to sandy loam
H4 - 84 to 94 inches: cemented

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: 40 to 60 inches to cemented horizon; 60 to 84 inches to duripan
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.5 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R021XG910CA - Loamy
Hydric soil rating: No

Minor Components

Unnamed, soils less than 40" deep to tuff

Percent of map unit: 8 percent
Landform: Stream terraces
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Esperanza

Percent of map unit: 7 percent
Landform: Stream terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

jbyx—Rubble land-Argixerolls-Rock outcrop complex, 30 to 75 percent slopes

Map Unit Setting

National map unit symbol: jbyx
Elevation: 2,500 to 7,800 feet
Mean annual precipitation: 12 to 60 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 50 to 120 days
Farmland classification: Not prime farmland

Map Unit Composition

Rubble land: 40 percent
Argixerolls and similar soils: 30 percent
Rock outcrop: 20 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rubble Land

Setting

Landform: Escarpments
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear

Typical profile

H1 - 0 to 60 inches: fragmental material
R - 60 to 70 inches: bedrock

Properties and qualities

Slope: 30 to 75 percent
Depth to restrictive feature: 60 inches to lithic bedrock
Drainage class: Excessively drained
Available water supply, 0 to 60 inches: Very low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Description of Argixerolls

Setting

Landform: Escarpments
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex

Parent material: Colluvium derived from igneous rock

Typical profile

H1 - 0 to 7 inches: stony sandy loam
H2 - 7 to 15 inches: very stony sandy clay loam
H3 - 15 to 25 inches: extremely stony sandy clay loam
H4 - 25 to 35 inches: bedrock

Properties and qualities

Slope: 30 to 75 percent
Depth to restrictive feature: 10 to 60 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydrologic Soil Group: C
Ecological site: R021XG915CA - Wet Meadow
Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Escarpments
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex

Typical profile

H1 - 0 to 10 inches: unweathered bedrock

Properties and qualities

Slope: 30 to 75 percent
Depth to restrictive feature: 0 inches to lithic bedrock

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Minor Components

Jellico

Percent of map unit: 3 percent
Landform: Escarpments
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Searvar

Percent of map unit: 3 percent
Landform: Escarpments
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Splawn

Percent of map unit: 2 percent
Landform: Escarpments
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Unnamed, shallow soils with various textures

Percent of map unit: 2 percent
Landform: Escarpments
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

jbz3—Rubble land-Xerorthents complex, 50 to 70 precent slopes

Map Unit Setting

National map unit symbol: jbz3
Elevation: 2,700 to 7,800 feet
Mean annual precipitation: 12 to 60 inches
Mean annual air temperature: 39 to 52 degrees F
Frost-free period: 50 to 120 days
Farmland classification: Not prime farmland

Map Unit Composition

Rubble land: 45 percent
Xerorthents and similar soils: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rubble Land

Setting

Landform: Escarpments

Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear

Typical profile
H1 - 0 to 60 inches: fragmental material

Properties and qualities
Slope: 50 to 70 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Drainage class: Excessively drained
Available water supply, 0 to 60 inches: Very low (about 0.0 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Description of Xerorthents

Setting
Landform: Escarpments
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Colluvium derived from igneous rock

Typical profile
H1 - 0 to 3 inches: loam
H2 - 3 to 22 inches: cobbly sandy loam
H3 - 22 to 34 inches: very cobbly sandy loam
H4 - 34 to 38 inches: weathered bedrock

Properties and qualities
Slope: 50 to 70 percent
Depth to restrictive feature: 20 to 90 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.4 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: F022BG201CA - Mesic Ash-Influenced Mountains
Hydric soil rating: No

Minor Components

Nikal
Percent of map unit: 4 percent

Landform: Escarpments
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Nanny

Percent of map unit: 4 percent
Landform: Stream terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Neer

Percent of map unit: 4 percent
Landform: Escarpments
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Unnamed, soils < 20" deep to hard bedrock

Percent of map unit: 3 percent
Landform: Escarpments
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

jc0p—Winnibulli loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: jc0p
Elevation: 3,200 to 4,500 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 80 to 100 days
Farmland classification: Prime farmland if irrigated and drained

Map Unit Composition

Winnibulli and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Winnibulli

Setting

Landform: Fan remnants
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous rock

Typical profile

H1 - 0 to 11 inches: loam
H2 - 11 to 55 inches: clay loam
H3 - 55 to 72 inches: sandy clay loam
H4 - 72 to 87 inches: sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 42 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 10.5 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C
Ecological site: F021XG914CA - Wet Loamy
Hydric soil rating: No

Minor Components

Gasper

Percent of map unit: 6 percent
Landform: Fan remnants
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Nosoni

Percent of map unit: 6 percent
Landform: Fan remnants
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Scarface

Percent of map unit: 5 percent

Landform: Fan remnants
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Pitvar

Percent of map unit: 3 percent
Landform: Fan remnants
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

jc0t—Winnibulli-Burman complex, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: jc0t
Elevation: 3,200 to 4,500 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 80 to 100 days
Farmland classification: Prime farmland if irrigated and drained

Map Unit Composition

Winnibulli and similar soils: 60 percent
Burman and similar soils: 25 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Winnibulli

Setting

Landform: Fan remnants
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous rock

Typical profile

H1 - 0 to 11 inches: loam
H2 - 11 to 55 inches: clay loam
H3 - 55 to 72 inches: sandy clay loam
H4 - 72 to 87 inches: sandy loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches

Drainage class: Somewhat poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 42 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 10.5 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C
Ecological site: F021XG914CA - Wet Loamy
Hydric soil rating: No

Description of Burman

Setting

Landform: Fan remnants
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous rock

Typical profile

H1 - 0 to 8 inches: loam
H2 - 8 to 33 inches: clay loam
H3 - 33 to 39 inches: indurated
H4 - 39 to 72 inches: stratified sandy loam to silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 20 to 40 inches to duripan
Drainage class: Somewhat poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.8 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Ecological site: F022BG202CA - Mesic, Cool (FFD<100) Ash-Influenced Mountains
Hydric soil rating: Yes

Minor Components

Unnamed

Percent of map unit: 7 percent
Landform: Fan remnants
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Henhill

Percent of map unit: 5 percent
Landform: Stream terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Pit

Percent of map unit: 3 percent
Landform: Flood plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

jc10—Wyntoon sandy loam, 2 to 15 percent slopes

Map Unit Setting

National map unit symbol: jc10
Elevation: 3,200 to 4,300 feet
Mean annual precipitation: 40 to 50 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 80 to 100 days
Farmland classification: Not prime farmland

Map Unit Composition

Wyntoon and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wyntoon

Setting

Landform: Fan remnants
Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous rock

Typical profile

H1 - 0 to 9 inches: sandy loam
H2 - 9 to 25 inches: loam
H3 - 25 to 49 inches: clay loam
H4 - 49 to 74 inches: clay

Properties and qualities

Slope: 2 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very high (about 13.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F021XG914CA - Wet Loamy
Hydric soil rating: No

Minor Components

Riverwash

Percent of map unit: 10 percent
Landform: Flood plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Nanny

Percent of map unit: 4 percent
Landform: Fan remnants
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Ponto

Percent of map unit: 3 percent
Landform: Alluvial fans
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear

Hydric soil rating: No

Unnamed, soils with >35% rock frags in profile

Percent of map unit: 3 percent
Landform: Fan remnants
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

jc2x—Water

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

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VESTRA
5300 Aviation Drive | Redding, CA 96002
Phone 530.223.2585 | Fax 530.223.1145
info@vestra.com | www.vestra.com
GIS, Environmental, & Engineering Services

June 20, 2023

72231

Cary Japp
Senior Environmental Scientist
Supervisor, Northern Region
California Department of Fish and Wildlife
601 Locust Street
Redding, CA 96001

Via Email
Cary.Japp@wildlife.ca.gov

RE: Request for Collaboration PRC §4123
Shasta County Wildfire Mitigation and Hazardous Fuels Reduction Project
Grant #5293

Dear Mr. Japp:

The California Department of Forestry and Fire Protection (CAL FIRE) has awarded grant funding to The McConnell Foundation for wildfire mitigation and hazardous fuels reduction activities in Shasta County, California. The Shasta County Wildfire Mitigation and Hazardous Fuels Reduction Project is being administered by The McConnell Foundation and executed through a partnership with VESTRA Resources, Inc. VESTRA is in the process of preparing an Initial Study/Mitigated Negative Declaration for the project in accordance with CEQA Statutes (Public Resources Code §21000 *et seq.*) and current CEQA Guidelines (California Code of Regulations [CCR] §15000 *et seq.*). CAL FIRE is lead agency for CEQA compliance.

Pursuant to California Public Resources Code Section §4123, when selecting a fuels reduction project, the Department shall collaborate with the State Water Resources Control Board and the Department of Fish and Wildlife to ensure the design of the fuels reduction project protects the water resources and wildlife habitat while addressing fire behavior and public safety. In accordance with California Public Resources Code Section §4123, VESTRA, under the direction CAL FIRE, is requesting collaboration for the Shasta County Wildfire Mitigation and Hazardous Fuels Reduction Project. A description of the project is included herein.

Please respond to this request for collaboration within 30 days. Responses must be postmarked or received via email prior to the end of the 30-day period for consideration. Comments may be submitted to:

Wendy Johnston
VESTRA Resources, Inc
5300 Aviation Drive
Redding, CA 96002
Email: wjohnston@vestra.com

PROJECT DESCRIPTION

The project includes hazardous fuels reduction on private property within Wildland Urban Interface (WUI) areas in Shasta County. The project site includes 11 Project Activity Areas (PAAs) throughout Shasta County adjacent to public roadways. The general location of each PAA within Shasta County is

included on Figure 1. Individual PAAs are shown on Figure 2 through Figure 12. The final acreage and number of parcels included in the project will be determined based on landowner participation and the environmental, operational, or physical constraints of each parcel. The maximum potential acreage to be treated would be 6,291 acres. The number of acres that will receive treatment and number of participating landowners will be less than the maximum extent of the PAAs.

The project will not include work in areas with slopes over 65 percent or in areas with highly erosive soils on slopes greater than 50 percent. In addition, the project will include a 75-foot setback from perennial streams and wetlands and a 50-foot setback from intermittent and ephemeral streams. Biomass removal, herbicide application, equipment staging, operation of mechanical equipment, piling and burning, and on-site disposal of removed biomass will not occur within the setbacks. Prior to project implementation, special treatment zones (STZ) will be identified for known cultural resources within the project area. Dredge tailings and areas treated previously by another party will not be included in the project. These constraint areas will be identified and treatment prescription (TP) for each individual parcel within the PAAs modified prior to project implementation.

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Please contact me with any questions or if additional information is needed.

Sincerely,

VESTRA Resources, Inc.

Wendy Johnston
Vice President

CC: Ben Rowe/CAL FIRE

Enclosures

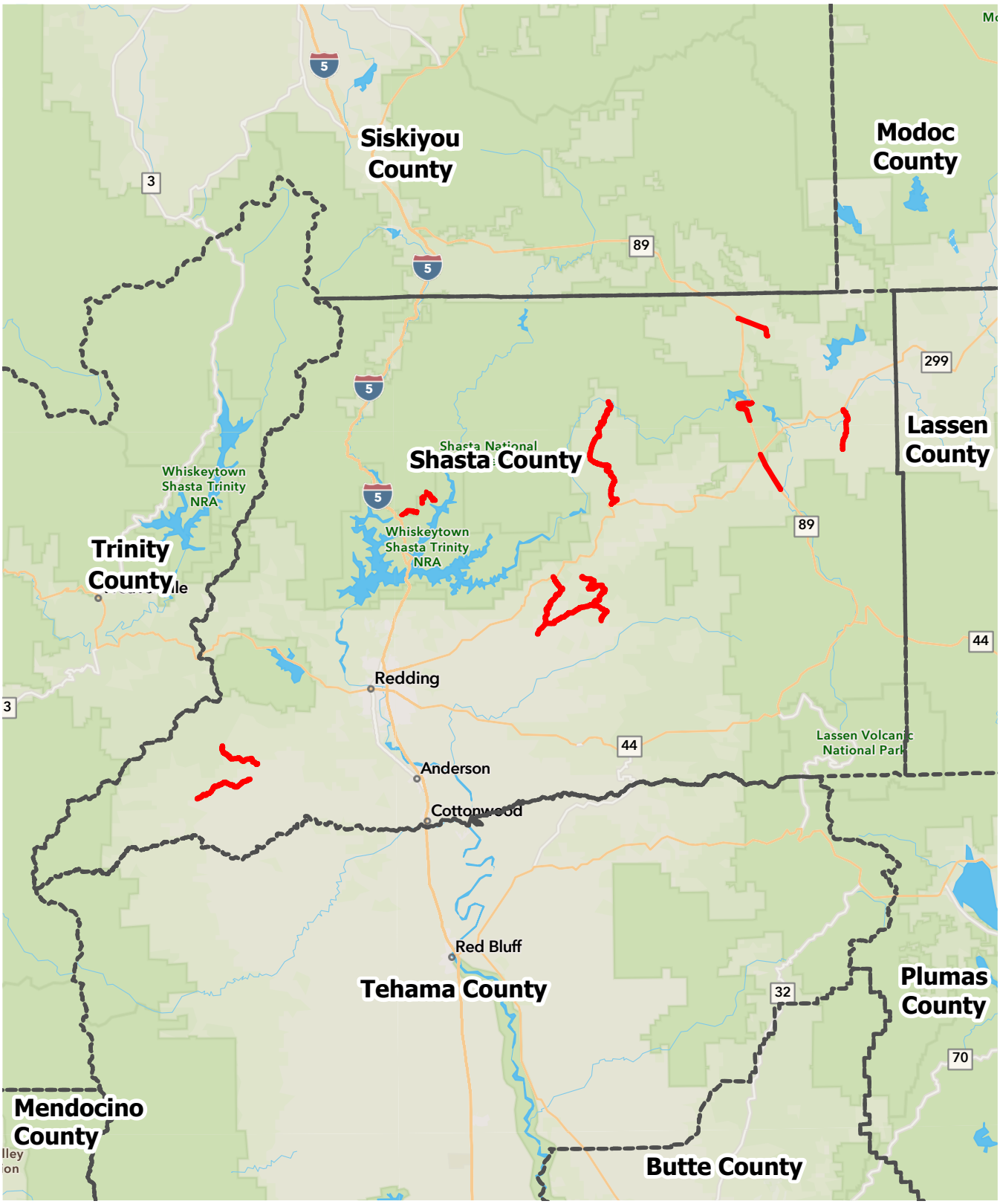

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FIGURE 1
PROJECT LOCATION
WILDFIRE MITIGTAION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

