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Lower Clear Creek Floodplain and Stream Channel Restoration Project, Phase 3C

Shasta County, California

Draft Environmental Assessment/Initial Study

U.S. Department of the Interior
Bureau of Reclamation

U.S. Department of the Interior
Bureau of Land Management

Central Valley Regional Water Quality Control Board

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Mission Statements

The Department of the Interior protects and manages the Nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

It is the mission of the Bureau of Land Management to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

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List of Acronyms and Abbreviations

BA	Biological Assessment
BAMM	Best Available Mitigation Measures
BDAs	Beaver Dam Analogue
BLM	Bureau of Land Management
BLM SS	BLM Sensitive Species CAAQS California Ambient Air Quality Standards
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Policy Act
CFS	Cubic feet per second
CRHR	California Register of Historic Places
CV	Central Valley
CVPIA	Central Valley Project Improvement Act
CWA	Clean Water Act
CY	Cubic yardsdB Decibels
EA/IS	Environmental Assessment
EFH	Essential Fish Habitat
ESA	Federal Endangered Species Act
FSCRP	Floodplain and Stream Channel Restoration Project
GHG	Greenhouse Gases
MBTA	Migratory Bird Treaty Act
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NO_X	Nitrogen oxides including nitrogen dioxide
NRHP	National Register of Historic Places
NTU	Nephelometric Turbidity Units
OHWM	Ordinary High Water Mark
PCEs	Primary Constituent Elements
PM_{10}	Particulate matter less than 10 micrometers in diameter
$PM_{2.5}$	Particulate matter less than 2.5 micrometers in diameter
Reclamation	Bureau of Reclamation
SCAQMD	Shasta county air quality management district
SMM	Standard mitigation measures
SPCCP	Spill prevention, control, and countermeasures plan
SSC	Species of Special Concern
SWPPP	Storm water pollution prevention plan
TTLC	Toxic threshold limit concentration
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

Vdb	Vibrational Decibel
VELB	Valley elderberry longhorn beetle
VOC	Volatile organic compounds
WOUS/S	Waters of the United States
WSRCD	Western Shasta Resource Conservation District
YBCU	Yellow Billed Cuckoo

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Section 1, Introduction

1.1 Background

In accordance with the National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA), the Bureau of Reclamation (Reclamation) and the Bureau of Land Management have prepared this Environmental Assessment/Initial Study (EA/IS) to examine the potential direct, indirect, and cumulative impacts to the affected environment associated with Reclamation and BLM implementing the Lower Clear Creek Floodplain and Stream Channel Restoration Project, Phase 3C (Project). Additionally, Reclamation and BLM prepared this joint document for use by the Central Valley Regional Water Quality Control Board (CV Water Board) for their use in issuing the Clean Water Act Section 401 Water Quality Certification for the Project.

The Project is located in the southwest portion of the City of Redding, Shasta County, California, approximately 3.5 miles west of Interstate 5. The Project is also within the BLM Clear Creek Greenway located between the Gold Dredge Trailhead and the China Garden Trailhead off Clear Creek Road (Figure 1), and would occur on lower Clear Creek between approximately river mile 2.1 and 2.8.

Phase 3C is the last phase of the Lower Clear Creek Floodplain and Stream Channel Restoration Project (Lower Clear Creek FSCRP) described in the Clear Creek Conceptual Plan (McBain and Trush et al 1999a), Clear Creek Technical and Design Document (McBain and Trush et al 1999b) and the Lower Clear Creek Floodway Rehabilitation Project EA-IS (NCAO EA No. RE-01-22). The Lower Clear Creek FSCRP's primary goals are to improve salmonid spawning and rearing habitat, reduce fish stranding and improve fish passage. While other stream channel restoration projects have been proposed and undertaken in Clear Creek, the Lower Clear Creek FSCRP focused on a two-mile reach heavily damaged by human impacts including gold and gravel mining and lack of sediment due to Whiskeytown Dam.

From 1998 to 2008, actions within this two-mile reach include Phase 1, Phase 2A, Phase 2B North, Phase 2B South, Phase 3A and Phase 3B. In addition to those projects within the two-mile focus area, additional project areas (Phase 3 Borrow Areas; Lower Redding Bar and Upper Redding Bar) outside the focus area were needed to provide source material for restoration projects within the focus area. The original project was intended to be constructed in 3 phases, which were divided into smaller units to allow improved adaptive management by evaluating each phase to inform design of subsequent phases. Implementation of Phase 3C was delayed to allow monitoring of earlier phases to evaluate costs and benefits of the Project. There was uncertainty of the benefits of the Project and environmental costs due to potential loss of spawning habitat, potential mercury contamination, and loss of habitat for sensitive amphibian, reptile and bird species. Monitoring results of adult and juvenile salmonid response to prior phases, and numerical modeling of fish ecology suggest that the Project would have larger benefits for juvenile salmonids than originally anticipated. Appendix A has the details of the history of the Lower Clear Creek Restoration Program.

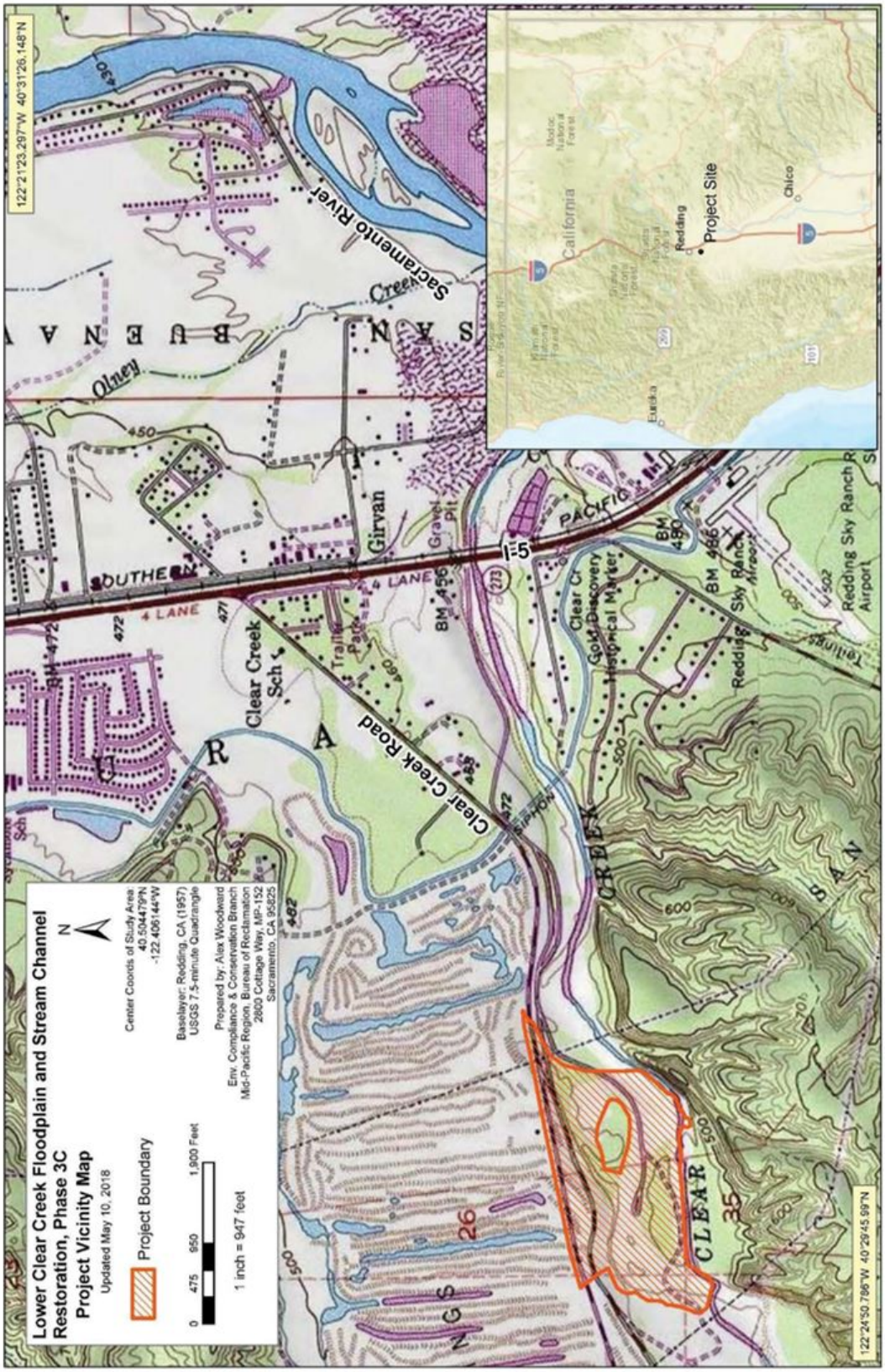

Figure 1. Clear Creek Phase 3C Project Vicinity Map

1.2 Purpose and Need for Action

The purpose of the Project is to improve rearing habitat for fry and juvenile salmonids, as well as improve fish passage as a migratory corridor in the Phase 3C section of Lower Clear Creek, while avoiding or minimizing effects to mature trees, wetlands, and sensitive habitats as much as practical.

The need for the Project is driven by the needs of anadromous salmonids in lower Clear Creek. Over the last 30 years, gravel extraction activities have removed the majority of the alluvial material that was once present throughout the stream channel and floodplain. Removal of the alluvium has lowered the stream channel, exposing hardpan and bedrock surfaces in many locations. The gravel mining process created and left a bypass channel used to divert water around alluvium deposits. Across most of the Project area, Clear Creek runs through an incised, steep, uniform channel, which provides little salmonid habitat. The remnant channel has a shallow pond that is isolated, except during rare high flow events. Salmonids that become trapped in the pond, are vulnerable to higher water temperatures, and become easy prey for predatory fish, birds and mammals. The pond is also excellent habitat for non-native species, such as bullfrogs, largemouth bass, and water primrose. Reduced gravel supplies have reduced the quality and quantity of valuable salmon spawning habitat available in the lower reaches of the creek.

Riparian habitat along lower Clear Creek has also been negatively impacted by gold dredging, gravel extraction, water diversion and flow regulation. These impacts include removal of riparian forests and alteration of floodplain morphology by mining activities and encroachment of riparian vegetation into the low flow stream channel due to flow regulation. As a result, riparian berms and thin lines of vegetation have formed, which often lack habitat diversity. On floodplain surfaces, the existing riparian vegetation occurs in-between large tailing piles and other disturbed landscapes impacted by historic gold and gravel mining activities.

Documentation supporting the need for Phase 3C includes the *Lower Clear Creek Watershed Analysis* (WSRCD 1996), CDFW memorandum (Coots 1971), the *Lower Clear Creek Fishery Study* (DWR 1986), the *Lower Clear Creek Floodway Restoration Project: Channel Reconstruction, Riparian Vegetation and Wetland Creation Design* (McBain and Trush et al 2000), the *Final Report: Geomorphic Evaluation of Lower Clear Creek Downstream of Whiskeytown Reservoir* (McBain and Trush 2001) and the *2006 Update to the Clear Creek Gravel Management Plan* (GMA 2006b).

1.3 Scoping and Public Involvement

Technical team meetings composed of representatives of BLM; California Department of Fish and Wildlife; U.S. Fish and Wildlife Service; and Reclamation's North California Area Office, Mid-Pacific Region Construction Office, Mid-Pacific Regional Office, and Denver Technical Service Center have been meeting regularly to provide input on the design and monitoring of the Proposed Action.

BLM reached out to local landowners and land users and attended local meetings to explain the project and solicit public input.

Consistent with BLM's NEPA requirements, public review of this EA/IS began when the agencies posted the document to their official websites for a thirty-day review period. At the onset of the review period, Reclamation and BLM sent notices informing the public of the availability of this EA/IS for review.

1.4 Decision to be Made

Reclamation intends to prepare a Finding of No Significant Impact and BLM intends to determine if a Finding of No Significant Impact will be reached after analysis and considering any comments received by the end of the public review period or if it is appropriate to proceed to complete an Environmental Impact Statement. The CV Water Board intends to adopt a Mitigated Negative Declaration.

Section 2, Alternatives Including the Proposed Action

2.1 No Action

Under No Action, Reclamation and BLM would not restore aquatic habitat in the Phase 3C area of lower Clear Creek. There would be no new channel alignment, no alcove creation, no log jam control feature or floodplain earthwork, no planting of riparian vegetation in areas where the lowered floodplain can support it, and subsequently, no major increase or improvement of the fish and wildlife habitat.

2.2 Proposed Action Alternative

Reclamation and BLM's Proposed Action Alternative to restore aquatic habitat in the Lower Clear Creek channel is to construct a channel plug and redirect flows to a new channel constructed along the historic alignment with a variety of islands, riffles, side channels, and backwater alcoves (see Figures 1 and 2).

The project includes the following design elements to enhance riverine and riparian functions, and aquatic habitats:

- Re-alignment of the stream channel to the historic alignment to lengthen the channel, increase sinuosity and establish a more complex channel with more suitable stream bed materials for spawning;
- Channel splits to increase shoreline area for fry habitat;
- Creation of additional channels and alcoves inundated at 200 cfs (cubic feet per second) and greater flows to expand fish rearing habitat within normal Clear Creek hydrology;
- Creation of an off-channel pond with adjacent seasonal wetlands to increase off-channel rearing habitat;
- Addition of large woody debris to increase channel complexity and improve rearing habitat;
- Maintain seasonal wetlands
- Increase and enhance endemic existing riparian, emergent, and wetland vegetation;
- Creation of floodplain surfaces at suitable elevations to increase natural recruitment of cottonwoods.
- Creation of a recreation trail to connect Phase 3C and Phase 3B project area. (See Figure 2).

The project would result in a net increase of the Clear Creek channel by 600 linear feet. Flows are expected to overtop banks in this reach at less than 2,000 cfs, which improves floodplain

function, reduces the risk of channel incision, and prevents the development of a headcut that could migrate upstream towards existing restoration sites. The proposed channel is designed to have at least 0.9 feet of flow depth at 100 cfs for adult fish passage. 58,780 cubic yards of material would be cut and 58,080 of this would be used as fill.

The proposed action would result in temporary physical disturbance to a total area of 17.8 acres and permanent disturbance to 27.3 acres. There would be a total of 7.45 acres of temporary impacts to Clear Creek, from the placement of fill below the OHWM, and 10.35 acres of permanent impacts. The temporary ground disturbance area would be re-contoured to pre-project condition and re-vegetated with native species, upon Project completion.

A total of 9.9 acres of riparian areas would be replanted. Although the floodplain earthwork areas would be contoured to a different grade from pre-project conditions, they would be revegetated with native plant species, with an emphasis on riparian plants. The other Project features would consist of either rocks and logs, or water from Clear Creek as flows are introduced to the new channel alignment.

The majority of the area to be disturbed (caused by new channel creation, floodplain fill and revegetation, stream crossings, log jam installation, and the Primary Stage, Stockpile, and Processing Areas) is located below the OHWM of Clear Creek. This consists of a pond, Clear Creek, and a variety of vegetation communities such as Fremont cottonwood-willow, willow-blackberry, valley oak woodland alliance, arroyo willow thickets alliance, upland mustards/annual brome grasslands, and gray pine/white leaf manzanita, as defined by the California Natural Communities List. (California Department of Fish and Wildlife 2018). All other areas of disturbance would be above the OHWM. A footpath recreational trail would be constructed through the project area that would connect into the existing non-motorized trail system in the Clear Creek Greenway. Approximately 0.5 miles of new trail would be constructed along the northern and western edge of the new channel on the bluffs above. (Figure 2).

The replanting aerial estimates do not include areas on access roads or contractor use areas that may be planted to minimize riparian forest fragmentation. If sourced from off-site, all materials used will be sourced from non-native sources.

A Traffic Control Plan would be developed and approved when the final design is completed.

Reclamation’s on-site project coordinator would communicate any project changes made during construction with BLM and other necessary agencies to ensure analysis and compliance.

Technical Description of the Proposed Action is found in Appendix B.

2.3 Schedule

Civil construction would occur when flows in Clear Creek are lowest, stream temperatures are high, and anadromous fish presence is least likely. The project may occur in a single phase or two phases contingent upon environmental compliance and permitting. In a single phased approach, the project would be scheduled to occur between June 1 and mid-December; in a two-phased approach, the project would begin as soon as possible in August/September and continue

until mid-Decemeber before stopping work until June the following year. In this scenario, the site would be stabilized for erosion and sediment control and there would be multiple mobilization and demobilization of equipment to the project site.

In both scenarios, a majority of the vegetation removal will occur between September 1 and March 1; however, some vegetation removal may occur outside of this time frame. Exact construction schedule dates will be contingent upon environmental compliance and permitting. The Notice to Proceed will be issued immediately after environmental permits are complete in order to execute the project successfully within the construction duration requirements.

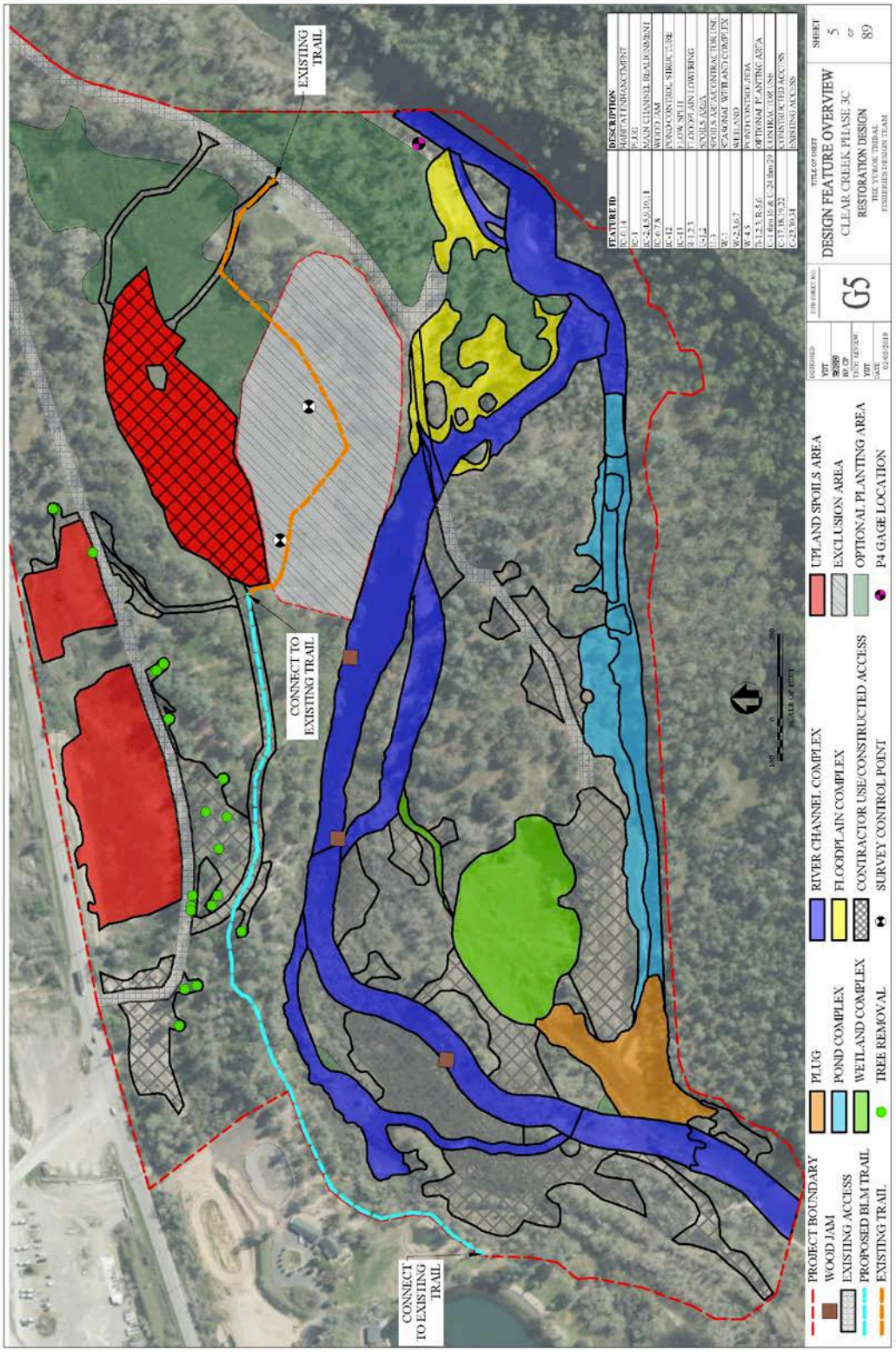

Figure 2. Project Activity Area Map

All in-water work, except for stream crossing removal, would occur from July 1 to September 30 when stream flows are at their minimums, unless otherwise approved by NMFS and CDFW. The stream crossing may be active until October 15 to allow above-water close-out activities to conclude. Flows in Clear Creek during most of this work period are expected to be around the base flow of 150 cfs and to not exceed the upper operating limit of 275 cfs in September and October for temperature control.

Revegetation work in all disturbance areas would begin in July and continue through mid-December, during and following civil construction. Revegetation would conclude by mid-December, weather permitting. Access to the site for revegetation efforts outside of the 2019 instream work window, or after September 30 would occur by foot or boat. Revegetation performance would be evaluated annually for the first three years, then every other year for a period of ten years. Areas with low plant survival could be replanted as directed under the MMRP.

Access roads necessary for ongoing monitoring and maintenance of revegetated sites would be left open until no longer needed, or until the 10-year monitoring and maintenance period ends. Access roads that are no longer necessary for safety, or monitoring and maintenance would be regraded to the existing grade adjacent to the road, decompacted, seeded with native grasses and forbs, and mulched with certified weed free straw.

If MMRP related monitoring results indicate a need for site modification with heavy equipment, the stream crossing may need to be reactivated. The stream crossing (C-50) may be reactivated for heavy equipment access if post-project monitoring indicates a need. The location of the stream crossing may shift slightly due to channel adjustments and site evolution

Construction activities would occur a maximum of 7 a.m. to 7 p.m., Monday through Friday, with the option of working through Saturday when needed.

2.4 Environmental Protection Measures and Commitments

As part of the Project, Reclamation would implement the following environmental protection measures and commitments to avoid and minimize potential environmental impacts associated with the Project. These are different from mitigation measures proposed in specific resource sections analyzed in *Section 3, Affected Environment and Environmental Consequences*. Many of these environmental protection measures and commitments are consistent with those approved by NMFS in the 2007 *Lower Clear Creek Floodway Rehabilitation Project–Phase 3B Biological Opinion*:

2.4.1 Permits

Reclamation and the CV Water Board would obtain all applicable federal and state permits and authorizations for the implementation of the Project and would ensure compliance with all conditions included in those permits and authorizations. Where appropriate, the permit and authorization conditions would be incorporated into the construction plans and specifications. These permits and authorizations may include, but would not be limited to:

- Endangered Species Act, as amended in 1973, biological opinion and letter of concurrence;
- Clean Water Act Section 404 Permit;
- Clean Water Act Section 401 Certification;
- National Pollution Discharge Elimination System Construction General Permit;
- Dewatering Permits
- Environmental Education Workshop
- BLM Right Of Way: After the EA/IS is finalized, BLM would issue a right-of-way to Reclamation pursuant to Title V of the Federal Land Policy and Management Act (43 USC 1761 et seq.) for implementation of the rehabilitation activities on BLM-managed land. BLM would also issue a Free Use Permit pursuant to 43 CFR 3604 that would authorize Reclamation to process and use up to 73,720 cubic yards of mineral materials for restoration activities. All environmental commitments, project design features, mitigation measures, and best management practices (BMPs) developed for this EA/IS would be considered for incorporation into the BLM authorizations.
- Construction personnel and all subcontractors would be required to participate in, and fully comply with, an environmental education workshop. The workshop would include, but not be limited to:
    - Federal, state, and local environmental laws and permits, as well as the benefits of compliance and penalties for noncompliance with environmental requirements and conditions;
    - Threatened, endangered, and other special-status species, and their habitats;
    - Environmental protection measures, mitigation, compensation, and restoration. A member of the contractor's management staff would be required to participate in the training session to discuss the contractor's environmental protection plans
    - The importance of working exclusively in designated work zones and the importance of avoiding any impacts to environmentally sensitive exclusion zones;
    - What to do when there is a potential violation; and
    - Upon completion of the training all personnel would sign and date a form stating that they received and understand the materials presented.

2.4.2 Designated Work and Exclusion Zones

Construction equipment and activities would be confined to designated work zones including designated access roads. These work zones would be indicated on the Project construction plans. Prior to construction, the work zones would be clearly fenced and flagged. In addition, sensitive areas within, or near, the designated work zone would also be indicated on the Project plans as exclusion zones and clearly marked in the field with high-visibility fencing or flagging adequate to prevent accidental entry, and maintained throughout construction activities. Project boundary marking would be checked and maintained daily by the construction contractor.

Exclusion zones within the Project boundaries would have signs attached that identify each area as an Environmentally Sensitive Area. The following paragraph would be included in the construction specifications for environmentally sensitive areas:

The contractor's attention is directed to the areas designated as "Environmentally Sensitive Areas." These areas are protected, and no entry by the contractor for any purpose would be allowed unless specifically authorized by the COR. The contractor shall take measures to ensure that the contractor's employees and subcontractors do not enter or disturb these areas, including by issuing written notice to employees and subcontractors regarding compliance with restrictions for environmentally sensitive areas.

During construction, job inspectors and resource monitors would ensure that construction equipment and ancillary activities avoid any disturbance of sensitive resources outside the designated work zones. Resource monitors would conduct surveys as appropriate for threatened, endangered, and special-status species. The following measures would also be implemented:

- Use and storage of construction equipment would be confined to designated work zones;
- Existing roads and access points would be used to the greatest extent possible to minimize disturbance to the environment and wildlife;
- Equipment staging areas, borrow material sites, parking locations, stockpile areas, and storage areas would be located outside of Environmentally Sensitive Areas as much as feasible and would be clearly marked and monitored; and
- Vehicle fueling and maintenance would occur in upland areas, away from water bodies

2.5 Alternatives Considered but Eliminated from Detailed Study

Reclamation's Technical Service Center design team in Denver developed six preliminary alternatives for Clear Creek Phase 3C in 2016 (See Appendix C). The Clear Creek Technical Advisory Committee discussed the alternatives and developed a consensus design that became the Proposed Action.

Section 3, Affected Environment and Environmental Consequences

This section of the EA/IS provides a description of the affected environment and the environmental consequences associated with the No Action Alternative and the Proposed Action. Appendix D has a California Environmental Quality Act checklist.

3.1 No Action Alternative

Under No Action, Reclamation and BLM would not restore aquatic habitat in the Phase 3C area of lower Clear Creek. There would be no new channel alignment, no alcove creation, no log jam control feature or floodplain earthwork, no planting of riparian vegetation in areas where the lowered floodplain can support it, and subsequently, no improvement of the fish and wildlife habitat. Therefore, this alternative is not analyzed further.

3.2 Proposed Action Alternative

This section of the EA/IS provides a description of the affected environment and the environmental consequences associated with implementing the Proposed Action/Proposed Project.

3.2.1 Visual Resources and Aesthetics

3.2.1.1 Affected Environment

This portion of lower Clear Creek is characterized by broad alluvial floodplains, meandering gravel bars and lush riparian vegetation (Figures 3–5). Varying sections of this reach of lower Clear Creek are influenced by visual and noise impacts from residential homes, industrial areas, commercial developments and State Highway 273. In addition, mine tailings are visible in areas from past gold dredger and placer mining operations. Although a portion of lower Clear Creek—from the southern boundary of the Whiskeytown Unit of the NRA downstream to Clear Creek Road bridge, approximately 2.5 miles upstream of the Project area is classified as “Scenic” and is eligible for inclusion in the National Wild and Scenic Rivers System (U.S. Bureau of Land Management 1993), the reach through the Project area has no such status. No scenic highways have been designated or recommended for designation in the vicinity of the Project area (California Department of Transportation 2017). The BLM’s 2015 Visual Resource Inventory (VRI) designated this project area with an A for Scenic Quality Rating and an H sensitivity level rating, resulting in a Class II VRI rating. The proposed actions would only temporarily impact this rating during construction. The posts included in the construction of the various woods structures would be roughed up to resemble natural process and not impact visual resources. Following construction this project will not negatively impact this rating.

Figure 3. Existing deep, narrow lower Clear Creek channel in Phase 3C

Figure 4. Open floodplain/Clear Creek occupied by herbaceous riparian and upland species

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Figure 5. Upstream end of Phase 3C – Riparian vegetation and gravel bars

3.2.1.2 Environmental Consequences

The potential impacts of the proposed action would include changes brought about by the removal of vegetation, construction of inundated surfaces, construction of new access roads, and creation and use of staging and gravel processing areas. These activities are intended to restore aquatic habitat in the Lower Clear Creek channel by redirecting flows to a new channel constructed along the historic alignment with a variety of islands, riffles, side channels, and backwater alcoves. By restoring the original form of Clear Creek, the proposed action would enhance the overall aesthetic values and visual resources of the Clear Creek corridor. Although the adverse impacts are expected to be temporary and the long-term outcome should is expected to improve the visual diversity of the corridor, the short-term impacts would persist.

Overall, the proposed action incorporates the Project area's diversity of landscapes and vegetation types to define the location, character, and magnitude of the rehabilitation activities at the sites. For example, materials excavated from riverine areas would be removed to upland areas or used as a source of coarse sediment to enhance the alluvial function of the river. Material transported to upland activity areas would be placed in a manner that blends the materials into the contours of the topography. Retention of existing topographic features would significantly lessen the degree of visual impact.

There would not be any new permanent sources of light. Construction activities that occur after sunset would require lighting, and a temporary new source of light at nighttime. However, this

would be temporary and *Mitigation Measures AESTH-1* and *AESTH-2* would be implemented to avoid and minimize potential effects on nighttime views to a less than significant level.

3.2.1.2.1 Mitigation Measures: Aesthetics (AESTH)

- AESTH-1. Construction activities would be limited to 7 a.m. to 7 p.m., Monday through Friday, with the option of working through Saturday when needed, to avoid potential light nuisance at night.
- AESTH-2. Stationary floodlights would be shielded and directed to shine downward at an angle less than horizontal, and away from residences so they would not be a nuisance to surrounding areas

3.2.2 Air Quality

3.2.2.1 Affected Environment

The Proposed Action is located in southern portion of the City of Redding, Shasta County, which lies within the northern end of the Sacramento Valley Air Basin (SVAB). The SVAB is bounded on the north and west by the Coastal Mountain Range and on the east by the southern portion of the Cascade Mountain Range and the northern portion of the Sierra Nevada range, trapping pollutants. This problem is exacerbated by a temperature inversion layer, and north/north-easterly winds that transport pollutants from large urban areas in the San Francisco Bay Area and Sacramento Valley. Shasta County is regulated by the Shasta County Air Quality Management District (SCAQMD).

The U.S. Environmental Protection Agency and California Air Resources Board developed federal and state health-based air quality standards, known as National and California ambient air quality standards (NAAQS and CAAQS), for criteria air pollutants. Criteria air pollutants consist of carbon monoxide, ozone, sulfur dioxide, nitrogen dioxide, (NO_X) inhalable particulate matter between 2.5 and 10 microns in diameter (PM_{10}), particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), and lead. The CAAQS also set standards for sulfates, hydrogen sulfide and visibility.

Section 176(c) of the Clean Air Act (42 U.S.C. 7506(c)) requires that any entity of the federal government that engages in, supports, or in any way provided financial support for, licenses or permits, or approves any activity to demonstrate that the action conforms to the applicable State Implementation Plan before the action is otherwise approved. The U.S. Environmental Protection Agency promulgated the General Conformity Rule to ensure that such federal actions are consistent with a State Implementation Plan's purpose of eliminating or reducing the severity and number of violations of the NAAQS for criteria air pollutants and achieving expeditious attainment of those standards. If an action does not conform to the State Implementation Plan, the Federal agency must submit a conformity determination to the U.S. Environmental Protection Agency, State and local air pollution control agencies, and to the public. Federal actions that are exempt from the General Conformity Regulations include, but are not limited to, actions with associated emissions clearly at or below specified de minimis levels (USEPA 2017).

Shasta County is in unclassified or attainment status for all criteria pollutant NAAQS. Regarding CAAQS, the entire SVAB is in non-attainment for O3 (and its precursors of VOC and NOx) and PM_{10}. Table 1 below presents the criteria pollutants Shasta County is in nonattainment status

with for CAAQS, and local SCAQMD significance thresholds. The SCAQMD adopted local significance thresholds to determine impact significance of a project during CEQA review. The SCAQMD follows a uniform method of applying mitigation measures, such as Standard Mitigation Measures (SMM) and Best Available Mitigation Measures (BAMM), which are recommended if emissions for a stationary source exceed Level "A" thresholds. If Level "B" thresholds are exceeded, SMM, BAMM, and special BAMM as determined with the SCAQMD are to be implemented. These thresholds and measures seek to reduce long-term emissions associated with stationary type projects and reduce cumulative impacts. Pollutant emissions associated with the proposed Project would be limited to fugitive dust and mobile source emissions released during equipment operation and ground disturbing construction activities. There are no mitigation thresholds currently established for mobile source emissions. Regardless, these thresholds can be used to help describe and assess potential impacts to air quality that may result from Project construction.

Table 1. CAAQS Attainment Status and Local Significance Thresholds for Shasta County

Pollutant	CAAQS Attainment Status	SCAQMD Level "A" Significance Threshold[a, b] (lbs/day)	SCAQMD Level "B" Significance Threshold[a, c] (lbs/day)
VOC (as ozone precursor)	Nonattainment	25	137
NO_X (as ozone precursor)	Nonattainment	25	137
PM_{10}	Nonattainment	80	137

[a] SCAQMD General Plan (2004)

[b] If emissions exceed Level "A" thresholds, SMM and appropriate BAMM would be applied to reduce emissions below the threshold.

[c] If application of SMM and BAMM cannot reduce emissions to below the Level "B" thresholds, emission offsets would be required.

3.2.2.2 Environmental Consequences

The proposed action is in an area classified as in attainment with all criteria pollutant NAAQS; therefore, the proposed action would neither conflict with nor obstruct the California SIP, and the Federal general conformity regulations do not apply. Considering the details needed to run the California Emissions Estimator Model to estimate the amount of emissions that could be produced by the proposed action cannot be determined until after the contractor is selected through the design-build process, qualitative analysis would be used to analyze potential effects to air quality in regards to the CAAQS.

Restoration activities involved with the Project require use of construction equipment that temporarily contribute to air pollution in the Redding area in the form of ozone precursors and PM_{10}. Construction excavation, fill, grading, hauling materials, land clearing and equipment travel on unpaved road surfaces would be temporary sources of fugitive dust emissions (PM_{10}). Fugitive dust resulting from Project activities would occur over up to four months during the dry summer and early fall months, when PM_{10} levels may be elevated by wood stove use, brush burning, or wildland fires. The proposed action would increase the PM_{10} levels to varying degrees, depending on the type and extent of construction activity. Diesel- and gasoline-powered

equipment and vehicles used during construction would also temporarily emit VOC and NO_X, over the four-month construction season. Potential PM_{10}, VOC and NO_X emissions would be negligible for remaining revegetation efforts that would be complete over a few weeks during the adaptive management period. Once proposed action activities complete, the resulting emissions and impact on air quality would also cease. Considering the proposed action involves movement of approximately 58,780 cubic yards of material, that construction would occur when fugitive dust emissions are generally elevated, and that construction equipment would be operated throughout the duration of the Project, Project-generated PM_{10}, VOC and NO_X emissions may exceed the SCAQMD Level "A" daily significance thresholds.

However, implementation of SCAQMD SMM and BAMM (*Mitigation Measures AQ-1* through *AQ-6* listed at the end of this section) would minimize these emissions to less than significant levels. Air pollution controls for construction projects not involving stationary sources are not included in the *Northern Sacramento Valley Planning Area 2015 Triennial Air Quality Attainment Plan*, adopted by the SCAQMD. However, the reasonably available control measures as listed in Table 1 of SCAQMD's Rule 3-16: *Fugitive, Indirect, or Non-Traditional Sources* (*Mitigation Measure AQ-1*) would be implemented to avoid and minimize potential PM_{10} emissions. *Mitigation Measures AQ-2* through *AQ-5* would also be implemented to avoid and minimize emissions of NO_X and VOC, and are considered as SMM and BAMM commonly approved by SCAQMD. The Project would neither conflict with nor obstruct implementation of the applicable air quality plan or violate any air quality standards. Project impacts on existing air quality standards and plans would be less than significant with mitigation incorporated.

The Lower Clear Creek Anadromous Fish Restoration & Management Project (LCCAFRM) is a project proposed by Reclamation for gravel augmentation in lower Clear Creek. There are 14 sites proposed along lower Clear Creek from Whiskeytown Dam to its confluence with the Sacramento River. Up to 15,000 tons of spawning gravel are planned for injection at several of these sites in 2018. The specific sites are known at the time of this document, but it is assumed injections of 15,000 tons of gravel would occur at the three closest sites: 3B; Phase 2A; and above 3A. For the purpose of cumulative effects analysis, it is also assumed these injections would occur back to back, simultaneously with the Proposed Action sometime between June 1 and September 30. Gravel injection activities could take approximately two weeks per site. CAP emissions from these activities were estimated in the 2014 *Lower Clear Creek Fish Habitat Restoration Initial Study/Mitigated Negative Declaration* and are described as having the potential to generate fugitive dust (PM_{10}) and emit VOC and NO_X from heavy equipment exhaust during gravel sorting and injection activities. However, these CAPs would be emitted over a short time period of six weeks simultaneously with the Proposed Action, and mitigation measures to control fugitive dust and limit vehicle emissions are proposed to be implemented to avoid and minimize effects to air quality. The LCCAFRM Project was not determined to conflict with any applicable air quality plan or violate any air quality standards.

Construction activities associated with the Proposed Action would result in an increase in VOC, NO_X and PM_{10} emissions. However, considering the combined LCCAFRM Project and Proposed Action emissions would be temporary, occurring concurrently over a total of six weeks, and that mitigation measures in line with the SCAQMD's SMM and BAMM, and the Northern SVAB Triennial Air Quality Attainment Plan would be implemented to minimize emissions, the

Project's incremental contribution to ozone and PM_{10} emissions would not be cumulatively considerable. There would be a less than significant impact.

Receptors who may be sensitive to air pollutants or emissions from sources in or near the Project area include residents and recreationists. Sensitive receptors near the Project area include five residences located within 2,300 feet immediately east, west, and south of the Project area, and recreationists along the Clear Creek corridor. The nearest residence to the Project site is approximately 220 feet northwest of the northwestern-most bend of the proposed channel alignment. However, emissions from diesel engines working in this area would be temporary as construction of the channel continues and moves further away. Public entrance to the Project site would be prohibited, but recreationists could still utilize portions of the China Gardens and Gold Dredge trailheads surrounding the Project area. Emissions are likely to disperse away from receptors in the prevailing winds in the area and would be temporary. Therefore, there would be a less than significant impact.

Emissions from equipment do contain an odor objectionable to some people. Given the distance of the proposed Project from the residences and recreational users, such as hikers and fishermen using the Clear Creek corridor immediately adjacent to the Project site, are the only sensitive receptors subject to objectionable odors from equipment operations. Considering that people would not have access to the Project site, the Project site is an open area subject to air flow that discourages odor concentration, construction emissions would be temporary, and odors from operation of equipment would affect a minor number of hikers and fishermen, there would be a less than significant impact.

3.2.2.2.1 Mitigation Measures: Air Quality (AQ)

- AQ-1. Reclamation would implement a dust control program to avoid and minimize fugitive dust (PM_{10}) emissions. The dust control program would include elements of the SCAQMD Rule 3-16: *Fugitive, Indirect, or Non-Traditional Sources* as appropriate, such as:
    - Spray water on disturbed or exposed soil surfaces, unpaved roads, and stockpiles to suppress dust.
    - Inactive stockpiles would be covered or sprayed as needed to suppress dust.
    - Disturbed areas outside of channel would be revegetated to minimize fugitive dust and soil erosion.
    - Pursuant to the California Vehicle Code (Section 23114), all trucks hauling soil or other loose material to and from the construction site would be covered or would maintain adequate freeboard to ensure retention of materials within the truck's bed (e.g., ensure 1-2 feet vertical distance between top of load and the trailer).
    - Paved roads would be swept (with water sweepers) if visible soil material is carried onto adjacent private and public roads, as required by Reclamation.
    - Vehicular speed on unpaved roads would be limited to 20 mph.
- AQ-2. The contractor would comply with SCAQMD's Rule 3-28: *Stationary Internal Combustion Engines* and have all applicable portable internal combustion engines

registered and certified under the state portable equipment regulation contained in California Health & Safety Code Sections 41750 through 41755.

- AQ-3. Diesel-fueled equipment would be certified tier 2 or better and use ultra-low sulphur diesel fuel.
- AQ-4. All construction equipment would be maintained and properly tuned in accordance with manufacturers' specifications.
- AQ-5. Equipment idling would be minimized, and off-road equipment would shut off engines if idling for longer than five minutes.
- AQ-6. Disturbed areas of the Project site that would not be inundated by Clear Creek flows would be revegetated, which would offset CO2 emissions in the long-term.

3.2.3 Biological Resources

3.2.3.1 Affected Environment

The action area is defined as all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action. Areas affected directly would be those in the immediate footprint of the Project. Indirect effects of the Project are those effects that are caused by, or would result from, the Proposed Action and may occur later in time, but are still reasonably certain to occur. Indirect effects associated with the Project are those related to noise, dust, and turbidity above ambient levels.

3.2.3.1.1 Special-Status Species

An official species list was first obtained for this Project through the USFWS Information for Planning and Consultation website on May 16, 2016, and was last updated on March 29, 2019. Reclamation referenced the California Natural Diversity Database and previous consultations and environmental documents for projects in the area (such as the *Lower Clear Creek Floodway Rehabilitation Project–Phase 3B, and the Clear Creek Aquatic Habitat and Mercury Abatement Project*) to determine what special-status species may occur within dispersal distance of the Project.

Reclamation refined the list of species to those that have the potential to be within the action area during Project implementation. Excluded from this list are species that are not expected to be within the action area due to either lack of habitat (e.g., vernal pools, rocky outcrops, salt marshes) or because the Project lies outside of the species' range. Appendix E Table 1 summarizes the determinations for inclusion or exclusion of species and associated critical habitat considered for this project, and that are protected under the ESA, California Endangered Species Act, the Bald and Golden Eagle Protection Act, Migratory Bird Protection Act, and species designated sensitive by BLM. Based on the analysis in Appendix E, the Central Valley (CV) spring-run Chinook salmon, CV steelhead, valley elderberry longhorn beetle (VELB), and Western distinct population segment (DPS) of yellow-billed cuckoo have the potential to be in the action area during Project implementation

A rich diversity of bird species is documented in the Wintu Audubon 2005 Bird List for Shasta County, and many were observed during site visits. The Proposed Action has the potential to

affect various woodpeckers and common song birds present, such as flycatchers, sparrows, warblers, towhees, and other birds protected under the Migratory Bird Treaty Act.

Reclamation biologists conducted a survey for nesting raptors in and near the Clear Creek Phase 3C project site on March 21, 2019. They observed red-tailed hawks, osprey, and turkey vultures. They observed osprey observed three times carrying nesting materials over the site and later they located an active next on a cell phone tower east of the project area.

They located a large nest in a mature cottonwood tree approximately 100 meters south of the beaver dam on the project site. It appeared to be well maintained and was approximately 3' in diameter. Later, two red-tailed hawks were observed circling above the central portion of the project site and then appeared immediately overhead (about 50 feet) about 100 meters from the nest, circling for a few minutes.

3.2.3.1.2 Non-Special-Status Wildlife and Migratory Corridors

The Proposed Action has the potential to affect other non-special-status wildlife and their migratory corridors that have been observed onsite, such as North American river otter (*Lontra canadensis*), black-tailed deer (*Odocoileus hemionus columbianus*). Signs of American beaver (Castor canadensis) activity are present around the pond, including the beaver dam that creates the pond, potential feet and tail prints, and teeth marks on trees and felled trees. River otters have been observed in Clear Creek at the upstream end of the action area. Black-tailed deer, including young fawns, have also been observed feeding in and moving through the action area. River otter was observed in Clear Creek during the 2016 wetland delineation and 2017 western YBCU surveys.

3.2.3.1.3 Waters of the U.S. and State, and Riparian Habitat

The Project site was delineated for waters of the U.S. on October 18 and 19, 2016. The delineation was conducted in accordance with the *Corps of Engineers Wetlands Delineation Manual* (USACE 1987), *A Field Guide to the Identification of Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual* (USACE 2008a) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (Version 2.0; USACE 2008b). Information about the channel characteristics were recorded on the 2010 updated *Arid West Ephemeral and Intermittent Streams OHWM Datasheet* and the locations of three transects associated with the datasheets were recorded using a Trimble handheld GPS unit with sub-meter accuracy. The 493.05-acre study area contains five aquatic resources types: seasonal wetland, seep, perennial wetland, ephemeral drainages, and perennial stream. The extent of these aquatic resources is provided in Table 2. Detailed descriptions for each water type is provided below along with the location and size for each mapped feature.

Table 2. Summary of waters of the U.S. in the study area

Name	Size (Acres)	Length (Feet)
Seasonal wetlands	0.67	N/A
Seasonal wetlands/Palustrine Emergent	0.62	N/A
Seasonal wetlands Riparian Wetland	0.52	N/A
Palestine Emergent Wetland Hillside Seep	0.26	N/A

Name	Size (Acres)	Length (Feet)
Perennial wetland Emergent Wetland	1.85	N/A
Perennial wetland/Riparian Wetland	0.21	N/A
Ephemeral drainages	2.45	4,718
Intermittent Channel	0.09	323
Pond	3.63	N/A
Perennial stream (Clear Creek)	41.69	3,559

The vegetation community in the observed seasonal, ephemeral and depressional wetlands is a mix of upland, facultative upland, facultative, facultative wetland, and obligate species including wild oats (*Avena fatua*), moth mullein (*Verbascum blattaria*), white-flowered pincushion (*Navarretia leucocephala*), wild mint (*Mentha arvensis*), California wild oat grass (*Danthonia californica*), Himalayan blackberry (*Rubus armeniacus*), bermudagrass (*Cynodon dactylon*), Santa Barbara sedge (*Carex barbarae*), curly dock (*Rumex crispus*), tall scouring rush (*Equisetum hyemale*), tall flatsedge (*Cyperus eragrostis*), Baltic rush (*Juncus balticus*), Mexican rush (*Juncus mexicanus*), common spikerush (*Eleocharis palustris*), prostrate knotweed (*Polygonum aviculare*), quaking oat grass (*Briza minor*), stork's bill (*Erodium botrys*), Italian ryegrass (*Festuca perennis*), plantain (*Plantago subnuda*), poison oak, California pipevine, red willow (*Salix laevigata*), black willow (*Salix gooddingii*), arroyo willow (*Salix lasiolepis*), sandbar willow (*Salix exigua*), grey pine, interior live oak, and Fremont's cottonwood.

Vegetation at and below the OHWM consists of facultative upland, facultative, facultative wetland, and obligate shrub, vine, tree, and herbaceous species. Dominant plants along the edge of the creek include white alder (*Alnus rhombifolia*), Oregon ash, California grape, California blackberry (*Rubus ursinus*), mugwort (*Artemisia douglasiana*), quaking oat grass, dense sedge (*Carex densa*), Miner's lettuce (*Claytonia perfoliata*), bermudagrass, velvet grass (*Holcus lanatus*), bird's foot trefoil (*Lotus corniculatus*), spearmint (*Mentha spicata*), buckbean (*Menyanthes trifoliata*), seep monkeyflower (*Mimulus guttatus*), Hooker's evening primrose (*Oenothera elata*), and willows. Dominant emergent vegetation consist of common duckweed (*Lemna minor*), buckbean (*Menyanthes trifoliata*) and six petal water primrose (*Ludwigia hexapetala*). The pond margins contain tall flatsedge (*Cyperus eragrosta*), mugwort (*Artemisia douglasii*), and are heavily vegetated with willows such as narrow leaf willow, arroyo willow, and red willow (*Salix laevigata*).

3.2.3.2 Environmental Consequences

3.2.3.2.1 Special-Status Species

This section discusses potential effects the Proposed Action could have on special-status species, either directly or through habitat modifications. Proposed mitigation measures are listed at the end of this resource subsection. Appendix E Table 1 summarizes special status species that were further analyzed and are protected under the federal ESA, CESA, Bald and Golden Eagle Protection Act, Migratory Bird Treaty Act (MBTA), and by BLM. Appendix E Table 2 lists species considered but eliminated from further analysis. These species and their habitat do not occur in the Project area and would not be affected by the proposed Project.

3.2.3.2.1.1 Central Valley (CV) spring-run, fall-run, late fall-run Chinook salmon, winter-run Chinook salmon, and Central Valley steelhead (Federal and State Threatened; SSC; SSC; Federal and State Endangered; and Federal Threatened, respectively)

The action area functions as a migratory corridor and juvenile rearing habitat for adult and juvenile spring-run Chinook salmon, CV fall-run/late fall-run Chinook salmon, and CV steelhead. Spring run Chinook salmon spawning occurs further upstream Clear Creek. The construction window avoids spawning impacts to the other species. Due to the life history timing of CV late fall-run Chinook salmon in Clear Creek, the migratory period of December to March would be avoided. Clear Creek does not support a winter-run population, although it is occasionally used by straying adults for spawning and there may be some non-natal rearing in lower reaches. Due to the life history timing of CV spring-run Chinook salmon, CV fall-run Chinook salmon, CV late fall-run Chinook salmon (rearing juveniles only), and CV steelhead, it is possible for the following life stages to be present within the action area during implementation of the Proposed Action:

1. Adult migrant CV spring-run Chinook salmon (June to August);
2. Rearing and emigrating juvenile CV spring-run Chinook salmon (June);
3. Adult migrant CV fall-run Chinook salmon (September to October);
4. Rearing juvenile CV fall-run Chinook salmon (year-round);
5. Rearing juvenile CV late fall-run Chinook salmon (year-round);
6. Rearing juvenile CV winter-run Chinook Salmon (year-round);
7. Spawning adult CV winter-run Chinook Salmon (Jun to July);
8. Adult migrant CV steelhead (June and September to October); and
9. Rearing and emigrating juvenile CV steelhead (year-round).

Construction-related effects to these species and life histories fall into the following categories: (1) hazardous material spill; (2) turbidity increases; (3) temporary riparian vegetation removal; and (4) direct injury or death from in-channel work and relocation efforts.

The majority of Project activities would occur below the OHWM of Clear Creek; however, construction would occur over the summer months when flows are low, typically around 150 cfs between July and September, and up to 275 cfs in late September and mid-October. The pond and backwater channel that connects to the main active channel at high flows receive water from a combination of groundwater and overland flow during high winter/spring flows (greater than 500 cfs). In this EA, in-water activities are defined as those that occur in the active, wet channel. The only in-water activities that would occur in June would be potential installation of a diversion berm at the confluence of the backwater channel with the main creek channel, fish and turtle rescue efforts, and installation of the stream crossing in the backwater channel in order to allow equipment access to start vegetation removal. Other in-water activities include, the permanent log jam control features, creation of the alcoves, and removal of the stream crossings. Pulse flows in June could reach approximately 800 cfs, which are high enough to connect the pond and backwater channel to the main channel via overland flow. Depending on the planned June pulse flow, the contractor would use discretion in the field to determine if the diversion

berm would need to be removed prior to the pulse flow and re-established to isolate work areas. Re-establishment of the diversion berm would be done within the work windows approved by NMFS and CDFW. Vegetation removal activities would also occur in upland-most areas first, and then would occur in areas closer to the active channel after the pulse flows pass.

A small amount of salmonid spawning and rearing habitat will occur in the action area during construction. This spawning and rearing habitat may be temporarily disturbed during in-water construction. Under current conditions the site is a fish passage corridor (0.67 miles; with some difficult spots where water is less than a foot deep). A migration path will be maintained during all stages of construction

The amount of available salmonid habitat in the action area during construction (measured at flows of 200 cfs) encompasses habitat which approximately 0.58 miles, all of which allows fish passage (with some difficult spots where water is less than a foot deep), and approximately 0.48 miles of which provides juvenile rearing habitat.

3.2.3.2.1.1.1 Accidental Spill of Hazardous Materials (Contaminants)

The large majority of Project activities would occur in exposed and dry portions of the creek; however, these activities would still be below the OHWM and any accidental contaminant spill, such as petroleum products from equipment, would thereby be within Clear Creek. Construction activities below the OHWM of Clear Creek include removing riparian vegetation; installing temporary diversion berms and turbidity curtains; excavating a new channel alignment; sorting, cleaning, and stockpiling excavated material; re-purposing sorted materials for channel and floodplain construction and revegetation; building temporary roads and stream crossings; constructing a logjam; creating alcoves; installing rock or large woody habitat structures; and revegetation. Activities that would be considered in-water activities, all of which would require diversion berms and pumping of ponded water to isolate work, include stream crossing installation, excavation and fill of the pond and backwater channel (where the proposed downstream split channels would be), alcove creation, log jam construction, and installation of in-water habitat structures. Heavy equipment would be used in the creek channel to implement all of these activities.

The use of heavy equipment in, and near, the stream channel would increase the potential for an accidental spill of petroleum products, and other construction-related materials into the channel. Accidental spills of petroleum products and other construction-related materials could cause mortality and lowered growth rates and reproductive success of CV spring-run Chinook salmon and CV steelhead, and other fish and aquatic species. In addition, accidental spill of petroleum products and the effects of cleanup would degrade habitat, adversely affecting major components of Essential Fish Habitat (EFH) for Pacific salmon, and Primary Constituent Elements (PCEs) of designated Critical Habitat for spring-run Chinook salmon and CV steelhead. The freshwater rearing habitat and migration corridor habitat PCEs for Chinook salmon and steelhead also cover three of the four major components of freshwater EFH for Pacific salmon (juvenile rearing habitat, juvenile migration corridors, and adult migration corridors and holding habitat). Effects to EFH and PCEs are further analyzed below under *Effects to Critical Habitat and Essential Fish Habitat*. Adverse effects from contaminants would be avoided or minimized with implementation of *Mitigation Measures HAZ-1* through *HAZ-4* listed under *Section 3.2.8,*

Hazards and Hazardous Materials. These measures include implementing a Spill Prevention, Control and Countermeasures Plan (SPCCP) to prevent and immediately clean up accidental spills of contaminants, refueling equipment in an area set back from Clear Creek and protected from direct runoff, using a diversion berm to isolate work from flowing waters, and cleaning and checking equipment for leaks daily. Additionally, most of the construction would not be in-water and fish would be removed and excluded from areas of in-water work prior to activities. These and other measures would result in the potential effect of accidental contaminant spills being reduced to an insignificant level.

3.2.3.2.1.1.2 Turbidity Increases

Construction of the new channel alignment, temporary access roads, temporary stream crossings, alcoves for rearing habitat, and the logjam, vegetation removal, temporary installation of diversion dams and turbidity curtains, and temporary sorting and stockpiling of excavated materials would occur below the OHWM of Clear Creek. Each of these activities have the potential to cause temporary turbidity and sedimentation increases in Clear Creek. The majority of the Contractor Use Areas would be located below the OHWM. However, this area does not activate with flows during July through September (activates at 1,000 cfs). Based on expected conditions, approximately 20% of construction activities would occur in-water. This would involve a total of approximately 11,490 cubic yards (CY) of wet excavation, and approximately 12,190 CY of in-water fill, which could increase turbidity and suspended sediment levels in lower Clear Creek. The approximately 80% of work that would not be in-water involves approximately 58,780 CY of excavation and 58,080 CY of fill and topsoil replacement.

Turbidity and suspended sediment levels associated with in-water activities and from storm water runoff from dry construction may negatively affect juvenile and adult CV spring-run Chinook salmon, fall-run Chinook salmon, CV steelhead, and juvenile late fall-run Chinook salmon temporarily by causing fish to be stressed and avoid or leave preferred habitats. Juveniles in particular may incur reduced feeding and growth rates, and increased likelihood of predation if they are displaced into deeper, open-water habitat. If turbidity were to reach high levels for long periods of time, it could result in death of individual fish.

Implementation of *Mitigation Measures FISH-2* and *FISH-5*, and *TURB-1* through *TURB-9* (*Section 3.2.9, Hydrology and Water Quality*) would reduce the potential increase in turbidity and effects on fish. Equipment use would be limited to the activity areas. The majority of ground disturbance and channel construction would occur during summer months from July through September, when flows are low (not to exceed 275 cfs) and the majority of the construction areas below the OHWM of Clear Creek are also exposed and dry. Also during this time water temperature is higher, chance of storm events are low, and presence of salmonids in the creek are lowest. Erosion control devices such as silt fence and straw wattles would be installed according to the Storm Water Pollution and Prevent Plan (SWPPP). In-water activities would also be isolated from the main creek channel by installation of diversion berms around these activities and installing turbidity curtains or covering the berms with a geomembrane to capture and allow turbid water to settle prior to returning to the creek. Prior to activities in isolated areas, fish rescue and relocation efforts would occur.

Upon completion of excavating the new channel alignment, the turbidity curtains and diversion berms isolating the new channel from the main stem would be removed starting with the downstream end, providing time for inundation, and then followed by controlled removal of the upstream inlet. This order of activity would minimize turbidity during the initial introduction of flows to the new channel alignment. Equipment would use wet stream crossings, which would be composed of streambed material. All stream crossing materials would be removed by October 15, unless spawning gravel is used, which would be left in-stream as replenishment. Disturbed upland and riparian areas would be revegetated with native species, which would reduce erosion and sedimentation post-Project. Additional planting of riparian species would also occur in areas where the floodplain would be lowered, and along the new channel alignment. In-water work windows and implementation of the FISH and TURB mitigation measures listed below would avoid and minimize the possible effects of turbidity and sedimentation on juvenile and adult salmonids to a less than significant level.

3.2.3.2.1.1.3 Riparian Vegetation Removal and Revegetation – Rearing Habitat

Approximately 5.3 acres of vegetation would be temporarily impacted and 8.7 acres would be permanently impacted. Vegetation removal is currently scheduled to start as early as June 1, 2019 and is anticipated to be complete within a month. Some riparian vegetation, such as willow cuttings and willow clumps, would be preserved for replanting at the end of the project in fall. The majority of vegetation removal would be from the new channel alignment; however, the effect of vegetation clearing on rearing habitat would be mitigated by maintaining vegetated banks along the new channel and planting additional native riparian plants throughout the site. The proposed channel alignment would also provide more shading and food sources than the current alignment as existing mature vegetation and understory would be retained along the banks of the new channel, and additional high- and medium-density riparian communities would be planted where the site currently lacks structurally complex riparian vegetation.

Riparian vegetation provides cover, shade, and food resources required by adult and juvenile life stages. Removal of riparian vegetation along lower Clear Creek could negatively affect the quality of rearing habitat for juvenile salmonids by decreasing the amount of food supply entering the creek, as well as increasing water temperatures due to loss of shading. A decrease for cover may also increase the likelihood of predation.

Project components and mitigation measures have been developed to reduce the potential effects of the Project on listed fish species. For instance, disturbance to mature riparian vegetation would be avoided as much as feasible to maintain in-stream habitat structures, bank cover, shading, and riparian forest connectivity for the new channel alignment. All areas of temporary ground disturbance would be revegetated with native riparian species wherever riparian communities can be supported. The Project would plant approximately 9.9 acres of wetland, emergent and riparian vegetation. Proposed riparian revegetation and planting in floodplain areas lowered to hydrologically support additional riparian communities and along the proposed channel would improve the overall quality and riparian connectivity throughout the Clear Creek floodplain. This would increase the amount of high-quality rearing habitat for juvenile salmonids in lower Clear Creek. See Table 1 and Figure 3 in Appendix B for proposed location, community type, and acres of revegetation for proposed location, community type, and acres of revegetation. Large wood features would also be installed in the channel, which would provide additional

coverage for juvenile salmonids and increased channel complexity. *Mitigation Measure VEG-1* through *VEG-5* would be implemented to avoid and minimize effects to vegetation, and to guide revegetation efforts.

There would be a minor, temporary reduction in rearing and holding habitat during construction, but which would also be compensated for by retaining existing vegetation along the bank of the new channel and planting more structurally diverse riparian vegetation. Temporary effects to holding adult CV spring-run Chinook salmon, fall-run Chinook salmon and CV steelhead, and rearing juvenile fall/late fall-run Chinook salmon and CV steelhead in the action area from a reduction in cover and food could be adverse. However, these are anticipated to be short-term and ultimately improve rearing and holding habitat due to maintenance of riparian vegetation along the new embankments, and revegetation efforts. The creation of riparian habitat is ultimately expected to provide a long-term beneficial effect to salmonids by creating a source of food, cover, and river shading.

3.2.3.2.1.1.4 Mechanized Construction Activities

Project activities involving equipment that could cause direct injury or mortality, to adult CV spring-run Chinook salmon, juvenile late fall-run Chinook salmon, adult and juvenile fall-run Chinook salmon, and CV steelhead include the following in-water activities: installing temporary diversion dams, turbidity curtains, and stream crossings, creating alcoves for rearing habitat, and constructing the logjam and in-water habitat structures.

3.2.3.2.1.1.5 Dewatering and Fish Rescue Operations

The access crossing over the backwater channel would be one of the first construction activities. This would occur prior to installation of the diversion berm and potential turbidity curtain where the small backwater channel connects with the main stem channel at higher flows (between 500 and 1,000 cfs). Although flows would be low during construction so the backwater channel would be disconnected from the main channel, there is the potential that adult and juvenile salmonids may be stranded in those areas from the spring pulse flows. Removing standing water from the pond and backwater channel could result in salmonids becoming stranded, crushed during installation of the crossing, or entrained in the water intake system during ponded water removal. However, a seining or electrofishing would be done in the pond and backwater area to rescue and relocate fish prior to the pumping of ponded water. Also, pumping of ponded water would only occur where construction areas have been isolated from the channel and after fish rescue and relocation efforts have been completed. As mentioned in *Mitigation Measure FISH-6* below, water intakes would be screened with mesh and covered with a perforated drum to prevent debris and aquatic organisms from entering the water intake system, according to NMFS's 1997 *Fish Screening Criteria for Anadromous Salmonids*. *Mitigation Measure FISH-1* details fish rescue operations that would take place by qualified fish biologists to avoid and minimize construction interaction with fish. The appropriate rescue and relocation methods would be determined by NMFS-approved fish biologists and approved by NMFS prior to dewatering. The preferred rescue and relocation method is seining, but if electrofishing is deemed appropriate and necessary for the efficient and successful removal of fish, the NMFS electrofishing guidelines (NMFS 2000) would be strictly followed. Up to two fish rescue teams of two to four persons would be used to facilitate efficient fish removal, reduce handling time,

lower physiological stress, and reduce potential mortality rates. CV spring-run Chinook salmon, fall/late fall-run Chinook salmon, and CV steelhead may be handled during fish rescue operations. Although further harm would be avoided and minimized with mitigation measures and the fish rescue operation itself is a mitigation measure for other Project effects, the capture of these protected species is an adverse effect.

3.2.3.2.1.1.6 In-Water Construction Activities

Diversion berms would be constructed along the embankment of the existing channel to isolate in-water work associated with constructing the proposed channel alignment, alcoves, and the logjam, and to exclude fish from these areas. In addition, as mentioned above, fish from behind the diversion berms would be rescued and relocated to avoid further effects, but initial construction of these control features could cause direct injury or mortality of adult and juvenile salmonids in the action area. Juveniles, which are less able swimmers than adult fish, may be crushed if they are trapped by heavy equipment or materials and cannot escape. However, *Mitigation Measure FISH-1* through *FISH-6* would be implemented to avoid and minimize injuring or killing fish. These mitigation measures include operating equipment or placing materials in the active channel slowly and deliberately to encourage fish to move out of the in-water activity area, and repeating this after long periods of inactivity.

Considering in-water work would occur in summer months when Clear Creek flows would be low and 80% of the action area below the OHWM would be dry and exposed, and that fish rescue operations would occur after the proposed channel alignment is isolated from Clear Creek, all construction activities along the proposed alignment would then avoid direct effects to CV spring-run Chinook salmon, fall/late fall-run Chinook salmon, and CV steelhead. Such activities include excavation of the new channel alignment, construction of the temporary stream crossings, pond filling and grading, creation of the alcoves, and revegetation.

In-water activities may cause direct injury or mortality to adult CV spring-run Chinook salmon, juvenile late fall-run Chinook salmon, and adult and juvenile fall-run Chinook salmon and CV steelhead that could be in the action area. However, potential adverse effects would be greatly reduced by implementing the mitigation measures and most effects resulting from this Project are expected to be in the form of harm and harassment during relocation and exclusion activities.

3.2.3.2.1.1.7 Effects to Critical Habitat and Essential Fish Habitat (EFH)

The action area contains Critical Habitat PCEs that support freshwater rearing and 0.67 mile of juvenile and adult migration corridor habitat for Chinook salmon and steelhead, which covers three of the four major components of freshwater EFH for Pacific salmon (juvenile rearing habitat, juvenile migration corridors, adult migration corridors, and adult holding habitat). The majority of creek and floodplain restoration activities are located below the OHWM of Clear Creek, which could affect the PCEs and EFH components of freshwater rearing and migration corridor habitat. Potential release of contaminants, erosion and turbidity increases, temporary vegetation removal, and installation of diversion berms from all Project activities could temporarily affect water quality, cover and protection from predators, food supply, and passage associated with the freshwater rearing habitat and freshwater migratory corridor PCEs and EFH components.

There may be some short-term effects to water quality in lower Clear Creek, and thereby may reduce the quality of PCEs and EFH. The potential for hazardous materials to enter Clear Creek is insignificant because the majority of construction would occur in the summer months when flows are low, the pond would not be connected to the active channel, and 80% of the work would not be in-water. The active channel would be affected only during installation of diversion berms and turbidity curtains, construction of the logjam, creation of the alcoves, and opening of the proposed channel to the main creek channel upon completion. Therefore, there would be temporary adverse effects in the limited areas of habitat currently available in the action area.

The potential for adverse effects to water quality by contaminant spill would be further reduced because of implementation of the conservation measures listed in Section 2.15 on *Hazardous Waste Spill Control*. Installation of diversion berms and turbidity curtains, and construction of the IC-1 and the pond complex (IC-12, W-2 to W6) could cause a temporary increase in turbidity deposit silt or sand into Clear Creek, which could temporarily reduce food availability and lower water quality. Diversion berms are anticipated at the following activity areas to be isolated: (1) pond connection to main channel (downstream end of IC-11); (2) upstream connection of proposed channel to main channel (IC-2); (3) upstream of IC-1; (4) downstream end of IC-12; (5) upstream and downstream end of IC-13. Depending on level of water at each site, these diversion berms would consist of either k-rails or clean spawning gravel covered with a geomembrane, and a turbidity curtain. These control features would be installed with equipment slowly to minimize sediment suspension. Turbidity discharges resulting from project activities would be monitored to ensure that turbidity (measured in NTU) does not exceed Central Valley Regional Water Quality Control Board 401 general water quality certification. A turbidity increase may also occur when the new channel alignment is opened, and flows are first directed through; however, this would be minimized by only using clean gravel and cobble in the new channel alignment, and letting the downstream portion of the channel backfill before gradually opening the upstream connection. Erosion and storm water runoff controls would also be implemented for activities outside of the channel, such as installing silt fences or straw wattles around stockpiles, revegetating and seeding disturbed areas when construction concludes. If revegetation activities cannot conclude prior to winter when flows are higher, disturbed areas would be stabilized with jute matting or similar materials until revegetation activities can continue the next fall. Potential effects from turbidity increases and sedimentation would be temporary and minimized with the implementation of conservation measures listed under Section 2.15 on *Water Quality–Turbidity/Sedimentation Controls and Vegetation Restoration*, and of the CV Water Board's Clean Water Act (CWA) permit requirements.

There would be some physical disturbance to rearing habitat from the short-term loss of riparian vegetation during floodplain earthwork, logjam construction, and alcove and channel creation. However, these impacts would be minimized by avoiding existing vegetation, especially mature riparian trees, to the extent practicable, and all temporarily disturbed areas would be revegetated with native riparian species where they can be supported. See *Mitigation Measures VEG* listed below. Implementation of these mitigation measures would ensure these potential effects remain insignificant. Islands would be created and in-water habitat structures, such as rootwads, would be installed in the proposed channel to provide more habitat complexity and rearing habitat.

Potential effects from construction activities in Clear Creek to designated Critical Habitat for CV spring-run Chinook salmon and CV steelhead and EFH components for Pacific salmon would be

temporary. The purpose of the Project is to improve fish passage and rearing habitat and floodplain function. Therefore, the Project would ultimately lead to long-term benefits for the PCEs of freshwater rearing and migration corridor habitat and EFH components, and would be in line with recovery and restoration plans for spring-run Chinook salmon, fall/late fall-run Chinook salmon, and CV steelhead.

3.2.3.2.1.2 Terrestrial Species

3.2.3.2.1.2.1 Valley elderberry longhorn beetle (Federal Threatened)

The VELB occurs in riparian woodlands throughout the Central Valley, where it feeds on the pith and leaves of elderberry shrubs (*Sambucus nigra ssp. caerulea*) with stems measuring at least 1.0-inch in diameter at ground level. Elderberry shrubs grow in a variety of riparian and non-riparian communities, most common on riparian terraces where they are not inundated for long periods of time (USFWS 2017: 5). Elderberry shrubs are host plants for VELB as the beetle lays its eggs on leaves or at the axil. Upon hatching, the larvae bores into the stem and feeds on the pith, then pupates in the pith gallery until it emerges as an adult beetle (USFWS 2017: 4). The active season for the beetle during which emergence, mating, and egg laying occurs is approximately March 1 to June 30. The presence of exit holes on the stems of the elderberry shrubs may indicate the presence of beetles.

The current presumed range of VELB extends throughout the Central Valley, from approximately southern Shasta County to Fresno County, including the valley floor and lower foothills. The majority of VELB have been documented below 500 feet in elevation. A California Natural Diversity Database query showed three occurrence records of the beetle within 10 miles of the action area, with the closest occurrence 4.5 miles east along Churn Creek. The other occurrences are further away along the Sacramento River. Potential habitat exists within, and near the action area in the form of elderberry shrubs and suitable elevation. Surveys for elderberry shrubs were performed in the action area on March 27, 2017, April 21, 2017, and April 18, 2018 with a follow up survey on November 6, 2018 following a fire that impacted the site during the summer of 2018. Following the fire in November 2018, 121 elderberry shrubs were observed within the project area. Of the 121 elderberry shrubs observed, 113 shrubs were in riparian habitat. No VELB were observed during these surveys but exit holes made by the VELB were observed, and therefore VELB is presumed present.

Figure 6. Elderberry Shrubs Near Project Activity Areas

Elderberry Shrubs
Lower Clear Creek Floodplain and Stream
Channel Restoration Project, Phase 3C

0 100 200 400
Feet

N

Legend

- Shrubs 14.2 - 20.0 feet from Activity Areas
- Shrubs 20.0 - 127.4 feet from Activity Areas
- 20-foot Buffer of Activity Areas
- Activity Areas

Distance from Work Area (ft)	Elderberry Count
14.2-20.0	6
20.0-127.4	115
Total	**121**

The Project has the potential to cause indirect effects to several elderberry shrubs resulting from physical vibration and increase in dust during operation of equipment during construction activities. The Project cannot avoid the entire VELB flight season (March to July); however, project activities would not begin until after June 1.

The surveys mapped a total of 134 elderberry shrubs at the project site (See Figure 6). Of these 134 elderberry shrubs, 16 shrubs are located 165 feet or more away from project activities and would not be affected by the project. Several elderberry shrubs are located adjacent proposed channel alignment. There are 112 shrubs that are located between 20 and 165 feet from project activities. A minimum of 20-foot buffer would be established from the dripline for the protection of the elderberry shrubs. Due to the close proximity of elderberry shrubs to the creek it would be difficult to observe the required a 20-foot radius buffer along some portions of the creek. Several shrubs are located 14 feet from the edge of the pond that would be filled and converted to the main channel. These shrubs are situated on the hillslope above the pond, thus work would be conducted below the ground surface of the shrub and below the drip line. Reclamation is proposing a 14-foot radius buffer zone, using concrete barriers for protection for six shrubs.

Potential effects to VELB would be reduced by avoiding elderberry shrubs by installing fencing or concrete barriers around the shrubs as a buffer between activities, and training workers on VELB, and to avoid these areas (See *Mitigation Measures VELB-1* through *VELB-5*).

The Project may result in short-term adverse effects to VELB, but with implementation of the conservation measures, restoration of the floodplain along approximately half a mile of lower Clear Creek, and planting of additional native riparian vegetation throughout the project site is expected result in long-term benefits to the species.