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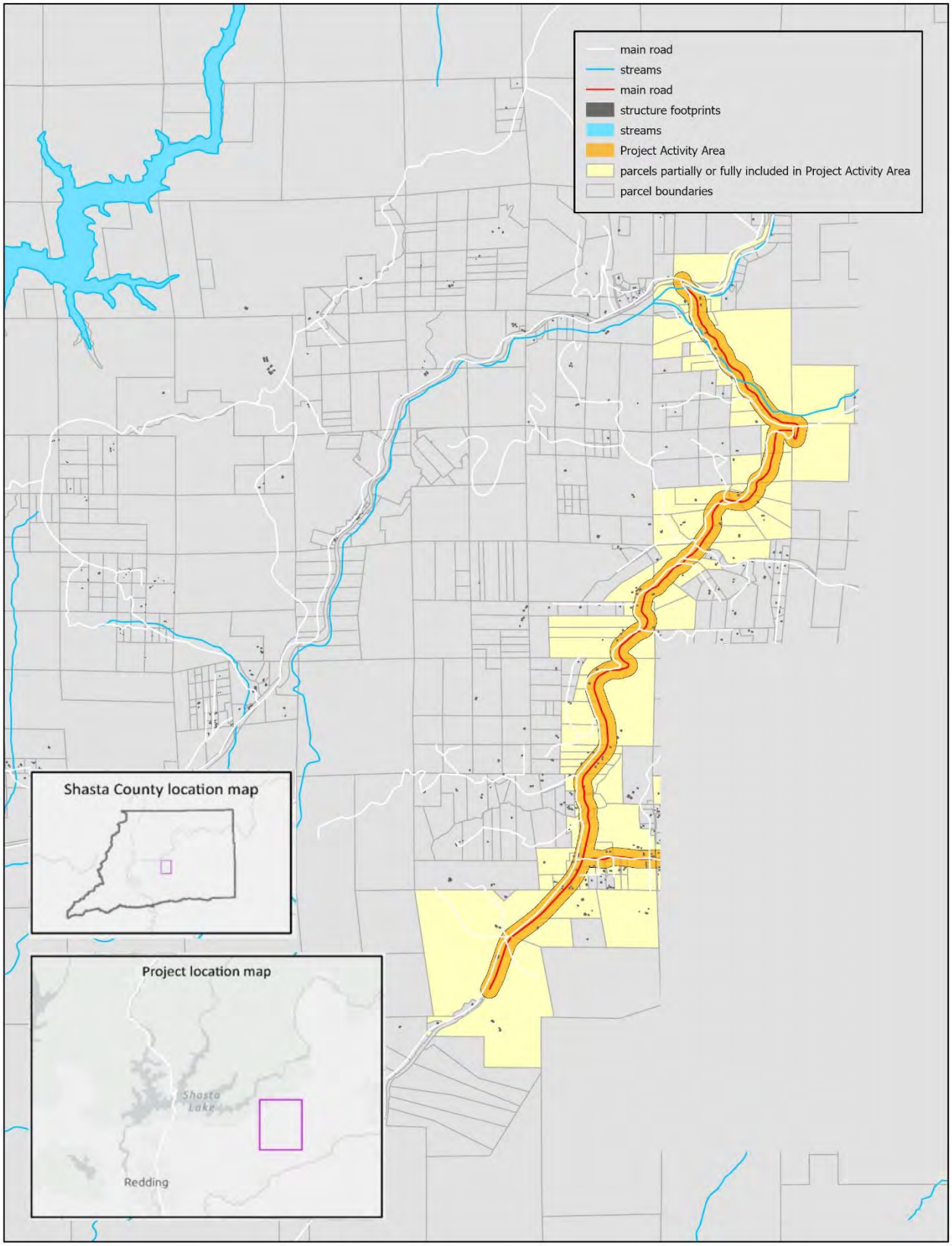

FIGURE 2
OAK RUN ROAD PAA
WILDFIRE MITIGTAION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

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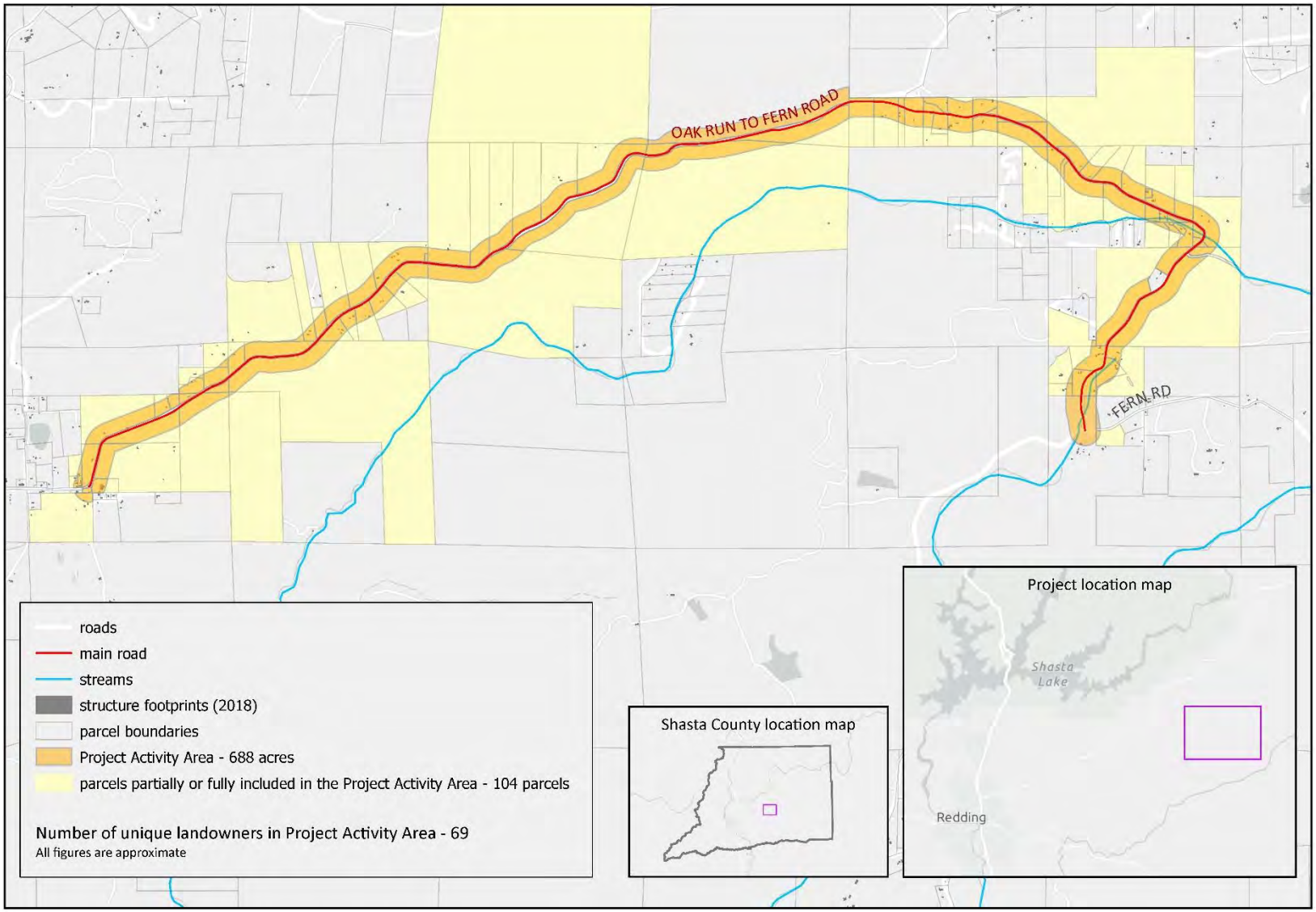

FIGURE 3
OAK RUN TO FERN ROAD PAA
WILDFIRE MITIGTAION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

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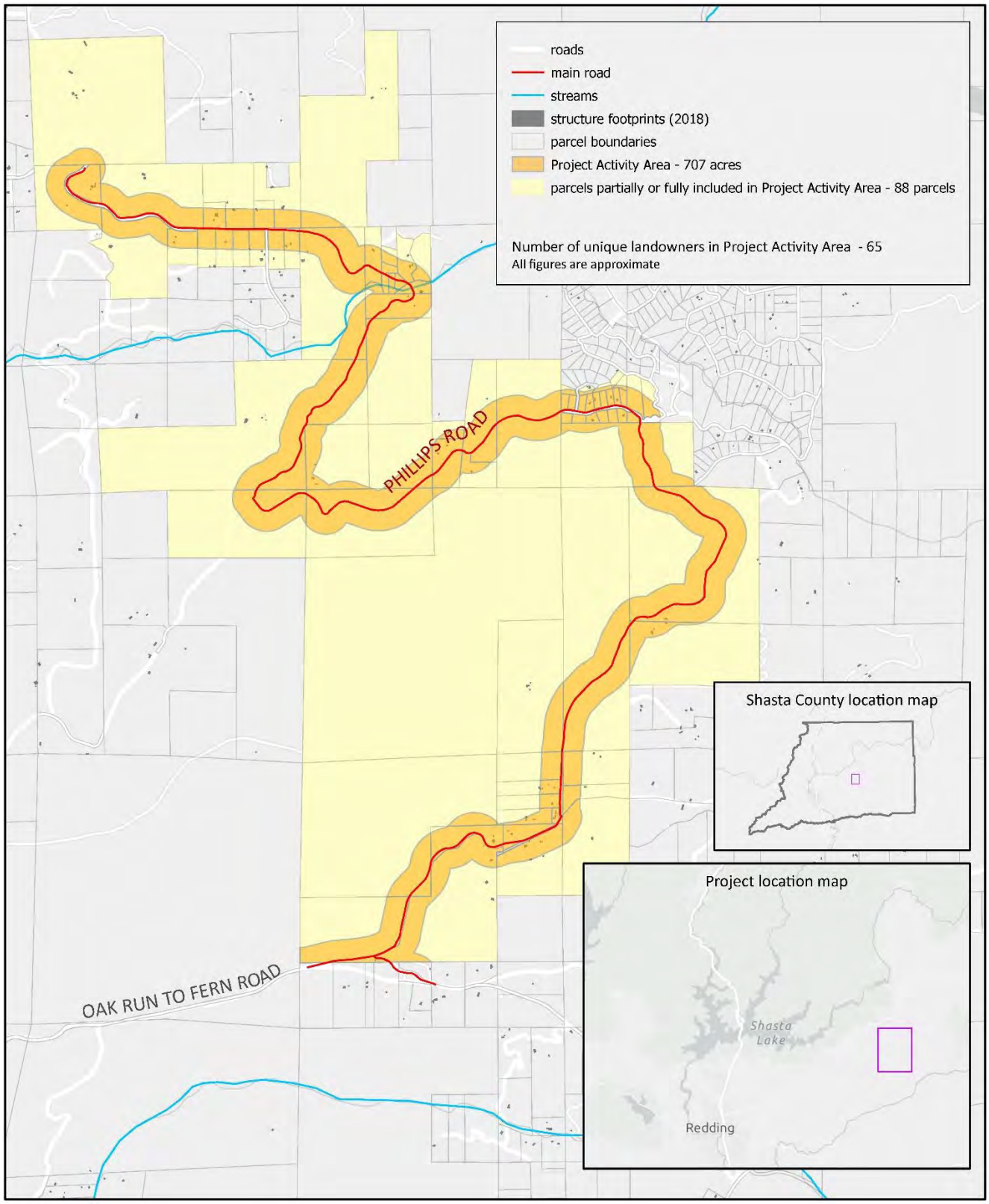