3.2.3.2.1.2.2 Western DPS yellow-billed cuckoo (Federal Threatened/State Endangered)

Western YBCU breed in broad, well-developed, low-elevation riparian woodlands comprised primarily of mature cottonwoods, willows and blackberry. In the Sacramento Valley, this species generally prefers patches of at least 20 hectares along the Sacramento River with nests regularly spaced. However, where there is extensive foraging habitat and extremely restricted nesting habitat, nests have been observed as close as 60m apart, which indicates that they are capable of nesting in close proximity to one another (Laymon 1980 as cited in Laymon 1998). On occasion, the western YBCU has been observed along tributaries with a series of smaller adjacent riparian forest patches, less than 100m apart. Western YBCU are primarily foliage-gleaning insectivores (cottonwoods preferred), but also hover, glean, hawk, and even hop on the ground to obtain their prey. Breeding season generally begins with pair formation in mid-June and lasts until mid-August. Cuckoos generally arrive in California during June and begin nesting shortly thereafter. The species begins its fall migration around late July to early August and most have left California by mid-September (Gaines and Laymon 1984).

While the action area is within the breeding range of the species, the nearest location of suspected nesting is 25 miles to the south along the Sacramento River. The action area contains several patches of cottonwood and willow trees along lower Clear Creek that are considered suitable as foraging and nesting habitat. Protocol surveys for western YBCU were performed in the action area from June through July 2017 and 2018 by a federally permitted surveyor. Six

surveys, 10 days apart, were performed with the use of “playback calls” throughout the action area, and no western YBCU individuals called back nor were observed. The survey results showed that the western YBCU were not using the action area for nesting during the 2017 or 2018 nesting season. The western YBCU may forage in, but is not known to currently breed in the action area along lower Clear Creek.

The Project may adversely affect foraging western YBCU where construction overlaps with the species’ potential presence from early-June to mid-August. Vegetation removal and grubbing would occur as early as June 1 and take approximately a month to complete. These activities have the potential to cause direct harm to foraging or nesting western YBCU, due to some loss of foraging and nesting vegetation, from early June to mid-August. Mature riparian cottonwoods would be avoided as much as feasible, and this species could continue to forage in those trees and areas adjacent to the action area. The sight and sound of operating equipment and ground disturbance in the action area could also temporarily cause noise and visual disturbance, potentially interrupting nesting or foraging western YBCU and cause them to fly away. However, disturbance to foraging western YBCU would be temporary and insignificant as there is foraging habitat available in other areas along Clear Creek and superior foraging habitat on the Sacramento River downstream. To avoid and minimize potential effects to nesting western YBCU from Project activities delayed beyond the start of the nesting season (June 1), pre-construction surveys for the species would be conducted at the start of the nesting season until the activities commence. If an active western YBCU nest is observed, construction fencing would be installed around it to create a 250-foot avoidance buffer. A biological monitor would also be on-site to monitor the nest for any project-related disturbances and to determine when the nest is no longer active. These and other mitigation measures implemented to avoid and minimize potential effects to avian species, including western YBCU are listed in *Mitigation Measures BIRD-4* and *-5*.

With implementation of these mitigation measures, the potential Project effect on western YBCU would be less than significant. In addition, the successful completion of the Project as the last phase of the Lower Clear Creek FSCRP may provide long-term benefits to the species through the creation of additional and more cohesive riparian forest foraging habitat and, potentially, breeding habitat. In the long-term, the additional riparian habitat resulting from the Project would lead to beneficial effects and be in line with the recovery and restoration plans for western YBCU.

3.2.3.2.1.2.3 Bald Eagle (State Endangered; FP; Bald and Golden Eagle Protection Act)

The Clear Creek riparian corridor provides both foraging, perching, and nesting habitat for bald eagles. No bald eagle nesting activity is known to occur in the general area, and the nearest known nests are approximately 6.5 miles away along the Sacramento River at Turtle Bay in Redding and nine miles northwest at Whiskeytown Reservoir. Potential nesting habitat is present within the action area. Although there is a low likelihood that bald eagles would nest within the action area due to the lack of established existing nests, new nesting territories could be established in the action area.

Vegetation removal and other construction activities could temporarily affect nesting and foraging activities throughout the Project area; however, this impact would be temporary and there is an abundance of suitable foraging habitat near the action area. Surveys for active raptor nests would occur between January and March. If an active nest is found, avoidance measures, such as observance of buffers with a monitor, would be determined in consultation with USFWS and implemented (*Mitigation Measures BIRD-1* and *BIRD-2*). The riparian restorative nature of the Project and additional riparian plantings would also result in long-term benefits for bald eagles by improving nesting habitat and foraging habitat. There would be a less than significant impact with mitigation incorporated.

3.2.3.2.1.2.4 Osprey (SSC; MBTA)

Osprey nest from March to September in large trees, snags, cliffs or human-made structures near fish-producing waters where it can prey on fish. The Clear Creek riparian corridor also provides both foraging, perching, and nesting habitat for osprey. There currently is an osprey nest, presumably active, on a nesting platform approximately 1,600 feet west of the action area. There is dense vegetation and trees between the nest and the action area that buffer noise and potential visual disturbances.

Osprey have been observed foraging in the action area and throughout lower Clear Creek. Construction activities could temporarily affect nesting activities, if resident ospreys relocated closer to the action area, as well as foraging activities throughout the Project area; however, this impact would be temporary and there is an abundance of suitable foraging habitat in the vicinity of the action area. *Mitigation Measures BIRD-1* and *BIRD-2* would also be implemented to ensure there are no active osprey nests in the action area. The riparian restorative nature of the Project and additional riparian plantings would also result in long-term benefits for osprey by improving nesting habitat and foraging habitat. There would be a less than significant impact with mitigation incorporated.

3.2.3.2.1.2.5 Little willow flycatcher (State Endangered; SSC; MBTA)

The little willow flycatcher is not expected to nest in the lower Clear Creek corridor as they nest in dense willow thickets in upper elevations in montane meadows and streams with meadows from 2000 to 8000 feet (Craig, D. and P. L. Williams. 1998). This species would be using the action area during their spring migration from early May to mid-June and fall migration from early August to mid-September. Little willow flycatchers may use the riparian habitats in the action area for foraging and construction activities such as vegetation removal, noise, and other disturbance associated with the construction activities could preclude birds from using habitats adjacent to the activity areas during the construction period. The loss of foraging habitat would be temporary as disturbed areas that would not become occupied with water from the new channel alignment would be revegetated, with an emphasis on riparian vegetation, preferred by birds. There is also an abundance of suitable foraging habitat near the action area along lower Clear Creek, and the restorative nature of the Project would lead to long-term benefits of improved foraging habitat. Mature riparian trees and contiguous patches of riparian habitat would be avoided as much as feasible to maintain riparian habitat in the Project area (*Mitigation Measure 5.)*

3.2.3.2.1.2.6 Yellow warbler and yellow-breasted chat (SSC; MBTA)

Yellow warbler and yellow-breasted chat both have been observed in the lower Clear Creek corridor. As currently designed, the Project would require vegetation removal and construction activities during the yellow warbler and yellow-breasted chat nesting periods (April 15 and May 1 to August 1 respectively). People and equipment working, vegetation removal, and noise from construction activities during the nesting season could disturb nearby birds or nests and cause young to be abandoned, harmed, or killed. Vegetation removal would also reduce foraging habitat; however, this impact would be temporary as temporarily disturbed areas would be revegetated, there is an abundance of suitable foraging habitat near the action area, and the restorative nature of the Project would lead to long-term benefits of improved foraging habitat.

Mitigation Measure BIRD-3 would be implemented to avoid and minimize effects to nesting yellow warbler and yellow-breasted chat, which involves surveying for active migratory bird nests up to five days prior to construction activities, and observing a 250-foot buffer around active nests until July 31 or nestlings fledge, as determined by a biological monitor. It also includes sequencing Project activities to begin in areas with fewer historic nest sites and proceed to higher density sites after the nesting season ends on July 31. Potential adverse effects would be reduced to a less than significant level with mitigation incorporated.

3.2.3.2.1.2.7 Western red and pallid bats (BLM SS; SSC)

The action area contains potential roosting and foraging habitat for western red (SSC) and pallid bats. These bat species inhabit riparian and woodland habitats that occur in and within the vicinity of the action area and that could support roosting and foraging. The western red bat roosts in tree hollows or crevices of riparian edge habitat, and forage in the action area. The pallid bat prefers to roost in open, dry habitats with rocky areas such as caves, crevices, and mines, and only occasionally in hollow trees and buildings. Project activities such as vegetation removal and general equipment operation could disturb, harm or kill bats potentially roosting in trees on-site. However, *Mitigation Measures BAT-1* through *BAT-3*, which include, but are not limited to, performing surveys for active maternity roosts and observing buffers as necessary, would be implemented to avoid and minimize directly affecting these special-status bats. Mature riparian trees that are more likely to be used as roosting sites than younger trees would also be avoided as much as feasible, and temporarily disturbed areas would be revegetated (*Mitigation Measures VEG-1, VEG-2, and VEG-5*). Implementation of mitigation measures would reduce potentially adverse effects to roosting western red and pallid bats to a less than significant level.

Vegetation removal could also reduce foraging habitat for these bat species. However, this impact would be temporary for up to four months, there is an abundance of suitable foraging habitat near the action area, and temporarily disturbed areas would be revegetated, with an emphasis on native riparian species. The restorative nature of the Project would also lead to long-term benefits of improved foraging habitat. There would be a less than significant impact on bats foraging in the action area.

3.2.3.2.1.2.8 Spotted, Townsend's western big-eared, and western mastiff bats (BLM SS)

The action area contains potential foraging habitat for spotted, Townsend's western big-eared, and western mastiff bats. Potential impacts on these bat species would primarily be limited to construction disturbance near dawn and dusk, their peak feeding periods. However, considering construction would be limited to 7 a.m. to 7 p.m., Monday through Saturday, and that the sun starts to rise closer to 7 a.m. and set closer to 7 p.m. in late September towards the end of the Project, this potential impact would be minor and occur over only a few weeks. There is also an abundance of suitable foraging habitat near the action area, and temporarily disturbed areas would be revegetated with native, mostly riparian species. The restorative nature of the Project would also lead to long-term benefits of improved foraging habitat for bats. There would be a less than significant impact on bats foraging in the action area.

3.2.3.2.1.2.9 Northwestern pond turtle (SSC)

Northwestern pond turtles are known to occur in lower Clear Creek, and the pond and backwater area of the action area provide suitable foraging, basking, nesting, and over-wintering habitat. Water removal and excavation and fill activities in the pond and backwater channel could incidentally harm or kill northwestern pond turtles that may inhabit these areas. These activities could also temporarily remove cover habitat, or crush eggs that may be laid in surrounding upland areas during the nesting season (late April to early August). These potential impacts would be temporary. However, to avoid and minimize adverse effects, these areas would be surveyed by a qualified biologist prior to standing water removal and ground disturbing activities to relocate any northwestern pond turtles that may be present. Captured turtles would be relocated within the same day of capture to suitable habitat outside of the action area (*Mitigation Measure TURT-1*). The proposed action also involves creating a more diverse creek channel with islands, alcoves, and a backwater area that could support northwestern pond turtle in the long-term. The restorative nature of the Project should also lead to long-term benefits of improved foraging and breeding habitat. There would be a less than significant impact on northwestern pond turtle with mitigation incorporated.

This section discusses potential effects the Proposed Action could have on the movements and migratory corridors of native resident or migratory fish or wildlife species. The Proposed Action could remove habitat and directly harm or kill beavers inhabiting the beaver dam at the pond during water removal and excavation activities in the pond. The American beaver is not a special status species, and the Project could remove one habitat source out of a variety of suitable habitat in the region for this species; therefore, the effects of the Project would be less than significant and are not likely to result in a trend toward Federal listing.

Installation of the control feature and construction of the alcoves and proposed channel could also remove habitat for river otters along the Clear Creek embankments, increase turbidity in the water column, and directly impact river otters in the action area. However, otters are swift and likely to move away from movement of equipment and materials in the channel. Diversion of flows from the current channel alignment to the proposed alignment would be phased to maintain consistent flow and channel connection and minimize impacting migratory movements in lower Clear Creek. These effects would be temporary. The restorative nature of the Project would also lead to the long-term benefit of river otters by improving channel diversity and riparian habitat.

The river otter is also not a special-status species and potential effects from the Proposed Action would be temporary and less than significant and are not likely to result in a trend toward Federal listing.

Black-tailed deer may be temporarily displaced from parts of the action area during the four-month construction period. Black-tailed deer may have difficulty moving around the activity areas and would be at risk of mortality and injury from vehicle or equipment collisions; however, this risk would be minimized by limiting equipment vehicle speed to 20 mph on unpaved roads. Deer and other wildlife species temporarily displaced would be able to utilize the restored habitats upon Project completion; therefore, there would be a less than significant impact.

3.2.3.2.1.3 Mitigation Measures: FISH, VELB, BIRD, WILDLIFE, VEG, BAT, TURT

3.2.3.2.1.3.1 Fish (FISH):

- FISH-1. Fish Rescue Operations:
    - Reclamation and BLM, in coordination and consultation with the NMFS, USFWS and CDFW, would ensure that at least one permitted fish biologist is on-site to implement fish rescue operations through the use of seining, or electrofishing.
    - The most appropriate method of rescuing and relocating stranded fish from areas to be isolated from the main channel and have ponded water removed would be determined by fish biologists.
        - Initially, seining would be the preferred procedure. However, if electrofishing were deemed appropriate and necessary for the efficient and successful removal of fish, the NMFS electrofishing guidelines (NMFS 2000) would be strictly followed.
    - The fish rescue team would be comprised of qualified fishery biologists with professional experience using seines and electrofishing equipment. Up to two fish rescue teams of two to four persons would be used to facilitate efficient fish removal, reduce handling time, lower physiological stress, and reduce potential mortality rates.
        - If electrofishing were employed, a minimum of three passes through each stranding location would be conducted until most of the fish are removed.
        - Captured juvenile fish would be placed in 5-gallon buckets and segregated by size classes throughout captivity. At the end of each pass, captured fish would be transferred into buckets with aerated water or into in-river holding tanks (e.g., buckets with small holes allowing freshwater infiltration). After fish are fully recovered, they would be released to the main flowing lower Clear Creek channel. All captured adult fish would be placed in appropriately-sized containers and immediately transported and released to the main flowing lower Clear Creek channel. All rescued fish would be counted, measured, and recorded by species at a minimum if they appear to be stressed the number and run-type of Chinook salmon and

steelhead captured, and the number of fish accidentally killed prior to release, would be reported to NMFS and CDFW.

- FISH-2. NMFS and CDFW determined the in-water work window of July 1 to September 30 to minimize impacts to anadromous fish. This in-water work period is when flows in Clear Creek are lowest, stream temperatures are high and densities of anadromous fish are at their lowest. In-water work would not occur outside of this window, unless approved by NMFS and CDFW. Reclamation coordinated with NMFS and CDFW to install the stream crossing in the backwater channel for initial equipment access for vegetation removal June 1, and to allow removal of the stream crossings by September 30, with the possibility of extending this window to October 14 with NMFS and CDFW approval.
- FISH-3. The contractor would design all stream crossings to ensure that conditions are maintained for effective upstream and downstream fish passage, at all times and under all appropriate flow conditions.
- FISH-4. Prior to unavoidable in-water activities, equipment or materials would be operated/placed slowly and deliberately to alert and cause any adult and juvenile salmonids to shift away from the activity area. This would be repeated after extended periods of inactivity that give fish time to reoccupy the site.
- FISH-5. In-water activities, such as construction of the proposed channel alignment, new alcoves, and the logjam would be isolated from Clear Creek by constructing diversion berms. Turbidity curtains would be installed to contain any turbid water. Fish rescue and relocation operations would occur prior to pumping of ponded water or construction activities.
- FISH-6. Water intake pumps used to pump ponded water from isolated work areas prior to in-water construction would be screened with 3/32-inch mesh, complying both NMFS's 1997 Fish Screening Criteria for Anadromous Salmonids and CDFW's 2000 Fish Screening Criteria (with steelhead present) requirements. Additionally, the intake pumps will be covered with a velocity reducing device to further prevent debris and aquatic organisms from entering the pump system.

3.2.3.2.1.3.2 Valley Elderberry Longhorn Beetle (VELB):

- VELB-1. A qualified biologist would provide training for all contractors, work crews, and any onsite personnel on the status of the VELB, its host plant and habitat, the need to avoid damaging the elderberry shrubs, and the possible penalties for noncompliance.
- VELB-2. When possible, a minimum setback of 20 feet from the dripline of all elderberry shrubs would be established. These areas would be fenced, flagged, and maintained during construction. Due to the proximity of the elderberry shrubs to the creek, it would be difficult to observe the required 20-foot radius buffer zone for protection of all the elderberry shrubs along portions of the creek restoration areas. For those rare instances when 20-foot minimum buffer zone are not possible, the Reclamation is proposing a 14-foot radius or larger buffer zone at these locations, using concrete barriers for protection.

- VELB-3. All placement of barriers to protect elderberry shrubs adjacent to the construction areas shall be completed prior to construction activity.
- VELB-4. Herbicides and insecticides will not be used within the elderberry buffer zones discussed in VELB-2. Any herbicides and insecticides used in other areas of the project area will abide with the Redding BLM's Integrated Vegetation Management Plan Environmental Assessment (DOI-BLM-CA-N060-2016-0021-EA).
- VELB-5. A qualified biologist would monitor the work area at appropriate intervals to assure that all avoidance and minimization measures are implemented. The amount and duration of monitoring would depend on the project specifics and would be coordinated with the Service biologist.

3.2.3.2.1.3.3 Raptors and Migratory Birds (BIRD):

- BIRD-1. Raptor Protection: Any tree removal, vegetation clearing, or the onset of potentially disturbing construction activities shall occur between September 1 and January 1 (outside of the nesting season for raptors with potential to occur within, or in the vicinity of the project site). Note: Also see measure WILD-1.
- BIRD-2. Surveys for active raptor nests to determine potential presence of nesting raptors will occur between January and March and be conducted by a qualified biologist. If an active nest is found, avoidance measures, such as observance of buffers, would be determined in consultation with USFWS and/or CDFW and implemented. The Raptor Nesting Season is January 1 through August 31. See also BIRD-3
- BIRD-3. Non-raptor/migratory bird species: If Project activities, including vegetation removal, cannot be done outside of the migratory bird nesting season in this region (March 1 to July 31), the following measures would be implemented:
    - Pre-Project surveys for active migratory bird nests within 500 feet of activity areas would occur up to 7 days prior to construction;
    - If active bird nests are observed, measures from the USFWS *Nationwide Standard Conservation Measures* for migratory birds would be implemented. These measures include establishment of a 250-foot buffer, unless a qualified biologist determines that smaller buffers would be sufficient to avoid impacts to nesting birds. Factors to be considered for determining buffer size would include: the presence of natural buffers provided by vegetation or topography; the bird species affected; nest height; locations of foraging territory; and baseline levels of noise and human activity. The buffer would be monitored by a biological monitor and maintained until July 31, or until nestlings fledge. NOTE: No nests area allowed to be removed during the nesting period, as per Fish and Game Code.3503.5.
        - If it is determined that work needs to occur within the 500-foot avoidance buffer, a qualified biologist would determine, based on location and activity specifics, an appropriate minimum buffer zone. The nest and attending adults would then be monitored during Project activities within the 250-foot buffer. If at any time the qualified biologist determines that Project activities may have an adverse effect on nest-success or bird

health, Project activities would immediately halt, and the 250-foot buffer would be re-established.

- Project phasing would be sequenced to begin in areas with fewer known nest sites and proceed to higher density sites after the nesting season ends July 31.

- BIRD-4. If Project activities occur during the western DPS yellow-billed cuckoo nesting season (June 1 to August 15), a protocol survey would be performed by a biologist with an ESA Section 10(a)(1)(A) permit at the start of the bird's nesting season, prior to the start of activities. If an active western DPS yellow-billed cuckoo nest is observed, the following measures would be implemented:
    - Construction fencing would be installed around the nest to create a 250-foot buffer from activities. The 250-foot buffer is not to be reduced;
    - A USFWS-approved biologist would monitor for any potential disturbance to the bird caused by the Project, until the nest is deemed no longer active (until August 15 when western yellow-billed cuckoo nesting season ends). If Project activities are determined to be adversely affecting the nesting birds or fate of the nest, the biologist would have the authority to stop activities and would contact USFWS to determine appropriate measures to continue construction.
- BIRD-5. Mature riparian trees and vegetation, and contiguous patches of riparian habitat would be avoided as much as feasible to maintain existing riparian habitat in the Project area.

3.2.3.2.1.3.4 Wildlife (WILD):

- WILD-1. Prior to construction, a biologist will inspect the project site for signs of denning by ringtails. If ringtails are found to be denning, construction activities will be suspended until a qualified biologist, in consultation with CDFW, can establish appropriate measures to protect ringtail.

3.2.3.2.1.3.5 Bats (BAT):

- BAT-1. Surveys for special-status bat species by a qualified bat biologist would be performed prior to vegetation removal during bat maternity season (April May 1 – August 31), no less than 7 days and no more than 14 days prior to vegetation removal.
- BAT-2. If active special status bat species are detected, efforts would be made to locate maternity roosts. If maternity roosts are found, a buffer determined by a biologist would be established and observed until August 31, or the roost is no longer active.
- BAT-3. If roosts are determined to be present and must be removed, the bats would be excluded from the roosting site before it is removed. Exclusion methods may include use of one-way doors at roost entrances (bats may leave, but not re-enter), or sealing roost entrances when the site can be confirmed to contain no bats.

BAT-4. All vegetation clearing within potential western red bat roosting habitat (contiguous woody riparian habitat in stands at least 150 ft. by 150 ft. or larger,

particularly those containing trees larger than 12 inches diameter at breast height and that have crevices and holes) shall be conducted between August 31 and May 1. These dates correspond to the time period when bats would not be caring for non-volant young and have not yet entered torpor. Tree removal may occur prior to August 31st based upon site-specific tree removal plan approved by CDFW. The plan shall consider or include the following: Monitoring of the affected trees shall be conducted using bat detection equipment within 5 days of tree removal. If red bats are not present, tree removal can proceed. If red bats are present, a dusk survey on the night prior to tree removal may help confirm the use of that tree by bats. If bats are potentially using the tree, a qualified biologist shall monitor removal/trimming of trees that provide suitable bat roosting habitat. Tree removal/trimming shall occur over two consecutive days. On the first day in the afternoon, limbs and branches shall be removed using chainsaws only. Limbs with cavities, crevices, or deep bark fissures shall be avoided, and only branches or limbs without those features shall be removed. On the second day, the entire tree shall be removed. Prior to tree removal/trimming, each tree shall be shaken gently and several minutes shall pass before felling trees or limbs to allow bats time to arouse and leave the tree. The biologist shall search downed vegetation for dead or injured bat species and report any dead or injured special-status bat species to CDFW. All bat observations should be reported to CDFW.

- 3.2.3.2.1.3.6 Turtles (TURT):

- TURT-1. Prior to standing water removal or construction of the stream crossing, the pond and backwater channel would be surveyed by a qualified biologist to relocate northwestern pond turtles that may be present. Any turtles that are discovered would be captured and moved to suitable habitat areas outside the action area, preferably downstream. All turtles would be relocated the same day they are captured and as quickly as possible to reduce stress on the animal.

3.2.3.2.1.3.7 Vegetation (VEG):

- VEG-1. Impacts to existing vegetation, especially mature riparian trees and contiguous communities, would be avoided to the extent feasible.
- VEG-2. Disturbed areas would be revegetated with native plant species.
- VEG-3. The riparian and wetland restoration would follow the restoration plan prepared by a contracted botanist/riparian ecologist, in coordination with USFWS, Reclamation, and BLM.(North State Resources 1999).
- VEG-4. Prior to arriving at the construction area, all equipment used for the Project would be thoroughly washed off-site to remove invasive NIS plant seed, stems, etc. and inspected to prevent transfer of aquatic invasive species, such as quagga mussel and New Zealand mud snail.
- VEG-5. Sediment would be salvaged to support revegetation efforts.
- VEG-6. Any off-site rock, gravel, or sediments would be from NIS plant seed-free source(s).

3.2.3.2.2 Waters of the U.S. and State, and Riparian Habitat

This section discusses potential effects the Proposed Action could have on riparian habitat and waters of the U.S., as defined by CWA, Section 404. Proposed mitigation measures are listed at the end of this resource subsection. The purpose of the Project is to improve anadromous salmonid passage and juvenile rearing habitat by restoring this portion of lower Clear Creek to a historic, diverse channel alignment and planting native riparian plants to encourage a more contiguous corridor of riparian habitat. These restoration activities require the majority of work to occur within the ordinary high water mark (OHWM) of lower Clear Creek and the active floodplain. It is important to note that placement of fill in lower Clear Creek and the active floodplain, and habitat structures would not convert lower Clear Creek to dry land, significantly increase the bottom elevation of the creek, or change the use of the stream. Vegetation clearing and grubbing is anticipated for the majority of these areas, which includes riparian communities.

A 0.09-acre seasonal wetland will be expended and enhanced as part of project. The current wetland feature would be overexcavated, fine sediment placed, and planted with wetland plants to increase the soils, hydrology and wetland function.

The Proposed Action would result in the temporary fill, permanent fill, and permanent excavation below the OHWM of Clear Creek, which is a water of the U.S./State. Table 3 and Figure 7 detail the area and location of temporary and permanent impacts from Project activities. There would be a total of 7.55 acres of temporary impacts to Clear Creek, from the placement of fill below the OHWM, and 10.35 acres of permanent impacts. The area would be restored to pre-project conditions and revegetated as the final Project close-out activity, within 30 days of all other revegetation activities concluding (*Mitigation Measure WOUS-3*). Revegetation would be done according to a revegetation plan prepared by Reclamation and BLM (*Mitigation Measure VEG-3*).

Table 3. Proposed Action Impacts to Waters of the U.S./State

Wetlands/Waters	Size of Temporary Impact (acres)	Size of Permanent Impact (acres)
Seasonal Wetland	0.1	0.05
Seasonal Wetland (PE)	0.07	0.23
Seasonal Wetland (RFW)/ Riparian Wetland	0.01	0.003
Perennial Wetland (RPW)/ Riparian Wetland	0.05	0.16
Perennial Wetland (FEM)/ Emergent Wetlands	1.07	0.66
Palustrine Emergent/ Hill Seep	0.08	0
Ephemeral Drainage	0.24	0.15
Intermittent Channel	0	0.04
Pond	0.13	2.71
Perennial Channel	5.80	6.34
Total Impacts	**7.55**	**10.35**

There would be approximately 10.35 acres permanent impacts to Clear Creek due to the placement of fill materials that includes soils, rock, and wood to construct the project features.

The project would increase the function and value of the Clear Creek by creating the new channel and floodplain complex therefore, no compensatory mitigation is proposed. The project would change the waters of the United States into a seasonal wetland complex and wetland pond complex. Overall, the project would improve the quality of habitat for aquatic species by increasing the aquatic function and services within the project area. There would be no net loss to waters of the United States. Table 3 list the changes in water type.

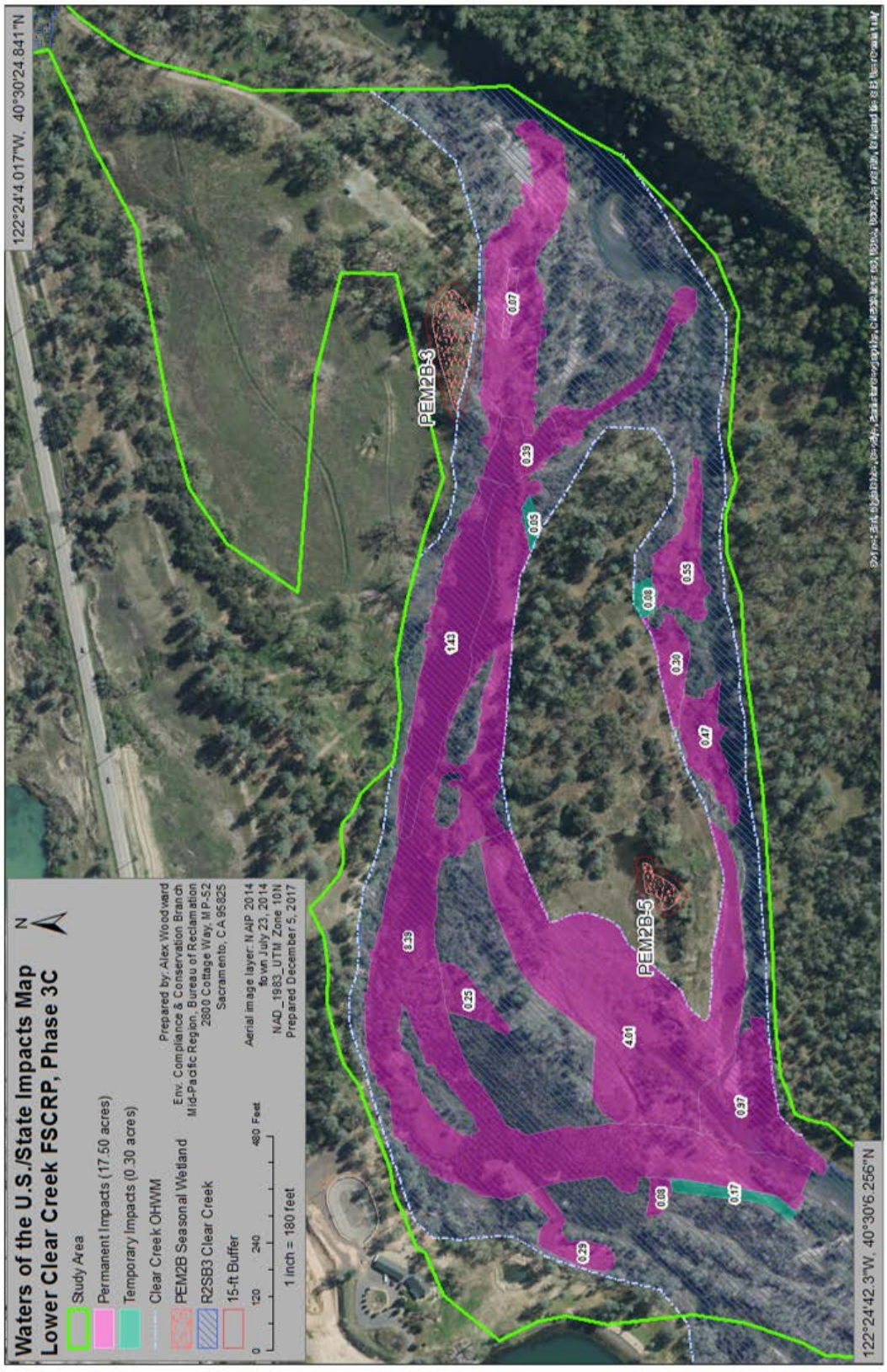

Figure 7. Temporary and Permanent Impact Areas

Table 4. Change to Change to Type of Waters of the U.S.

Wetlands/Waters	New Water Type	Acres
Seasonal Wetland (PE)	Perennial Channel	0.22
Seasonal Wetland (PE)	Floodplain Complex	0.07
Seasonal Wetland (RFW)/ Riparian Wetland	Perennial Channel	0.003
Perennial Wetland (FEM)/ Emergent Wetlands	Perennial Channel	0.12
Perennial Wetland (FEM)/ Emergent Wetlands	Seasonal Wetland	0.18
Ephemeral Drainage	Perennial Channel	0.01
Ephemeral Drainage	Seasonal Wetland	0.23
Intermittent Channel	Perennial Channel	0.04
Intermittent Channel	Seasonal Wetland	0.04
Pond	Perennial Channel	0.20
Pond	Seasonal Wetland	0.06
Perennial Channel	Seasonal Wetland	1.92
Perennial Channel (Floodplain)	Perennial Channel (new active channel)	5.68
Perennial Channel (Floodplain)	Floodplain Complex	1.60
	Total	**10.37**

The Proposed Action would restore and enhance aquatic habitats and conclude the final phase of the Lower Clear Creek FSCRP, which aims to improve salmonid spawning and rearing habitat and reduce fish stranding and improve fish passage in the two-mile reach of lower Clear Creek heavily damaged from placer, dredger, and in-stream aggregate mining for gold and gravel. The restored channel would improve floodplain function, which would support growth and contiguous riparian habitat in the lower Clear Creek corridor in the long-term. The Proposed Action would result in an increase of Clear Creek channel by 600 linear feet due to the longer alignment of the new channel and the maintenance of the current channel as a backwater area at higher flows. Therefore, implementation of the proposed Project would result in net beneficial effects to waters of the U.S./State and riparian habitats. There would be a less than significant impact on riparian habitat and federally protected wetlands as defined by Section 404 of the Clean Water Act.

3.2.3.2.2.1 Mitigation Measures: Waters of the U.S. and State (WOUS/S):

- WOUS/S-1. Wetlands located near construction areas, and at risk of inadvertent disturbance, would be protected with high-visibility fencing installed 15 feet from the feature.
- WOUS/S-2. Storm water runoff would be directed away from wetland features and waters of the U.S./State with water bars or other storm water controls.
- WOUS/S-3. Temporarily impacted waters of the U.S./State would be restored to pre-project grade and revegetated within 30 days of project completion, according to a revegetation plan prepared by Reclamation and BLM.
- WOUS/S-4. Existing access roads would not be widened or improved. Ephemeral drainages and seeps along these roads would be avoided.

3.2.4 Cultural Resources

A cultural resource is a broad term that includes prehistoric, historic, architectural, and traditional cultural properties. Cultural resources that meet criteria for listing on the California Register of Historical Resources (CRHR) (defined at 14 CCR § 15064.5[a]) are called "historical resources;" and cultural resources that meet the criteria for listing on the National Register of Historic Places (NRHP) (defined at 36 CFR § 60.4) are called "historic properties." While the CRHR and NRHP significance criteria are similar, NRHP is given precedence in this analysis because cultural resources eligible for the NRHP are also eligible for inclusion in the CRHR, but the reverse is not necessarily true (PRC 5024.1[c]). Therefore, employing the federal standards would fulfill both federal and state requirements for cultural resources.

3.2.4.1 Affected Environment

This section describes existing conditions for cultural resources within the project area. All information regarding existing conditions was collected through an examination of current literature, archival and record search information, and archaeological inventory survey data related to the project area. Reclamation also requested information regarding cultural resources from the Redding Rancheria, pursuant to 36 CFR § 800.3(f)(2) as well as comments or concerns regarding sacred sites on Federal land or access to sacred sites on Federal land under Executive Order 13007. Reclamation also requested information regarding cultural resources from the Winnemem Wintu Tribe, pursuant to 36 CFR § 800.4(a)(3).

Human use and occupation of the local region extends from current to approximately 8,000 years before present. Information regarding archaeological and ethnographic context is contained in a confidential cultural resources inventory report. One cultural resource, a section of the abandoned old Clear Creek Road has been documented within the project area. This road segment was evaluated and determined not eligible for inclusion in the NRHP.

3.2.4.2 Environmental Consequences

No significant cultural resources, historical resources, or historic properties were identified within the Project area, therefore there would be no impacts to this type of resource from any of the activities in the Proposed Action. All proposed activities within the floodplain are in a heavily, previously disturbed setting. Existing roads used for access would not need widening. Temporary roads and staging/stockpiling areas would be situated in previously disturbed settings and would be seeded for revegetation.

No human remains have been identified in the Project area. The Paleontological Resources Protection Act (43 CFR § 49.1) mandates BLM and Reclamation to protect and preserve paleontological resources on Federal land. Furthermore, under 43 CFR § 49.30, the agencies are to inventory and monitor paleontology resources where found on a project site. The base of the cliff along the active stream was investigated for weathered out fossils by a qualified paleontologist. A field assessment showed that the clast composition is mixed and includes metamorphic and sedimentary clasts. There was no discernable change in composition throughout the section. Additionally, the composition and distribution is similar to the tailings adjacent to the stream in the historic channel. These layers have been assigned to "Qa" or Quarternary alluvium, namely, deposits of Holocene to recent streams. The paleontologist determined that the exposed bank along the north side of the active channel are young fluvial deposits and are not likely to contain significant fossils, due to age (SubTerra Consulting 2018).

No paleontological resources or sites or unique geologic features have been identified in the Project area; therefore, there would be no impact. In addition, no Indian Sacred Sites as defined under the Federal Executive Order 13007 have been identified in the Project area.