FIGURE 4
PHILLIPS ROAD PAA
WILDFIRE MITIGTAION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

VESTRA

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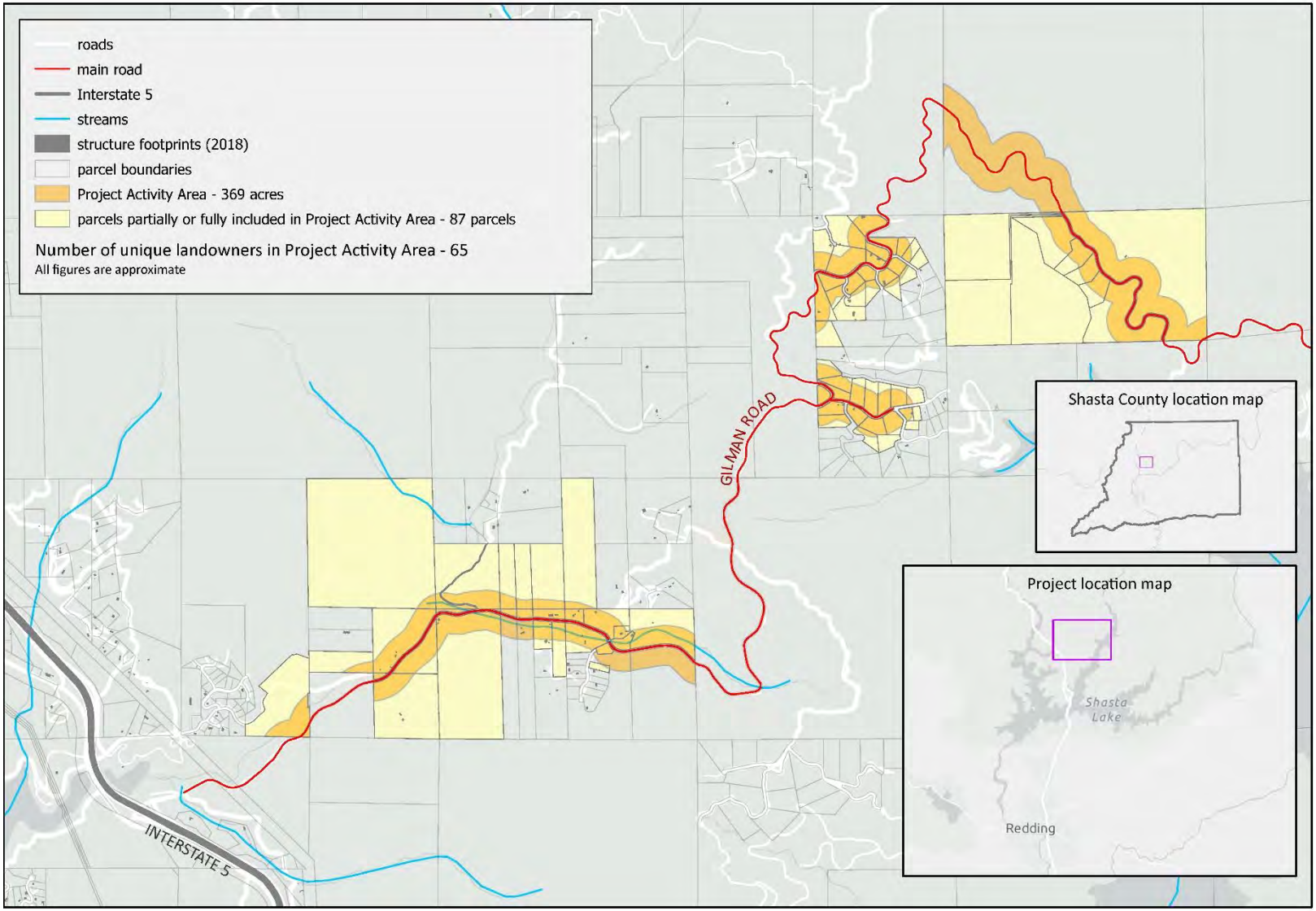

FIGURE 5
GILMAN ROAD PAA
WILDFIRE MITIGTAION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

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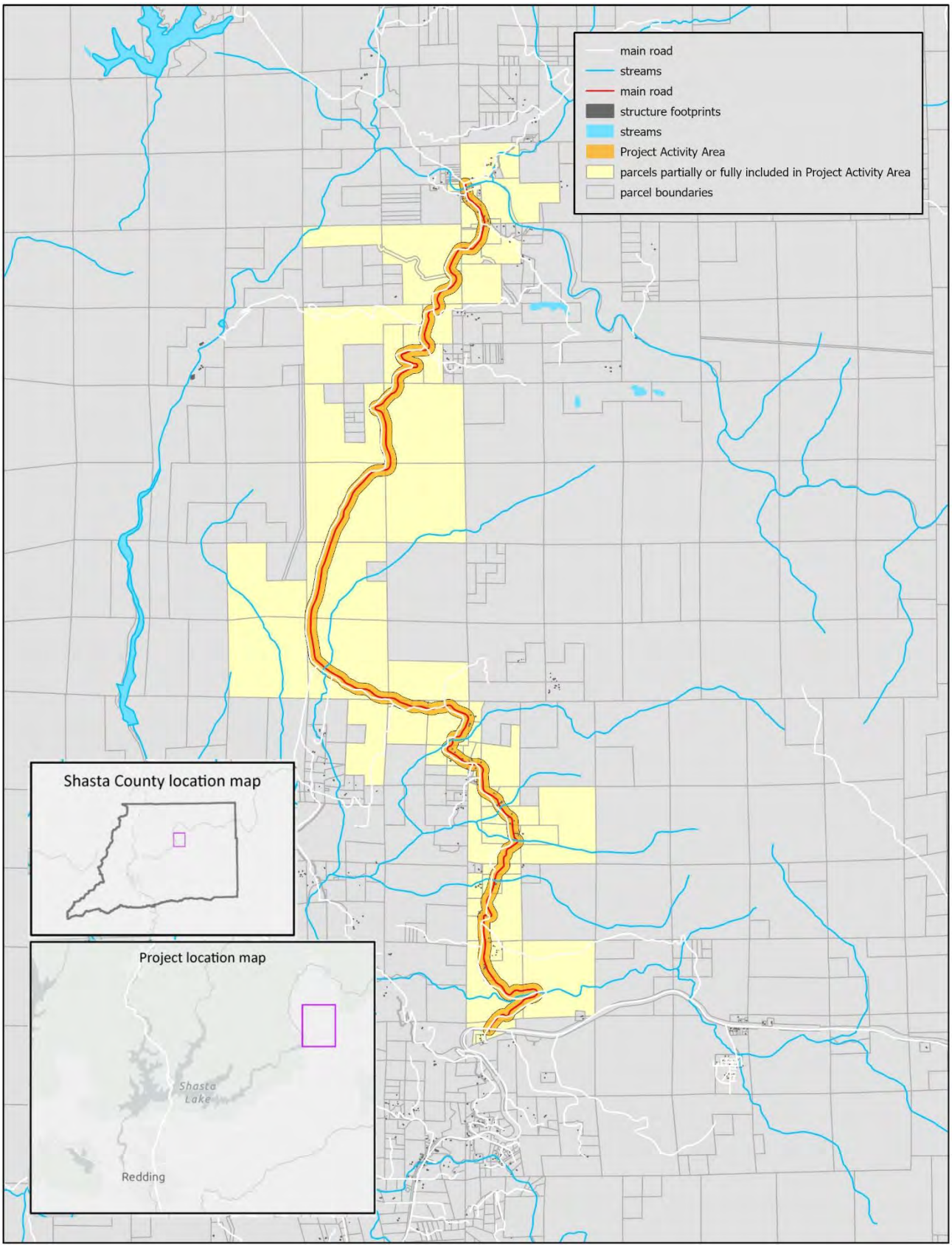

FIGURE 6
BIG BEND ROAD PAA
WILDFIRE MITIGTAION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

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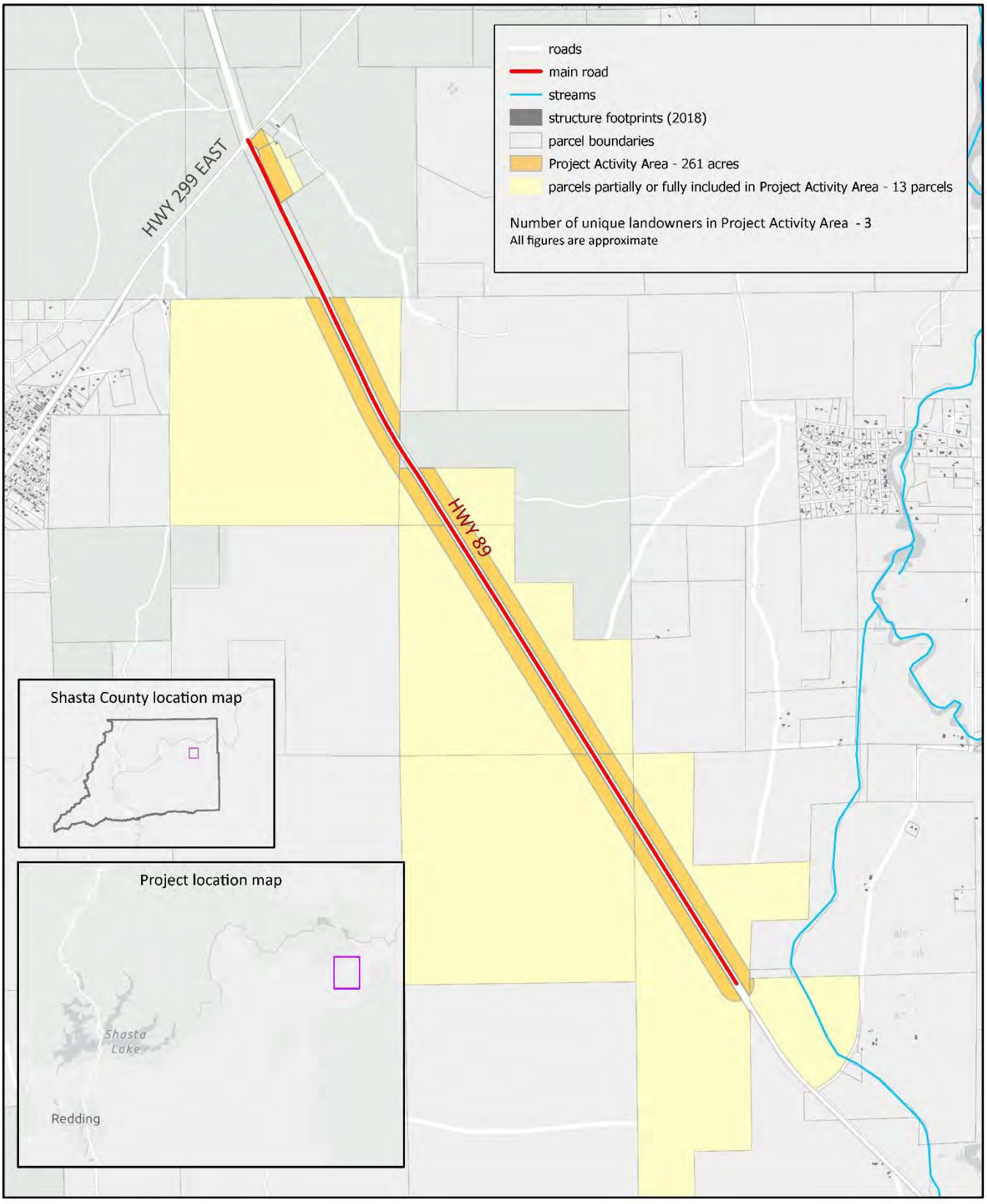

FIGURE 7
HIGHWAY 89 CASSEL ROAD PAA
WILDFIRE MITIGTAION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

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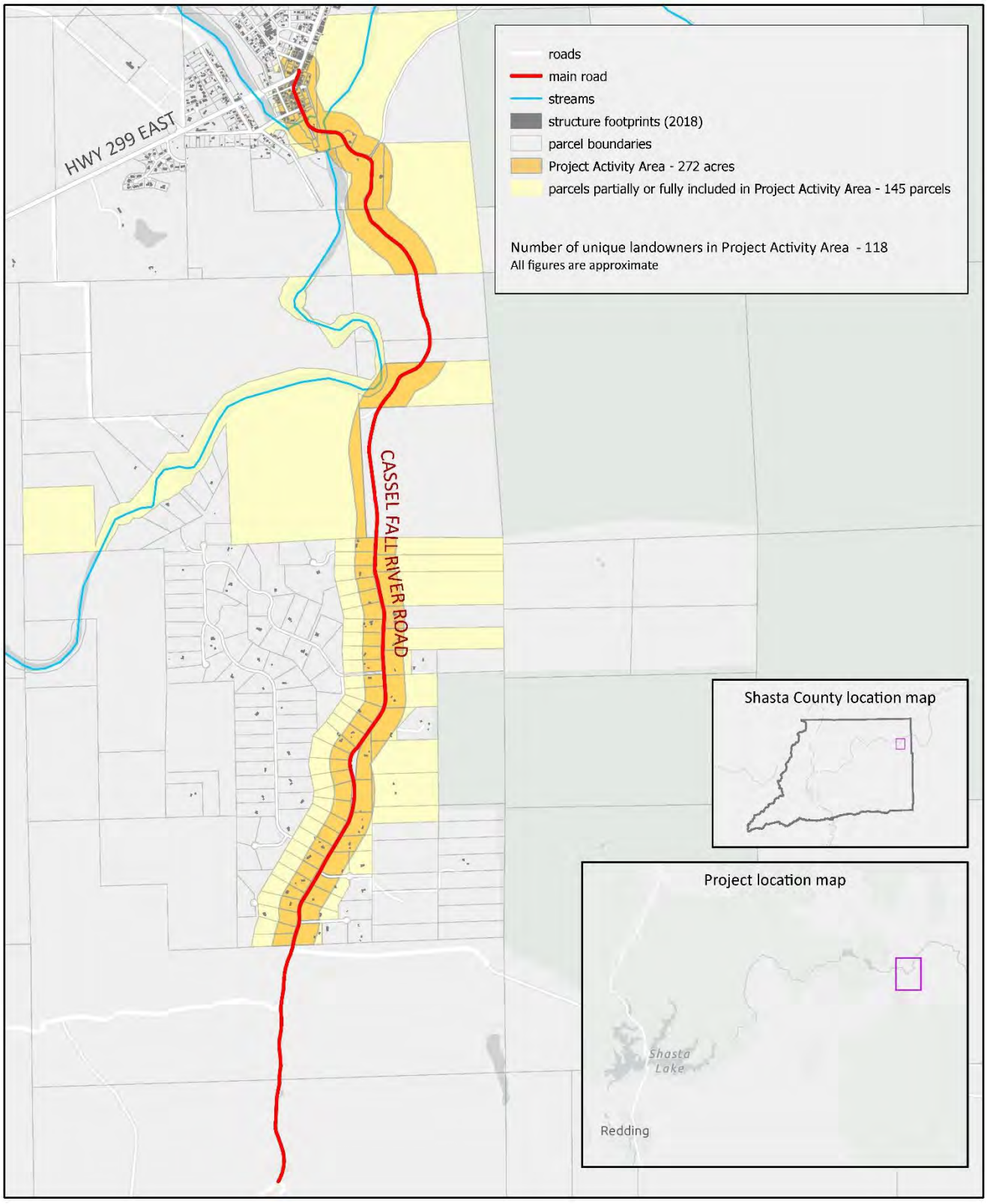

FIGURE 8
CASSEL FALL RIVER ROAD PAA
WILDFIRE MITIGTAION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

VESTRA

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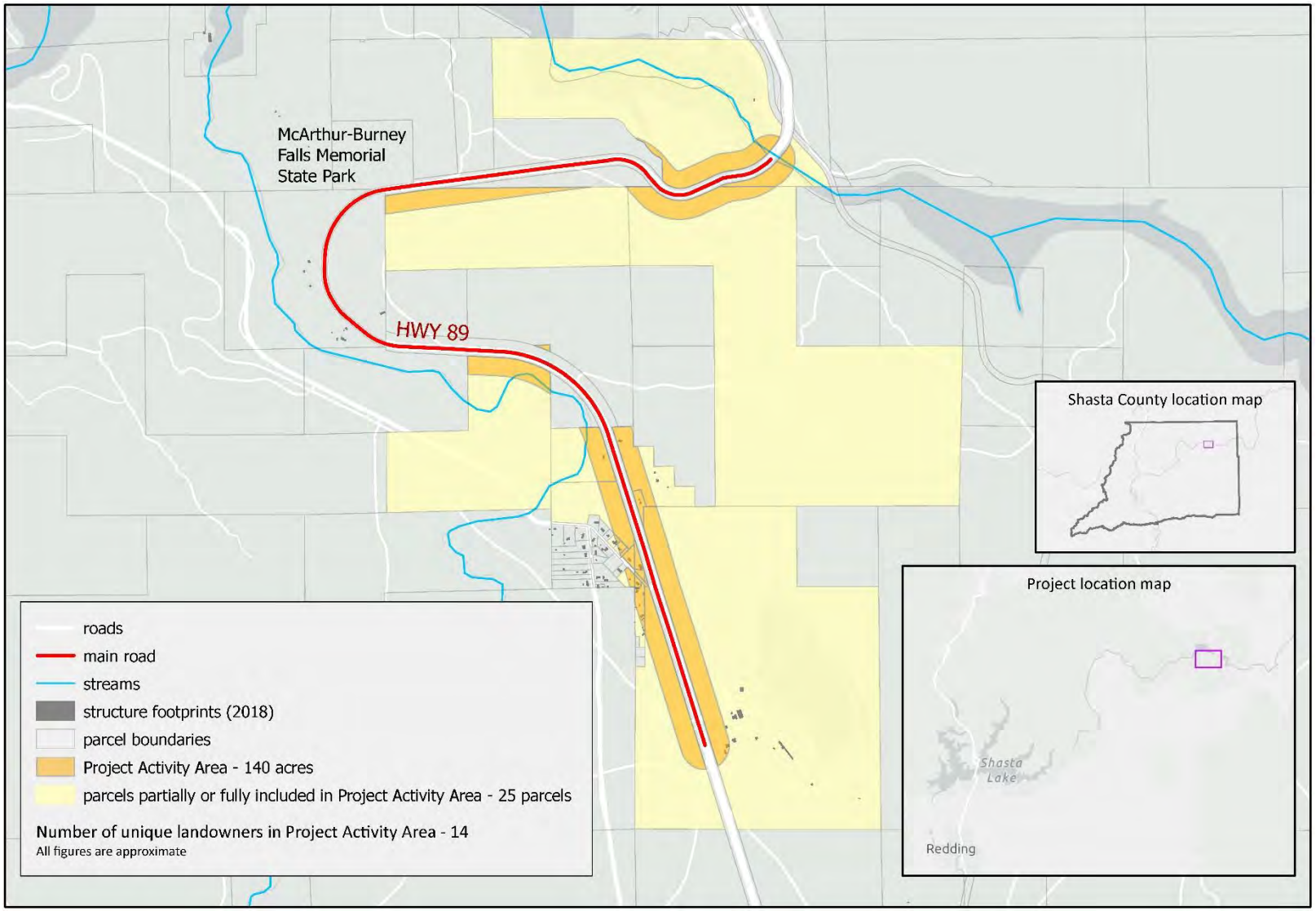

FIGURE 9
STATE ROUTE 89 PAA
WILDFIRE MITIGTAION/HAZARDOUS
FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

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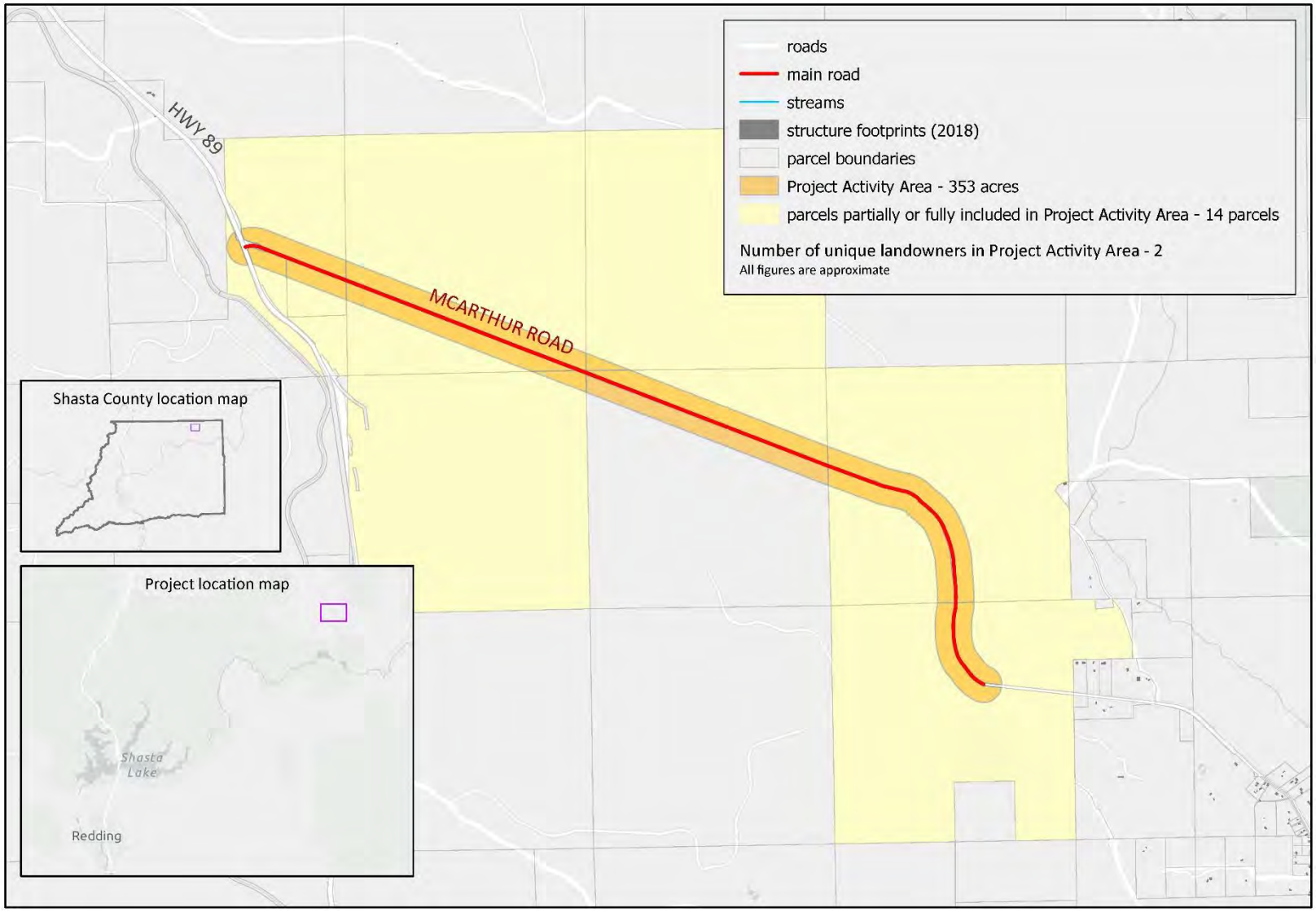

FIGURE 10
MCARTHUR ROAD PAA
WILDFIRE MITIGTAION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

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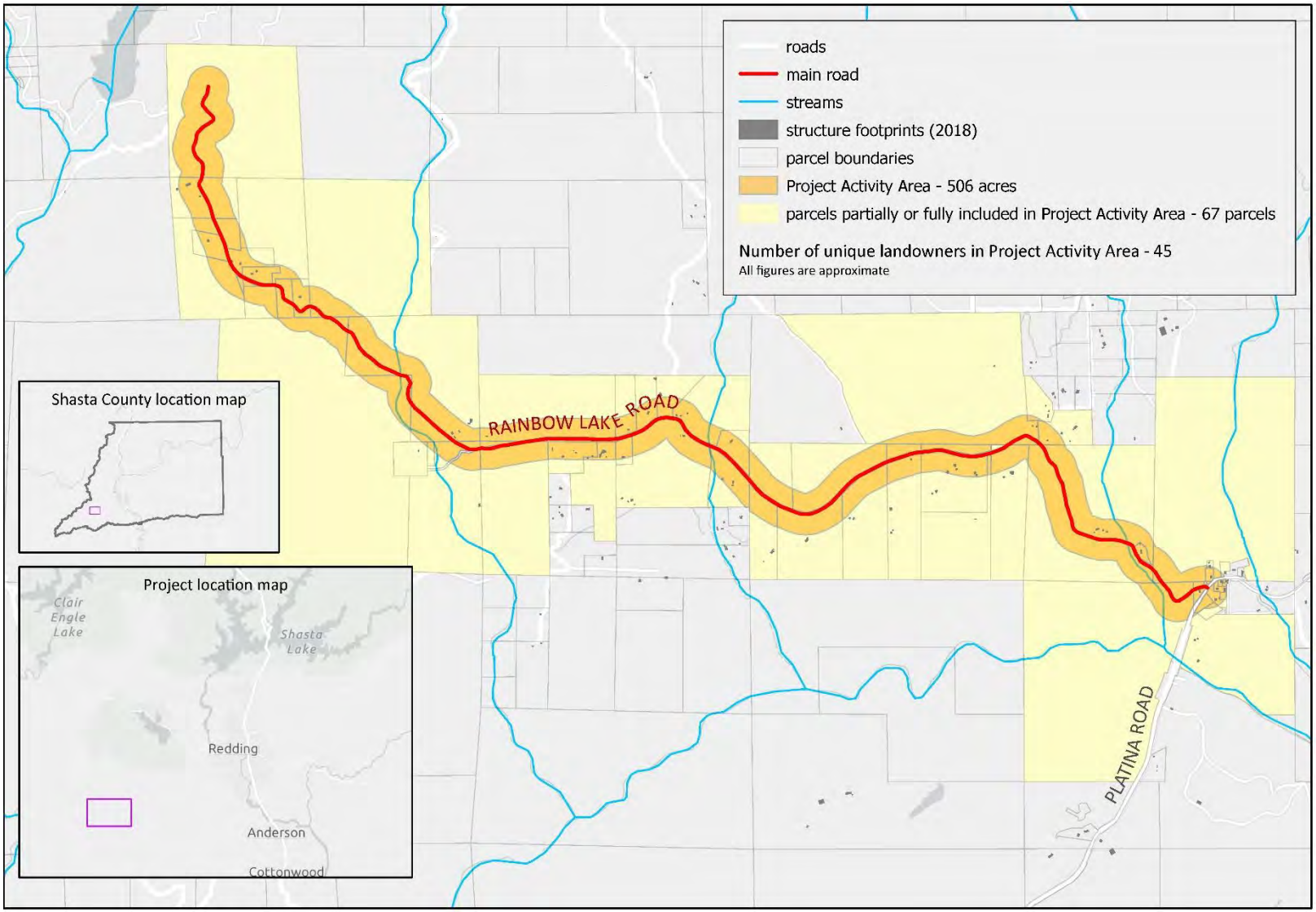