3.2.5 Geology and Soils

3.2.5.1 Affected Environment

Clear Creek, one of the major tributaries of the upper Sacramento River, drains the eastern Trinity Mountains. Alluvial plain and terrace gravels of lower Clear Creek, at the northwest edge of the Sacramento Valley, contain placer gold that has been mined since the Gold Rush by various methods including hydraulic mining and dredging. In addition, from the 1950s to the 1980s aggregate-mining operations removed gravel from the lower Clear Creek flood plain. The Klamath Mountains of northern California and southwestern Oregon have produced significant amounts of gold, both from placer and lode deposits. The most important placer deposits occur along the major rivers, including Clear Creek and the Trinity, Klamath, and Smith Rivers, and their tributaries (Clark, 1970). The placers of lower Clear Creek have been mined intermittently by various methods since the 1850s (Clark, 1970; Averill, 1933), with the result that all the alluvial gravel forming the flood plain of Clear Creek and most of the gravel capping adjacent terraces has been disturbed. In addition, in recent decades gravel has been removed from the lower Clear Creek alluvial system for aggregate. (Ashley and Rytuba 2008).

Mercury occurrence and problems are discussed in *Section 3.2.9, Hydrology and Water Quality*

3.2.5.2 Environmental Consequences

Construction activities involving soil disturbance, such as excavation, stockpiling, and grading could result in increased erosion. However, substantial erosion will be avoided and minimized with implementation of *Mitigation Measures TURB-1, TURB-4, and TURB-9* listed in *Section 3.2.9, Hydrology and Water Quality*, which include preparing and implementing a Storm Water Pollution Prevention Plan, to limit ground disturbance and control erosion and sediment.

3.2.6 Greenhouse Gas Emissions

3.2.6.1 Affected Environment

Climate change refers to significant change in measures of climate (e.g., temperature, precipitation, or wind) lasting for decades or longer. Many environmental changes (changes in sun's intensity, changes in ocean circulation, deforestation, urbanization, burning fossil fuels, etc.) can contribute to climate change (EPA 2009). Gases that trap heat in the atmosphere are often called greenhouse gases (GHG). Some GHG such as carbon dioxide (CO2) occur naturally and are emitted to the atmosphere through natural processes and human activities. Other GHG (e.g., fluorinated gases) are created and emitted solely through human activities. The principal greenhouse gases that enter the atmosphere because of human activities are CO2, methane, nitrous oxide, and fluorinated gasses (EPA 2009).

Burning of fossil fuels is considered a major contributor to perceived global climate change. During the past century, humans have contributed to the amount of GHG in the atmosphere by burning fossil fuels such as coal, natural gas, oil, and gasoline to power our cars, factories, utilities, and appliances. Some CO2 is liberated naturally, but this may be augmented greatly

through human activities. Increases in air temperature may lead to changes in precipitation patterns, runoff timing and volume, sea level rise, and changes in the amount of irrigation water needed due to modified evapotranspiration rates. These changes may lead to impacts to Nevada and California's water resources and Project operations.

In 2002 California adopted Assembly Bill 1493 (AB 1493) which required the California Air Resources Board to develop and implement regulations to reduce automobile and light truck GHG emissions beginning with their respective 2009 models. The State has adopted Assembly Bill 32 (AB 32) and has identified GHG reduction goals. While the emissions of one single Project would not cause global climate change, the State's objective is to reduce GHG emissions. In considering when to disclose projected quantitative GHG emissions, the Council on Environmental Quality provided a reference point of 25,000 metric tons of carbon dioxide equivalent emissions on an annual basis below which a GHG emissions quantitative analysis is not warranted unless quantification below that reference point is easily accomplished (CEQ 2014). AB 32 established 25,000 metric tons/year as the threshold for mandatory emissions reporting for stationary sources. California did not establish a threshold for cumulative emissions from temporary mobile sources, such as construction equipment, which would be lower than permanent stationary sources.

3.2.6.2 Environmental Consequences

The proposed action would involve a short-term increase in CO2 emissions from equipment operation during Project construction. Considering CO2 emissions cannot be precisely calculated at this time, the estimated CO2 emissions for a Project similar in scope and magnitude is used for GHG analysis. Analysis has been completed for channel rehabilitation projects similar to the proposed action, with the determination that they would produce approximately 3.0 metric tons of CO2 per day over the life of the projects, which equates to approximately 280 tons/year (NCRWQCB and USBR 2009). Since the estimated annual emissions of CO2 anticipated to be emitted from construction of the proposed action is well below 25,000 metric tons/year, the contribution of GHG is negligible. As discussed in *Section 3.2.3, Air Quality*, SMM and BAMM are measures adopted by the SCAQMD intended to reduce cumulative air quality impacts, and implementation of *Mitigation Measure AQ-2 through AQ-6* listed in that section would further minimize CO2 emissions. Vegetation replanting and natural re-seeding within the existing riparian area would also offset the total Project GHG emissions in the long term.

3.2.7 Hazards and Hazardous Materials

3.2.7.1 Affected Environment

The affected environment is the riparian corridor of lower Clear Creek. Historic mining and dredging occurred in the creek channel. The closest known Super Fund site is the Iron Mountain Mine located approximately two miles north of Whiskeytown Reservoir

3.2.7.2 Environmental Consequences

Activities associated with the Proposed Action would utilize potentially hazardous materials (e.g., oil and fuels) associated with the operation of vehicles and construction equipment during construction. These materials are similar to those routinely used for other types of construction projects throughout Shasta County. The widespread use and associated transport of these materials along the highways 1and county roads in Shasta County combined with the low level

of incidents (spills), suggest that impacts related to rehabilitation activities would be similar to that elsewhere in the county. *Mitigation Measures HAZ-1 through HAZ-5* would also be implemented to avoid and minimize potential hazardous material spills, which include preparation and implementation of a Spill Prevention, Control, and Containment Plan. Given the temporary nature of construction and the distance from residences, schools, and frequently used recreation areas, implementation of mitigation measures would minimize the potential for any Project-related hazardous materials becoming a public hazard to a less than significant level.

3.2.7.2.1 Mitigation Measures: Hazards and Hazardous Materials (HAZ):

- HAZ-1. The contractor would develop and implement a Spill Prevention, Control and Countermeasures Plan (SPCCP) with the CV Water Board prior to the onset of construction to regulate the use of hazardous materials, such as petroleum-based products for equipment fuel and lubricants. The SPCCP would include measures to be implemented onsite that would keep construction and hazardous materials out of waterways and drainages. The SPCCP would include provisions for daily checks for leaks; hand-removal of external oil, grease, and mud; and the use of spill containment booms for refueling.
- HAZ-2. Soils contaminated with fuels or chemicals would be disposed of in an approved landfill to prevent potential discharge to surface waters.
- HAZ-3. Temporary diversion berms would be used to isolate construction areas from flowing waters where feasible.
- HAZ-4. All construction equipment refueling and maintenance would be restricted to designated staging areas located away from streams and sensitive habitats.
    - On-site fuels and toxic materials would be placed or contained in an area protected from direct runoff, outside of water bodies, such as in the Alternative Stage, Stockpile, Processing Area.
    - Spill kits would be maintained at fueling areas and other appropriate locations.
- HAZ-5. Signs would be placed along the road, warning of large equipment entering/exiting Clear Creek Road.

3.2.8 Hydrology and Water Quality

3.2.8.1 Affected Environment

As stated in the Project Description, lower Clear Creek hydrology has been drastically changed since the gold mining days. Flows within lower Clear Creek vary seasonally. With the exception of some minor accretion flows from side tributaries, flows in Lower Clear Creek are controlled by the releases from Whiskeytown Dam. The United States Geological Survey (USGS) maintains a gauging station on Clear Creek located approximately 6.5 miles upstream of the Project. The USGS station (#11372000) has been collecting discharge data since October 1, 1940. Table 5 contains daily average discharge data broken up into monthly data from October 1, 1940 to October 15, 2017. The table also includes the monthly data count to show data representation.

Table 5: Clear Creek Monthly Flows (cfs) from October 1940 to October 2017

Month	Count	Minimum	Average	Maximum
January	2,387	41	461	8,590
February	2,175	48	599	14,100
March	2,387	48	487	15,100
April	2,310	46	366	12,500
May	2,387	44	215	3,800
June	2,310	40	131	1,190
July	2,387	16	76	295
August	2,387	11	64	827
September	2,310	9	90	1,590
October	2,401	13	127	3,390
November	2,310	28	181	2,530
December	2,386	38	355	14,500

Source: USGS 2017

Water quality in lower Clear Creek is generally of excellent quality. However, the creek is CWA 303(d) Listed as impaired for mercury. This is likely due to historic mining activities in the creek.

3.2.8.2 Environmental Consequences

Construction of Phase 3C of the Lower Clear Creek FSCRP would result in major earthwork involving realigning a portion of Clear Creek to return it to its historic meander resulting in better fish passage and juvenile salmonid rearing habitat. These construction activities have the potential to increase erosion, sedimentation and disturb heavy metals such as mercury. Additionally, construction equipment would require the use of hazardous materials such as gasoline and engine oil, which could contaminate runoff that could enter Clear Creek. Discharge of sediment or hazardous construction materials into Clear Creek could result in violating water quality standards. However, *Mitigation Measures TURB-1* through *TURB-6* would be implemented to avoid and minimize the discharge of sediment or hazardous material into Clear Creek. For example, if a spill were to occur, a Spill Prevention Control and Countermeasure Plan (SPCCP) would be developed and implemented by the contractor to mitigate any spill that may impact surface water quality or groundwater quality. A Storm Water Pollution and Prevent Plan (SWPPP) would also be developed and implemented by the contractor to control the potential sediment input downstream. To ensure the performance of the SWPPP and comply with the CWA, Section 401 Water Quality Certification, a qualified individual would perform turbidity monitoring upstream for ambient in-situ conditions, and compare the ambient results to those collected 300 feet downstream of in-water work. The standard frequency of monitoring and turbidity limits as described in the Water Quality Certification, within Basin Plan criteria, would be followed.

The CV Water Board is also anticipated to grant Reclamation an additional 15 NTUs exceedance over ambient conditions during in-water construction, along with appropriate averaging periods that may be applied provided that beneficial uses would be fully protected, as approved by CV

Water Board staff. In addition to monitoring for turbidity, a qualified individual would sample for settleable material 300 feet downstream of the construction to ensure settleable material does not exceed limits established in the Construction General Permit. If turbidity or settleable material results are in violation of the Water Quality Certification, construction would stop until levels drop to below thresholds. In addition, the CV Water Board would be notified of any violation that occurs during in-water work. Further water quality mitigation measures are listed in *Mitigation Measures TURB-1* through *TURB-7*.

Construction also has the potential to disturb and release mercury downstream of the Project. As a result, Reclamation's Environmental Monitoring Branch conducted a one-time investigation of mercury levels in sediments of the pond that would make up part of the new alignment of Clear Creek. None of the samples resulted in the detection of total mercury above the Toxic Threshold Limit Concentration (TTLC) of 20 mg/kg (Reclamation, 2016). However, all of the samples tested positive for methylmercury above the RL (RL = 0.0503 ng/g dry) ranging from 0.078 to 5.540 ng/g and averaging 1.228 ng/g. While there is no TTLC for methylmercury, the CV Water Board has adopted thresholds for methylmercury for the Sacramento-San Joaquin Delta in the Basin Plan. These methylmercury thresholds apply to this Project because of the "Tributary Rule." The Tributary Rule states that upstream projects shall not contribute to downstream water quality impairments. The Basin Plan threshold for methylmercury is 0.08 mg/kg (CVRWQCB 2016). The highest concentration of methylmercury collected from the pond was 5.550 ng/g. 5.550 ng/g is equal to 0.00554 mg/kg, significantly less than the Basin Plan methylmercury threshold. In addition, the newly created backwater channel (see Figure 4), has the potential to produce methylmercury if the channel does not receive adequate turnover flows. It is anticipated that the backwater channel would have adequate amount of turnover as half of the backwater channel becomes inundated with flows above 500 cfs.

As a result, the Project would have a less than significant impact with mitigation incorporated on water quality thresholds and would not substantially degrade water quality.

Construction of Phase 3C of the Lower Clear Creek FSCRP would not deplete groundwater supplies or interfere with groundwater recharge resulting in groundwater loss. The Project would involve a small amount of standing water removal from the pond and backwater area. A standing water removal plan would be prepared with the CV Water Board and implemented during construction. Water would either be pumped to water trucks for onsite dust control, or to settling tanks where additional sediment would settle, and water infiltrates. The water removal would result in no onsite lost water, and no impact to groundwater.

The Project involves substantially altering the existing drainage pattern of lower Clear Creek. However, the new channel would be returning Clear Creek to its more natural historic drainage pattern and improve floodplain function in this part of lower Clear Creek. Construction of the new channel would be completed prior to gradually diverting Clear Creek flows into the new channel. This would minimize erosion potential. In addition, the Project would adhere to the Clean Water Act, Section 401 Water Quality Certification which requires monitoring of turbidity upstream and downstream of the Project during construction (*Mitigation Measures TURB-1* through *TURB-9*). The Project would be required to meet Basin Plan criteria for turbidity and settleable material; therefore, the Project would not substantially increase the rate or amount of

runoff that would result in flooding on or off-site or increased sedimentation. This impact is considered less than significant with mitigation incorporated.

3.2.8.2.1 Mitigation Measures: Turbidity and Erosion (TURB)

Measures to avoid and minimize the potential for adverse effects of turbidity or resuspension of sediment during instream work on the listed anadromous species shall include the following:

- TURB-1. The contractor would develop and implement a Storm Water Pollution Prevention Plan (SWPPP) in coordination with the CV Water Board and other regulatory agencies. The SWPPP would include measures to minimize erosion and storm water sediment runoff to Clear Creek, such as sediment containment devices, protection of construction spoils, and proper installation of diversion berms. This may include but is not limited to straw bales, straw wattles and silt fences around ground disturbance and stockpiles.
- TURB-2. During in-water work, turbidity would be monitored to remain within criteria established by the CV Water Board in the Clean Water Act, Section 401 Water Quality Certification obtained for the Project. Requirements may include, but not be limited to the following:
    - In-water work would occur during periods of low flow and no precipitation.
    - Monitoring turbidity levels so that activities do not cause turbidity increases in surface water to exceed:
        - Where natural turbidity is between 0 and 5 Nephelometric Turbidity Units (NTUs), increases shall not exceed 1 NTU;
        - Where natural turbidity is between 5 and 50 NTUs, increases shall not exceed 20 percent;
        - Where natural turbidity is between 50 and 100 NTUs, increases shall not exceed 10 NTUs; and
        - Where natural turbidity is greater than 100 NTUs, increases shall not exceed 10 percent.
    - An additional 15 NTUs exceedance over ambient conditions during in-water construction may be granted along with appropriate averaging periods that may be applied provided that beneficial uses would be fully protected, as approved by CV Water Board staff.
    - Activities would not cause settleable matter to exceed 0.1 mL/L in surface waters as measured in surface waters within approximately 300 feet downstream of the Project.
    - Reclamation would notify the CV Water Board immediately if the above criteria for turbidity, settleable matter or other water quality objectives are exceeded.
- TURB-3. A standing water removal plan would be prepared and implemented by the contractor, as approved by the CV Water Board. Removed water is anticipated to either be pumped to water trucks to be used for dust abatement throughout the Project site or discharged to a settling basin excavated on-site to allow infiltration or evaporation. The

settling basin would be located east of the existing pond, at least 50 feet away from the main Clear Creek channel, and pumping velocities would be adjusted to ensure discharge does not exceed infiltration or evaporation. A berm and silt fence would be constructed around the settling basin to ensure no runoff water discharges into waters of the U.S/State. The settling basin would be located within the footprint of the proposed channel alignment; therefore, settled sediments would eventually be excavated during channel creation, and the area may be covered with native material 2.5 to 5 inches in diameter.

- TURB-4. Mature riparian vegetation would be avoided as much as feasible. All areas of ground disturbance would be revegetated with native plant species. Vegetative cover reduces the potential for erosion and storm water sediment runoff.
- TURB-5. Construction of the new channel alignment would be isolated from the existing channel by first constructing diversion berms and turbidity curtains before working in-water and potentially causing turbidity in the creek.
- TURB-6. Either diversion berms would be lined with a plastic material or turbidity curtains would be used, as necessary, around in-water work areas to minimize turbidity such as for constructing the alcoves, temporary stream crossings, and the logjam.
- TURB-7. Temporary stream crossings would be constructed to have minimal effect on water quality and flows; they could consist of either a railroad flat car bridge or clean spawning gravel and cobble with culverts, or something similar. Following completion of restoration activities, any spawning gravel used for crossings would either be removed from the stream channel or spread evenly across the bottom of the channel.
- TURB-8. Removal of diversion berms and allowing of creek flows to occupy the new channel would occur gradually to minimize turbidity downstream.
- TURB-9. Disturbed areas not revegetated immediately after construction completion and that would be monitored under an adaptive management plan for revegetation would be stabilized with erosion control mats or similar devices until the next revegetation period. The next anticipated revegetation period is two springs after construction completion.

3.2.9 Noise

3.2.9.1 Affected Environment

The proposed Project is located adjacent to existing gravel processing plants where noise generation from heavy equipment is common. Vehicles traveling along Clear Creek Road near the Project area are the other source of noise. Noise levels near Clear Creek Road are estimated to be 65 decibels (dB) within 60 feet of the center of Clear Creek Road, and 60 dB within 126 feet of the centerline (average noise levels for a 24-hour period) (Shasta County 1998). As distance from Clear Creek Road increases, noise levels decrease. Intervening dense vegetation and topography between the road and Project area and the nearby residences and Project area also help mask noise levels.

Noise concerns are typically described in terms of effects on noise-sensitive land uses that are located within hearing range of a noise-producing activity. These noise-sensitive land uses are referred to as "sensitive receptors" and include residences, schools, hospitals, child-care facilities, and other similar land uses. Noise sources that are generally of concern include heavy equipment, gas or diesel motors, and conveyor systems. Sensitive receptors near the Project area include residences located immediately east, west, and south of the Project area. The nearest residence to the Project site is 220 feet from the construction area.

3.2.9.2 Environmental Consequences

The Shasta County General Plan establishes acceptable noise standards for non-transportation and transportation activities that generate noise. In rural areas where large lots exist, such as in the Project vicinity, construction equipment (e.g., conveyer belt, gravel sorter) and other non-transportation activities must be operated or implemented at least 100 feet from any residence. Transportation-related noise near a residence should would not exceed the following maximum allowable noise exposure levels: 60 decibels (dB) in the outdoor activity area and 45 dB inside the residence. The City of Redding General Plan has the same standards (City of Redding 2000). Noise generated from new projects, affected by or including non-transportation sources, should not exceed 55 dB during daytime hours (7 a.m. to 10 p.m.) or 50 dB during nighttime hours (10 p.m. to 7 a.m.) (Shasta County 1998). These noise thresholds are based on a 24-hour average. Average noise levels of construction equipment range from about 77 dB to 85 dB at 50 feet from the source (FHWA 2006).

Construction activities under the proposed action would temporarily increase noise levels in and near the Project area. Increased traffic associated with transporting heavy construction equipment and materials along local roads would temporarily increase transportation-related noise during construction. The maximum noise level at the nearest residence during construction is estimated to be 68.9 dBA, using the Roadway Construction Noise Model (FHWA 2006). This residence is about 220 feet northwest of the construction area. This would exceed the Shasta County General Plan Noise Element. The other four nearby residences are between about 1,400 feet to 2,300 feet away from the construction area. Noise levels at those residences would be less than 55 dB and not exceed the Shasta County General Plan Noise element. The impacts to the nearby residences would be mitigated to a less than significant level by implementing *Mitigation Measures NOISE-1* through *NOISE-5*.

3.2.9.2.1 Mitigation Measures: Noise (NOISE)

- NOISE-1. Construction activities would be limited to 7 a.m. to 7 p.m., Monday through Friday, with the option of working through Saturday.
- NOISE-2. The inhabitants of the residence near the construction area would be notified in advance about the proposed construction timing and duration.
- NOISE-3. Reclamation would require placement of all stationary noise-generating equipment as far away as feasibly possible from sensitive noise receptors or in an orientation minimizing noise impacts (e.g., behind existing barriers, storage piles, unused equipment).
- NOISE-4. All construction equipment would be properly maintained and equipped with noise-reduction intake and exhaust mufflers and engine shrouds, in accordance with

manufacturers' recommendations. Equipment engine shrouds would be closed during equipment operation.

- NOISE-5. All motorized construction equipment would be shut down when not in use to prevent idling.
- NOISE-6. The contractor would designate a "disturbance coordinator" who would be responsible for responding to any local complaints about construction noise. The disturbance coordinator would determine the cause of the noise complaint (e.g., starting too early, bad muffler, etc.) and would require that reasonable measures warranted to correct the problem be implemented. A flyer with the telephone number for the disturbance coordinator would be provided to nearby residences and posted at the construction administration area to allow for reporting of excessive noise.

3.2.10 Recreation

3.2.10.1 Affected Environment

The Clear Creek Greenway offers hiking, biking, horseback riding, wildlife viewing and swimming all within a short drive from Redding. This area covers over 5,000 acres of public land running from the mouth of the Sacramento River to the boundary of the Whiskeytown NRA, which is managed by the National Park Service. One of access points to the Greenway is the China Gardens Trailhead on Clear Creek Road which is adjacent to the Proposed Action area.

3.2.10.2 Environmental Consequences

Visitors to the Clear Creek area for fishing, birding, or hiking would experience a dead end on the China Gardens trailhead where it reaches Clear Creek and construction equipment would be mobilized. Visitors could also experience elevated noise levels caused by heavy machinery during construction, which would disrupt bird or wildlife viewing. Visitors could still use the China Gardens picnic tables and access other parts of lower Clear Creek around the Project site. However, they would have to cross a busy haul road, which would probably limit use during the week. There would not be construction on Sunday and visitors would be more likely to use picnic tables and adjacent Clear Creek. These impacts would be temporary over one four-month season of construction.

The proposed 0.5 mile recreational trail would enhance recreation in the area. Trail construction would only occur when soil moisture levels are optimal for adequate compaction (generally in the spring or during windows of dry weather during the winter). Work shall be suspended during precipitation events or when observations indicate that saturated soils exist to the extent that there is visible runoff or a potential for causing soil erosion. Vegetation would be removed approximately 10 feet vertically and 10-15 feet horizontally on each side of the alignment for trail construction. Trees would not be cut unless they pose a safety hazard. This vegetative clearing would be maintained for safety reasons (sight distance).

3.2.11 Transportation/Traffic

3.2.11.1 Affected Environment

Clear Creek Road is a two-lane rural arterial that provides access to rural communities and recreational areas west and south of the city of Redding. This road winds through the area with

limited passing opportunities and is designed for low speeds. Clear Creek Road is used by rural residents, recreationists, and service providers, and also used as a haul route for local mining companies transporting materials between commercial aggregate mines and nearby cities.

3.2.11.2 Environmental Consequences

Construction of the Project could cause a minor increase in truck traffic along Clear Creek Road. Several gravel operators, landscape companies, trucking companies, and other industrial uses are present along Clear Creek Road. Due to the industrial character of the road and its low use, minimal impacts to traffic are expected to occur. The large majority of material excavated in the Project site would be reused or stockpiled on-site, and a small amount of materials (boulders, logs, and riffle material) is anticipated to be imported, and wastes exported. The primary period of construction is anticipated to occur between June 1 and October 15. However, some road restoration and revegetation actions on-site may remain after October 15 and may resume and conclude within two years, under an adaptive management plan for revegetation efforts. Signs would be placed along the road, warning of large equipment entering/exiting Clear Creek Road (*Mitigation Measure HAZ-5*). A Traffic Control Plan would be developed (*Mitigation Measure TRAFFIC-1*).

3.2.11.2.1 Mitigation Measures: Traffic

TRAFFIC-1. A Traffic Control Plan would be developed when the final design is completed. The following general requirements shall be addressed in the traffic control plan:

- Meet requirements of Reclamation Safety and Health Standards Sections 9 and 20; and Manual on Uniform Traffic Control Devices, Part 6.
- Provide cones, delineators, concrete safety barriers, barricades, flasher lights, danger signals, signs, and other temporary traffic control devices, as required, to protect work and public safety on roads and waterways.
- Provide flaggers and guards as required to prevent accidents and damage or injury to passing traffic.
- Do not begin work along public or private roads until proper traffic control devices for warning, channeling, and protecting motorists are in place in accordance with reviewed traffic control plan.
- Maintain traffic flow on roads and waterways and conduct implementation operations to minimize obstruction and inconvenience to public traffic in accordance with reviewed plan.
- Protect roads closed to traffic with effective barricades and warning signs.
- Illuminate barricades and obstructions from sunset to sunrise.
- Remove traffic control devices on as-needed basis.

3.2.12 Tribal Cultural Resources

3.2.12.1 Affected Environment

See the *Prehistoric/Ethnographic Context* subheading in *Section 3.2.5.1, Affected Environment of the Cultural Resources* section above.

3.2.12.2 Environmental Consequences

Reclamation coordinated with the Redding Rancheria by sending a letter on November 14, 2016 requesting information regarding cultural resources, pursuant to 36 CFR § 800.3(f)(2), as well as comments or concerns regarding sacred sites on Federal land or access to sacred sites on Federal land under Executive Order 13007. Reclamation's contractor has been working with the Redding Rancheria and they have attended technical meetings. Reclamation also sent a letter to the Winnemum Wintu Tribe requesting information regarding cultural resources in the Project area, pursuant to 36 CFR § 800.4(a)(3). The Winnemum Wintu Tribe has not replied with interest in the Proposed Action Alternative. Therefore, No other resources of significance to a California Native American tribe were determined to be present.

3.2.13 Mandatory Findings of Significance

The purpose of the proposed Project is to restore and improve riparian habitat for salmonids in lower Clear Creek by creating a channel and floodplain that provides the necessary hydrology and connectivity. The analysis of this EA/IS shows that any potential biological habitats, or archaeological findings would be avoided and mitigated per the previous impact section discussions. There would be a less than significant impact with avoidance and mitigation incorporation

According to Council of Environmental Quality (CEQ) regulations for implementing the procedural provisions of NEPA, a cumulative impact is defined as *the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time* (40 CFR 1508.7).

A project which contributes to cumulative water quality impacts similar to the Proposed Action is the Lower Clear Creek Anadromous Fish Restoration & Management Project (LCCAFRM). Spawning gravel would be added to lower Clear Creek at 14 specific sites located between Whiskeytown Dam and the lower Clear Creek/Sacramento River confluence. Up to 15,000 tons of gravel are proposed to be injected at some of these sites in 2018. For analysis purposes, it is assumed that the three closest sites totaling up to 15,000 tons of spawning gravel injections would occur simultaneously with the Proposed Action, sometime between June 1 and September 30. Construction activities for both the Proposed Action and the LCCAFRM Project would be implemented in full compliance with the Water Quality Control Plan (Basin Plan) and in consultation with the Central Valley Regional Water Quality Control Board. Compliance with the standards, terms and conditions of the Water Quality Certification and the General Construction Activity Storm Water Permit issued by the CV Water Board would also be required for the LCCAFRM Project. If thresholds are exceeded during construction of both projects, activities are expected to halt until turbidity levels drop below the threshold. Therefore, turbidity standards and limits would be maintained for both projects and there would not be a cumulatively significant water quality impact.

See Section 3.2.3.2 (c) for cumulative effects for air quality.

See Section 3.2.7.2 for cumulative effects for GHG.

The Proposed Action Alternative has the potential to have adverse impacts on aesthetics, air quality, biological resources, geology and soils, hazards and hazardous materials, hydrology and water quality, and noise. However, mitigation measures AQ, VEG, BIRD, BAT, FISH, TURT, VELB, TURB, WOUS, HAZ, and NOISE would be implemented before, during, or after construction to prevent and reduce the impacts of the Proposed Action Alternative to below the level of significance.

3.3 Federal Disclosure Requirements

Department of the Interior Regulations, Executive Orders, and BLM and Reclamation guidelines require a discussion of the following items when preparing environmental documentation:

3.3.1 Indian Sacred Sites

Sacred sites are defined in Executive Order 13007 (May 24, 1996) as "any specific, discrete, narrowly delineated location on Federal land that is identified by an Indian tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site." No Indian Sacred Sites have been identified in the project area; therefore, the Proposed Action would not affect nor prohibit access to and ceremonial use of Indian sacred sites.

3.3.2 Indian Trust Assets

Indian Trust Assets (ITAs) are legal interests in assets that are held in trust by the United States for federally recognized Indian tribes or individuals. There are no Indian reservations, rancherias or allotments in the Project area. The nearest ITA is the Redding Rancheria, which is 0.33 miles to the east of the Project site. The Proposed Action would not affect ITAs (See Appendix F).

3.3.3 Environmental Justice

Executive Order 12898 requires each Federal agency to identify and address disproportionately high and adverse human health or environmental effects, including social and economic effects of its program, policies, and activities on minority populations and low-income populations. No significant changes in agricultural communities or practices would result from the Proposed Action. Therefore, the Proposed Action would not have disproportionately negative impacts on low-income or minority individuals or populations within the Project area.

3.3.4 Wilderness Characteristics

BLM Instruction Memorandum 2011-154 and Manuals 6310 and 6320 set out the BLM's approach to protecting wilderness characteristics on BLM public lands. This guidance acknowledges that wilderness is a resource that is part of BLM's multiple use mission, requires the BLM to keep a current inventory of wilderness characteristics, and directs the agency to consider protection of these values in land use planning decisions.

The BLM has not designated any lands as *Lands with Wilderness Characteristics (LWC)*, within the Redding Field Office, beyond those previously established as wilderness study areas. Lands that lack wilderness characteristics are those that do not meet the naturalness criterion (BLM

Manual 6310) because they have extensive surface disturbance and/or do not meet the size criterion of 5,000 acres or larger. Areas less than 5,000 acres may have wilderness characteristics and require protective actions if BLM determines that wilderness characteristics are present. No areas of this nature have been identified at this time.

An inventory of *Lands with Wilderness Characteristics* within the Redding Field Office was completed in December of 2016. Although some areas within the Redding Field Office were found to meet LWC criterion, the project area does not fall within an area that meets the criteria for LWC. Currently there are no land use decisions for the protection or management of these LWC. Therefore, this resource would not be discussed or analyzed in this document.

Section 4, Cumulative Impacts

For the purpose of this analysis, a cumulative imact is defined as an impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions.

The cumulative impacts section of the 1999 EA/IS describes relevant projects. To date, many of these projects have been implemented. The following projects are still considered timely and relevant:

- *Clear Creek Phase 3B Completetion*: Initial construction portions of the Lower Clear Creek Phase 3B Restoration project were completed in the late 2000's. Final floodplain modifications, wetland, and riparian replanting efforts for the site were to be funded by the State of California, but a portion of those tasks were not completed due to thethose final actions were a casualty of the California Bond Crisis (2008). The purpose of this charter is to finish restoration at the Phase 3B Restoration site, and realize the complete benefits of a fully constructed site. Additionally, in discussions regarding other Lower Clear Creek Floodway Restoration Project phases, the Army Corps of Engineers (Corps) has expressed concern regarding the balance of wetland and riparian loss and creation over the 20- year multiple phase period of the lower Clear Creek Floodway Restoration Program, of which Phase 3C is the final remaining piece (scheduled for 2019 construction and completion). The Corps wants a final accounting of the loss/creation balance. This Phase 3B Completion project provides an opportunity to address the Corps' concerns regarding the balance for this 20 year period that is soon coming to a close. This project is critical for meeting the commitments CVPIA has made to permitting agencies and the landowner (BLM). These commitments will also improve floodplain habitats for salmon and terrestrial species by creating additional floodplain habitat (riparian, wetland), reducing fragmentation between earlier revegetated section of the floodplain, and further augmenting spawning habitat.
- *Lower Clear Creek Gravel Augmentation*: Lower Clear Creek gravel augmentations are an ongoing project, benefitting multiple species including two ESA-listed fish species. These gravel augmentations supports maintain spawning habitat in streams, increase perennially inundated juvenile Chinook Salmon habitat (Sacramento River watershed upstream of the American R. confluence), and increase seasonally inundated juvenile Chinook Salmon habitat at 2-yr frequency (Sacramento River watershed upstream of the American R. confluence). The Clear Creek Restoration Program (3406(b)(12) evaluates the amount of spawning habitat using Potential Spawning Habitat Mapping (PSAM) and Spawning Habitat Use (SHU) data collected by USFWS. SHU maps and quantifies all habitat actually used or disturbed during spawning in reaches used by Fall-run Chinook Salmon. PSAM maps and quantifies areas that meet spawning habitat criteria of depth, velocity, and substrate for steelhead and three runs of Chinook Salmon (Spring-run, Fall-run, and Late Fall-run). Overall trends in spawning area can be detected with these methods as well as changes on reach and site-specific scales.
- *Stream Channel Restoration*: Two sections are currently under Clear Creek Technical Team evaluation for Stream Channel Restoration, the Reading Bar area and the Spawning

Curve area. The Reading Bar area is particularly important to Clear Creek's spring-run Chinook Salmon and steelhead, as it is the first location where the stream has the potential to spread out across a wide valley. Upstream of the Reading Bar area is a long, steep, narrow canyon that contains little rearing habitat for these species. Sediments transported through the canyon during high flows also have their first opportunity to drop out of suspension in the reading bar area, providing potential for important alluvial processes. This stream channel restoration project would improve sections of highly degraded stream channel within Lower Clear Creek for the benefit of multiple species including two ESA-listed anadromous fish species.

The Western Shasta Resource Conservation District has an active planting site that they are maintaining at the Clear Creek Phase 3B site. These plantings would enhance overall habitat in the Clear Creek area.

Land Use

Implementation of the proposed action, in combination with other related projects, would not have cumulative impact in terms of planning policies, nor would stream rehabilitation activities result in cumulative effects in terms of local or federal land use planning policies.

Geomorphology and Soils

No significant cumulative impacts associated with geologic hazards, geomorphic processes, or erosional processes are anticipated to occur as a result of implementation of the proposed action in combination with other related projects and landscape-level changes in the watershed. Large fires throughout the watershed continue to influence flow and sediment regimes within the watershed. Appropriate implementation of environmental commitments, project design features, and mitigation measures would reduce potential impact to less-than-significant level.

Hydrology and Flooding

Implementation of the proposed action in combination with other stream rehabilitation activities would have beneficial impacts on the hydrology and water storage capabilities, reducing negative impacts on flooding.

Water Quality

No significant cumulative impacts to water quality are anticipated to occur as result of implementation of the proposed action in combination with other related projects and watershed changes as a result of recent fires. Restoration activities have been and will continue to be staggered in a way that will allow sites to stabilize and revegetate. Individually, these activities would result in short-term, temporary effects on water quality. Appropriate implementation of environmental commitments, project design features, and mitigation measures would reduce potential impact to less-than-significant level.

Fishery Resources

No significant, adverse cumulative impacts to fisheries resources are anticipated to occur as a result of implementation of the proposed action. The effect of the proposed action, in conjunction with other projects and programs listed in Section 4, is expected to be beneficial in terms of the rehabilitation of habitat and fisheries resources. Appropriate implementation of environmental commitments, project design features, and mitigation measures would benefit rather than adversely affect the fishery resources of Clear Creek in the long term.

Vegetation, Wildlife, and Wetlands

No significant cumulative impacts to vegetation, wildlife, and wetlands are anticipated to occur as a result of implementation of the proposed action in combination with other related projects. The proposed action as designed, in conjunction with mitigation measures, would benefit rather than adversely affect vegetation, wildlife, and wetland in the long term, as would most of the other related projects and programs. Implementation of the proposed action would contribute to long-term ecological benefits in terms of vegetation, wildlife, and wetlands.

Recreation

No significant cumulative impacts to recreational resources are anticipated to occur as a result of implementation of the proposed action in combination with other related projects. Benefits to recreation values will be increased through the connected trail in the proposed action to previous actions.

Cultural Resources

No significant cumulative impacts to cultural resources are anticipated to occur as a result of implementation of the proposed action. The environmental commitments, project design features, and implementation of prescribed mitigation measures would adequately address impacts, including cumulative impacts.

Air Quality

No significant cumulative impacts to air quality are anticipated to occur as a result of implementation of the proposed action. The proposed action, in conjunction with other projects in the Clear Creek area, would contribute cumulatively to global climate change. Thus, the proposed action would contribute to an adverse cumulative contribution to global climate change. Appropriate implementation of environmental commitments, project design features, and mitigation measures would reduce potential impact to less-than-significant level.