FIGURE 11
RAINBOW LAKE ROAD PAA
WILDFIRE MITIGTAION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

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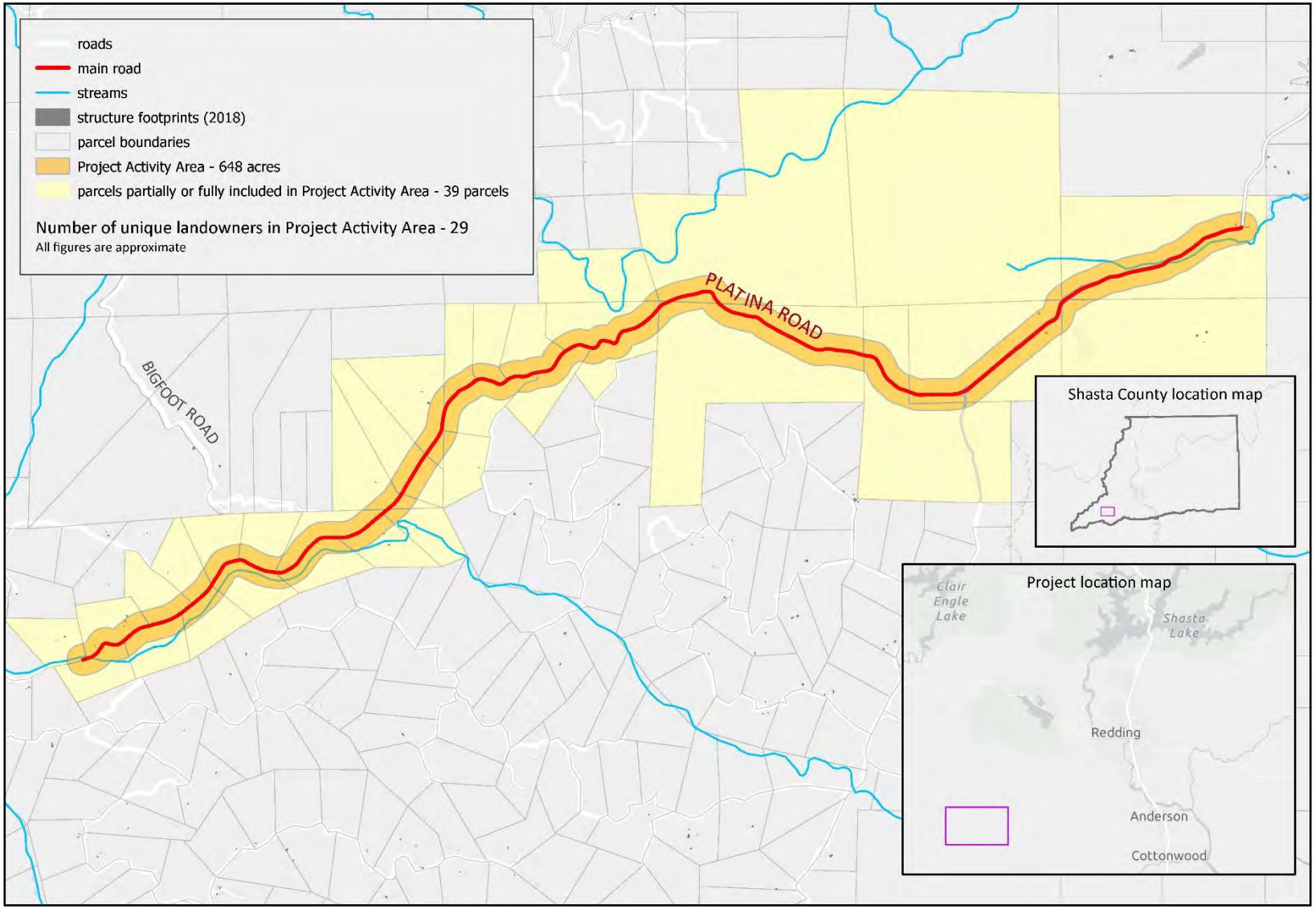

FIGURE 12
PLATINA ROAD PAA
WILDFIRE MITIGTAION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

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VESTRA
5300 Aviation Drive | Redding, CA 96002
Phone 530.223.2585 | Fax 530.223.1145
info@vestra.com | www.vestra.com
GIS, Environmental, & Engineering Services

June 20, 2023

72231

Griffin Perea
Central Valley Regional Water Quality Control Board
364 Knollcrest Drive, Suite 205
Redding, CA 96002

Via Email
Griffin.Perea@waterboards.ca.gov

RE: Request for Collaboration PRC §4123
Shasta County Wildfire Mitigation and Hazardous Fuels Reduction Project
Grant #5293

Dear Mr. Perea:

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Wendy Johnston
Vice President

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Enclosures

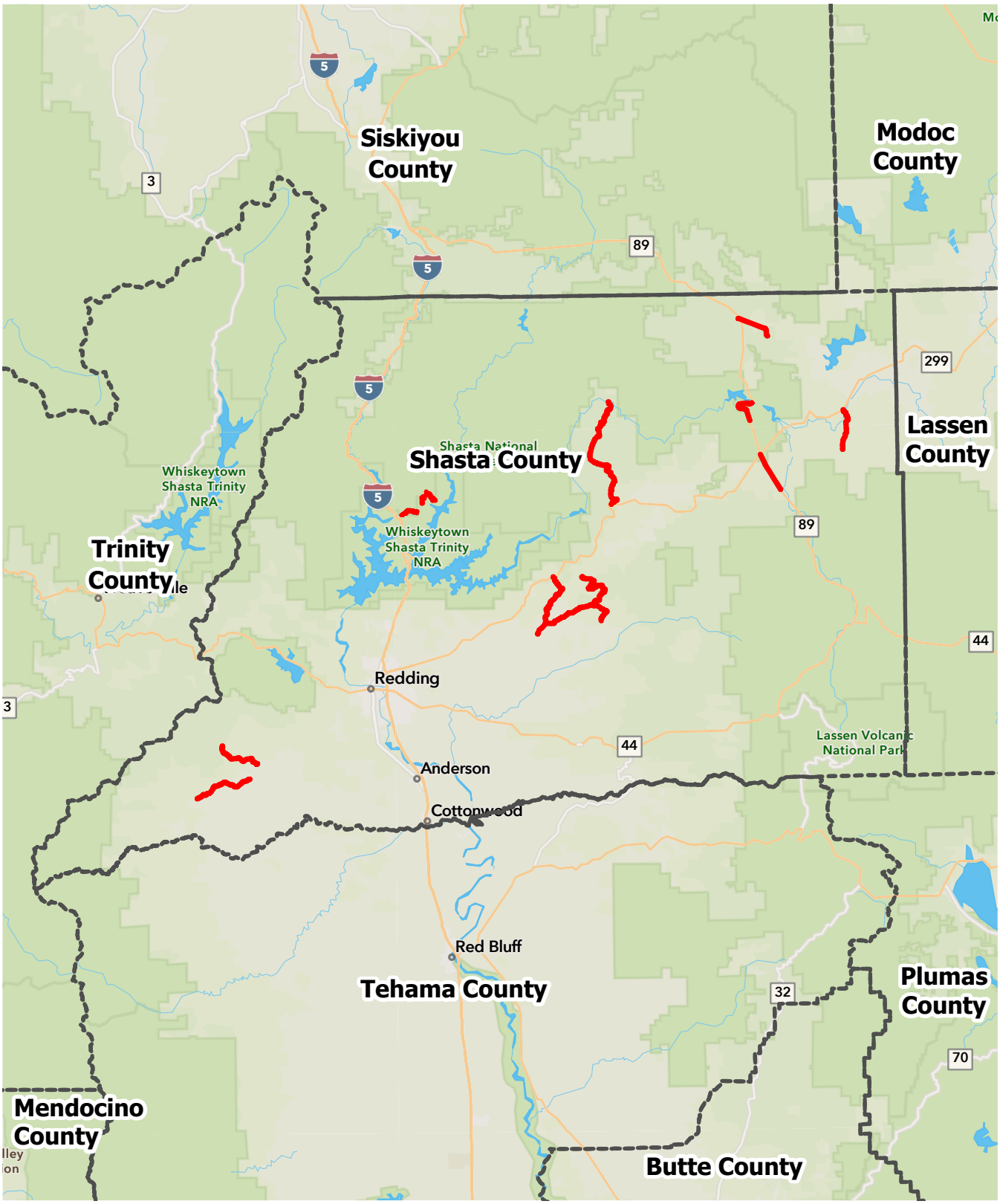

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FIGURE 1
PROJECT LOCATION
WILDFIRE MITIGTAION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

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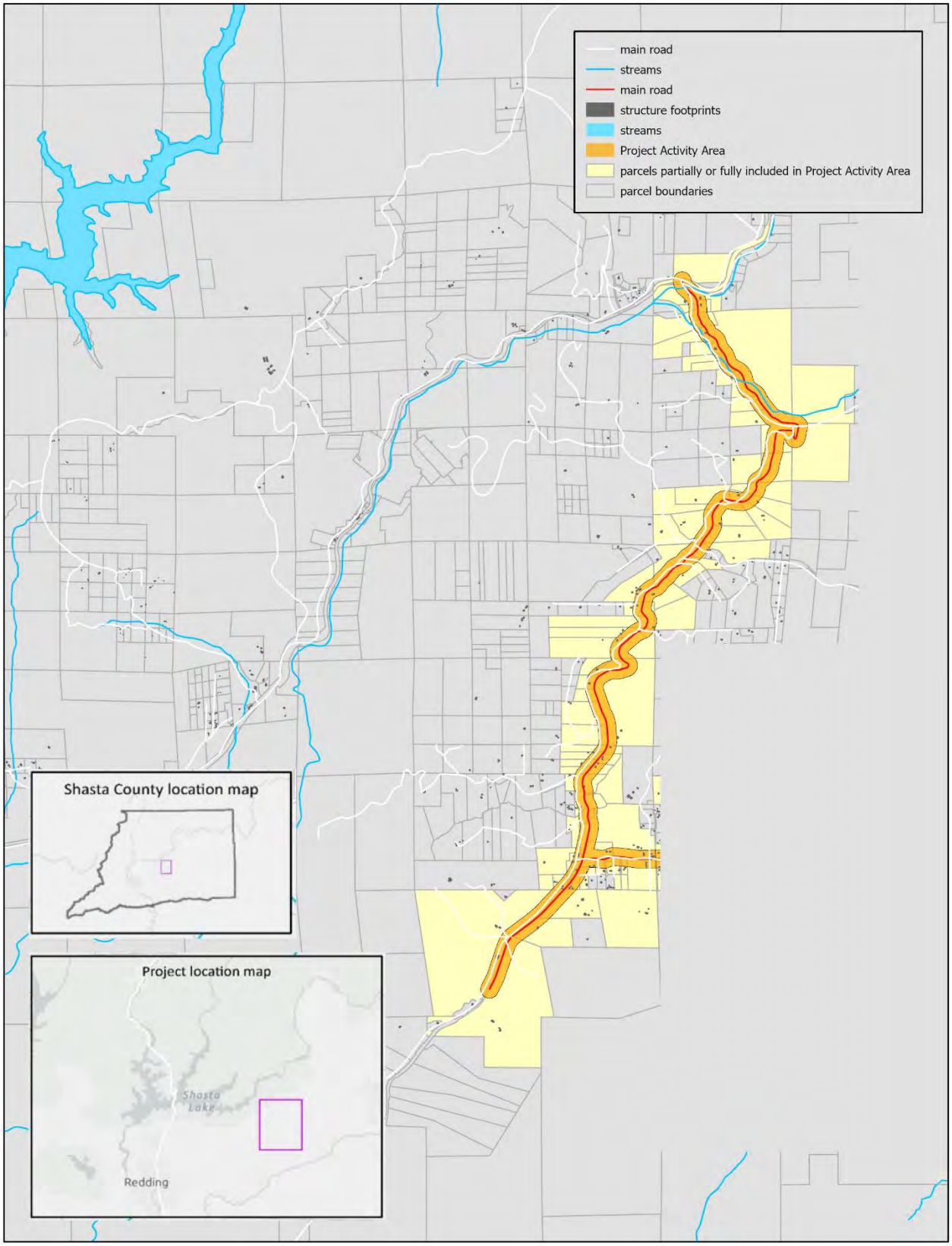

FIGURE 2
OAK RUN ROAD PAA
WILDFIRE MITIGTAION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

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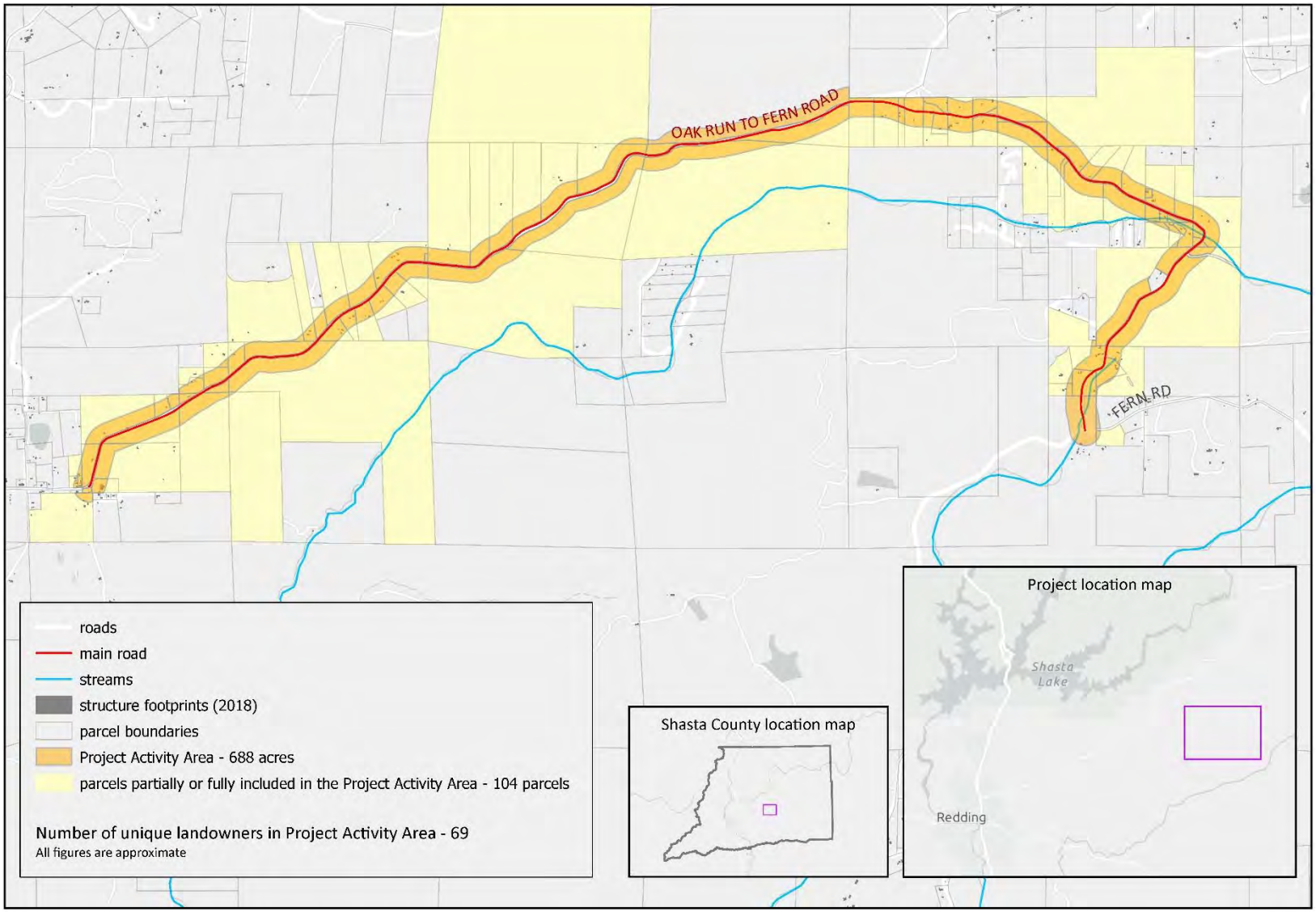