Aesthetics and Visual Resources

No significant cumulative impacts to visual resources are anticipated to occur as a result of implementation of the proposed action. The proposed action as designed, in conjunction with environmental commitments, project design features, and mitigation measures, would benefit rather than adversely affect

Noise

No significant cumulative impacts related to noise are anticipated through implementation of the proposed action in combination with other projects

Transportation/Traffic Circulation

No significant cumulative impacts related to transportation/traffic circulation are anticipated through the implementation of the proposed action in combination with other related projects. Traffic increases would be localized and temporary

Section 5, Consultation and Coordination

Reclamation coordinated with the BLM Redding Office, the CV Water Board Redding Office, the CDFW Redding Office, the USFWS Red Bluff Office, the USACE Redding Office, the the State Historic Preservaton ID SHPO, Redding Rancheria, and Winnemem Wintu Tribe in the preparation of this EA/IS.

5.1 Endangered Species Act (16 USC § 1531 et seq.)

Section 7 of the ESA requires Federal agencies, in consultation with the Secretary of the Interior, to ensure that their actions do not jeopardize the continued existence of endangered or threatened species, or result in the destruction or adverse modification of the Critical Habitat of these species.

In June 2019, Reclamation will request USFWS concurrence on the Proposed Action's effects on western YBCU, and initiation of formal consultation on the Proposed Action's adverse effects on VELB. In June 2019, Reclamation will request initiation of formal consultation with NMFS on the Proposed Action's adverse effects on CV spring-run Chinook salmon and CV steelhead, and adverse modifications to CV spring-run Chinook salmon designated Critical Habitat. These requests will be put in Appendix G. Neither Reclamation nor BLM would finalize this EAand the Finding of No Significant Impact/Decision Record until completion of informal and formal consultation with USFWS and NMFS.

5.2 Magnuson-Stevens Fishery Conservation and Management Act (16 USC § 1801 et seq.)

Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act directs Federal agencies to consult with NMFS on all actions or proposed actions that may adversely affect EFH. This act defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." Adverse effect means any impact that reduces quality or quantity of EFH, and may include direct or indirect physical, chemical, or biological alteration of the waters or substrate and loss of (or injury to) benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality or quantity of EFH.

Reclamation determined that the Proposed Action would adversely affect EFH for Pacific salmon, and will request consultation on potential effects in the ESA, Section 7 formal consultation request to be sent to NMFS.

5.3 National Historic Preservation Act (54 USC § 306108)

Reclamation is consulting under Title 54 USC § 306108, commonly known as Section 106 of the National Historic Preservation Act (NHPA), which requires that federal agencies give the Advisory Council on Historic Preservation an opportunity to comment on the effects of an undertaking on historic properties, properties that are eligible for inclusion in the National Register. The 36 CFR Part 800 regulations implement Section 106 of the NHPA. Section 106 of the NHPA requires federal agencies to consider the effects of federal undertakings on historic properties, properties determined eligible for inclusion in the National Register.

Reclamation initiated consultation with the California State Historic Preservation Office by letter dated December 17, 2018 notifying the office of Reclamation's determination of no historic properties affected for the proposed project. The State Historic Preservation Office responded by letter dated January 14, 2019 with no objection to the defined APE, the evaluation of 16-NC51-01, and the determination of no historic properties affected for the proposed project. (Appendix H).

On November 14, 2016, Reclamation requested information regarding cultural resources from the Redding Rancheria, pursuant to 36 CFR § 800.3(f)(2), as well as comments or concerns regarding sacred sites on Federal land or access to sacred sites on Federal land under Executive Order 13007, and information regarding cultural resources from the Winnemem Wintu Tribe, pursuant to 36 CFR § 800.4(a)(3).

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Appendix A, History of the Lower Clear Creek Restoration Program

Major Pierson B. Reading discovered gold near the present-day Clear Creek Road Bridge in 1848. Following this historic discovery, the lower Clear Creek watershed was extensively altered, beginning with placer mining and dredger mining for gold through the 1940s. Floodplains and terraces along the corridor were "turned upside down" by the dredging process, removing all riparian and upland vegetation, and converting finer grained substrates to piles of cobbles unsuitable for revegetation. Commercial in-stream aggregate mining was prevalent in the lower reaches of Clear Creek through the mid-1980s. In-stream mining disrupted the natural channel and floodplain morphology and removed significant gravel deposits from the floodplains.

Additional ecological impacts occurred in the lower Clear Creek watershed when Whiskeytown Dam was completed in 1963 at river mile 18 as part of the Trinity River Division of the Central Valley Project. All coarse and fine sediment from the upper watershed is now trapped by the reservoir. The resulting coarse sediment deficit and reduction in fisheries habitat quality in lower Clear Creek has been well documented by various investigators (Coots 1971 as cited in McBain and Trush 2001, Graham Matthews and Associates (GMA 2006b). Effects of reduced sediment supply include: riffle coarsening, fossilization of alluvial features, loss of fine sediments available for overbank deposition and riparian re-generation and a reduction in the amount and quality of spawning gravels available for anadromous salmonids. These processes are critical components in creating and maintaining dynamic channel morphology, high quality salmonid habitat and riparian vegetation. Tributary sources of coarse sediment from the reach between Whiskeytown Dam and Paige Boulder Creek are extremely limited and contribute appreciable amounts of sediment only during highly infrequent random events (GMA 2006a, Rasmussen 2006, Steensen 1997). Colluvial sources (canyon walls) contribute virtually nothing within practical management timeframes, and such material is of limited ecological value until it is transported and rounded by fluvial processes over some distance.

In addition to the reduction of coarse sediment, recruitment of large woody debris (trees) has also been reduced in lower Clear Creek due to the lack of large flood events. Generally, flood events uproot trees and deposit them in, or near, the active channel as the stream subsides. Large woody debris provides habitat by adding to stream complexity that adult and juvenile salmonids use as refugia during migration.

In 1903, Saeltzer Dam, a 12 feet high water diversion dam, was constructed. Saeltzer Dam was built only about 7 miles from Clear Creek's confluence with the Sacramento River and acted as an anadromous fish migration barrier. Even with several attempts in the 1940's to construct a working fish ladder at Saeltzer Dam, fish passage remained a substantial problem and few salmon made it past this barrier and on to their spawning grounds located near the town of French Gulch. The construction of Whiskeytown Dam in 1963 established a permanent anadromous fish barrier.

Beginning in the early 1990s, multiple federal, state and local agencies and private stakeholder groups concerned about lower Clear Creek began to plan and implement watershed restoration activities to reverse the impacts of Whiskeytown Dam, Saeltzer Dam, placer and dredger gold mining, in-stream aggregate mining, road-related erosion and decades of fire suppression. The Restoration Team (a multi-agency team consisting of Reclamation, BLM, U.S. Fish and Wildlife Service (USFWS), U.S. Department of Agriculture Natural Resources Conservation Service, California Department of Fish and Wildlife (CDFW), California Department of Water Resources, California Central Valley Regional Water Quality Control Board, Western Shasta Resource Conservation District (WSRCD), and Point Blue Conservation Resources) was formed to serve as technical advisors for watershed restoration planning, design, implementation and monitoring. The Restoration Team has identified the need to combine several restoration and management actions on lower Clear Creek into one project that would allow managers the flexibility to make minor modifications or reprioritize restoration actions based on monitoring results and environmental changes over a 10-year period. Anadromous fisheries restoration and management efforts in the post-dam era require the flexibility to adopt alternative approaches, as needed, to ensure the success of the lower Clear Creek restoration efforts. This adaptive management approach would enable the Restoration Team to meet established restoration goals and objectives.

Reclamation and the USFWS began implementation of the Central Valley Project Improvement Act (CVPIA) Fish Restoration Program in 1995 by increasing stream flows. The increased flows resulted in a 5 fold increase in fall-run Chinook salmon escapement over the CVPIA baseline escapement period. The CVPIA removed Saeltzer Dam in 2000, which has led to the establishment of populations of threatened spring-run Chinook salmon and steelhead. The CVPIA has funded numerous successful restoration projects in Clear Creek including more than 175,000 tons of coarse sediment.

In 1998, the WSRCD and the lower Clear Creek Coordinated Resource Management Planning Group developed the lower Clear Creek Watershed Management Plan (WSRCD 1998), which identified numerous restoration and management actions to restore watershed ecosystem function and native anadromous fish populations within lower Clear Creek. Since that time, the Restoration Team and the lower Clear Creek Coordinated Resource Management Planning Group have implemented multiple resource inventories and restoration projects including dam removal, gravel augmentation, flow augmentation, channel and floodplain restoration, erosion control, fuels reduction and non-native vegetation control.

Appendix B, Proposed Action Technical Description

(Tables and Figures are in main body of this EA/IS unless otherwise specified)

B.1 Site Preparation

B.1.1 Vegetation Clearing and Grubbing

Vegetation grubbing, clearing, and trimming would occur to clear work areas prior to construction. Mature riparian trees and areas of continuous riparian woodland would be avoided to help maintain a healthy, connected riparian habitat. Mature riparian trees vary in size by species and are generally characterized as greater than 35 feet tall or at least six inches in diameter at breast height. A variety of grasses, shrubs, vines, willows, young riparian trees (no more than three inches in diameter at breast height), and pine trees would be cleared from project work areas. Suitable materials, including desirable willow cuttings and clumps and other downed materials as described in B.2.1 would be integrated into wood structures. Grubbing would occur six inches down into surficial material. Elderberry that is near the margins of work areas and access routes would be flagged and protected.

B.1.2 Implementation of Bird-Related Protection Measures

Prior to Project activities occurring during the bird nesting season (March 1 to July 31), nesting deterrence activities may be performed by qualified biologists. These activities would be performed in conjunction with nesting bird surveys and conform to all appropriate environmental regulations. Project activities, including vegetation removal, that occur in the migratory bird nesting season would be preceded by preconstruction surveys for active nests, no more than five days prior to activities. If active nests are observed, a minimum 250-foot avoidance buffer would be maintained and a biological monitor would monitor the nest for potential disturbance until nestlings fledge or the nesting season ends on July 31. There would be the flexibility to increase the size of the avoidance buffer according to Department of Fish and Wildlife guidelines. If it is determined that work needs to occur within the 250-foot avoidance buffer, a qualified biologist would determine, based on location and activity specifics, an appropriate minimum buffer zone. The nest and attending adults would then be monitored during Project activities within the 250-foot buffer. If at any time the qualified biologist determines that Project activities may have an adverse effect on nest-success or bird health, Project activities would immediately halt and the 250-foot buffer would be re-established. Similar preconstruction surveys would also be implemented as necessary for trees suspected to host active maternity roosts for special-status bat species prior to tree removal.

B.1.3 In-Water Activity Isolation

In-water activities are those that occur in the portion of the channel where water is flowing. These activities would be isolated from flowing waters of Clear Creek. Isolation of activities would be accomplished by constructing diversion berms and turbidity curtains around the activity areas, consisting of k-rails covered with a plastic liner, or berms of spawning gravel with a turbidity curtain.

Upon completion of an in-water activity, the turbidity curtains and diversion berms isolating the activity from the flowing waters of Clear Creek would be removed gradually starting with the downstream end, providing time for inundation, and then, followed by inundation from the upstream end. Turbidity discharges resulting from project activities would be monitored to ensure that turbidity (measured in NTU) does not exceed Central Valley Regional Water Quality Control Board 401 general water quality certification.

B.1.4 Standing Water Removal and Discharge

Flows during the construction season are typically 150 cfs. The existing pond and adjacent wetland areas on the north side of the project site disconnect from the Clear Creek channel between 500 and 1,000 cfs. Thus, the upstream end of the pond and wetland areas are expected to be naturally disconnected from the main channel. The downstream end of the pond may stay connected to Clear Creek channel longer due to runoff from the north valley wall and elevated groundwater levels. The downstream end of the pond would be isolated from the flowing water of Clear Creek using techniques described in the previous section. When these features are isolated from Clear Creek, the existing pond is approximately nine feet deep, 950 feet in length and 120 feet wide and wetland areas below the Ordinary High Water Mark may contain a few inches to a foot of water.

Once the pond and wetlands are fully isolated from the flows of Clear Creek and fish, turtle, and other aquatic wildlife rescues are complete, the contractor may pump standing water from the wetlands and pond with a 3- to 6-inch pipe through a filter. Water would be pumped to water trucks to be used for dust abatement onsite, and the remaining amount would be slowly pumped into Clear Creek, not to exceed turbidity requirements. Plant parts and seed pods from the aquatic invasive species *Ludwigia hexapetala* would be removed by the filter before any water is returned to the Clear Creek. Water and soil contaminated with plant parts and seed pods would be removed to the upland areas of the project site.

B.1.5 Turtle Fish, and Amphibian Relocation

Prior to standing water removal, the pond and wetlands would be surveyed by a qualified biologist to relocate northwestern pond turtle (*Ictenymys marmorata*) and any native fish (salmonids, Sacramento Sucker, Riffle Sculpin, Western Brook Lamprey, etc.) that may be present. Any turtles that are discovered would be captured and moved to suitable habitat areas outside the construction area the same day they are captured and as quickly as possible to reduce stress on the animal.

Fish rescue and relocation operations would occur after in-water work areas are isolated from the flowing channel and prior to pumping of ponded water or construction activities. Fish biologists would implement fish rescue operations under an existing federal Endangered Species Act (ESA) Section 10 permit for Clear Creek Fish Restoration Program Monitoring, using seining, or electrofishing necessary. Use of seine nets may not be feasible in the wetland areas due to dense vegetation, and electrofishing may be necessary. Initially, seining would be the preferred procedure. However, if electrofishing is deemed appropriate and necessary for the efficient and successful removal of fish, the National Marine Fisheries Service (NMFS) electrofishing guidelines (NMFS 2000) would be followed.

The fish rescue team would be comprised of qualified fishery biologists with professional experience using seines and electrofishing equipment. Up to two fish rescue teams of two to four persons would be used to facilitate efficient fish removal, reduce handling time, lower physiological stress, and reduce potential mortality rates. If electrofishing were employed, a minimum of three passes through each stranding location would be conducted until all fish are removed. Captured juvenile fish would be placed in five-gallon buckets and segregated by size classes throughout captivity. At the end of each pass, captured fish would be transferred into buckets with aerated water or into in-river holding tanks (e.g., buckets with small holes allowing freshwater infiltration). After fish are fully recovered, they would be released to the main flowing lower Clear Creek channel. All captured adult fish would be placed in appropriately-sized containers to be counted, measured, and recorded by species at a minimum if they appear to be stressed. The number of Chinook salmon and steelhead captured, and the number of fish accidentally killed prior to release, would be reported to NMFS and CDFW.

Captured non-native, invasive species, such as bass, bullfrogs, and red-eared slider turtles, would be removed. This would benefit salmonids and pond turtles due to a reduction in competition and predators. All other species would be immediately transported and released to the main flowing Clear Creek channel after recording.

B.2 Contractor Use Areas

Contractor use areas include existing and new access roads for site access, as well as locations for equipment and materials storage during construction, and tree harvest. References in bold listed below refer to specific activity areas labeled on Figure 2.

B.2.1 Tree Harvest

A total of 19 pine trees were selected for harvest in Contractor Use areas by BLM staff in coordination with Reclamation for use in the restoration project. These trees are distributed in **C-24, C-25, C-27, C-28, and C-30**. Tree harvest includes removal of the entire tree, including the rootwad. After each rootwad is removed, the area would be filled in and packed down. Additionally, trees would be harvested off-site through agreements with federal land management agencies and private landowners.

Downed trees due to storms in February 2019 may also be used to including use of downed woody debris within the project site. Use of these trees and vegetation would only be used if it would not create additional resource damage to source and relocate.

B.2.2 Access

Access to the project site from Clear Creek Road is located at an existing unpaved access point that connects to the China Garden trail, west of the public entrance (Figure 2). Access throughout the work areas in the creek and floodplain would be limited to access routes and contractor use areas shown in Figure 2. Project access areas may also be cleared of vegetation and would be re-graded as part of the floodplain earthwork activities and subsequently revegetated to the same or better site conditions following construction. Reclamation of temporary roads would at a minimum include decompacting, seeding, and mulching these areas. Existing roads are approximately 12 feet wide and may need to be reinforced or widened up to 30 feet in selected areas to be used as haul roads. Most access roads would remain unchanged in width except in

areas where there would be congested truck hauling activities. These areas would be widened as needed (up to 30 feet) or strategic pullout areas would be developed for passing purposes. These areas would be chosen to limit mature vegetation removal as much as possible but some mature trees may need to be removed. At a minimum, access roads would be graded to match natural conditions, seeded with native seeds, and mulched following construction. Selected portions of access roads may be planted to minimize forest fragmentation.

C-23, C-30 and C-31 are existing access roads that would be used in the project site. These roads may require some grading, brushing, or clearing to achieve a 30-ft haul road width.

C-17, C-19, and C-22 are new temporary access roads that would be constructed to support project implementation. These temporary access roads would be completely rehabilitated following project implementation and maintenance. Reclamation of temporary roads would, at a minimum, include decompacting, seeding using native seeds, and mulching.

C-50 is a stream crossing that would become active following channel re-alignment. Prior to channel re-alignment, this area would simply be an extension of the existing access roads (C31 and C23). Following channel re-alignment, a limited number of crossings would occur at the stream crossing through the end of the construction period. The crossings would consist of either a railcar bed or constructed fill of gravel and cobble with culverts. This crossing would be used during the 10-year monitoring and maintenance period. However, if the monitoring results indicate a need for site modification with heavy equipment, this crossing may need to be reactivated. The location of the crossing may shift slightly due to channel adjustments and site evolution.

B.2.3 Staging, Stockpiling, and Materials Processing

C-1 to C-16, C-24 to C-29 would be used for short-term staging and materials processing. With the exception of the specified tree removal, these areas would not be cleared or graded, nor would materials be stockpiled for more than a few days. None of the fill would be stockpiled in water. Trees and other high-quality vegetation within the footprint of these areas would be preserved unless specifically stated. Selected portions of contractor use areas may be planted to minimize forest fragmentation. Work trailers, restrooms, equipment parking, etc. would be concentrated in contractor use areas near U-1, U-2 and U-3.

U-1, U-2, or U-3 would be utilized as staging, stockpiling, and materials processing as well as permanent spoil sites. At a minimum, disturbed areas would be decompacted, seeded using native seeds and mulched following construction. Selected portions of spoils areas may be planted to minimize forest fragmentation.

B.3 Upland Work Areas

U-1, U-2, and U-3 are upland areas that would be used to spoil excess material. At a minimum, disturbed areas would be decompacted, mulched and seeded with native seeds following construction. Selected portions of spoils areas may be planted to minimize forest fragmentation.

B.4 In-Channel Work Areas

The main river channel would be realigned from the current position that flows along the south valley wall. The new channel alignment would diverges from the existing alignment at the IC-1 control structure, which would blocks flow from entering the existing channel. The channel would crosses the valley floor from river right to left at the upstream end of the project site, then would crosses the valley floor to re-join the existing alignment at the downstream end of the project site (Figure 2).

The design channel alignment roughly follows the historic channel alignment shown in historic aerial photographs. The upstream flow split would traverses through a wetland area and has would have low banks relative to other portions of the channel. The dominant flow path through the second flow split would be on river left. The split channels would converge and flow back to the existing channel through an existing high flow channel at the outlet of the existing pond.

The dimensions and form of the river channel would vary along its length. The width of the main channel would typically be 80 feet in areas where flow splits do not occur. Bank height would vary depending on local topography, and would typically ranges from three to five feet. The design included various wood structures and elements. All of these elements would be anchored and follow the design protocol in the project specifications.

IC-0 and IC-14 are reaches of the existing channel where habitat would be enhanced by the addition of large wood. The wood is expected to locally alter flow patterns and create velocity refuge and cover to enhance habitat. Habitat wood would be placed as clusters, anchored, and field fit to take advantage of integration with existing trees and wood where possible.

IC-1 is a control feature (e.g., channel plug) constructed in the existing channel to discourage the channel from reoccupying the existing channel alignment following construction. IC-1 consists of large rock, earthen materials, and wood, and would be designed to be comparable to a landslide blocking a channel. The architecture and specific gradations of earthen materials would be dominated by large boulders at the base of the structure and fining upward. The structure is designed to be somewhat permeable, allowing approximately 3 cfs of water to pass through the structure to the downstream pond complex. The western portion of the structure would form the right bank and floodplain of the new channel and would be inundated at approximately 2,000 cfs. The eastern portion of the control structure would rises to a higher elevation and acts as an overflow channel into the pond complex during high flows. The overflow channel is would be activated when flows exceed the 2 to 5-year flood. IC-1 would ties together floodplain, wetland, and pond areas, and thus has several different planting types to transition between these environments, including: willow trenches, riparian plantings, sedge wetland plantings, and pond margin plantings as detailed in section B7.

IC-2, IC-4, IC-5, IC-9, IC-10, and IC-11 constitute the design main channel alignment. The channel is would be formed in IC-2, IC-4, IC-5, and IC-10 predominately by excavation of the existing floodplain surface. The channel is would be formed through IC-9 (currently a pond), by filling the pond with stream gravels. IC-11 would be an existing high flow channel that is converted to the main channel through selective cut and fill. Channel margin plantings, selective riparian infill and willow trenches would occur in the channel.

Wood generated on-site and/or imported would be installed throughout the proposed channel alignment where appropriate to provide additional rearing habitat for salmonid fry and juveniles. Habitat wood would be placed as clusters to be determined in the field to take advantage of integration with existing trees and wood where possible. Habitat wood would be partially buried with existing material, but is expected to be mobile, similar to wood naturally recruited to the river.

IC-6, IC-7, and IC-8 would be wood jams located within the main channel alignment. The fill is would be composed of earthen materials and large wood. Earthen materials are expected to be 3 to 6 inch cobbles. The source would be weed-free and onsite, offsite or both. Wood structures are designed at the upstream end of flow splits to steer flows at a range of discharges and at the upstream end of two bars to promote bar formation.

IC-12 would be a pond control structure that elevates water levels in the design pond complex (W-2 to W-6 described below). The fill is would be placed to gradually raise the channel bed in the upstream direction (~2% slope) until the channel bed is would be raised by approximately three feet. The fill is would be composed of a combination of stream gravels, large rock, and wood and is would be shaped similar to a mimic natural channel. Low flows would be confined to a low flow channel that would be sealed with fine sediments to limit subsurface leakage through the structure and to maintain flow connectivity and fish passage.

IC-13 would be a flow split located near the downstream end of the project site. The feature is would be a combination of large wood and floodplain material fill. This feature would increase the frequency of inundation of adjacent floodplain surfaces at flows greater than 200 cfs, increasing edge habitat as a result. IC-13 would transition into the R-3 surface to recruit cottonwoods.

B.5 Floodplain Work Areas

R-1, R-2, and R-3 are would be floodplain work areas located in the downstream portion of the project site. The floodplains are would be created by excavating material and adding large wood to create variable floodplain surfaces that would be inundated between 200 and 1,000 cfs. The floodplains would increase habitat complexity, provide rearing habitat, and create velocity refugia for salmonids and other aquatic species across a broad range of flows that frequently occur at the project site. Inundation of the floodplains at the target flow of 500 cfs would also coincide with cottonwood seed dispersal which would promote desirable cottonwood recruitment.

B.6 Wetland Work Areas

W-1 is a seasonal wetland complex. The wetland is would be created by primarily excavating floodplain materials and adding large wood. The seasonal wetland complex would have a variable depth up to approximately 3 feet. Four distinct wetland depressions would be constructed within the larger wetland complex. The wetlands are expected to fill as groundwater levels rise in the winter months and would receive surface flow as adjacent floodplains are inundated during high flows (> 2,000 cfs). The wetlands would partially drain through an

existing high flow channel that re-enters the main river channel. Water remaining in the wetland depressions is would be expected to infiltrate into the subsurface and completely dry during the summer months.

The seasonal wetland areas are would be expected to persist with a low rate of infilling over time. The primary mechanism for infilling the seasonal wetlands is would be sediment laden water during high flow events and accumulating organic debris. The surface connection between the river and wetland is would be relatively infrequent and short duration; furthermore, flow management at the dam typically desyncs dam releases from storm generated runoff that typically carries a higher sediment load. In addition, water entering the wetland would already have dropped much of the sediment load as it crosses the vegetated floodplain.

W-2 thru W-6 and **IC-12** form a pond complex. IC-12, W-4 and W-5 are would be the beaver dam analogue features that control water levels when flows are less than the 2- to 5-year floods and water enters the pond complex via subsurface flow. W-2 and W-3 are would be the portions of the pond that are excavated to expand the pond area and depth, while W-6 is would be the portion of the existing channel that is would be converted to pond and further enhanced by the addition of wood debris. Water temperatures in the wetland complex are expected to stratify, with cooler temperatures maintained lower in the pond, and warmer temperatures near the surface and shallow edges.

W-2 and W-3 are new wetland habitats resulting from the channel re-alignment. Water levels within these features are controlled by a combination of beaver dam analogues (BDAs, described below) and a pond control feature (IC-12). The wetland areas are primarily formed by excavation of the adjacent terrace and localized lowering of existing floodplains. The portion of the channel within W-3 that is between BDA's (W-4 and W-5) would be excavated up to 3 feet to increase the pond depth.

W-4 and W-5 are BDAs that are composed of earthen material, willow brush, and wood. These structures increase water levels incrementally in the upstream direction. The base of the structures would limit subsurface water movement to ensure an adequate amount of surface water is maintained over the woody portion of the structure to maintain fish passage between ponds and to the main channel. Subsurface flow through the upstream control structure (IC-1) and across the valley bottom is would be expected to maintain water levels throughout the summer to support year-round rearing of salmonids and passage over the earthen structures.

The upstream control structure (IC-1) would be periodically overtopped (2- to 5-year flow) which would increase velocities through the pond. The woody portion of the BDAs may be damaged during overtopping flows and require maintenance if not maintained by resident beaver. If the woody portions of the BDAs are damaged by high flows, and not re-built by either beaver or people, the earthen base of the BDAs would retain water in the ponds and fish passage between the ponds. However, water levels would be lower, and a smaller area of the pond would have adequate depth to meet temperature targets.

The pond complex is would be expected to persist with a low rate of infilling over time. The primary mechanism for infilling the pond complex is would be sediment laden water during high flow events and accumulating organic debris. The surface connection between the river and pond

complex occurs during storm flows and is relatively infrequent and short duration. In addition, water that backwaters into the pond during storm events would likely have deposited some of the suspended sediment in the alcove downstream of the pond control structure.

B.7 Riparian Restoration and Revegetation Work Areas

Planting of native riparian and wetland plant species throughout the project site would be expected to increase habitat for aquatic species, birds, and other wildlife. Revegetation and planting efforts would start during construction and may continue until early spring the following year. The revegetation would be maintained for 3–5 years and monitored for 10 years following implementation to ensure long-term success. The revegetation design includes wetland, and emergent planting, riparian planting, transition and upland planting and seeding and mulching (See Table 1 and Figure 1 below). The revegetation designs have been developed to compliment the topographic design.

Revegetation varies by revegetation zones and existing conditions within the project area. Low elevation surfaces consisting of pond margins, seasonal wetlands, and channel margins are to be planted at a high density with herbaceous wetland plants. Constructed benches and pond slopes are to be revegetated as emergent and riparian zones and are specifically targeted for a combination of woody and herbaceous plants (See Table 1 and Figure 1 below). Disturbed upland and contractor use areas would be decompacted, seeded with native grass and forbs, and mulched with certified weed free straw.

Non-native species have been identified for management within the project area and may occur in large patches (e.g., water primrose, yellow star thistle, tree of heaven, stinkwort) or as isolated individuals (e.g., fig, tamarisk). Whenever possible non-native invasive plants (NIS plants) would be treated using appropriate methods reflecting current BMP's for each NIS plant species encountered during construction. Weekly monitoring by BLM staff would occur to maintain populations of stinkwort. Where possible, these populations would be avoided by project activities as the species would increase with disturbance. Monitoring described in the MMRP would be used to identify specific actions that could inhibit the establishment and further spread of NIS plants post project. For 10 years post project construction, NIS plant populations would be monitored and treated following BLM Redding Field Office standard procedures (see DOI-BLM-CA-N060-2016-0021-EA "Integrated Vegetation Management") if needed as part of revegetation maintenance within the first three years after construction, or as directed under the MMRP.

Ground surface height elevations above the 100 cfs water surface is was used as a basis in the model to delineate vegetation zones. Riparian and emergent plantings would be a combination of sedges/grasses, forbs, vines, shrubs, and trees, planted as cuttings, bareroot, or nursery containers. Herbaceous plants would be planted as bare root plugs, nursery containers, or via broadcast seeding. Whenever feasible, plant material would be sourced from nurseries or sources that are close to the project site which follow Phytophthora best management practices, and are part of the voluntary State Nursery Certification program.

Supplemental watering for riparian areas would come from Clear Creek. Supplemental watering for any upland planting would come from municipal water supplies. There are two types of

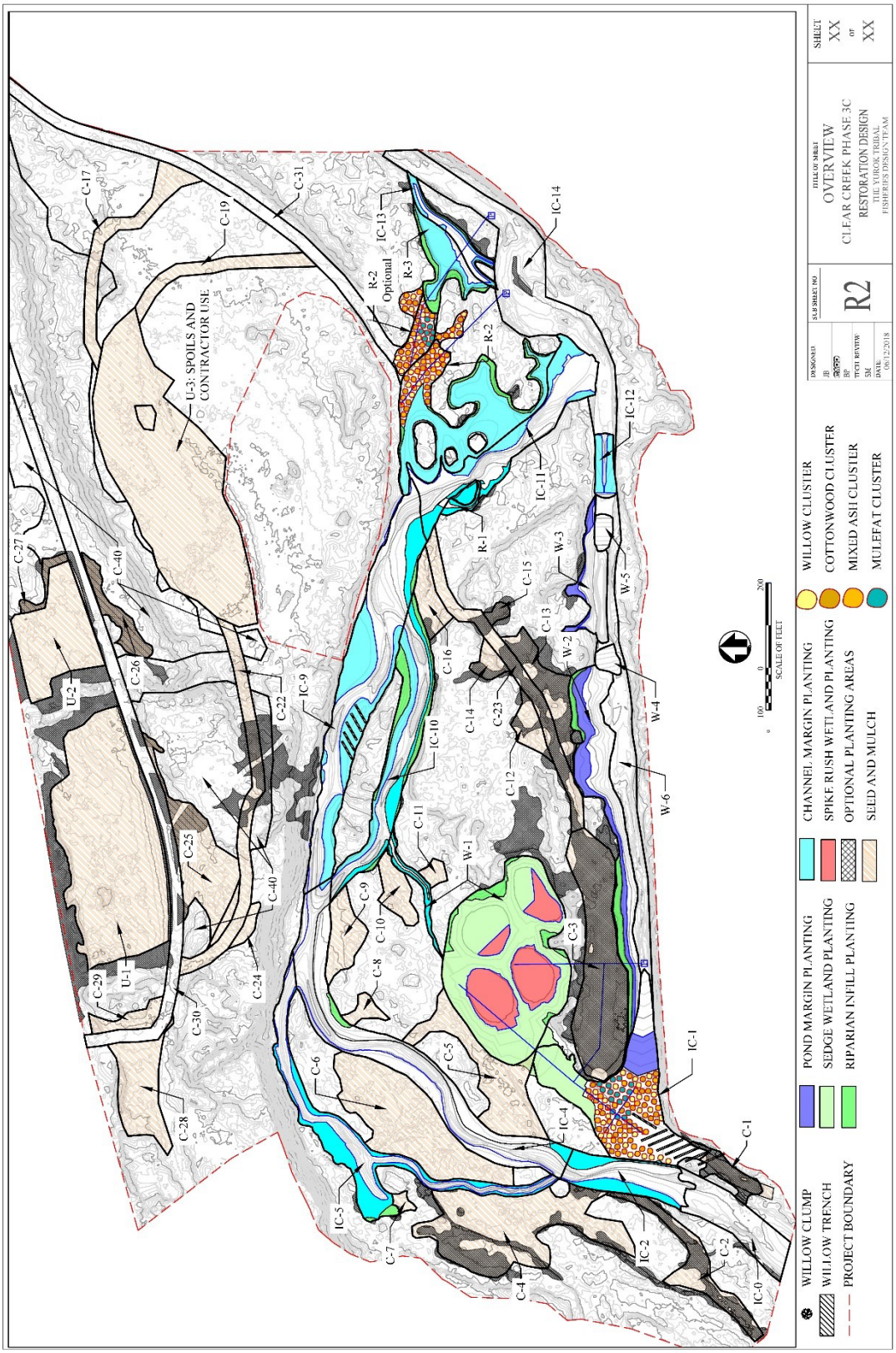
overhead sprinkler systems proposed, an in-place overhead sprinkler system and a mobile system that would be used during construction. The combination of these two systems is required to meet all riparian area irrigation needs. Each system is composed of the following components in series: water source connected by flexible hose with debris basket and fish screen, water pump, flexible hose to run between pump, and 4-inch Schedule 40 PVC pipe as the primary line, 4-inch T-fitting with 3-ft riser supported by a t-post, fittings to reduce riser diameter from a 4-inch to 1.5-inch, a 1.5-inch quick coupling valve and key to allow easy removal of sprinkler heads between waterings, and lastly, 1.5-inch impact sprinkler heads. All pumps would be accompanied by a fluid capture tray to prevent spill and contamination of the site. The intake hose for each pump will be will be connected to screened intake baskets placed in Clear Creek. Screened intake baskets on pumps will meet both the requirements from the California Salmonid Stream Habitat Restoration Manual (Flosi et al. 2010) and the Water Drafting Specifications (NMFS 2001) to avoid impacts to juvenile salmonids.

A Revegetation and Monitoring and Maintenance Plan would be prepared by Reclamation and BLM which would be appended to the Final EA/IS. Revegetation performance would be evaluated annually for the first three years, then every other year for a period of ten years. Areas with low plant survival could be replanted as directed under the MMRP.

A separate Revegetation Maintenance Plan (RMP) will prepared by Reclamation and BLM to address short term revegetation maintenance and irrigation. At a minimum, maintenance would include watering revegetated areas as conditions dictate, replanting if desired vegetation conditions are not obtained following monitoring, and removing any infrastructure left in place related to the revegetation efforts (such as drip line irrigation tubing and, deer protectors, etc.). The priorities for revegetation and habitat restoration are preserving existing mature vegetation and continuous riparian habitat areas of riparian habitat, providing water to riparian areas, planting large species of native trees that grow quickly, and revegetating with native species.

Table 1. Revegetation zones and acreage summary.

Planting Zone	Acres
Channel margin	3.62
Pond Margin	0.52
Sedge wetland	1.82
Spikerush wetland	0.74
Mesic	3.19
Total	**9.89**



Appendix B Figure 1. Riparian Design Overview

B.8 Exclusion Area

A large exclusion area between IC-9, R-2, and U-3 would be restricted from equipment access and construction-related impacts to protect sensitive resources. No work or equipment access would occur within the designated exclusion area.

B.9 Recreational Trail and Interpretive Panels

A footpath recreational trail would be constructed through the project area that would connect into the existing non-motorized trail system in the Clear Creek Greenway. Approximately 0.5 miles of new trail would be constructed along the northern and western edge of the new channel on the bluffs above. (Figure 2). New trail construction would be built using a small, rubber tracked mini-excavator and hand tools. Chainsaws would be used to cut brush along the trail alignment, which would be scattered or piled, as conditions dictate. A vibra-plate would be used to compact rolling dips and berms along the alignment. The trail would be approximately 3 feet wide with a finished trail tread of 18 inches, made of native surface material. Trail construction would only occur when soil moisture levels are optimal for adequate compaction (generally in the spring or during windows of dry weather during the winter). Work shall be suspended during precipitation events or when observations indicate that saturated soils exist to the extent that there is visible runoff or a potential for causing soil erosion. Vegetation would be removed approximately 10 feet vertically and 10–15 feet horizontally on each side of the alignment for trail construction. Trees would not be cut unless they pose a safety hazard. This vegetative clearing would be maintained for safety reasons (sight distance). Scattered brush would be in contact with the ground to promote rapid decomposition. Material scattered would not be put into stream courses or along stream banks. The finished trail tread would be maintained as needed to prevent erosion and rutting.

Three to five interpretative panels would be installed in the project area to provide information to the public about the restoration and the natural and cultural resources of the area. Panels would be placed along trails, trailheads, parking lots, or picnic areas.

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Appendix C, Clear Creek Phase 3C Preliminary Design Alternatives

C.1 Preliminary Channel Designs for Clear Creek Phase 3C Restoration

Reclamation's Technical Service Center design team is providing the Clear Creek Technical Advisory Group (TAG) with 6 alternatives to discuss for eventual selection of a single alternative. It is important to note that a single alignment resulting from some combination of multiple alternatives presented here is possible, even anticipated. For example, the bioengineered bank from Alternative #4 could be combined with the alignment from Alternative #1. Similarly, the riffle and pool locations from Alternative #2 could be combined with the alignment from Alternative #3. Generally, the primary design decisions include: channel alignment and planform, type of upstream plug of existing channel, type and location of riffles and/or grade control (deformable or not), and what to do with the existing "chute" channel. The channel alignment and planform is the most important decision at this time in order to continue to meet the design schedule. In order to avoid delays it will be important that we come away from this meeting (or shortly thereafter) with a single alignment, upon which we all agree.

The six preliminary designs are included as attachments as well as three other relevant figures. All volumes associated with this preliminary analysis are estimates, only intended to provide an approximation comparing one alternative to the next. One-dimensional (1-D) modeling has been performed on a few select options to provide some information on excavation volumes and channel dimensions. The cross sections and channel invert elevations will not likely remain the same as shown here, rather will be adapted to meet objectives.

C.2 Project Objectives

The primary objective of the project is to improve the aquatic habitat in this reach of Clear Creek with an emphasis on rearing for fry and juvenile salmonids under the CVPIA. Additional objectives include: improvement to riparian and upland vegetation for the benefit of terrestrial habitat; protect the existing restoration efforts from erosion; integrate with other existing and planned restoration work on Clear Creek; and reduce the potential for mercury methylation. Flows are expected to go out of bank in Phase 3C at less than 3,000 cfs, which improves floodplain function and reduces the risk of channel incision. Moderate change to channel morphology as the restoration matures is anticipated.

It is understood that there is no desire to design a channel in which the clay hardpan is part of the bed. There are multiple designs that propose some portion of the channel within the mapped clay hardpan area (McBain and Trush 2000). There are reasons for this that will be explained later. The scope of the current floodplain soil pit work includes a determination of the depth of the clay in the Phase 3C reach. It may be possible to excavate through a shallow clay lens.

It is also understood that the elimination of large woody species should be minimized. This will be part of the overall decision for the TAG and design group when selecting a given channel alignment. A possible mitigation for the removal of vegetation would be to construct a wetland in the downstream portion of the Phase 3B reach. Two potential wetland options are included and discussed later.

We realize that wood placements are an important component of the habitat. The TSC will be providing a 30% design for the restoration. Together, the TAG and the TSC can make general recommendations on the type, function, and location of wood placements for habitat. Or this can be left to the design-build contractor with input from the TAG and design team.

In order to provide channel continuity for all alignments except #5, the existing beaver dam downstream of the pond will have to be removed.

The placement of riffles in the final design will depend on specific needs regarding hydraulics. The riffles shown in the attached diagrams are not necessarily placed in locations that will remain in the final design. Riffles will be utilized in the final design for controlling the energy grade, providing a diversity of depth and velocity, and perhaps a local supply of gravel.

Based on preliminary 1-D modeling results the transition from the existing channel to the new channel will require an increase in grade. The modeling indicated that if a simple channel is started at the upstream connection at the current bed elevation the channel will be too deep throughout the alignment to the pond. Correcting for this will require work at the upstream end to bring the channel invert elevation up. This is visible in the sample profiles shown for select designs.

C.3 Schedule

Upon the selection of a single design and the delivery of all requested data the TSC will begin the second phase of the design. The surface will be generated based on the chosen design, followed by hydraulic and sediment transport modeling. At a reasonable point in this process (currently scheduled for June) the TSC will brief the TAG and ask for feedback on the design. It is expected that we will have velocity and depth maps to share at this point. We will primarily be seeking feedback regarding the aquatic habitat as it relates to depth and velocity values throughout the reach as well as the frequency of floodplain interaction. This process needs to begin April 1st in order to maintain the design schedule the TSC has put forth.

C.4 Design #1

This design includes two islands and a side channel adjacent to the existing pond. The pond is slated to remain as a pool in this design although it may evolve as the channel matures. The side channel adjacent to the pond is over top of a mapped clay layer. There is a soil pit sited in this alignment. The thickness of the clay layer has been requested. It may be reasonable to excavate the clay throughout this alignment depending on the layer thickness and ease of excavation. At

the downstream end of the reach from the channel splits. The northeastern channel runs through a mapped clay area. The same logic will be used here as was explained for the side channel at the pond.

A log jam on river right will protect the right bank and discourage an avulsion back into the existing channel. The floodplain between the existing channel and the pond, frequently active with surface flow, is to be filled in with topsoil (if available) and planted to discourage future channel formation during overbank events.

The upstream half of the existing channel (~1,200 ft) will be filled. The downstream half of the existing channel can be utilized for backwater and pond habitat. There is a porous dam between the proposed ponds (widened channel), the intent of which is to trap groundwater in what would be an upper pond. The channel downstream of the porous dam would have a surface connection to the downstream end of the reach, allowing varying water depths throughout the year. The cut areas shown in the diagram indicate a widening of the existing channel in areas that don't have significant vegetation.

The estimated floodplain fill volume for the flow path between the existing channel and the pond is about 4,000 cubic yards. This does not include the fill volume to plug the existing channel.

C.5 Design #2

This design completely avoids the mapped areas of clay. On river left there's an alcove in the design taking advantage of a low elevation area on the floodplain which can serve as zero or near-zero velocity habitat. There are two islands in this alignment, increasing shoreline length and diversity in depth/velocity. The pond is slated to remain as a pool in this design although it may evolve as the channel matures. The channel is single thread downstream of the pond.

A log jam on river right will protect the right bank and discourage an avulsion back into the existing channel. The floodplain between the existing channel and the pond, frequently active with surface flow, is to be filled in with topsoil (if available) and planted to discourage future channel formation during overbank events.

The net cut volume for the channel alignment in this alternative is approximately 60,000 cubic yards. The estimated floodplain fill volume for the flow path between the existing channel and the pond is about 4,000 cubic yards. The fill volume to plug the existing channel is approximately 5,200 cubic yards.

The preliminary profile and two selected cross sections for Design #2 are below, generated with a 1-D model (HEC-RAS). The 1-D model is an early look at what channel width and invert elevations might be appropriate. The cross sections (Figures 2 and 3) indicate that the channel width is excessive, resulting in an excessive channel capacity. As channel capacity increases floodplain interaction becomes less frequent and the risk of channel incision increases. Should this alignment be chosen, the design team would have to narrow the channel width and examine the invert elevations to achieve the stated objectives.

Given the observation of Design #2 having a channel with more capacity than desired, the excavation volume specified for this alternative should be viewed as a maximum. This volume can be compared to Design #3 for excavation volumes, which are significantly less given the narrower channel and partial fill volume of the existing pond.

C.6 Design #3

This channel design completely avoids the mapped areas of clay. It is very similar to what was published in McBain and Trush (2000) with the addition of three side channels, two upstream of the pond and one downstream. This design has the most upstream connection with the existing channel. The current pond will not remain as a pool but will flow similarly to the rest of the channel. The existing channel will only be filled to the hard right bend to discourage its reoccupation. A bioengineered bank will be installed on river right at the upstream end where the new alignment begins (as opposed to a log jam) to provide channel stability at this location. The remainder of the existing channel will remain as-is with a surface connection at the downstream end.

The preliminary earthwork volume estimates for this conceptual channel design are that there will be about 31,000 cubic yards of excavation and about 5,000 cubic yards of fill. The volume estimate does not include the fill volume required to plug the existing channel; it is only an estimate for the realigned channel.

C.7 Design #4

This design minimizes the removal of large woody vegetation due to its limited width. Tree removal will also be minimized because this alignment has the most downstream connection to the existing channel. A bioengineered bank on river right will provide channel stability at the connection point and only a small portion of the existing channel will be filled to discourage its reoccupation.

C.8 Design #5

This is the non-pond option, put forth in the event that we cannot include the pond in the channel design due to mercury contamination. The design calls for fill in the bottom portion of the channel to cover the clay bed. The width will be increased on the left bank and there will be a series of riffles to check velocity. The design also calls for a bioengineered embankment where there is currently a frequent floodplain connection to the pond.

This path was chosen for two primary reasons: (1) if we cannot occupy the pond with an active channel it is assumed that frequent overbank flows into the pond would not be permitted. With an alignment that occupies the floodplain to the north overbank flows would interact with the pond; (2) the floodplain to the north is within the clay footprint, which is to be avoided.

The preliminary earthwork volume estimates for this conceptual channel design indicate that there will be about 25,000 cubic yards of excavation and about 5,000 cubic yards of fill.

C.9 Design #6

This design has been put forth for two primary reasons: (1) This design can be accomplished without the removal of any large woody vegetation; (2) it is the obvious choice for a channel realignment due to its low elevation and if the TAG chooses another alignment this option will be on the record as having been declined by the team for specific reasons. More information about the depth and thickness of the reported clay layer would be especially helpful for assessing this alternative. It may be possible to excavate through the clay layer and allow for natural channel adjustment in this area. A wide and shallow channel may also encourage deposition within this alignment.

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Appendix D, California Environmental Quality Act Checklist

This checklist identifies physical, biological, social and economic factors that might be affected by the proposed project. The words "significant" and "significance" used throughout the following checklist are related to CEQA, not NEPA, impacts.

D.1 No Action Alternative

Under No Action, Reclamation and BLM would not restore aquatic habitat in the Phase 3C area of lower Clear Creek. There would be no new channel alignment, no alcove creation, no log jam control feature or floodplain earthwork, no planting of riparian vegetation in areas where the lowered floodplain can support it, and subsequently, no improvement of the fish and wildlife habitat. Therefore, this alternative is not analyzed further.

D.2 Proposed Action Alternative

This section of the EA/IS provides a description of the affected environment and the environmental consequences associated with implementing the Proposed Action/Proposed Project. Because CEQA requires a determination of significance for each resource provided in the checklist, the checklist provided in Appendix G of the CEQA Guidelines is used to form the body of the effects analysis for the EA/IS. For NEPA, significance is determined for an overall project by considering the direct and indirect impact as well as the context and intensity of any effects.

D.2.1 Visual Resources and Aesthetics

Would the Project?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
(a) Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒
(b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒
(c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☐	☒
(d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☒	☐	☐

D.2.1.1 Affected Environment

This portion of lower Clear Creek is characterized by broad alluvial floodplains, meandering gravel bars and lush riparian vegetation (Figures 6–8). Varying sections of this reach of lower Clear Creek are influenced by visual and noise impacts from residential homes, industrial areas, commercial developments and State Highway 273. In addition, mine tailings are visible in areas from past gold dredger and placer mining operations. Although a portion of lower Clear Creek—from the southern boundary of the Whiskeytown Unit of the NRA downstream to Clear Creek Road bridge, approximately 2.5 miles upstream of the Project area is classified as "Scenic" and is eligible for inclusion in the National Wild and Scenic Rivers System (U.S. Bureau of Land Management 1993), the reach through the Project area has no such status. No scenic highways have been designated or recommended for designation in the vicinity of the Project area (California Department of Transportation 2017). The BLM's 2015 Visual Resource Inventory (VRI) designated this project area with a A for Scenic Quality Rating and a H sensitivity level rating, resulting in a Class II VRI rating. The proposed actions would only temporarily impact this rating during construction. The posts included in the construction of the various woods structures would be roughed up to resemble natural process and not impact visual resources. Following construction this project will not negatively impact this rating.

Figure 2. Existing deep, narrow lower Clear Creek channel in Phase 3C

Figure 3. Open floodplain/Clear Creek occupied by herbaceous riparian and upland species

Figure 4. Upstream end of Phase 3C – Riparian vegetation and gravel bars

D.2.1.2 Environmental Consequences

a-c) *No Impact.* The potential impacts of the proposed action would include changes brought about by the removal of vegetation, construction of inundated surfaces, construction of new access roads, and creation and use of staging and gravel processing areas. These activities are intended to restore aquatic habitat in the Lower Clear Creek channel by redirecting flows to a new channel constructed along the historic alignment with a variety of islands, riffles, side channels, and backwater alcoves. By restoring the original form of Clear Creek, the proposed action would enhance the overall aesthetic values and visual resources of the Clear Creek corridor. Although the adverse impacts are expected to be temporary and the long-term outcome should is expected to improve the visual diversity of the corridor, the short-term impacts would persist.

Overall, the proposed action incorporates the Project area's diversity of landscapes and vegetation types to define the location, character, and magnitude of the rehabilitation activities at the sites. For example, materials excavated from riverine areas would be removed to upland areas or used as a source of coarse sediment to enhance the alluvial function of the river. Material transported to upland activity areas would be placed in a manner that blends the materials into the contours of the topography. Retention of existing topographic features would significantly lessen the degree of visual impact.

d) *Less Than Significant with Mitigation Incorporated*. There would not be any new permanent sources of light. Construction activities that occur after sunset would require lighting, and a temporary new source of light at nighttime. However, this would be temporary and *Mitigation Measures AESTH-1* and *AESTH-2* would be implemented to avoid and minimize potential effects on nighttime views to a less than significant level.

D.2.1.2.1 Mitigation Measures: Aesthetics (AESTH)

- AESTH-1. Construction activities would be limited to 7 a.m. to 7 p.m., Monday through Friday, with the option of working through Saturday when needed, to avoid potential light nuisance at night
- AESTH-2. Stationary floodlights would be shielded and directed to shine downward at an angle less than horizontal, and away from residences so they would not be a nuisance to surrounding areas

D.2.2 Agriculture Resources

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland.

Would the Project?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
(a) 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?	☐	☐	☐	☒
(b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒

D.2.2.1 Affected Environment

The Project area does not have any farmland.

D.2.2.2 Environmental Consequences

a) *No Impact*. No farmland would be converted.

b) *No Impact*. The Project area is not zoned for agricultural use.

D.2.3 Air Quality

Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations.

Would the Project?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
(a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☒	☐	☐
(b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☒	☐	☐
(c) 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 (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☐	☒	☐
(d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
(e) Create objectionable odors affecting a substantial number of people?	☐	☐	☒	☐

D.2.3.1 Affected Environment

The Proposed Action is located in the southern portion of the City of Redding, Shasta County, which lies within the northern end of the Sacramento Valley Air Basin (SVAB). The SVAB is bounded on the north and west by the Coastal Mountain Range and on the east by the southern portion of the Cascade Mountain Range and the northern portion of the Sierra Nevada range, trapping pollutants. This problem is exacerbated by a temperature inversion layer, and north/north-easterly winds that transport pollutants from large urban areas in the San Francisco Bay Area and Sacramento Valley. Shasta County is regulated by the Shasta County Air Quality Management District (SCAQMD).

The U.S. Environmental Protection Agency and California Air Resources Board developed federal and state health-based air quality standards, known as National and California ambient air quality standards (NAAQS and CAAQS), for criteria air pollutants. Criteria air pollutants consist of carbon monoxide, ozone, sulfur dioxide, nitrogen dioxide, (NO_X) inhalable particulate matter between 2.5 and 10 microns in diameter (PM_{10}), particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), and lead. The CAAQS also set standards for sulfates, hydrogen sulfide and visibility.

Section 176(c) of the Clean Air Act (42 U.S.C. 7506(c)) requires that any entity of the federal government that engages in, supports, or in any way provided financial support for, licenses or permits, or approves any activity to demonstrate that the action conforms to the applicable State Implementation Plan before the action is otherwise approved. The U.S. Environmental Protection Agency promulgated the General Conformity Rule to ensure that such federal actions are consistent with a State Implementation Plan's purpose of eliminating or reducing the severity and number of violations of the NAAQS for criteria air pollutants and achieving expeditious attainment of those standards. If an action does not conform to the State Implementation Plan, the Federal agency must submit a conformity determination to the U.S. Environmental Protection Agency, State and local air pollution control agencies, and to the public. Federal actions that are exempt from the General Conformity Regulations include, but are not limited to, actions with associated emissions clearly at or below specified *de minimis* levels (USEPA 2017).

Shasta County is in unclassified or attainment status for all criteria pollutant NAAQS. Regarding CAAQS, the entire SVAB is in non-attainment for O3 (and its precursors of VOC and NO_X) and PM_{10}. Table 2 below presents the criteria pollutants Shasta County is in nonattainment status with for CAAQS, and local SCAQMD significance thresholds. The SCAQMD adopted local significance thresholds to determine impact significance of a project during CEQA review. The SCAQMD follows a uniform method of applying mitigation measures, such as Standard Mitigation Measures (SMM) and Best Available Mitigation Measures (BAMM), which are recommended if emissions for a stationary source exceed Level "A" thresholds. If Level "B" thresholds are exceeded, SMM, BAMM, and special BAMM as determined with the SCAQMD are to be implemented. These thresholds and measures seek to reduce long-term emissions associated with stationary type projects and reduce cumulative impacts. Pollutant emissions associated with the proposed Project would be limited to fugitive dust and mobile source emissions released during equipment operation and ground disturbing construction activities. There are no mitigation thresholds currently established for mobile source emissions. Regardless, these thresholds can be used to help describe and assess potential impacts to air quality that may result from Project construction.

Table 2. CAAQS Attainment Status and Local Significance Thresholds for Shasta County

Pollutant	CAAQS Attainment Status	SCAQMD Level "A" Significance Threshold[a, b] (lbs/day)	SCAQMD Level "B" Significance Threshold[a, c] (lbs/day)
VOC (as ozone precursor)	Nonattainment	25	137
NO_X (as ozone precursor)	Nonattainment	25	137
PM_{10}	Nonattainment	80	137

[a] SCAQMD General Plan (2004)

[b] If emissions exceed Level "A" thresholds, SMM and appropriate BAMM would be applied to reduce emissions below the threshold.

[c] If application of SMM and BAMM cannot reduce emissions to below the Level "B" thresholds, emission offsets would be required.

D.2.3.2 Environmental Consequences

a, b) *Less Than Significant with Mitigation Incorporated*. The proposed action is in an area classified as in attainment with all criteria pollutant NAAQS; therefore, the proposed action would neither conflict with nor obstruct the California SIP, and the Federal general conformity regulations do not apply. Considering the details needed to run the California Emissions Estimator Model to estimate the amount of emissions that could be produced by the proposed action cannot be determined until after the contractor is selected through the design-build process, qualitative analysis would be used to analyze potential effects to air quality in regards to the CAAQS.

Restoration activities involved with the Project require use of construction equipment that temporarily contribute to air pollution in the Redding area in the form of ozone precursors and PM_{10}. Construction excavation, fill, grading, hauling materials, land clearing and equipment travel on unpaved road surfaces would be temporary sources of fugitive dust emissions (PM_{10}). Fugitive dust resulting from Project activities would occur over up to four months during the dry summer and early fall months, when PM_{10} levels may be elevated by wood stove use, brush burning, or wildland fires. The proposed action would increase the PM_{10} levels to varying degrees, depending on the type and extent of construction activity. Diesel- and gasoline-powered equipment and vehicles used during construction would also temporarily emit VOC and NOx, over the four-month construction season. Potential PM_{10}, VOC and NOx emissions would be negligible for remaining revegetation efforts that would be complete over a few weeks during the adaptive management period. Once proposed action activities complete, the resulting emissions and impact on air quality would also cease. Considering the proposed action involves movement of approximately 58,780 cubic yards of material, that construction would occur when fugitive dust emissions are generally elevated, and that construction equipment would be operated throughout the duration of the Project, Project-generated PM_{10}, VOC and NOx emissions may exceed the SCAQMD Level "A" daily significance thresholds.

However, implementation of SCAQMD SMM and BAMM (*Mitigation Measures AQ-1* through *AQ-6* listed at the end of this section) would minimize these emissions to less than significant levels. Air pollution controls for construction projects not involving stationary sources are not included in the *Northern Sacramento Valley Planning Area 2015 Triennial Air Quality*

Attainment Plan, adopted by the SCAQMD. However, the reasonably available control measures as listed in Table 1 of SCAQMD's Rule 3-16: *Fugitive, Indirect, or Non-Traditional Sources* (*Mitigation Measure AQ-1*) would be implemented to avoid and minimize potential PM_{10} emissions. *Mitigation Measures AQ-2* through *AQ-5* would also be implemented to avoid and minimize emissions of NOx and VOC and are considered as SMM and BAMM commonly approved by SCAQMD. The Project would neither conflict with nor obstruct implementation of the applicable air quality plan or violate any air quality standards. Project impacts on existing air quality standards and plans would be less than significant with mitigation incorporated.

c) *Less Than Significant Impact*. The Lower Clear Creek Anadromous Fish Restoration & Management Project (LCCAFRM) is a project proposed by Reclamation for gravel augmentation in lower Clear Creek. There are 14 sites proposed along lower Clear Creek from Whiskeytown Dam to its confluence with the Sacramento River. Up to 15,000 tons of spawning gravel are planned for injection at several of these sites in 2018. The specific sites are known at the time of this document, but it is assumed injections of 15,000 tons of gravel would occur at the three closest sites: 3B Rootwads; Phase 2A; and Above 3A. For the purpose of cumulative effects analysis, it is also assumed these injections would occur back to back, simultaneously with the Proposed Action sometime between June 1 and September 30. Gravel injection activities could take approximately two weeks per site. CAP emissions from these activities were estimated in the 2014 *Lower Clear Creek Fish Habitat Restoration Initial Study/Mitigated Negative Declaration* and are described as having the potential to generate fugitive dust (PM_{10}) and emit VOC and NO_X from heavy equipment exhaust during gravel sorting and injection activities. However, these CAPs would be emitted over a short time period of six weeks simultaneously with the Proposed Action, and mitigation measures to control fugitive dust and limit vehicle emissions are proposed to be implemented to avoid and minimize effects to air quality. The LCCAFRM Project was not determined to conflict with any applicable air quality plan or violate any air quality standards.

Construction activities associated with the Proposed Action would result in an increase in VOC, NOx and PM_{10} emissions. However, considering the combined LCCAFRM Project and Proposed Action emissions would be temporary, occurring concurrently over a total of six weeks, and that mitigation measures in line with the SCAQMD's SMM and BAMM, and the Northern SVAB Triennial Air Quality Attainment Plan would be implemented to minimize emissions, the Project's incremental contribution to ozone and PM_{10} emissions would not be cumulatively considerable. There would be a less than significant impact.

d, e) *Less Than Significant Impact*. Receptors who may be sensitive to air pollutants or emissions from sources in or near the Project area include residents and recreationists. Sensitive receptors near the Project area include five residences located within 2,300 feet immediately east, west, and south of the Project area, and recreationists along the Clear Creek corridor. The nearest residence to the Project site is approximately 220 feet northwest of the northwestern-most bend of the proposed channel alignment. However, emissions from diesel engines working in this area would be temporary as construction of the channel continues and moves further away. Public entrance to the Project site would be prohibited, but recreationists could still utilize portions of the China Gardens and Gold Dredge trailheads surrounding the Project area. Emissions are likely to disperse away from receptors in the prevailing winds in the area and would be temporary. Therefore, there would be a less than significant impact.

Emissions from equipment do contain an odor objectionable to some people. Given the distance of the proposed Project from the residences and recreational users, such as hikers and fishermen using the Clear Creek corridor immediately adjacent to the Project site, are the only sensitive receptors subject to objectionable odors from equipment operations. Considering that people would not have access to the Project site, the Project site is an open area subject to air flow that discourages odor concentration, construction emissions would be temporary, and odors from operation of equipment would affect a minor number of hikers and fishermen, there would be a less than significant impact.

D.2.3.2.1 Mitigation Measures: Air Quality (AQ)

- AQ-1. Reclamation would implement a dust control program to avoid and minimize fugitive dust (PM_{10}) emissions. The dust control program would include elements of the SCAQMD Rule 3-16: *Fugitive, Indirect, or Non-Traditional Sources* as appropriate, such as:
    - Spray water on disturbed or exposed soil surfaces, unpaved roads, and stockpiles to suppress dust.
    - Inactive stockpiles would be covered or sprayed as needed to suppress dust.
    - Disturbed areas outside of channel would be revegetated to minimize fugitive dust and soil erosion.
    - Pursuant to the California Vehicle Code (Section 23114), all trucks hauling soil or other loose material to and from the construction site would be covered or would maintain adequate freeboard to ensure retention of materials within the truck's bed (e.g., ensure 1-2 feet vertical distance between top of load and the trailer).
    - Paved roads would be swept (with water sweepers) if visible soil material is carried onto adjacent private and public roads, as required by Reclamation.
    - Vehicular speed on unpaved roads would be limited to 20 mph.
- AQ-2. The contractor would comply with SCAQMD's Rule 3-28: *Stationary Internal Combustion Engines* and have all applicable portable internal combustion engines registered and certified under the state portable equipment regulation contained in California Health & Safety Code Sections 41750 through 41755.
- AQ-3. Diesel-fueled equipment would be certified tier 2 or better and use ultra-low sulphur diesel fuel.
- AQ-4. All construction equipment would be maintained and properly tuned in accordance with manufacturers' specifications.
- AQ-5. Equipment idling would be minimized, and off-road equipment would shut off engines if idling for longer than five minutes.
- AQ-6. Disturbed areas of the Project site that would not be inundated by Clear Creek flows would be revegetated, which would offset CO2 emissions in the long-term.

D.2.4 Biological Resources

Would the Project?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
(a) 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 U.S. Fish and Wildlife Service?	☐	☒	☐	☐
(b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
(c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☒	☐	☐
(d) 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?	☐	☒	☐	☐
(e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
(f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

D.2.4.1 Affected Environment

The action area is defined as all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action. Areas affected directly would be those in the immediate footprint of the Project. Indirect effects of the Project are those effects that are caused by, or would result from, the Proposed Action and may occur later in time, but are still reasonably certain to occur. Indirect effects associated with the Project are those related to noise, dust, and turbidity above ambient levels.

D.2.4.1.1 Special-Status Species

An official species list was first obtained for this Project through the USFWS Information for Planning and Consultation website on May 16, 2016, and was last updated on March 29, 2019. Reclamation referenced the California Natural Diversity Database and previous consultations and environmental documents for projects in the area (such as *the Lower Clear Creek Floodway Rehabilitation Project—Phase 3B*, and the *Clear Creek Aquatic Habitat and Mercury Abatement Project*) to determine what special-status species may occur within dispersal distance of the Project.

Reclamation refined the list of species to those that have the potential to be within the action area during Project implementation. Excluded from this list are species that are not expected to be within the action area due to either lack of habitat (e.g., vernal pools, rocky outcrops, salt marshes) or because the Project lies outside of the species' range. Appendix B Table 1 summarizes the determinations for inclusion or exclusion of species and associated critical habitat considered for this project, and that are protected under the ESA, California Endangered Species Act, the Bald and Golden Eagle Protection Act, Migratory Bird Protection Act, and species designated sensitive by BLM. Based on the analysis in Appendix B, the Central Valley (CV) spring-run Chinook salmon, CV steelhead, valley elderberry longhorn beetle (VELB), and Western distinct population segment (DPS) of yellow-billed cuckoo have the potential to be in the action area during Project implementation

A rich diversity of bird species is documented in the Wintu Audubon 2005 Bird List for Shasta County, and many were observed during site visits. The Proposed Action has the potential to affect various woodpeckers and common song birds present, such as flycatchers, sparrows, warblers, towhees, and other birds protected under the Migratory Bird Treaty Act.

Reclamation biologists conducted a survey for nesting raptors in and near the Clear Creek Phase 3C project site on March 21, 2019. They observed red-tailed hawks, osprey, and turkey vultures. They observed osprey observed three times carrying nesting materials over the site and later they located an active next on a cell phone tower east of the project area.

They located a large nest in a mature cottonwood tree approximately 100 meters south of the beaver dam on the project site. It appeared to be well maintained and was approximately 3' in diameter. Later, two red-tailed hawks were observed circling above the central portion of the project site and then appeared immediately overhead (about 50 feet) about 100 meters from the nest, circling for a few minutes.

D.2.4.1.2 Non-Special-Status Wildlife and Migratory Corridors

The Proposed Action has the potential to affect other non-special-status wildlife and their migratory corridors that have been observed onsite, such as North American river otter (*Lontra canadensis*), black-tailed deer (*Odocoileus hemionus columbianus*). Signs of American beaver (Castor canadensis) activity are present around the pond, including the beaver dam that creates the pond, potential feet and tail prints, and teeth marks on trees and felled trees. River otters have been observed in Clear Creek at the upstream end of the action area. Black-tailed deer, including young fawns, have also been observed feeding in and moving through the action area. River otter was observed in Clear Creek during the 2016 wetland delineation and 2017 western YBCU surveys.

D.2.4.1.3 Waters of the U.S. and State, and Riparian Habitat

The Project site was delineated for waters of the U.S. on October 18 and 19, 2016. The delineation was conducted in accordance with the *Corps of Engineers Wetlands Delineation Manual* (USACE 1987), *A Field Guide to the Identification of Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual* (USACE 2008a) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual:*

Arid West Region (Version 2.0; USACE 2008b). Information about the channel characteristics were recorded on the 2010 updated *Arid West Ephemeral and Intermittent Streams OHWM Datasheet* and the locations of three transects associated with the datasheets were recorded using a Trimble handheld GPS unit with sub-meter accuracy. The 493.05-acre study area contains five aquatic resources types: seasonal wetland, seep, perennial wetland, ephemeral drainages, and perennial stream. The extent of these aquatic resources is provided in Table 3. Detailed descriptions for each water type is provided below along with the location and size for each mapped feature.

Table 3. Summary of waters of the U.S. in the study area

Name	Size (Acres)	Length (Feet)
Seasonal wetlands	0.67	N/A
Seasonal wetlands/ Palustrine Emergent	0.62	N/A
Seasonal wetlands/ Riparian Wetland	0.52	N/A
Palestine Emergent Wetland/ Hillside Seep	0.26	N/A
Perennial wetland/ Emergent Wetland	1.85	N/A
Perennial wetland/ Riparian Wetland	0.21	N/A
Ephemeral drainages	2.45	4,718
Intermittent Channel	0.09	323
Pond	3.63	N/A
Perennial stream (Clear Creek)	41.69	3,559

The vegetation community in the observed seasonal, ephemeral and depressional wetlands is a mix of upland, facultative upland, facultative, facultative wetland, and obligate species including wild oats (*Avena fatua*), moth mullein (*Verbascum blattaria*), white-flowered pincushion (*Navarretia leucocephala*), wild mint (*Mentha arvensis*), California wild oat grass (*Danthonia californica*), Himalayan blackberry (*Rubus armeniacus*), bermudagrass (*Cynodon dactylon*), Santa Barbara sedge (*Carex barbarae*), curly dock (*Rumex crispus*), tall scouring rush (*Equisetum hyemale*), tall flatsedge (*Cyperus eragrostis*), Baltic rush (*Juncus balticus*), Mexican rush (*Juncus mexicanus*), common spikerush (*Eleocharis palustris*), prostrate knotweed (*Polygonum aviculare*), quaking oat grass (*Briza minor*), stork's bill (*Erodium botrys*), Italian ryegrass (*Festuca perennis*), plantain (*Plantago subnuda*), poison oak, California pipevine, red willow (*Salix laevigata*), black willow (*Salix gooddingii*), arroyo willow (*Salix lasiolepis*), sandbar willow (*Salix exigua*), grey pine, interior live oak, and Fremont's cottonwood.

Vegetation at and below the OHWM consists of facultative upland, facultative, facultative wetland, and obligate shrub, vine, tree, and herbaceous species. Dominant plants along the edge of the creek include white alder (*Alnus rhombifolia*), Oregon ash, California grape, California blackberry (*Rubus ursinus*), mugwort (*Artemisia douglasiana*), quaking oat grass, dense sedge (*Carex densa*), Miner's lettuce (*Claytonia perfoliata*), bermudagrass, velvet grass (*Holcus lanatus*), bird's foot trefoil (*Lotus corniculatus*), spearmint (*Mentha spicata*), buckbean (*Menyanthes trifoliata*), seep monkeyflower (*Mimulus guttatus*), Hooker's evening primrose (*Oenothera elata*), and willows. Dominant emergent vegetation consists of common duckweed (*Lemna minor*), buckbean (*Menyanthes trifoliata*) and six petal water primrose (*Ludwigia hexapetala*). The pond margins contain tall flatsedge (*Cyperus eragrosta*), mugwort (*Artemisia*

douglasii), and are heavily vegetated with willows such as narrow leaf willow, arroyo willow, and red willow (Salix laevigata).

D.2.4.2 Environmental Consequences

D.2.4.2.1 Special-Status Species, Non-Special-Status Species, and Migratory Corridors

(a) Less Than Significant with Mitigation Incorporated. This section discusses potential effects the Proposed Action could have on special-status species, either directly or through habitat modifications. Proposed mitigation measures are listed at the end of this resource subsection. Appendix E Table 1 summarizes special status species that were further analyzed and are protected under the federal ESA, CESA, Bald and Golden Eagle Protection Act, Migratory Bird Treaty Act (MBTA), and by BLM. Appendix E Table 2 lists species considered but eliminated from further analysis. These species and their habitat do not occur in the Project area and would not be affected by the proposed Project.

D.2.4.2.1.1 Central Valley (CV) spring-run, Fall-run, Late fall-run Chinook Salmon, Winter-run Chinook Salmon, and Central Valley Steelhead (Federal and State Threatened; SSC; SSC; Federal and State Endangered; and Federal Threatened, respectively)

The action area functions as a migratory corridor and juvenile rearing habitat for adult and juvenile spring-run Chinook salmon, CV fall-run/late fall-run Chinook salmon, and CV steelhead. Spring run Chinook salmon spawning occurs further upstream Clear Creek. The construction window avoids spawning impacts to the other species. Due to the life history timing of CV late fall-run Chinook salmon in Clear Creek, the migratory period of December to March would be avoided. Clear Creek does not support a winter-run population, although it is occasionally used by straying adults for spawning and there may be some non-natal rearing in lower reaches Due to the life history timing of CV spring-run Chinook salmon, CV fall-run Chinook salmon, CV late fall-run Chinook salmon (rearing juveniles only), and CV steelhead, it is possible for the following life stages to be present within the action area during implementation of the Proposed Action:

1. Adult migrant CV spring-run Chinook salmon (June to August);
2. Rearing and emigrating juvenile CV spring-run Chinook salmon (June);
3. Adult migrant CV fall-run Chinook salmon (September to October);
4. Rearing juvenile CV fall-run Chinook salmon (year-round);
5. Rearing juvenile CV late fall-run Chinook salmon (year-round);
6. Rearing juvenile CV winter-run Chinook Salmon (year-round);
7. Spawning adult CV winter-run Chinook Salmon (Jun to July);
8. Adult migrant CV steelhead (June and September to October); and
9. Rearing and emigrating juvenile CV steelhead (year-round).

Construction-related effects to these species and life histories fall into the following categories: (1) hazardous material spill; (2) turbidity increases; (3) temporary riparian vegetation removal; and (4) direct injury or death from in-channel work and relocation efforts.

The majority of Project activities would occur below the OHWM of Clear Creek; however, construction would occur over the summer months when flows are low, typically around 150 cfs between July and September, and up to 275 cfs in late September and mid-October. The pond and backwater channel that connects to the main active channel at high flows receive water from a combination of groundwater and overland flow during high winter/spring flows (greater than 500 cfs). In this EA, in-water activities are defined as those that occur in the active, wet channel. The only in-water activities that would occur in June would be potential installation of a diversion berm at the confluence of the backwater channel with the main creek channel, fish and turtle rescue efforts, and installation of the stream crossing in the backwater channel in order to allow equipment access to start vegetation removal. Other in-water activities include, the permanent log jam control features, creation of the alcoves, and removal of the stream crossings. Pulse flows in June could reach approximately 800 cfs, which are high enough to connect the pond and backwater channel to the main channel via overland flow. Depending on the planned June pulse flow, the contractor would use discretion in the field to determine if the diversion berm would need to be removed prior to the pulse flow and re-established to isolate work areas. Re-establishment of the diversion berm would be done within the work windows approved by NMFS and CDFW. Vegetation removal activities would also occur in upland-most areas first, and then would occur in areas closer to the active channel after the pulse flows pass.