FIGURE 3
OAK RUN TO FERN ROAD PAA
WILDFIRE MITIGTAION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

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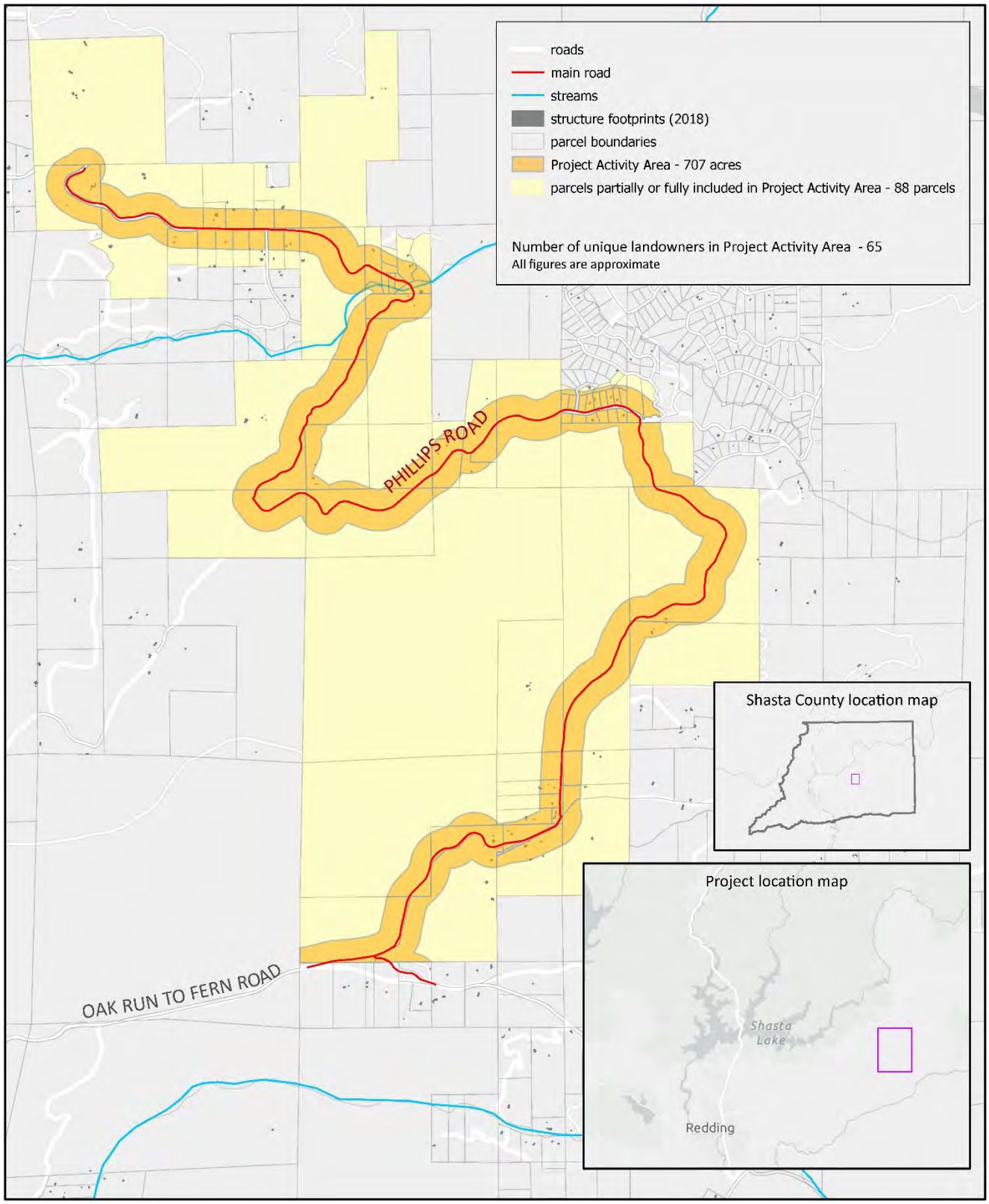

FIGURE 4
PHILLIPS ROAD PAA
WILDFIRE MITIGTAION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

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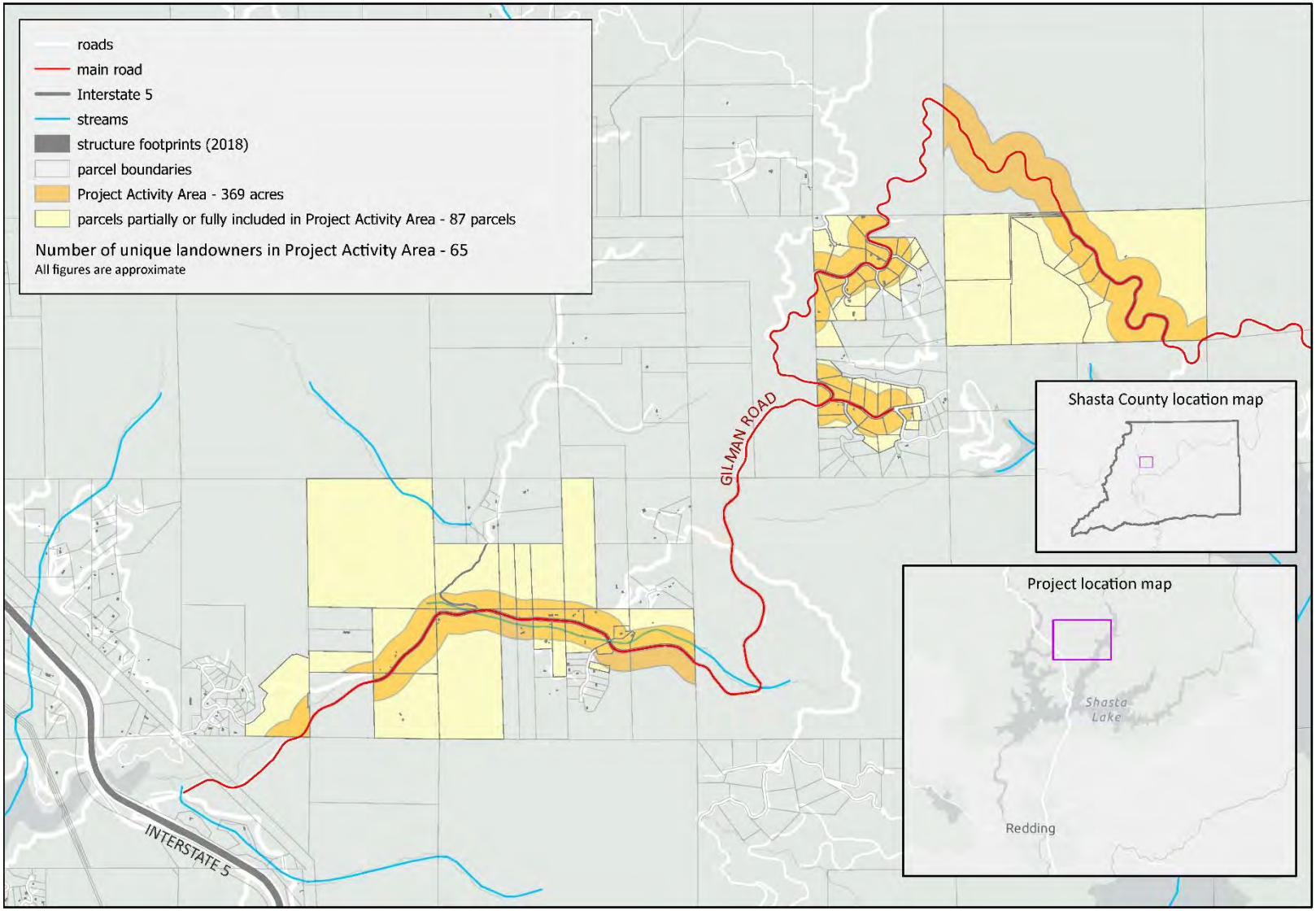

FIGURE 5
GILMAN ROAD PAA
WILDFIRE MITIGTAION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

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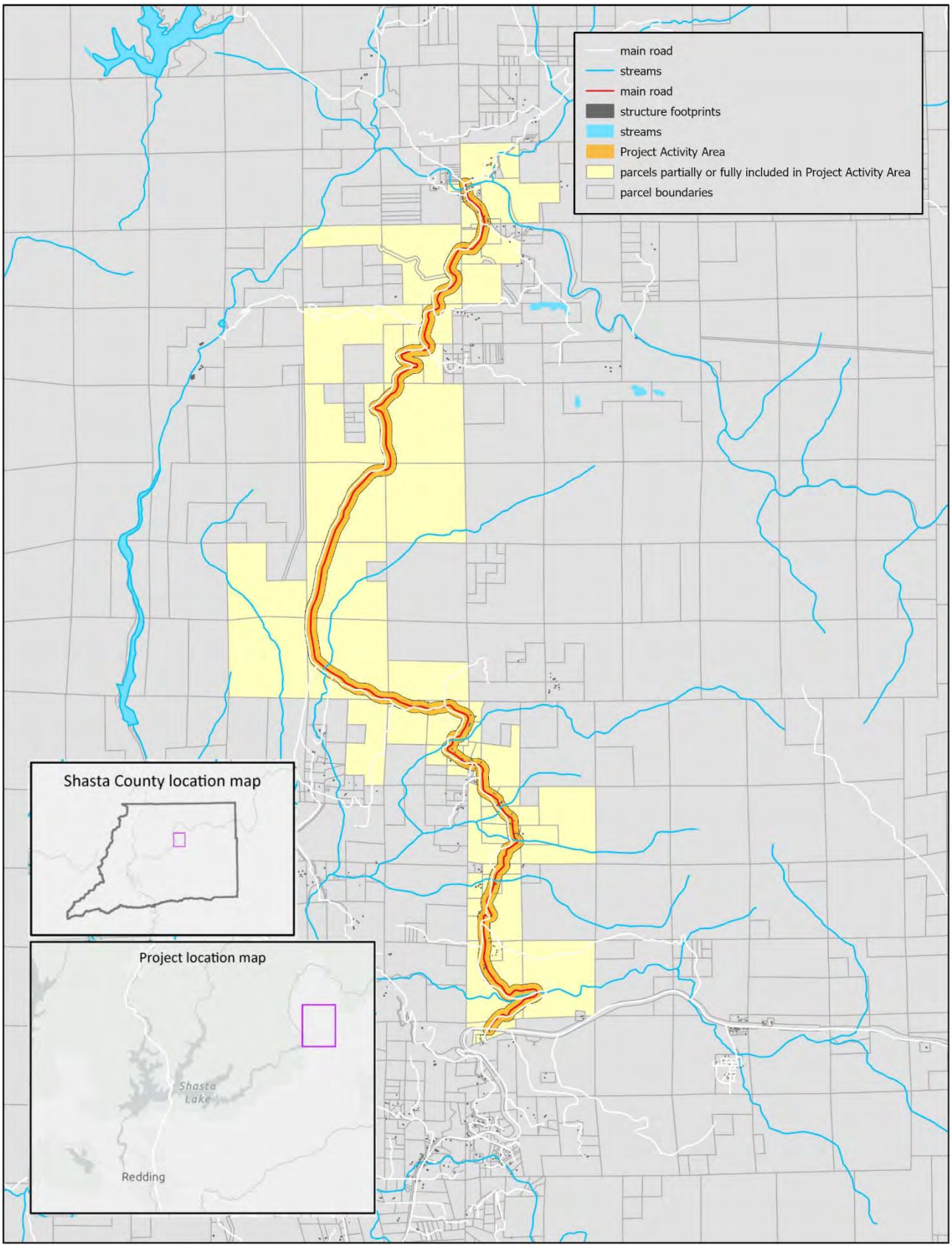