A small amount of salmonid spawning and rearing habitat will occur in the action area during construction. This spawning and rearing habitat may be temporarily disturbed during in-water construction. Under current conditions the site is a fish passage corridor (0.67 miles; with some difficult spots where water is less than a foot deep). A migration path will be maintained during all stages of construction

The amount of available salmonid habitat in the action area during construction (measured at flows of 200 cfs) encompasses habitat which approximately 0.58 miles, all of which allows fish passage (with some difficult spots where water is less than a foot deep), and approximately 0.48 miles of which provides juvenile rearing habitat.

D.2.4.2.1.1.1a Accidental Spill of Hazardous Materials (Contaminants)

The large majority of Project activities would occur in exposed and dry portions of the creek; however, these activities would still be below the OHWM and any accidental contaminant spill, such as petroleum products from equipment, would thereby be within Clear Creek. Construction activities below the OHWM of Clear Creek include removing riparian vegetation; installing temporary diversion berms and turbidity curtains; excavating a new channel alignment; sorting, cleaning, and stockpiling excavated material; re-purposing sorted materials for channel and floodplain construction and revegetation; building temporary roads and stream crossings; constructing a logjam; creating alcoves; installing rock or large woody habitat structures; and revegetation. Activities that would be considered in-water activities, all of which would require diversion berms and pumping of ponded water to isolate work, include stream crossing installation, excavation and fill of the pond and backwater channel (where the proposed downstream split channels would be), alcove creation, log jam construction, and installation of

in-water habitat structures. Heavy equipment would be used in the creek channel to implement all of these activities.

The use of heavy equipment in, and near, the stream channel would increase the potential for an accidental spill of petroleum products, and other construction-related materials into the channel. Accidental spills of petroleum products and other construction-related materials could cause mortality and lowered growth rates and reproductive success of CV spring-run Chinook salmon and CV steelhead, and other fish and aquatic species. In addition, accidental spill of petroleum products and the effects of cleanup would degrade habitat, adversely affecting major components of Essential Fish Habitat (EFH) for Pacific salmon, and Primary Constituent Elements (PCEs) of designated Critical Habitat for spring-run Chinook salmon and CV steelhead. The freshwater rearing habitat and migration corridor habitat PCEs for Chinook salmon and steelhead also cover three of the four major components of freshwater EFH for Pacific salmon (juvenile rearing habitat, juvenile migration corridors, and adult migration corridors and holding habitat). Effects to EFH and PCEs are further analyzed below under *Effects to Critical Habitat and Essential Fish Habitat*. Adverse effects from contaminants would be avoided or minimized with implementation of *Mitigation Measures HAZ-1* through *HAZ-4* listed in *Hazards and Hazardous Materials*. These measures include implementing a Spill Prevention, Control and Countermeasures Plan (SPCCP) to prevent and immediately clean up accidental spills of contaminants, refueling equipment in an area set back from Clear Creek and protected from direct runoff, using a diversion berm to isolate work from flowing waters, and cleaning and checking equipment for leaks daily. Additionally, most of the construction would not be in-water and fish would be removed and excluded from areas of in-water work prior to activities. These and other measures would result in the potential effect of accidental contaminant spills being reduced to an insignificant level.

D.2.4.2.1.1.1b Turbidity Increases

Construction of the new channel alignment, temporary access roads, temporary stream crossings, alcoves for rearing habitat, and the logjam, vegetation removal, temporary installation of diversion dams and turbidity curtains, and temporary sorting and stockpiling of excavated materials would occur below the OHWM of Clear Creek. Each of these activities have the potential to cause temporary turbidity and sedimentation increases in Clear Creek. The majority of the Contractor Use Areas would be located below the OHWM. However, this area does not activate with flows during July through September (activates at 1,000 cfs). Based on expected conditions, approximately 20% of construction activities would occur in-water. This would involve a total of approximately 11,490 cubic yards (CY) of wet excavation, and approximately 12,190 CY of in-water fill, which could increase turbidity and suspended sediment levels in lower Clear Creek. The approximately 80% of work that would not be in-water involves approximately 58,780 CY of excavation and 58,080 CY of fill and topsoil replacement.

Turbidity and suspended sediment levels associated with in-water activities and from storm water runoff from dry construction may negatively affect juvenile and adult CV spring-run Chinook salmon, fall-run Chinook salmon, CV steelhead, and juvenile late fall-run Chinook salmon temporarily by causing fish to be stressed and avoid or leave preferred habitats. Juveniles in particular may incur reduced feeding and growth rates, and increased likelihood of predation if

they are displaced into deeper, open-water habitat. If turbidity were to reach high levels for long periods of time, it could result in death of individual fish.

Implementation of *Mitigation Measures FISH-2* and *FISH-5*, and *TURB-1* through *TURB-9* (*Section 3.2.9, Hydrology and Water Quality*) would reduce the potential increase in turbidity and effects on fish. Equipment use would be limited to the activity areas. The majority of ground disturbance and channel construction would occur during summer months from July through September, when flows are low (not to exceed 275 cfs) and the majority of the construction areas below the OHWM of Clear Creek are also exposed and dry. Also during this time water temperature is higher, chance of storm events are low, and presence of salmonids in the creek are lowest. Erosion control devices such as silt fence and straw wattles would be installed according to the Storm Water Pollution and Prevent Plan (SWPPP). In-water activities would also be isolated from the main creek channel by installation of diversion berms around these activities and installing turbidity curtains or covering the berms with a geomembrane to capture and allow turbid water to settle prior to returning to the creek. Prior to activities in isolated areas, fish rescue and relocation efforts would occur.

Upon completion of excavating the new channel alignment, the turbidity curtains and diversion berms isolating the new channel from the main stem would be removed starting with the downstream end, providing time for inundation, and then followed by controlled removal of the upstream inlet. This order of activity would minimize turbidity during the initial introduction of flows to the new channel alignment. Equipment would use wet stream crossings, which would be composed of streambed material. All stream crossing materials would be removed by October 15, unless spawning gravel is used, which would be left in-stream as replenishment. Disturbed upland and riparian areas would be revegetated with native species, which would reduce erosion and sedimentation post-Project. Additional planting of riparian species would also occur in areas where the floodplain would be lowered, and along the new channel alignment. In-water work windows and implementation of the *FISH* and *TURB* mitigation measures listed below would avoid and minimize the possible effects of turbidity and sedimentation on juvenile and adult salmonids to a less than significant level.

D.2.4.2.1.1.1c Riparian Vegetation Removal and Revegetation–Rearing Habitat

Approximately 5.3 acres of vegetation would be temporarily impacted and 8.7 acres would be permanently impacted. Vegetation removal is currently scheduled to start as early as June 1, 2019 and is anticipated to be complete within a month. Some riparian vegetation, such as willow cuttings and willow clumps, would be preserved for replanting at the end of the project in fall. The majority of vegetation removal would be from the new channel alignment; however, the effect of vegetation clearing on rearing habitat would be mitigated by maintaining vegetated banks along the new channel and planting additional native riparian plants throughout the site. The proposed channel alignment would also provide more shading and food sources than the current alignment as existing mature vegetation and understory would be retained along the banks of the new channel, and additional high- and medium-density riparian communities would be planted where the site currently lacks structurally complex riparian vegetation.

Riparian vegetation provides cover, shade, and food resources required by adult and juvenile life stages. Removal of riparian vegetation along lower Clear Creek could negatively affect the

quality of rearing habitat for juvenile salmonids by decreasing the amount of food supply entering the creek, as well as increasing water temperatures due to loss of shading. A decrease for cover may also increase the likelihood of predation.

Project components and mitigation measures have been developed to reduce the potential effects of the Project on listed fish species. For instance, disturbance to mature riparian vegetation would be avoided as much as feasible to maintain in-stream habitat structures, bank cover, shading, and riparian forest connectivity for the new channel alignment. All areas of temporary ground disturbance would be revegetated with native riparian species wherever riparian communities can be supported. The Project would plant approximately 9.9 acres of wetland, emergent and riparian vegetation. Proposed riparian revegetation and planting in floodplain areas lowered to hydrologically support additional riparian communities and along the proposed channel would improve the overall quality and riparian connectivity throughout the Clear Creek floodplain. This would increase the amount of high-quality rearing habitat for juvenile salmonids in lower Clear Creek. See Table 1 and Figure 3 for proposed location, community type, and acres of revegetation. Large wood features would also be installed in the channel, which would provide additional coverage for juvenile salmonids and increased channel complexity. *Mitigation Measure VEG-1* through *VEG-5* would be implemented to avoid and minimize effects to vegetation, and to guide revegetation efforts.

There would be a minor, temporary reduction in rearing and holding habitat during construction, but which would also be compensated for by retaining existing vegetation along the bank of the new channel and planting more structurally diverse riparian vegetation. Temporary effects to holding adult CV spring-run Chinook salmon, fall-run Chinook salmon and CV steelhead, and rearing juvenile fall/late fall-run Chinook salmon and CV steelhead in the action area from a reduction in cover and food could be adverse. However, these are anticipated to be short-term and ultimately improve rearing and holding habitat due to maintenance of riparian vegetation along the new embankments, and revegetation efforts. The creation of riparian habitat is ultimately expected to provide a long-term beneficial effect to salmonids by creating a source of food, cover, and river shading.

D.2.4.2.1.1.1d Mechanized Construction Activities

Project activities involving equipment that could cause direct injury or mortality, to adult CV spring-run Chinook salmon, juvenile late fall-run Chinook salmon, adult and juvenile fall-run Chinook salmon, and CV steelhead include the following in-water activities: installing temporary diversion dams, turbidity curtains, and stream crossings, creating alcoves for rearing habitat, and constructing the logjam and in-water habitat structures.

D.2.4.2.1.1.1d(i) Dewatering and Fish Rescue Operations

The access crossing over the backwater channel would be one of the first construction activities. This would occur prior to installation of the diversion berm and potential turbidity curtain where the small backwater channel connects with the main stem channel at higher flows (between 500 and 1,000 cfs). Although flows would be low during construction so the backwater channel would be disconnected from the main channel, there is the potential that adult and juvenile salmonids may be stranded in those areas from the spring pulse flows. Removing standing water

from the pond and backwater channel could result in salmonids becoming stranded, crushed during installation of the crossing, or entrained in the water intake system during ponded water removal. However, a seining or electrofishing would be done in the pond and backwater area to rescue and relocate fish prior to the pumping of ponded water. Also, pumping of ponded water would only occur where construction areas have been isolated from the channel and after fish rescue and relocation efforts have been completed. As mentioned in *Mitigation Measure FISH-6* below, water intakes would be screened with mesh and covered with a perforated drum to prevent debris and aquatic organisms from entering the water intake system, according to NMFS's 1997 *Fish Screening Criteria for Anadromous Salmonids*. *Mitigation Measure FISH-1* details fish rescue operations that would take place by qualified fish biologists to avoid and minimize construction interaction with fish. The appropriate rescue and relocation methods would be determined by NMFS-approved fish biologists and approved by NMFS prior to dewatering. The preferred rescue and relocation method is seining, but if electrofishing is deemed appropriate and necessary for the efficient and successful removal of fish, the NMFS electrofishing guidelines (NMFS 2000) would be strictly followed. Up to two fish rescue teams of two to four persons would be used to facilitate efficient fish removal, reduce handling time, lower physiological stress, and reduce potential mortality rates. CV spring-run Chinook salmon, fall/late fall-run Chinook salmon, and CV steelhead may be handled during fish rescue operations. Although further harm would be avoided and minimized with mitigation measures and the fish rescue operation itself is a mitigation measure for other Project effects, the capture of these protected species is an adverse effect.

D.2.4.2.1.1.1d(ii) In-Water Construction Activities

Diversion berms would be constructed along the embankment of the existing channel to isolate in-water work associated with constructing the proposed channel alignment, alcoves, and the logjam, and to exclude fish from these areas. In addition, as mentioned above, fish from behind the diversion berms would be rescued and relocated to avoid further effects, but initial construction of these control features could cause direct injury or mortality of adult and juvenile salmonids in the action area. Juveniles, which are less able swimmers than adult fish, may be crushed if they are trapped by heavy equipment or materials and cannot escape. However, *Mitigation Measure FISH-1* through *FISH-6* would be implemented to avoid and minimize injuring or killing fish. These mitigation measures include operating equipment or placing materials in the active channel slowly and deliberately to encourage fish to move out of the in-water activity area, and repeating this after long periods of inactivity.

Considering in-water work would occur in summer months when Clear Creek flows would be low and 80% of the action area below the OHWM would be dry and exposed, and that fish rescue operations would occur after the proposed channel alignment is isolated from Clear Creek, all construction activities along the proposed alignment would then avoid direct effects to CV spring-run Chinook salmon, fall/late fall-run Chinook salmon, and CV steelhead. Such activities include excavation of the new channel alignment, construction of the temporary stream crossings, pond filling and grading, creation of the alcoves, and revegetation.

In-water activities may cause direct injury or mortality to adult CV spring-run Chinook salmon, juvenile late fall-run Chinook salmon, and adult and juvenile fall-run Chinook salmon and CV steelhead that could be in the action area. However, potential adverse effects would be greatly

reduced by implementing the mitigation measures and most effects resulting from this Project are expected to be in the form of harm and harassment during relocation and exclusion activities.

D.2.4.2.1.1.1e Effects to Critical Habitat and Essential Fish Habitat (EFH)

The action area contains Critical Habitat PCEs that support freshwater rearing and 0.67 mile of juvenile and adult migration corridor habitat for Chinook salmon and steelhead, which covers three of the four major components of freshwater EFH for Pacific salmon (juvenile rearing habitat, juvenile migration corridors, adult migration corridors, and adult holding habitat). The majority of creek and floodplain restoration activities are located below the OHWM of Clear Creek, which could affect the PCEs and EFH components of freshwater rearing and migration corridor habitat. Potential release of contaminants, erosion and turbidity increases, temporary vegetation removal, and installation of diversion berms from all Project activities could temporarily affect water quality, cover and protection from predators, food supply, and passage associated with the freshwater rearing habitat and freshwater migratory corridor PCEs and EFH components.

There may be some short-term effects to water quality in lower Clear Creek, and thereby may reduce the quality of PCEs and EFH. The potential for hazardous materials to enter Clear Creek is insignificant because the majority of construction would occur in the summer months when flows are low, the pond would not be connected to the active channel, and 80% of the work would not be in-water. The active channel would be affected only during installation of diversion berms and turbidity curtains, construction of the logjam, creation of the alcoves, and opening of the proposed channel to the main creek channel upon completion. Therefore, there would be temporary adverse effects in the limited areas of habitat currently available in the action area.

The potential for adverse effects to water quality by contaminant spill would be further reduced because of implementation of the conservation measures listed in *Hazardous Waste Spill Control*. Installation of diversion berms and turbidity curtains, and construction of the IC-1 and the pond complex (IC-12, W-2 to W6)- could cause a temporary increase in turbidity deposit silt or sand into Clear Creek, which could temporarily reduce food availability and lower water quality. Diversion berms are anticipated at the following activity areas to be isolated: (1) pond connection to main channel (downstream end of IC-11); (2) upstream connection of proposed channel to main channel (IC-2); (3) upstream of IC-1; (4) downstream end of IC-12; 5) upstream and downstream end of IC-13. Depending on level of water at each site, these diversion berms would consist of either k-rails or clean spawning gravel covered with a geomembrane, and a turbidity curtain. These control features would be installed with equipment slowly to minimize sediment suspension. Turbidity discharges resulting from project activities would be monitored to ensure that turbidity (measured in NTU) does not exceed Central Valley Regional Water Quality Control Board 401 general water quality certification. A turbidity increase may also occur when the new channel alignment is opened, and flows are first directed through; however, this would be minimized by only using clean gravel and cobble in the new channel alignment and letting the downstream portion of the channel backfill before gradually opening the upstream connection. Erosion and storm water runoff controls would also be implemented for activities outside of the channel, such as installing silt fences or straw wattles around stockpiles, revegetating and seeding disturbed areas when construction concludes. If revegetation activities cannot conclude prior to winter when flows are higher, disturbed areas would be stabilized with

jute matting or similar materials until revegetation activities can continue the next fall. Potential effects from turbidity increases and sedimentation would be temporary and minimized with the implementation of conservation measures listed in*Water Quality–Turbidity/Sedimentation Controls and Vegetation Restoration*, and of the CV Water Board's Clean Water Act (CWA) permit requirements.

There would be some physical disturbance to rearing habitat from the short-term loss of riparian vegetation during floodplain earthwork, logjam construction, and alcove and channel creation. However, these impacts would be minimized by avoiding existing vegetation, especially mature riparian trees, to the extent practicable, and all temporarily disturbed areas would be revegetated with native riparian species where they can be supported. See *Mitigation Measures VEG* listed below. Implementation of these mitigation measures would ensure these potential effects remain insignificant. Islands would be created and in-water habitat structures, such as rootwads, would be installed in the proposed channel to provide more habitat complexity and rearing habitat.

Potential effects from construction activities in Clear Creek to designated Critical Habitat for CV spring-run Chinook salmon and CV steelhead and EFH components for Pacific salmon would be temporary. The purpose of the Project is to improve fish passage and rearing habitat and floodplain function. Therefore, the Project would ultimately lead to long-term benefits for the PCEs of freshwater rearing and migration corridor habitat and EFH components, and would be in line with recovery and restoration plans for spring-run Chinook salmon, fall/late fall-run Chinook salmon, and CV steelhead.

D.2.4.2.1.1.1e(1) Valley Elderberry Longhorn Beetle (Federal Threatened)

The VELB occurs in riparian woodlands throughout the Central Valley, where it feeds on the pith and leaves of elderberry shrubs (*Sambucus nigra ssp. caerulea*) with stems measuring at least 1.0-inch in diameter at ground level. Elderberry shrubs grow in a variety of riparian and non-riparian communities, most common on riparian terraces where they are not inundated for long periods of time (USFWS 2017: 5). Elderberry shrubs are host plants for VELB as the beetle lays its eggs on leaves or at the axil. Upon hatching, the larvae bores into the stem and feeds on the pith, then pupates in the pith gallery until it emerges as an adult beetle (USFWS 2017: 4). The active season for the beetle during which emergence, mating, and egg laying occurs is approximately March 1 to June 30. The presence of exit holes on the stems of the elderberry shrubs may indicate the presence of beetles.

The current presumed range of VELB extends throughout the Central Valley, from approximately southern Shasta County to Fresno County, including the valley floor and lower foothills. The majority of VELB have been documented below 500 feet in elevation. A California Natural Diversity Database query showed three occurrence records of the beetle within 10 miles of the action area, with the closest occurrence 4.5 miles east along Churn Creek. The other occurrences are further away along the Sacramento River. Potential habitat exists within, and near the action area in the form of elderberry shrubs and suitable elevation. Surveys for elderberry shrubs were performed in the action area on March 27, 2017, April 21, 2017, and April 18, 2018 with a follow up survey on November 6, 2018 following a fire that impacted the site during the summer of 2018. Following the fire in November 2018, 121 elderberry shrubs

Figure 5. Elderberry Shrubs near Project Activity Areas

were observed within the project area. Of the 121 elderberry shrubs observed, 113 shrubs were in riparian habitat. No VELB were observed during these surveys but exit holes made by the VELB were observed, and therefore VELB is presumed present.

The Project has the potential to cause indirect effects to several elderberry shrubs resulting from physical vibration and increase in dust during operation of equipment during construction activities. The Project cannot avoid the entire VELB flight season (March to July); however, project activities would not begin until after June 1.

The surveys mapped a total of 134 elderberry shrubs at the project site (See Figure 6). Of these 134 elderberry shrubs, 16 shrubs are located 165 feet or more away from project activities and would not be affected by the project. Several elderberry shrubs are located adjacent proposed channel alignment. There are 112 shrubs that are located between 20 and 165 feet from project activities. A minimum of 20-foot buffer would be established from the dripline for the protection of the elderberry shrubs. Due to the close proximity of elderberry shrubs to the creek it would be difficult to observe the required a 20-foot radius buffer along some portions of the creek. Several shrubs are located 14 feet from the edge of the pond that would be filled and converted to the main channel. These shrubs are situated on the hillslope above the pond, thus work would be conducted below the ground surface of the shrub and below the drip line. Reclamation is proposing a 14-foot radius buffer zone, using concrete barriers for protection for six shrubs.

Potential effects to VELB would be reduced by avoiding elderberry shrubs by installing fencing or concrete barriers around the shrubs as a buffer between activities, and training workers on VELB, and to avoid these areas *(See Mitigation Measures VELB-1* through *VELB-5*).

The Project may result in short-term adverse effects to VELB, but with implementation of the conservation measures, restoration of the floodplain along approximately half a mile of lower Clear Creek, and planting of additional native riparian vegetation throughout the project site is expected result in long-term benefits to the species.

D.2.4.2.1.1.1e(2) Western DPS Yellow-billed Cuckoo (Federal Threatened/State Endangered)

Western YBCU breed in broad, well-developed, low-elevation riparian woodlands comprised primarily of mature cottonwoods, willows and blackberry. In the Sacramento Valley, this species generally prefers patches of at least 20 hectares along the Sacramento River with nests regularly spaced. However, where there is extensive foraging habitat and extremely restricted nesting habitat, nests have been observed as close as 60m apart, which indicates that they are capable of nesting in close proximity to one another (Laymon 1980 as cited in Laymon 1998). On occasion, the western YBCU has been observed along tributaries with a series of smaller adjacent riparian forest patches, less than 100m apart. Western YBCU are primarily foliage-gleaning insectivores (cottonwoods preferred), but also hover, glean, hawk, and even hop on the ground to obtain their prey. Breeding season generally begins with pair formation in mid-June and lasts until mid-August. Cuckoos generally arrive in California during June and begin nesting shortly thereafter. The species begins its fall migration around late July to early August and most have left California by mid-September (Gaines and Laymon 1984).

While the action area is within the breeding range of the species, the nearest location of suspected nesting is 25 miles to the south along the Sacramento River. The action area contains several patches of cottonwood and willow trees along lower Clear Creek that are considered suitable as foraging and nesting habitat. Protocol surveys for western YBCU were performed in the action area from June through July 2017 and 2018 by a federally permitted surveyor. Six surveys, 10 days apart, were performed with the use of "playback calls" throughout the action area, and no western YBCU individuals called back nor were observed. The survey results showed that the western YBCU were not using the action area for nesting during the 2017 or 2018 nesting season. The western YBCU may forage in, but is not known to currently breed in the action area along lower Clear Creek.

The Project may adversely affect foraging western YBCU where construction overlaps with the species' potential presence from early-June to mid-August. Vegetation removal and grubbing would occur as early as June 1 and take approximately a month to complete. These activities have the potential to cause direct harm to foraging or nesting western YBCU, due to some loss of foraging and nesting vegetation, from early June to mid-August. Mature riparian cottonwoods would be avoided as much as feasible, and this species could continue to forage in those trees and areas adjacent to the action area. The sight and sound of operating equipment and ground disturbance in the action area could also temporarily cause noise and visual disturbance, potentially interrupting nesting or foraging western YBCU and cause them to fly away. However, disturbance to foraging western YBCU would be temporary and insignificant as there is foraging habitat available in other areas along Clear Creek and superior foraging habitat on the Sacramento River downstream. To avoid and minimize potential effects to nesting western YBCU from Project activities delayed beyond the start of the nesting season (June 1), pre-construction surveys for the species would be conducted at the start of the nesting season until the activities commence. If an active western YBCU nest is observed, construction fencing would be installed around it to create a 250-foot avoidance buffer. A biological monitor would also be on-site to monitor the nest for any project-related disturbances and to determine when the nest is no longer active. These and other mitigation measures implemented to avoid and minimize potential effects to avian species, including western YBCU are listed in *Mitigation Measures BIRD-4* and *BIRD-5*.

With implementation of these mitigation measures, the potential Project effect on western YBCU would be less than significant. In addition, the successful completion of the Project as the last phase of the Lower Clear Creek FSCRP may provide long-term benefits to the species through the creation of additional and more cohesive riparian forest foraging habitat and, potentially, breeding habitat. In the long-term, the additional riparian habitat resulting from the Project would lead to beneficial effects and be in line with the recovery and restoration plans for western YBCU.

D.2.4.2.1.1.1e(3) Bald Eagle (State Endangered; FP; Bald and Golden Eagle Protection Act)

The Clear Creek riparian corridor provides both foraging, perching, and nesting habitat for bald eagles. No bald eagle nesting activity is known to occur in the general area, and the nearest known nests are approximately 6.5 miles away along the Sacramento River at Turtle Bay in Redding and nine miles northwest at Whiskeytown Reservoir. Potential nesting habitat is present

within the action area. Although there is a low likelihood that bald eagles would nest within the action area due to the lack of established existing nests, new nesting territories could be established in the action area.

Vegetation removal and other construction activities could temporarily affect nesting and foraging activities throughout the Project area; however, this impact would be temporary and there is an abundance of suitable foraging habitat near the action area. Surveys for active raptor nests would occur between January and March. If an active nest is found, avoidance measures, such as observance of buffers with a monitor, would be determined in consultation with USFWS and implemented (*Mitigation Measures BIRD-1* and *BIRD-2*). The riparian restorative nature of the Project and additional riparian plantings would also result in long-term benefits for bald eagles by improving nesting habitat and foraging habitat. There would be a less than significant impact with mitigation incorporated.

D.2.4.2.1.1.1e(4) Osprey (SSC; MBTA)

Osprey nest from March to September in large trees, snags, cliffs or human-made structures near fish-producing waters where it can prey on fish. The Clear Creek riparian corridor also provides both foraging, perching, and nesting habitat for osprey. There currently is an osprey nest, presumably active, on a nesting platform approximately 1,600 feet west of the action area. There is dense vegetation and trees between the nest and the action area that buffer noise and potential visual disturbances.

Osprey have been observed foraging in the action area and throughout lower Clear Creek. Construction activities could temporarily affect nesting activities, if resident ospreys relocated closer to the action area, as well as foraging activities throughout the Project area; however, this impact would be temporary and there is an abundance of suitable foraging habitat in the vicinity of the action area. *Mitigation Measures BIRD-1* and *BIRD-2* would also be implemented to ensure there are no active osprey nests in the action area. The riparian restorative nature of the Project and additional riparian plantings would also result in long-term benefits for osprey by improving nesting habitat and foraging habitat. There would be a less than significant impact with mitigation incorporated.

D.2.4.2.1.1.1e(5) Little Willow Flycatcher (State Endangered; SSC; MBTA)

The little willow flycatcher is not expected to nest in the lower Clear Creek corridor as they nest in dense willow thickets in upper elevations in montane meadows and streams with meadows from 2000 to 8000 feet (Craig, D. and P. L. Williams. 1998). This species would be using the action area during their spring migration from early May to mid-June and fall migration from early August to mid-September. Little willow flycatchers may use the riparian habitats in the action area for foraging and construction activities such as vegetation removal, noise, and other disturbance associated with the construction activities could preclude birds from using habitats adjacent to the activity areas during the construction period. The loss of foraging habitat would be temporary as disturbed areas that would not become occupied with water from the new channel alignment would be revegetated, with an emphasis on riparian vegetation, preferred by birds. There is also an abundance of suitable foraging habitat near the action area along lower Clear Creek, and the restorative nature of the Project would lead to long-term benefits of

improved foraging habitat. Mature riparian trees and contiguous patches of riparian habitat would be avoided as much as feasible to maintain riparian habitat in the Project area (*Mitigation Measure 5*).

D.2.4.2.1.1.1e(6) Yellow Warbler and Yellow-breasted Chat (SSC; MBTA)

Yellow warbler and yellow-breasted chat both have been observed in the lower Clear Creek corridor. As currently designed, the Project would require vegetation removal and construction activities during the yellow warbler and yellow-breasted chat nesting periods (April 15 and May 1 to August 1, respectively). People and equipment working, vegetation removal, and noise from construction activities during the nesting season could disturb nearby birds or nests and cause young to be abandoned, harmed, or killed. Vegetation removal would also reduce foraging habitat; however, this impact would be temporary as temporarily disturbed areas would be revegetated, there is an abundance of suitable foraging habitat near the action area, and the restorative nature of the Project would lead to long-term benefits of improved foraging habitat.

Mitigation Measure BIRD-3 would be implemented to avoid and minimize effects to nesting yellow warbler and yellow-breasted chat, which involves surveying for active migratory bird nests up to five days prior to construction activities, and observing a 250-foot buffer around active nests until July 31 or nestlings fledge, as determined by a biological monitor. It also includes sequencing Project activities to begin in areas with fewer historic nest sites and proceed to higher density sites after the nesting season ends on July 31. Potential adverse effects would be reduced to a less than significant level with mitigation incorporated.

D.2.4.2.1.1.1e(7) Western Red and Pallid Bats (BLM SS; SSC)

The action area contains potential roosting and foraging habitat for western red (SSC) and pallid bats. These bat species inhabit riparian and woodland habitats that occur in and within the vicinity of the action area and that could support roosting and foraging. The western red bat roosts in tree hollows or crevices of riparian edge habitat, and forage in the action area. The pallid bat prefers to roost in open, dry habitats with rocky areas such as caves, crevices, and mines, and only occasionally in hollow trees and buildings. Project activities such as vegetation removal and general equipment operation could disturb, harm or kill bats potentially roosting in trees on-site. However, *Mitigation Measures BAT-1* through *BAT-3*, which include, but are not limited to, performing surveys for active maternity roosts and observing buffers as necessary, would be implemented to avoid and minimize directly affecting these special-status bats. Mature riparian trees that are more likely to be used as roosting sites than younger trees would also be avoided as much as feasible, and temporarily disturbed areas would be revegetated (Mitigation Measures *VEG-1, VEG-2*, and *VEG-5*). Implementation of mitigation measures would reduce potentially adverse effects to roosting western red and pallid bats to a less than significant level.

Vegetation removal could also reduce foraging habitat for these bat species. However, this impact would be temporary for up to four months, there is an abundance of suitable foraging habitat near the action area, and temporarily disturbed areas would be revegetated, with an emphasis on native riparian species. The restorative nature of the Project would also lead to long-term benefits of improved foraging habitat. There would be a less than significant impact on bats foraging in the action area.

D.2.4.2.1.1.1e(8) Spotted, Townsend's Western Big-eared, and Western Mastiff Bats (BLM SS)

The action area contains potential foraging habitat for spotted, Townsend's western big-eared, and western mastiff bats. Potential impacts on these bat species would primarily be limited to construction disturbance near dawn and dusk, their peak feeding periods. However, considering construction would be limited to 7 a.m. to 7 p.m., Monday through Saturday, and that the sun starts to rise closer to 7 a.m. and set closer to 7 p.m. in late September towards the end of the Project, this potential impact would be minor and occur over only a few weeks. There is also an abundance of suitable foraging habitat near the action area, and temporarily disturbed areas would be revegetated with native, mostly riparian species. The restorative nature of the Project would also lead to long-term benefits of improved foraging habitat for bats. There would be a less than significant impact on bats foraging in the action area.

D.2.4.2.1.1.1e(9) Northwestern Pond Turtle (SSC)

Northwestern pond turtle are known to occur in lower Clear Creek, and the pond and backwater area of the action area provide suitable foraging, basking, nesting, and over-wintering habitat. Water removal and excavation and fill activities in the pond and backwater channel could incidentally harm or kill northwestern pond turtles that may inhabit these areas. These activities could also temporarily remove cover habitat, or crush eggs that may be laid in surrounding upland areas during the nesting season (late April to early August). These potential impacts would be temporary. However, to avoid and minimize adverse effects, these areas would be surveyed by a qualified biologist prior to standing water removal and ground disturbing activities to relocate any northwestern pond turtles that may be present. Captured turtles would be relocated within the same day of capture to suitable habitat outside of the action area (*Mitigation Measure TURT-1*). The proposed action also involves creating a more diverse creek channel with islands, alcoves, and a backwater area that could support northwestern pond turtle in the long-term. The restorative nature of the Project should also lead to long-term benefits of improved foraging and breeding habitat. There would be a less than significant impact on northwestern pond turtle with mitigation incorporated.

D.2.4.2.1.1.1e(10) Less Than Significant Impact

This section discusses potential effects the Proposed Action could have on the movements and migratory corridors of native resident or migratory fish or wildlife species. The Proposed Action could remove habitat and directly harm or kill beavers inhabiting the beaver dam at the pond during water removal and excavation activities in the pond. The American beaver is not a special status species, and the Project could remove one habitat source out of a variety of suitable habitat in the region for this species; therefore, the effects of the Project would be less than significant, and are not likely to result in a trend toward Federal listing.

Installation of the control feature and construction of the alcoves and proposed channel could also remove habitat for river otters along the Clear Creek embankments, increase turbidity in the water column, and directly impact river otters in the action area. However, otters are swift and likely to move away from movement of equipment and materials in the channel. Diversion of flows from the current channel alignment to the proposed alignment would be phased to maintain

consistent flow and channel connection and minimize impacting migratory movements in lower Clear Creek. These effects would be temporary. The restorative nature of the Project would also lead to the long-term benefit of river otters by improving channel diversity and riparian habitat. The river otter is also not a special-status species and potential effects from the Proposed Action would be temporary and less than significant, and are not likely to result in a trend toward Federal listing.

Black-tailed deer may be temporarily displaced from parts of the action area during the four-month construction period. Black-tailed deer may have difficulty moving around the activity areas and would be at risk of mortality and injury from vehicle or equipment collisions; however, this risk would be minimized by limiting equipment vehicle speed to 20 mph on unpaved roads. Deer and other wildlife species temporarily displaced would be able to utilize the restored habitats upon Project completion; therefore, there would be a less than significant impact.

D.2.4.2.1.2 Mitigation Measures: FISH, VELB, BIRD, WILDLIFE, VEG, BAT, TURT

D.2.4.2.1.2.1 Fish (FISH)

- FISH-1. Fish Rescue Operations:
    - Reclamation and BLM, in coordination and consultation with the NMFS, USFWS and CDFW, would ensure that at least one permitted fish biologist is on-site to implement fish rescue operations through the use of seining, or electrofishing.
    - The most appropriate method of rescuing and relocating stranded fish from areas to be isolated from the main channel and have ponded water removed would be determined by fish biologists.
        - Initially, seining would be the preferred procedure. However, if electrofishing were deemed appropriate and necessary for the efficient and successful removal of fish, the NMFS electrofishing guidelines (NMFS 2000) would be strictly followed.
    - The fish rescue team would be comprised of qualified fishery biologists with professional experience using seines and electrofishing equipment. Up to two fish rescue teams of two to four persons would be used to facilitate efficient fish removal, reduce handling time, lower physiological stress, and reduce potential mortality rates.
        - If electrofishing were employed, a minimum of three passes through each stranding location would be conducted until most of the fish are removed.
        - Captured juvenile fish would be placed in 5-gallon buckets and segregated by size classes throughout captivity. At the end of each pass, captured fish would be transferred into buckets with aerated water or into in-river holding tanks (e.g., buckets with small holes allowing freshwater infiltration). After fish are fully recovered, they would be released to the main flowing lower Clear Creek channel. All captured adult fish would be placed in appropriately-sized containers and immediately transported and released to the main flowing lower Clear Creek channel. All rescued fish

would be counted, measured, and recorded by species at a minimum if they appear to be stressed the number and run-type of Chinook salmon and steelhead captured, and the number of fish accidentally killed prior to release, would be reported to NMFS and CDFW.

- FISH-2. NMFS and CDFW determined the in-water work window of July 1 to September 30 to minimize impacts to anadromous fish. This in-water work period is when flows in Clear Creek are lowest, stream temperatures are high and densities of anadromous fish are at their lowest. In-water work would not occur outside of this window, unless approved by NMFS and CDFW. Reclamation coordinated with NMFS and CDFW to install the stream crossing in the backwater channel for initial equipment access for vegetation removal June 1, and to allow removal of the stream crossings by September 30, with the possibility of extending this window to October 14 with NMFS and CDFW approval.
- FISH-3. The contractor would design all stream crossings to ensure that conditions are maintained for effective upstream and downstream fish passage, at all times and under all appropriate flow conditions.
- FISH-4. Prior to unavoidable in-water activities, equipment or materials would be operated/placed slowly and deliberately to alert and cause any adult and juvenile salmonids to shift away from the activity area. This would be repeated after extended periods of inactivity that give fish time to reoccupy the site.
- FISH-5. In-water activities, such as construction of the proposed channel alignment, new alcoves, and the logjam would be isolated from Clear Creek by constructing diversion berms. Turbidity curtains would be installed to contain any turbid water. Fish rescue and relocation operations would occur prior to pumping of ponded water or construction activities.
- FISH-6. Water intake pumps used to pump ponded water from isolated work areas prior to in-water construction would be screened with 3/32 inch mesh, complying both NMFS's 1997 Fish Screening Criteria for Anadromous Salmonids and CDFW's 2000 Fish Screening Criteria (with steelhead present) requirements. Additionally, the intake pumps will be covered with a velocity reducing device to further prevent debris and aquatic organisms from entering the pump system.