FIGURE 6
BIG BEND ROAD PAA
WILDFIRE MITIGTAION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

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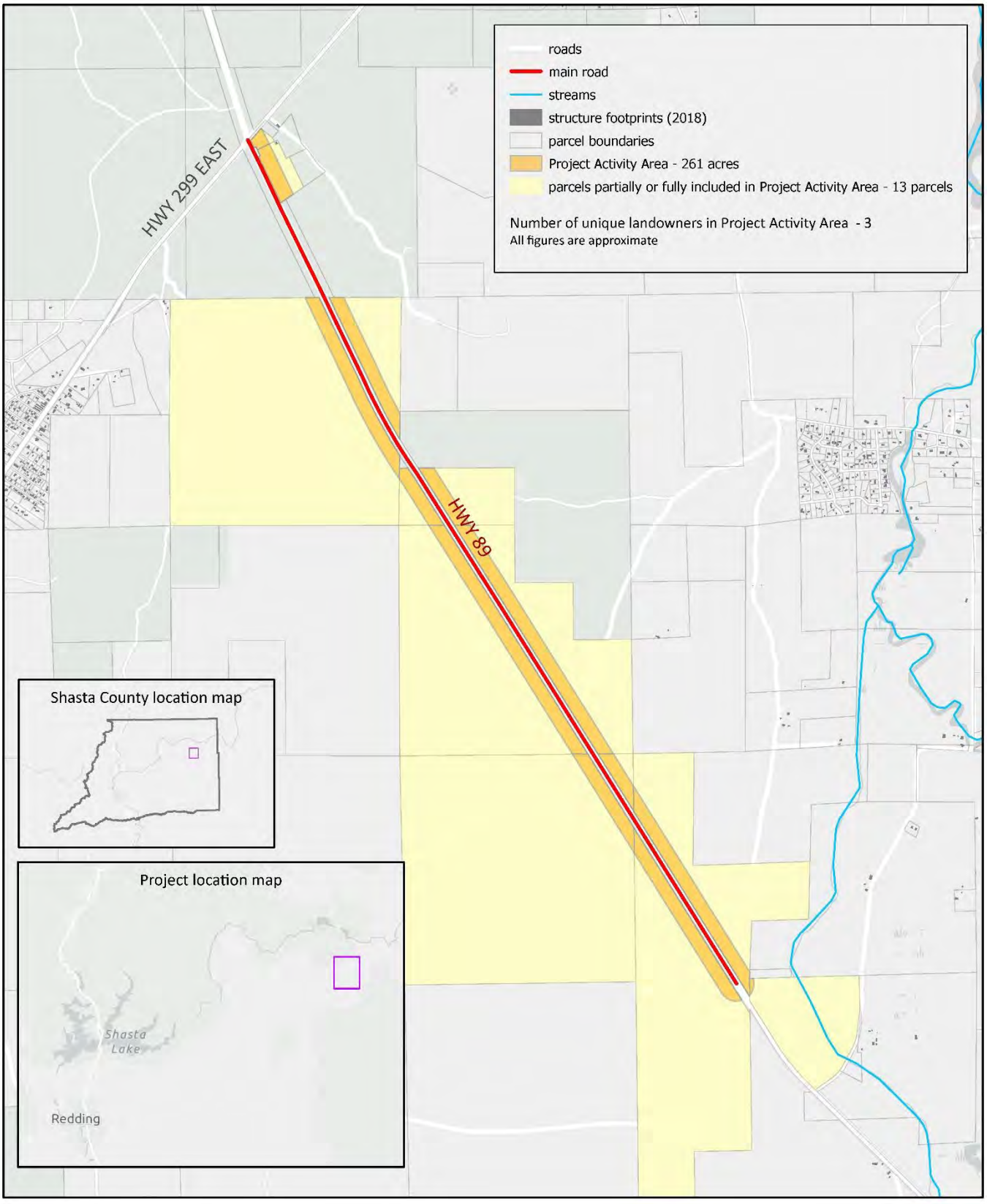

FIGURE 7
HIGHWAY 89 CASSEL ROAD PAA
WILDFIRE MITIGTAION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

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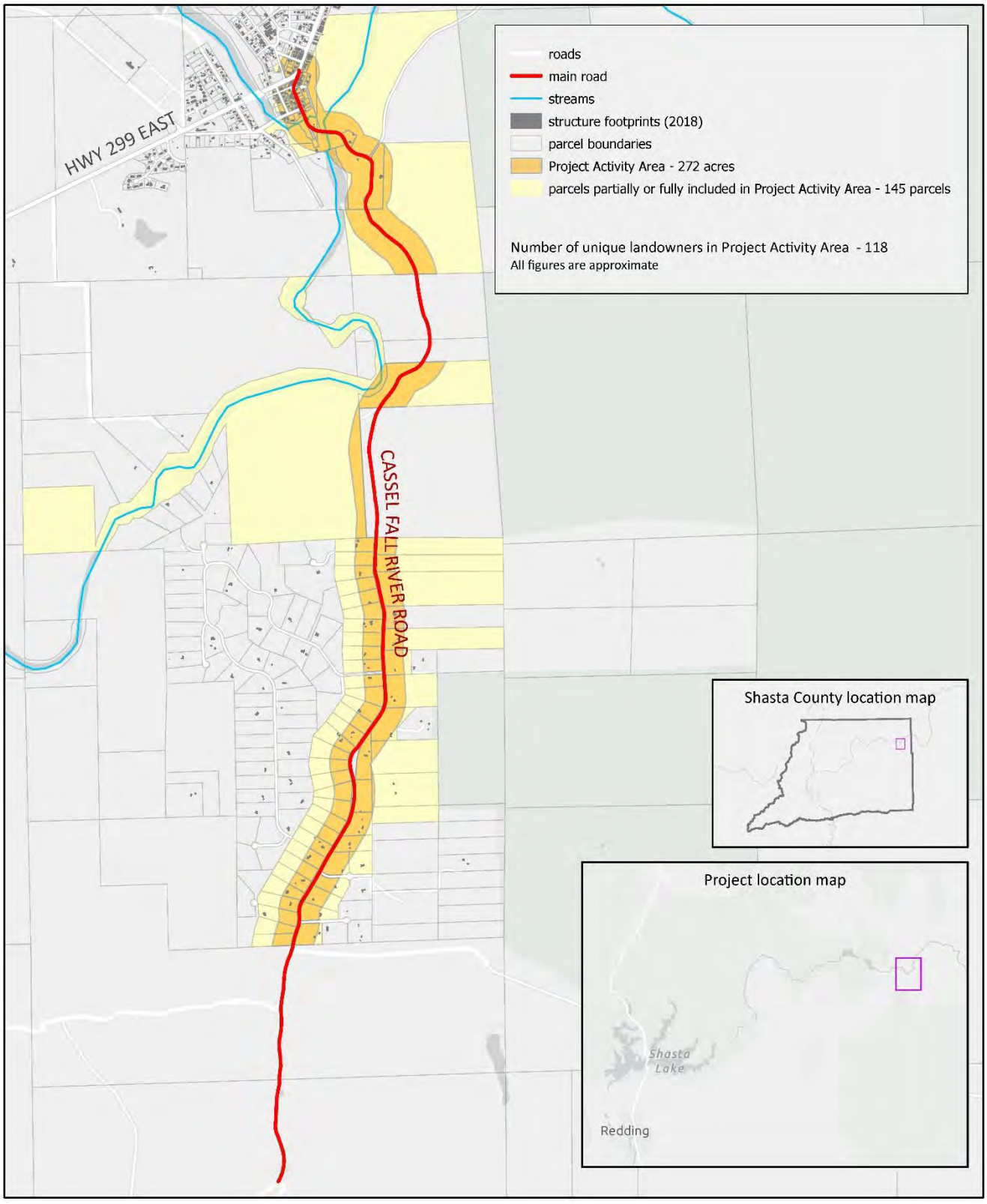

FIGURE 8
CASSEL FALL RIVER ROAD PAA
WILDFIRE MITIGTAION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

VESTRA

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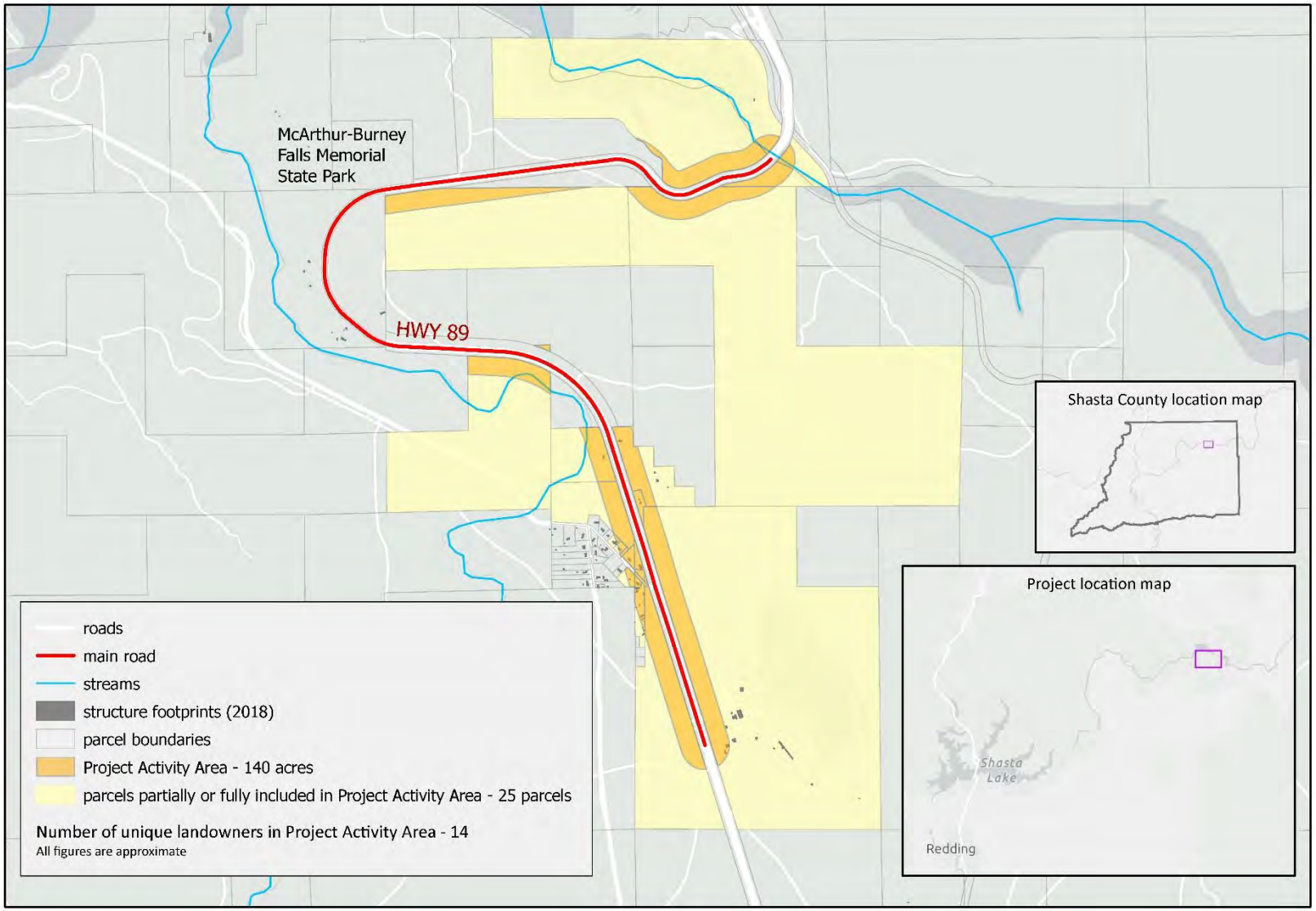

FIGURE 9
STATE ROUTE 89 PAA
WILDFIRE MITIGTAION/HAZARDOUS
FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

VESTRA

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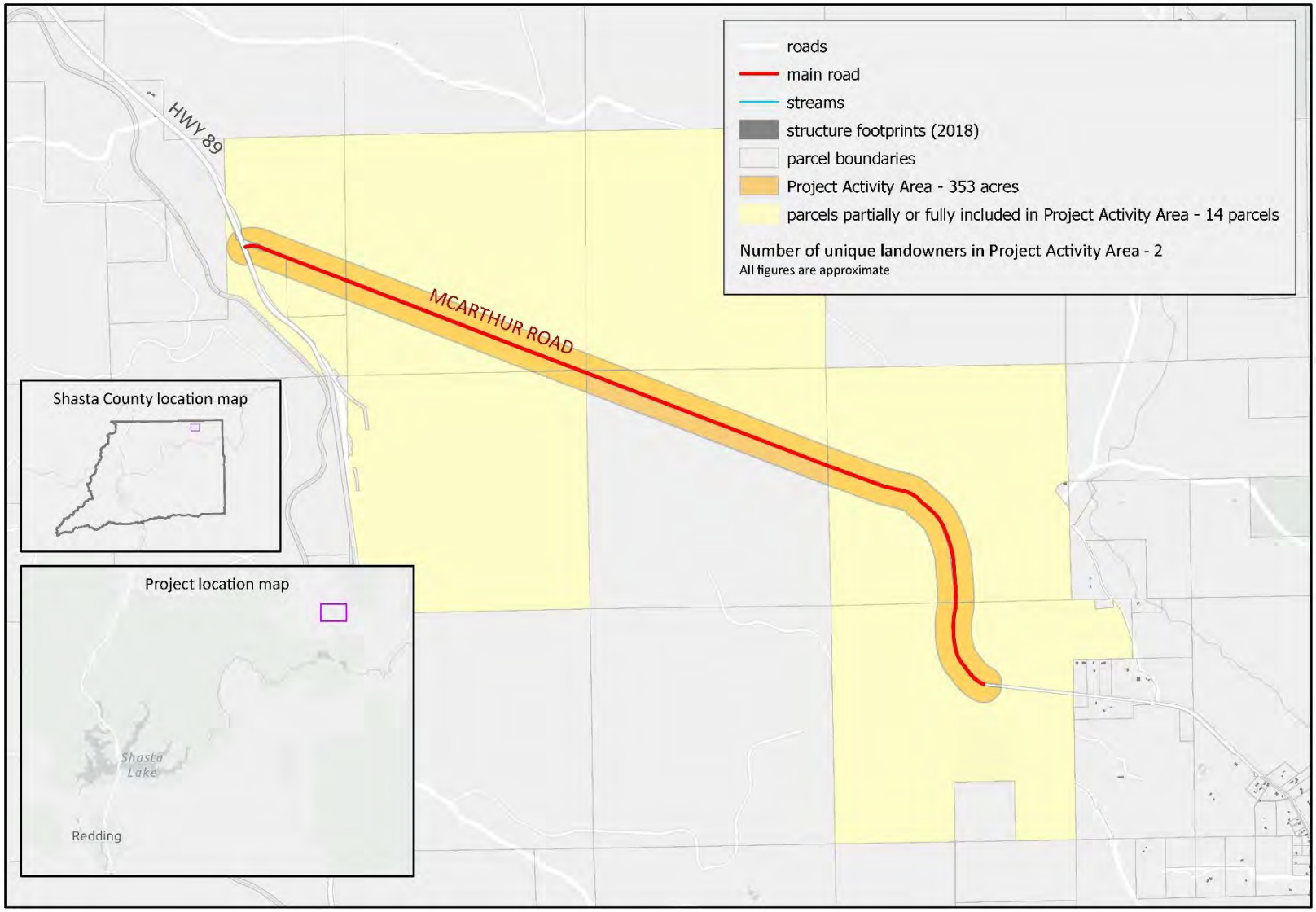

FIGURE 10
MCARTHUR ROAD PAA
WILDFIRE MITIGTAION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

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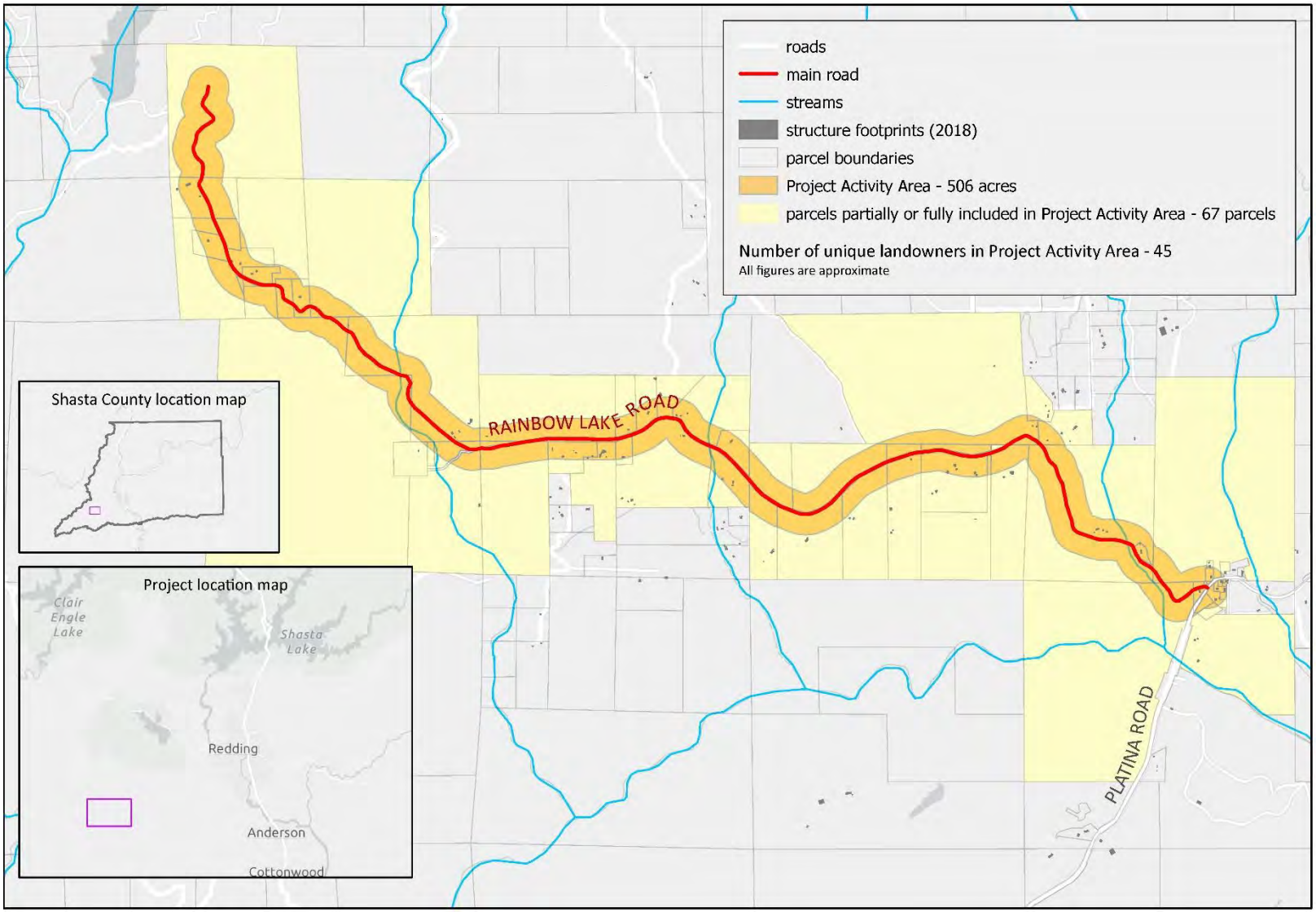

FIGURE 11
RAINBOW LAKE ROAD PAA
WILDFIRE MITIGTAION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

VESTRA

P:\GIS\72231\ProProjects\CEQA processing\Figures\CEQA\PAA Maps\72231_Rainbow Lake Road.docx

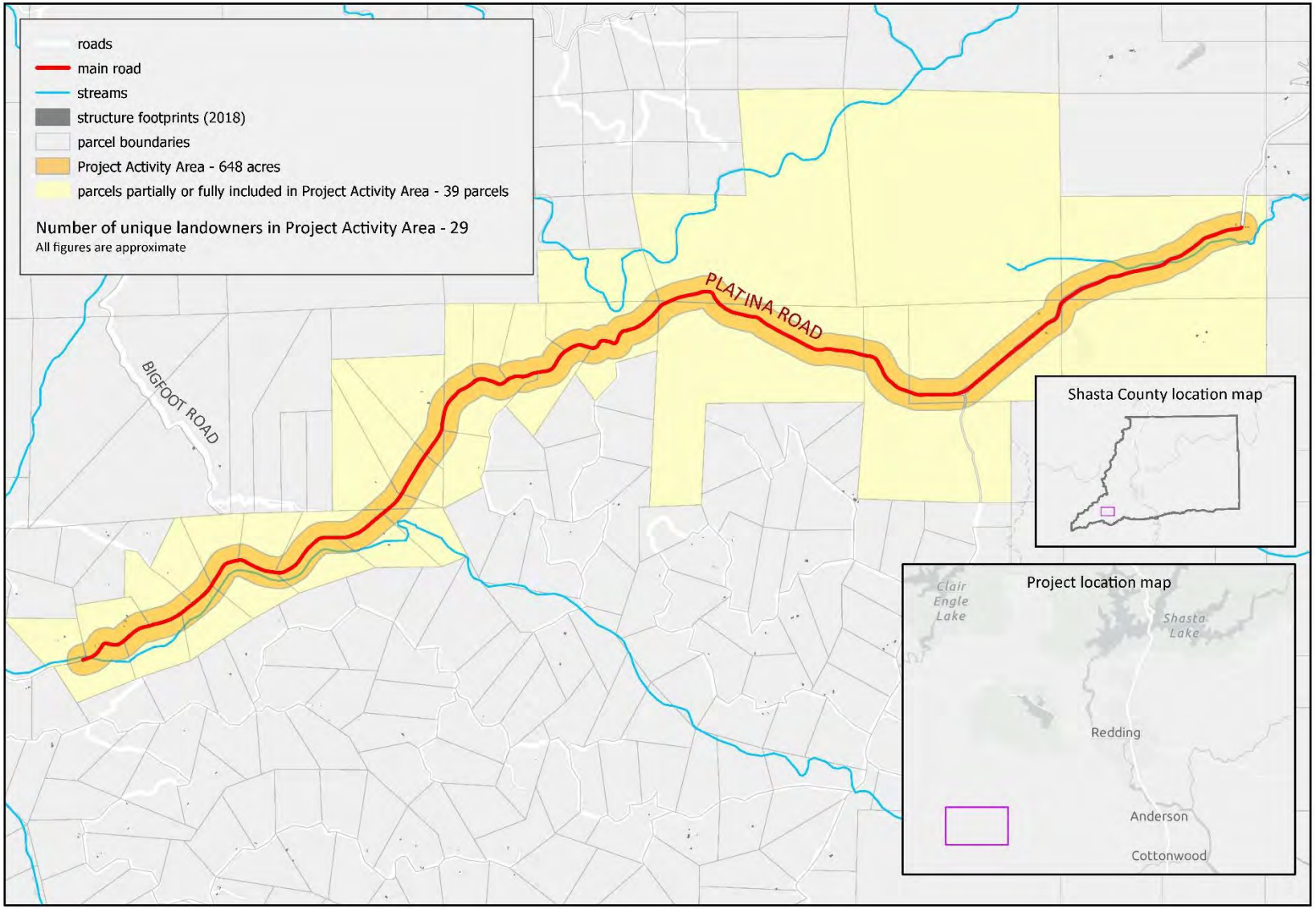

FIGURE 12
PLATINA ROAD PAA
WILDFIRE MITIGTAION/HAZARDOUS FUELS REDUCTION PROJECT
GRANT #5293
SHASTA COUNTY, CALIFORNIA

VESTRA

P:\GIS\72231\ProProjects\CEQA processing\Figures\CEQA\PAA Maps\72231_Platina Road.docx

From:	Battles, Michael@DOT
To:	Sacramento Public Comment@CALFIRE
Cc:	Grah, Kathy M@DOT; Babcock, Kelly M@DOT; Clark, Cherie D@DOT
Subject:	Shasta County Wildfire Mitigation/Haz Fuels Reduction Project #5293
Date:	Thursday, January 18, 2024 1:37:35 PM

Good afternoon,

Thank you for the opportunity to review and comment on the proposed Shasta County Wildfire Mitigation/Haz Fuels Reduction Project #5293. Based upon review of the MND by Caltrans functional units, we wish to submit the following comments:

- If there is any work taking place within the Caltrans Right-of-Way, an Encroachment Permit is required. This may include access points if the access is not already permitted
- A request to have Attachment "A" of the MND sent to Caltrans was submitted via email to Calfire, but this Attachment was never sent for review. Please submit Attachment A to the Caltrans District 2 Local Development Review Coordinator so that it can be distributed to Caltrans functional units for review
- The project proponent should protect Caltrans assets, including but not limited to, highway culverts and highway water channels
- The IS/MND report states that trees cut down during work will be sold and hauled off-site. The report also states that the project will produce a large quantity of biomass, some of which is to be hauled to off-site biomass facilities. These activities will create a number of transport vehicles hauling off this material, that will have to access the State Highway System. If hauling of materials from the site requires direct access to the State Highway System, the project proponent shall conduct a safety/operational analysis of the stopping sight distance according to Section 201.3 of the California Highway Design Manual at the access point. If hauling in excess of 20 trucks a day from any site, the project proponent shall conduct a safety/operation analysis at the intersection where trucks enter the State Highway System. Alternatively, the project proponent may propose an approvable alternative process

Once again, thank you for the opportunity to review and comment on the proposed Shasta County Wildfire Mitigation Project #5293. Please let me know if there are any questions regrading any of Caltrans comments.

Sincerely,

Mike Battles
Local Development Review Coordinator
Caltrans District 2
1657 Riverside Drive
Redding, CA 96001

State of California **Natural Resources Agency**

M e m o r a n d u m

To: Mike Battles
Local Development Review Coordinator
Caltrans District 2
1657 Riverside Drive
Redding, CA 96001

Date: 2/6/2024

Telephone: (916) 653-7772

Website: www.fire.ca.gov

From: Len Nielson
Staff Chief of Prescribed Fire and Environmental Protection

California Department of Forestry and Fire Protection (CAL FIRE)

Subject: Shasta County Wildfire Mitigation/Haz Fuels Reduction Project #5293

This memorandum is in response to your comments made, via email on 1/18/2024 regarding the Initial Study Mitigated Negative Declaration titled Shasta County Wildfire Mitigation/Haz Fuels Reduction Project (5293). Below are your comments.

1) If there is any work taking place within the Caltrans Right-of-Way, an Encroachment Permit is required. This may include access points if the access is not already permitted.

2) A request to have Attachment "A" of the MND sent to Caltrans was submitted via email to Calfire, but this Attachment was never sent for review. Please submit Attachment A to the Caltrans District 2 Local Development Review Coordinator so that it can be distributed to Caltrans functional units for review.

3) The project proponent should protect Caltrans assets, including but not limited to, highway culverts and highway water channels.

4) The IS/MND report states that trees cut down during work will be sold and hauled off-site. The report also states that the project will produce a large quantity of biomass, some of which is to be hauled to off-site biomass facilities. These activities will create a number of transport vehicles hauling off this material, that will have to access the State Highway System. If hauling of materials from the site requires direct access to the State Highway System, the project proponent shall conduct a safety/operational analysis of the stopping sight distance according to Section 201.3 of the California Highway Design Manual at the access point. If hauling in excess of 20 trucks a day from any site, the project proponent shall conduct a safety/operation analysis at the intersection where trucks enter the State Highway System. Alternatively, the project proponent may propose an approvable alternative process.

The responses to your comments are as follows and each answer correlates to the numbered question above:

1) No work can be conducted on government owned parcels or easements. Only existing roads with existing encroachment permits are to be utilized in the project.

2) The document will be resubmitted, 2/6/2024, in the State Clearinghouse with the appropriate attachments for full transparency. Attachment A are the maps of the project area and will be available with resubmittal.

3) No work can be or will be conducted on government owned parcels or easements. Only existing roads with existing encroachment permits are to be utilized in the project. Care will be taken not to damage Caltrans infrastructure. In the event the contractor damages any of CALTRANS infrastructure, the contractor will repair any damage with the instruction of CALTRANS.

4) The Project will not produce more than 20 trucks per day from any individual parcel or roadway. Any tree harvesting will be conducted under a harvest document and all information pertaining to that effort will be detailed in that document. The mention of potential tree harvesting was mentioned in the ISMND for full disclosure.

This memorandum will be emailed to the submitter and filed in the State Clearinghouse for another 30-day review period.