D.2.4.2.1.2.2 Valley Elderberry Longhorn Beetle (VELVB)

- VELB-1. A qualified biologist would provide training for all contractors, work crews, and any onsite personnel on the status of the VELB, its host plant and habitat, the need to avoid damaging the elderberry shrubs, and the possible penalties for noncompliance.
- VELB-2. When possible, a minimum setback of 20 feet from the dripline of all elderberry shrubs would be established. These areas would be fenced, flagged, and maintained during construction. Due to the proximity of the elderberry shrubs to the creek, it would be difficult to observe the required 20-foot radius buffer zone for protection of all the elderberry shrubs along portions of the creek restoration areas. For those rare instances when 20-foot minimum buffer zone are not possible, the Reclamation is proposing a 14-foot radius or larger buffer zone at these locations, using concrete barriers for protection.

- VELB-3. All placement of barriers to protect elderberry shrubs adjacent to the construction areas shall be completed prior to construction activity.
- VELB-4. Herbicides and insecticides will not be used within the elderberry buffer zones discussed in VELB-2. Any herbicides and insecticides used in other areas of the project area will abide with the Redding BLM's Integrated Vegetation Management Plan Environmental Assessment (DOI-BLM-CA-N060-2016-0021-EA).
- VELB-5. A qualified biologist would monitor the work area at appropriate intervals to assure that all avoidance and minimization measures are implemented. The amount and duration of monitoring would depend on the project specifics and would be coordinated with the Service biologist.

D.2.4.2.1.2.3 Raptors and Migratory Birds (BIRD)

- BIRD-1. Raptor Protection: Any tree removal, vegetation clearing, or the onset of potentially disturbing construction activities shall occur between September 1 and January 1 (outside of the nesting season for raptors with potential to occur within, or in the vicinity of the project site). Note: Also see measure WILD-1.
- BIRD-2. Surveys for active raptor nests to determine potential presence of nesting raptors will occur between January and March and be conducted by a qualified biologist. If an active nest is found, avoidance measures, such as observance of buffers, would be determined in consultation with USFWS and/or CDFW and implemented. The Raptor Nesting Season is January 1 through August 31. See also BIRD-3.
- BIRD-3. Non-raptor/migratory bird species: If Project activities, including vegetation removal, cannot be done outside of the migratory bird nesting season in this region (March 1 to July 31), the following measures would be implemented:
    - Pre-Project surveys for active migratory bird nests within 500 feet of activity areas would occur up to 7 days prior to construction;
    - If active bird nests are observed, measures from the USFWS *Nationwide Standard Conservation Measures* for migratory birds would be implemented. These measures include establishment of a 250-foot buffer, unless a qualified biologist determines that smaller buffers would be sufficient to avoid impacts to nesting birds. Factors to be considered for determining buffer size would include: the presence of natural buffers provided by vegetation or topography; the bird species affected; nest height; locations of foraging territory; and baseline levels of noise and human activity. The buffer would be monitored by a biological monitor and maintained until July 31, or until nestlings fledge. NOTE: No nests area allowed to be removed during the nesting period, as per Fish and Game Code.3503.5.
    - If it is determined that work needs to occur within the 500-foot avoidance buffer, a qualified biologist would determine, based on location and activity specifics, an appropriate minimum buffer zone. The nest and attending adults would then be monitored during Project activities within the 250-foot buffer. If at any time the qualified biologist determines that Project activities may have an adverse effect on nest-success or bird health, Project activities would immediately halt and the 250-foot buffer would be re-established.

        - Project phasing would be sequenced to begin in areas with fewer known nest sites and proceed to higher density sites after the nesting season ends July 31.

- BIRD-4. If Project activities occur during the western DPS yellow-billed cuckoo nesting season (June 1 to August 15), a protocol survey would be performed by a biologist with an ESA Section 10(a)(1)(A) permit at the start of the bird's nesting season, prior to the start of activities. If an active western DPS yellow-billed cuckoo nest is observed, the following measures would be implemented:
    - Construction fencing would be installed around the nest to create a 250-foot buffer from activities. The 250-foot buffer is not to be reduced;
    - A USFWS-approved biologist would monitor for any potential disturbance to the bird caused by the Project, until the nest is deemed no longer active (until August 15 when western yellow-billed cuckoo nesting season ends). If Project activities are determined to be adversely affecting the nesting birds or fate of the nest, the biologist would have the authority to stop activities and would contact USFWS to determine appropriate measures to continue construction.
- BIRD-5. Mature riparian trees and vegetation, and contiguous patches of riparian habitat would be avoided as much as feasible to maintain existing riparian habitat in the Project area.

D.2.4.2.1.2.4 Wildlife (WILD)

- WILD-1. Prior to construction, a biologist will inspect the project site for signs of denning by ringtails. If ringtails are found to be denning, construction activities will be suspended until a qualified biologist, in consultation with CDFW, can establish appropriate measures to protect ringtail.

D.2.4.2.1.2.5 Bats (BAT)

- BAT-1. Surveys for special-status bat species by a qualified bat biologist would be performed prior to vegetation removal during bat maternity season (May 1–August 31), no less than 7 days and no more than 14 days prior to vegetation removal.
- BAT-2. If active special status bat species are detected, efforts would be made to locate maternity roosts. If maternity roosts are found, a buffer determined by a biologist would be established and observed until August 31, or the roost is no longer active.
- BAT-3. If roosts are determined to be present and must be removed, the bats would be excluded from the roosting site before it is removed. Exclusion methods may include use of one-way doors at roost entrances (bats may leave, but not re-enter), or sealing roost entrances when the site can be confirmed to contain no bats.

BAT-4. All vegetation clearing within potential western red bat roosting habitat (contiguous woody riparian habitat in stands at least 150 ft. by 150 ft. or larger, particularly those containing trees larger than 12 inches diameter at breast height and that have crevices and holes) shall be conducted between August 31 and May 1. These dates correspond to the time period when bats would not be caring for non-volant young and have not yet entered torpor.

Tree removal may occur prior to August 31st based upon site-specific tree removal plan approved by CDFW. The plan shall consider or include the following: Monitoring of the affected trees shall be conducted using bat detection equipment within 5 days of tree removal. If red bats are not present, tree removal can proceed. If red bats are present, a dusk survey on the night prior to tree removal may help confirm the use of that tree by bats. If bats are potentially using the tree, a qualified biologist shall monitor removal/trimming of trees that provide suitable bat roosting habitat. Tree removal/trimming shall occur over two consecutive days. On the first day in the afternoon, limbs and branches shall be removed using chainsaws only. Limbs with cavities, crevices, or deep bark fissures shall be avoided, and only branches or limbs without those features shall be removed. On the second day, the entire tree shall be removed. Prior to tree removal/trimming, each tree shall be shaken gently and several minutes shall pass before felling trees or limbs to allow bats time to arouse and leave the tree. The biologist shall search downed vegetation for dead or injured bat species and report any dead or injured special-status bat species to CDFW. All bat observations should be reported to CDFW.D.2.4.2.1.2.6 Vegetation (VEG)

- VEG-1. Impacts to existing vegetation, especially mature riparian trees and contiguous communities, would be avoided to the extent feasible.
- VEG-2. Disturbed areas would be revegetated with native plant species.
- VEG-3. The riparian and wetland restoration would follow the restoration plan prepared by a contracted botanist/riparian ecologist, in coordination with USFWS, Reclamation, and BLM.(North State Resources 1999).
- VEG-4. Prior to arriving at the construction area, all equipment used for the Project would be thoroughly washed off-site to remove invasive NIS plant seed, stems, etc. and inspected to prevent transfer of aquatic invasive species, such as quagga mussel and New Zealand mud snail.
- VEG-5. Sediment would be salvaged to support revegetation efforts.
- VEG-6. Any off-site rock, gravel, or sediments would be from NIS plant seed-free source(s).

D.2.4.2.1.2.7 Turtles (TURT)

- TURT-1. Prior to standing water removal or construction of the stream crossing, the pond and backwater channel would be surveyed by a qualified biologist to relocate northwestern pond turtles that may be present. Any turtles that are discovered would be captured and moved to suitable habitat areas outside the action area, preferably downstream. All turtles would be relocated the same day they are captured and as quickly as possible to reduce stress on the animal.

D.2.4.2.2 Waters of the U.S. and State, and Riparian Habitat

b, c) *Less Than Significant with Mitigation Incorporated*. This section discusses potential effects the Proposed Action could have on riparian habitat and waters of the U.S., as defined by CWA, Section 404. Proposed mitigation measures are listed at the end of this resource subsection. The purpose of the Project is to improve anadromous salmonid passage and juvenile rearing habitat by restoring this portion of lower Clear Creek to a historic, diverse channel alignment and

planting native riparian plants to encourage a more contiguous corridor of riparian habitat. These restoration activities require the majority of work to occur within the ordinary high water mark (OHWM) of lower Clear Creek and the active floodplain. It is important to note that placement of fill in lower Clear Creek and the active floodplain, and habitat structures would not convert lower Clear Creek to dry land, significantly increase the bottom elevation of the creek, or change the use of the stream.

Vegetation clearing and grubbing is anticipated for the majority of these areas, which includes riparian communities.

A 0.09-acre seasonal wetland will be expended and enhanced as part of project. The current wetland feature would be over excavated, fine sediment placed, and planted with wetland plants to increase the soils, hydrology and wetland function.

The Proposed Action would result in the temporary fill, permanent fill, and permanent excavation below the OHWM of Clear Creek, which is a water of the U.S./State. Table 5 and Figure 6 details the area and location of temporary and permanent impacts from Project activities. There would be a total of 7.55 acres of temporary impacts to Clear Creek, from the placement of fill below the OHWM, and 10.35 acres of permanent impacts. The area would be restored to pre-project conditions and revegetated as the final Project close-out activity, within 30 days of all other revegetation activities concluding (*Mitigation Measure WOUS-3*). Revegetation would be done according to a revegetation plan prepared by Reclamation and BLM (*Mitigation Measure VEG-3*).

Table 5. Proposed Action Impacts to Waters of the U.S./State

Wetlands/Waters	New Water Type	Acres
Seasonal Wetland	0.1	0.05
Seasonal Wetland (PE)	0.07	0.23
Seasonal Wetland (RFW)/ Riparian Wetland	0.01	0.003
Perennial Wetland (RPW)/ Riparian Wetland	0.05	0.16
Perennial Wetland (FEM)/ Emergent Wetlands	1.07	0.66
Palustrine Emergent/ Hill Seep	0.08	0
Ephemeral Drainage	0.24	0.15
Intermittent Channel	0	0.04
Pond	0.13	2.71
Perennial Channel	5.80	6.34
Total Impacts	**7.55**	**10.35**

There would be approximately 10.35 acres permanent impacts to Clear Creek due to the placement of fill materials that includes soils, rock, and wood to construct the project features.

The project would increase the function and value of the Clear Creek by creating the new channel and floodplain complex therefore, no compensatory mitigation is proposed. The project would change the waters of the United States into a seasonal wetland complex and wetland pond complex. Overall, the project would improve the quality of habitat for aquatic species by

increasing the aquatic function and services within the project area. There would be no net loss to waters of the United States. Table 3 list the changes in water type.

d. The Proposed Action would restore and enhance aquatic habitats and conclude the final phase of the Lower Clear Creek FSCRP, which aims to improve salmonid spawning and rearing habitat and reduce fish stranding and improve fish passage in the two-mile reach of lower Clear Creek heavily damaged from placer, dredger, and in-stream aggregate mining for gold and gravel. The restored channel would improve floodplain function, which would support growth and contiguous riparian habitat in the lower Clear Creek corridor in the long-term. The Proposed Action would result in an increase of Clear Creek channel by 600 linear feet due to the longer alignment of the new channel and the maintenance of the current channel as a backwater area at higher flows. Therefore, implementation of the proposed Project would result in net beneficial

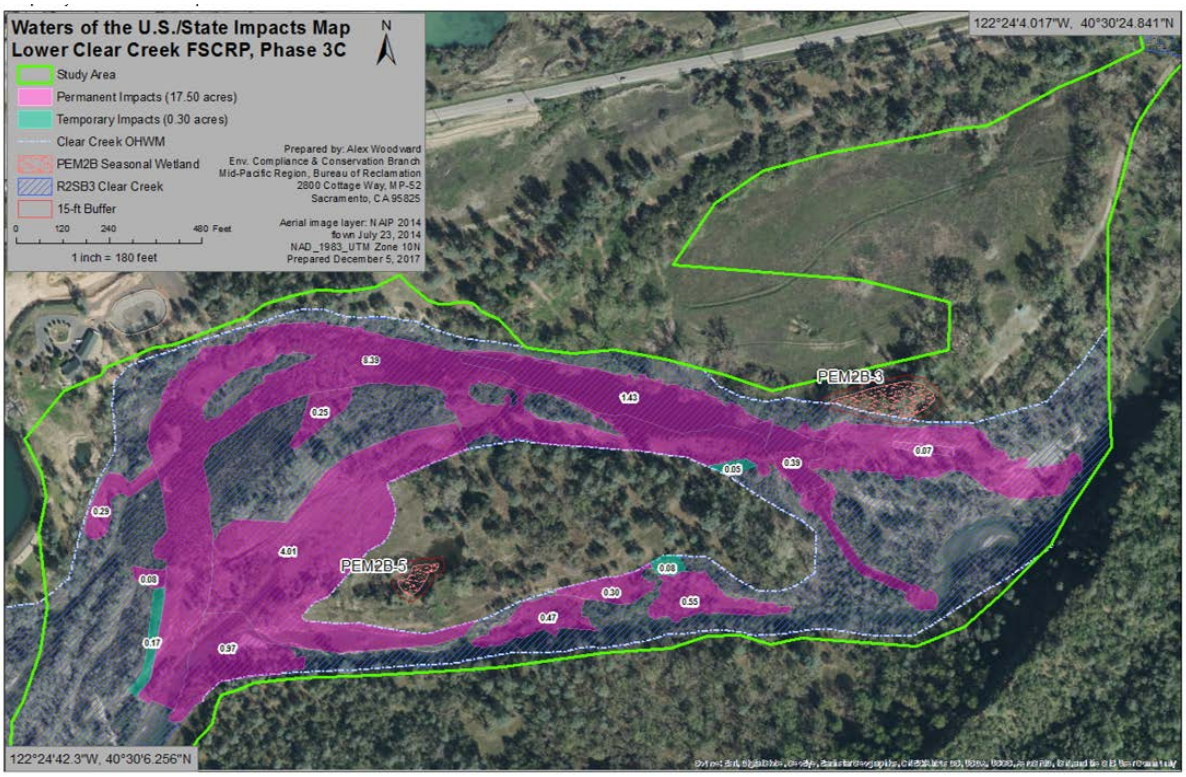

Figure 6. Temporary and Permanent Impact Areas

Table 6. Change to Change to Type of Waters of the U.S.

Wetlands/Waters	New Water Type	Acres
Seasonal Wetland (PE)	Perennial Channel	0.22
Seasonal Wetland (PE)	Floodplain Complex	0.07
Seasonal Wetland (RFW)/ Riparian Wetland	Perennial Channel	0.003
Perennial Wetland (FEM)/ Emergent Wetlands	Perennial Channel	0.12
Perennial Wetland (FEM)/ Emergent Wetlands	Seasonal Wetland	0.18
Ephemeral Drainage	Perennial Channel	0.01

Wetlands/Waters	New Water Type	Acres
Ephemeral Drainage	Seasonal Wetland	0.23
Intermittent Channel	Perennial Channel	0.04
Intermittent Channel	Seasonal Wetland	0.04
Pond	Perennial Channel	0.20
Pond	Seasonal Wetland	0.06
Perennial Channel	Seasonal Wetland	1.92
Perennial Channel (Floodplain)	Perennial Channel (new active channel)	5.68
Perennial Channel (Floodplain)	Floodplain Complex	1.60
	Total	**10.37**

effects to waters of the U.S./State and riparian habitats. There would be a less than significant impact on riparian habitat and federally protected wetlands as defined by Section 404 of the Clean Water Act.

e, f) *No Impact*. The Project area is not within a Timber Protection Zone. There would be no impact. Reclamation has coordinated with BLM regarding areas of disturbance, construction activities, and restoration of the Project site after construction and has not identified any conflicts with the BLM's 1993 Redding Field Office Resource Management Plan. There would be no impact.

D.2.4.2.2.1 Mitigation Measures: Waters of the U.S. and State (WOUS/S):

- WOUS/S-1. Wetlands located near construction areas, and at risk of inadvertent disturbance, would be protected with high-visibility fencing installed 15 feet from the feature.
- WOUS/S-2. Storm water runoff would be directed away from wetland features and waters of the U.S./State with water bars or other storm water controls.
- WOUS/S-3. Temporarily impacted waters of the U.S./State would be restored to pre-project grade and revegetated within 30 days of project completion, according to a revegetation plan prepared by Reclamation and BLM.
- WOUS/S-4. Existing access roads would not be widened or improved. Ephemeral drainages and seeps along these roads would be avoided.

D.2.5 Cultural Resources

Would the Project?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
(a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☐	☐	☐	☒

Would the Project?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
(b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☐	☐	☒
(c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☐	☒
(d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☐	☒

A cultural resource is a broad term that includes prehistoric, historic, architectural, and traditional cultural properties. Cultural resources that meet criteria for listing on the California Register of Historical Resources (CRHR) (defined at 14 CCR § 15064.5[a]) are called "historical resources;" and cultural resources that meet the criteria for listing on the National Register of Historic Places (NRHP) (defined at 36 CFR § 60.4) are called "historic properties." While the CRHR and NRHP significance criteria are similar, NRHP is given precedence in this analysis because cultural resources eligible for the NRHP are also eligible for inclusion in the CRHR, but the reverse is not necessarily true (PRC 5024.1[c]). Therefore, employing the federal standards would fulfill both federal and state requirements for cultural resources.

D.2.5.1 Affected Environment

This section describes existing conditions for cultural resources within the project area. All information regarding existing conditions was collected through an examination of current literature, archival and record search information, and archaeological inventory survey data related to the project area. Reclamation also requested information regarding cultural resources from the Redding Rancheria, pursuant to 36 CFR § 800.3(f)(2) as well as comments or concerns regarding sacred sites on Federal land or access to sacred sites on Federal land under Executive Order 13007. Reclamation also requested information regarding cultural resources from the Winnemem Wintu Tribe, pursuant to 36 CFR § 800.4(a)(3).

Human use and occupation of the local region extends from current to approximately 8,000 years before present. Information regarding archaeological and ethnographic context is contained in a confidential cultural resources inventory report. One cultural resource, a section of the abandoned old Clear Creek Road has been documented within the project area. This road segment was evaluated and determined not eligible for inclusion in the NRHP.

D.2.5.2 Environmental Consequences

a–d) *No Impact*. No significant cultural resources, historical resources, or historic properties were identified within the Project area, therefore there would be no impacts to this type of resource from any of the activities in the Proposed Action. All proposed activities within the floodplain are in a heavily, previously disturbed setting. Existing roads used for access would not need widening. Temporary roads and staging/stockpiling areas would be situated in previously disturbed settings and would be seeded for revegetation.

No human remains have been identified in the Project area. The Paleontological Resources Protection Act (43 CFR § 49.1) mandates BLM and Reclamation to protect and preserve paleontological resources on Federal land. Furthermore, under 43 CFR § 49.30, the agencies are to inventory and monitor paleontology resources where found on a project site. The base of the cliff along the active stream was investigated for weathered out fossils by a qualified paleontologist. A field assessment showed that the clast composition is mixed, and includes metamorphic and sedimentary clasts. There was no discernable change in composition throughout the section. Additionally, the composition and distribution is similar to the tailings adjacent to the stream in the historic channel. These layers have been assigned to "Qa" or Quarternary alluvium, namely, deposits of Holocene to recent streams. The paleontologist determined that the exposed bank along the north side of the active channel are young fluvial deposits and are not likely to contain significant fossils, due to age (SubTerra Consulting 2018). No paleontological resources or sites or unique geologic features have been identified in the Project area; therefore, there would be no impact. In addition, no Indian Sacred Sites as defined under the Federal Executive Order 13007 have been identified in the Project area.

D.2.6 Geology and Soils

Would the Project?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
(a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
(i) 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 Division of Mines and Geology Special Publication 42.	☐	☐	☐	☒
(ii) Strong seismic ground shaking?	☐	☐	☐	☒
(iii) Seismic-related ground failure, including liquefaction?	☐	☐	☐	☒
(iv) Landslides	☐	☐	☐	☒
(b) Result in substantial soil erosion or the loss of topsoil?	☐	☒	☐	☐
(c) 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?	☐	☐	☐	☒
(d) Be located on expansive soil, as defined in Table 18-1-B of the most recently adopted Uniform Building Code creating substantial risks to life or property?	☐	☐	☐	☒
(e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒

D.2.6.1 Affected Environment

Clear Creek, one of the major tributaries of the upper Sacramento River, drains the eastern Trinity Mountains. Alluvial plain and terrace gravels of lower Clear Creek, at the northwest edge of the Sacramento Valley, contain placer gold that has been mined since the Gold Rush by various methods including hydraulic mining and dredging. In addition, from the 1950s to the 1980s aggregate-mining operations removed gravel from the lower Clear Creek flood plain. The Klamath Mountains of northern California and southwestern Oregon have produced significant amounts of gold, both from placer and lode deposits. The most important placer deposits occur along the major rivers, including Clear Creek and the Trinity, Klamath, and Smith Rivers, and their tributaries (Clark, 1970). The placers of lower Clear Creek have been mined intermittently by various methods since the 1850s (Clark, 1970; Averill, 1933), with the result that all the alluvial gravel forming the flood plain of Clear Creek and most of the gravel capping adjacent terraces has been disturbed. In addition, in recent decades gravel has been removed from the lower Clear Creek alluvial system for aggregate. (Ashley and Rytuba 2008).

Mercury occurrence and problems are discussed in *Section 3.2.9, Hydrology and Water Quality*

D.2.6.2 Environmental Consequences

a) *No Impact*. The Alquist-Priolo Earthquake Fault Zone is located in Los Angeles County, so the Project in Shasta County will not be affected. Therefore, the proposed Project would not expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death as a result of an Alquist-Priolo Earthquake Fault rupture.

b) *Less Than Significant with Mitigation Incorporated*. Construction activities involving soil disturbance, such as excavation, stockpiling, and grading could result in increased erosion. However, substantial erosion will be avoided and minimized with implementation of *Mitigation Measures TURB-1*, *TURB-4*, and *TURB-9* listed in *Section 3.2.8, Hydrology and Water Quality*, which include preparing and implementing a Storm Water Pollution Prevention Plan, to limit ground disturbance and control erosion and sediment.

c) *No Impact*. The Project involves relocating the existing Clear Creek channel to its general historic alignment, within a riverbed, and is designed to return this reach to its previous stable alignment that was altered by gravel mining. There are no landslides mapped in the vicinity of the Project. Minor amounts of erosion could occur upon initial introduction of flows through the alignment because the creek had this alignment prior to gravel mining and areas with clay layers would be avoided; therefore, the grade and substrate of the proposed channel would be stable. Excavated material would be processed and reused as fill within the Project area and spread across the stockpile area and seeded. The Project would not result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse.

d) *No Impact*. The restoration activities are not the type of actions which could create substantial risks to life or property.

e) *No Impact*. No septic tanks are proposed for the Project; therefore, no impacts are anticipated.

D.2.7 Greenhouse Gas Emissions

VII. Greenhouse Gas Emissions. Would the Project?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
(a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐
(b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐

D.2.7.1 Affected Environment

Climate change refers to significant change in measures of climate (e.g., temperature, precipitation, or wind) lasting for decades or longer. Many environmental changes (changes in sun's intensity, changes in ocean circulation, deforestation, urbanization, burning fossil fuels, etc.) can contribute to climate change (EPA 2009). Gases that trap heat in the atmosphere are often called greenhouse gases (GHG). Some GHG such as carbon dioxide (CO2) occur naturally and are emitted to the atmosphere through natural processes and human activities. Other GHG (e.g., fluorinated gases) are created and emitted solely through human activities. The principal greenhouse gases that enter the atmosphere because of human activities are CO2, methane, nitrous oxide, and fluorinated gasses (EPA 2009).

Burning of fossil fuels is considered a major contributor to perceived global climate change. During the past century, humans have contributed to the amount of GHG in the atmosphere by burning fossil fuels such as coal, natural gas, oil, and gasoline to power our cars, factories, utilities, and appliances. Some CO2 is liberated naturally, but this may be augmented greatly through human activities. Increases in air temperature may lead to changes in precipitation patterns, runoff timing and volume, sea level rise, and changes in the amount of irrigation water needed due to modified evapotranspiration rates. These changes may lead to impacts to Nevada and California's water resources and Project operations.

In 2002 California adopted Assembly Bill 1493 (AB 1493) which required the California Air Resources Board to develop and implement regulations to reduce automobile and light truck GHG emissions beginning with their respective 2009 models. The State has adopted Assembly Bill 32 (AB 32) and has identified GHG reduction goals. While the emissions of one single Project would not cause global climate change, the State's objective is to reduce GHG emissions. In considering when to disclose projected quantitative GHG emissions, the Council on Environmental Quality provided a reference point of 25,000 metric tons of carbon dioxide equivalent emissions on an annual basis below which a GHG emissions quantitative analysis is not warranted unless quantification below that reference point is easily accomplished (CEQ 2014). AB 32 established 25,000 metric tons/year as the threshold for mandatory emissions reporting for stationary sources. California did not establish a threshold for cumulative emissions from temporary mobile sources, such as construction equipment, which would be lower than permanent stationary sources.

D.2.7.2 Environmental Consequences

a, b) *Less Than Significant Impact*. The proposed action would involve a short-term increase in CO2 emissions from equipment operation during Project construction. Considering CO2 emissions cannot be precisely calculated at this time, the estimated CO2 emissions for a Project similar in scope and magnitude is used for GHG analysis. Analysis has been completed for channel rehabilitation projects similar to the proposed action, with the determination that they would produce approximately 3.0 metric tons of CO2 per day over the life of the projects, which equates to approximately 280 tons/year (NCRWQCB and USBR 2009). Since the estimated annual emissions of CO2 anticipated to be emitted from construction of the proposed action is well below 25,000 metric tons/year, the contribution of GHG is negligible. As discussed in *Section 3.2.2, Air Quality,* SMM and BAMM are measures adopted by the SCAQMD intended to reduce cumulative air quality impacts, and implementation of *Mitigation Measure AQ-2* through *AQ-6* listed in that section would further minimize CO2 emissions. Vegetation replanting and natural re-seeding within the existing riparian area would also offset the total Project GHG emissions in the long term.

D.2.8 Hazards and Hazardous Materials

Would the Project?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
(a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☒	☐	☐
(b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☒	☐	☐
(c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☒	☐	☐
(d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
(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 for people residing or working in the Project area?	☐	☐	☐	☒
(f) For a Project within the vicinity of a private airstrip, would the Project result in a safety hazard for people residing or working in the Project area?	☐	☐	☐	☒
(g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
(h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires,	☐	☐	☐	☒

Would the Project?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?				

D.2.8.1 Affected Environment

The affected environment is the riparian corridor of lower Clear Creek. Historic mining and dredging occurred in the creek channel. The closest known Super Fund site is the Iron Mountain Mine located approximately two miles north of Whiskeytown Reservoir

D.2.8.2 Environmental Consequences

a-c) *Less Than Significant with Mitigation Incorporated.* Activities associated with the Proposed Action would utilize potentially hazardous materials (e.g., oil and fuels) associated with the operation of vehicles and construction equipment during construction. These materials are similar to those routinely used for other types of construction projects throughout Shasta County. The widespread use and associated transport of these materials along the highways 1and county roads in Shasta County combined with the low level of incidents (spills), suggest that impacts related to rehabilitation activities would be similar to that elsewhere in the county. *Mitigation Measures HAZ-1* through *HAZ-5* would also be implemented to avoid and minimize potential hazardous material spills, which include preparation and implementation of a Spill Prevention, Control, and Containment Plan. Given the temporary nature of construction and the distance from residences, schools, and frequently used recreation areas, implementation of mitigation measures would minimize the potential for any Project-related hazardous materials becoming a public hazard to a less than significant level.

d–f) *No Impact*. Not applicable

g) *No Impact*. The completed Project would not result in any physical features that would impair implementation of, or physically interfere with, emergency evacuations. During construction, implementation of the standard traffic control measures would reduce impacts to a less than significant level. As a result, the proposed Project would not have an adverse effect on emergency response plans or evacuation plans, and there would be no impact.

h) *No Impact*. Most activities occur within or adjacent to the Clear Creek riparian corridor. Potential fuels within the boundaries of the Proposed Action are generally noncontiguous and Clear Creek serves as a substantial natural firebreak. The types and amounts of fuels and their continuity may be decreased temporarily by implementation of the Proposed Action, particularly in areas subject to vegetation removal, but any such changes would not be significant with respect to fire potential and behavior. In the long-term, potential fire conditions would be similar to those that currently exist.

D.2.8.3 Mitigation Measures: Hazards and Hazardous Materials (HAZ)

- HAZ-1. The contractor would develop and implement a Spill Prevention, Control and Countermeasures Plan (SPCCP) with the CV Water Board prior to the onset of

construction to regulate the use of hazardous materials, such as petroleum-based products for equipment fuel and lubricants. The SPCCP would include measures to be implemented onsite that would keep construction and hazardous materials out of waterways and drainages. The SPCCP would include provisions for daily checks for leaks; hand-removal of external oil, grease, and mud; and the use of spill containment booms for refueling.

- HAZ-2. Soils contaminated with fuels or chemicals would be disposed of in an approved landfill to prevent potential discharge to surface waters.
- HAZ-3. Temporary diversion berms would be used to isolate construction areas from flowing waters where feasible.
- HAZ-4. All construction equipment refueling and maintenance would be restricted to designated staging areas located away from streams and sensitive habitats.
    - On-site fuels and toxic materials would be placed or contained in an area protected from direct runoff, outside of water bodies, such as in the Alternative Stage, Stockpile, Processing Area.
    - Spill kits would be maintained at fueling areas and other appropriate locations.
- HAZ-5. Signs would be placed along the road, warning of large equipment entering/exiting Clear Creek Road.

D.2.9 Hydrology and Water Quality

the Project?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
(a) Violate any water quality standards or waste discharge requirements?	☐	☒	☐	☐
(b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☐	☒
(c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☐	☒	☐	☐
(d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☐	☒	☐	☐
(e) Create or contribute runoff water which would exceed the capacity of existing or planned	☐	☐	☐	☒

the Project?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
stormwater drainage systems or provide substantial additional sources of polluted runoff?				
(f) Otherwise substantially degrade water quality?	☐	☒	☐	☐
(g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
(h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	☒
(i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☒
(j) Inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒

D.2.9.1 Affected Environment

As stated in the Project Description, lower Clear Creek hydrology has been drastically changed since the gold mining days. Flows within lower Clear Creek vary seasonally. With the exception of some minor accretion flows from side tributaries, flows in Lower Clear Creek are controlled by the releases from Whiskeytown Dam. The United States Geological Survey (USGS) maintains a gauging station on Clear Creek located approximately 6.5 miles upstream of the Project. The USGS station (#11372000) has been collecting discharge data since October 1, 1940. Table 4 contains daily average discharge data broken up into monthly data from October 1, 1940 to October 15, 2017. The table also includes the monthly data count to show data representation.

Table 7: Clear Creek monthly flows (cfs) from October 1940 to October 2017

Month	Count	Minimum	Average	Maximum
January	2,387	41	461	8,590
February	2,175	48	599	14,100
March	2,387	48	487	15,100
April	2,310	46	366	12,500
May	2,387	44	215	3,800
June	2,310	40	131	1,190
July	2,387	16	76	295
August	2,387	11	64	827
September	2,310	9	90	1,590
October	2,401	13	127	3,390
November	2,310	28	181	2,530
December	2,386	38	355	14,500

Source: USGS 2017

Water quality in lower Clear Creek is generally of excellent quality. However, the creek is CWA 303(d) Listed as impaired for mercury. This is likely due to historic mining activities in the creek.

D.2.9.2 Environmental Consequences

a, f) *Less than Significant Impact with Mitigation Incorporated*. Construction of Phase 3C of the Lower Clear Creek FSCRP would result in major earthwork involving realigning a portion of Clear Creek to return it to its historic meander resulting in better fish passage and juvenile salmonid rearing habitat. These construction activities have the potential to increase erosion, sedimentation and disturb heavy metals such as mercury. Additionally, construction equipment would require the use of hazardous materials such as gasoline and engine oil, which could contaminate runoff that could enter Clear Creek. Discharge of sediment or hazardous construction materials into Clear Creek could result in violating water quality standards. However, *Mitigation Measures TURB-1* through *TURB-6* would be implemented to avoid and minimize the discharge of sediment or hazardous material into Clear Creek. For example, if a spill were to occur, a Spill Prevention Control and Countermeasure Plan (SPCCP) would be developed and implemented by the contractor to mitigate any spill that may impact surface water quality or groundwater quality. A Storm Water Pollution and Prevent Plan (SWPPP) would also be developed and implemented by the contractor to control the potential sediment input downstream. To ensure the performance of the SWPPP and comply with the CWA, Section 401 Water Quality Certification, a qualified individual would perform turbidity monitoring upstream for ambient in-situ conditions, and compare the ambient results to those collected 300 feet downstream of in-water work. The standard frequency of monitoring and turbidity limits as described in the Water Quality Certification, within Basin Plan criteria, would be followed.

The CV Water Board is also anticipated to grant Reclamation an additional 15 NTUs exceedance over ambient conditions during in-water construction, along with appropriate averaging periods that may be applied provided that beneficial uses would be fully protected, as approved by CV Water Board staff. In addition to monitoring for turbidity, a qualified individual would sample for settleable material 300 feet downstream of the construction to ensure settleable material does not exceed limits established in the Construction General Permit. If turbidity or settleable material results are in violation of the Water Quality Certification, construction would stop until levels drop to below thresholds. In addition, the CV Water Board would be notified of any violation that occurs during in-water work. Further water quality mitigation measures are listed in *Mitigation Measures TURB-1* through *TURB-7*.

Construction also has the potential to disturb and release mercury downstream of the Project. As a result, Reclamation's Environmental Monitoring Branch conducted a one-time investigation of mercury levels in sediments of the pond that would make up part of the new alignment of Clear Creek. None of the samples resulted in the detection of total mercury above the Toxic Threshold Limit Concentration (TTLC) of 20 mg/kg (Reclamation, 2016). However, all of the samples tested positive for methylmercury above the RL (RL = 0.0503 ng/g dry) ranging from 0.078 to 5.540 ng/g and averaging 1.228 ng/g. While there is no TTLC for methylmercury, the CV Water Board has adopted thresholds for methylmercury for the Sacramento-San Joaquin Delta in the Basin Plan. These methylmercury thresholds apply to this Project because of the "Tributary Rule". The Tributary Rule states that upstream projects shall not contribute to downstream water quality impairments. The Basin Plan threshold for methylmercury is 0.08 mg/kg (CVRWQCB

2016). The highest concentration of methylmercury collected from the pond was 5.550 ng/g. 5.550 ng/g is equal to 0.00554 mg/kg, significantly less than the Basin Plan methylmercury threshold. In addition, the newly created backwater channel (see Figure 4), has the potential to produce methylmercury if the channel does not receive adequate turnover flows. It is anticipated that the backwater channel would have adequate amount of turnover as half of the backwater channel becomes inundated with flows above 500 cfs.

As a result, the Project would have a less than significant impact with mitigation incorporated on water quality thresholds and would not substantially degrade water quality.

b) *No Impact*. Construction of Phase 3C of the Lower Clear Creek FSCRP would not deplete groundwater supplies or interfere with groundwater recharge resulting in groundwater loss. The Project would involve a small amount of standing water removal from the pond and backwater area. A standing water removal plan would be prepared with the CV Water Board and implemented during construction. Water would either be pumped to water trucks for onsite dust control, or to settling tanks where additional sediment would settle, and water infiltrates. The water removal would result in no onsite lost water, and no impact to groundwater.

c, d) *Less than Significant Impact with Mitigation Incorporated*. The Project involves substantially altering the existing drainage pattern of lower Clear Creek. However, the new channel would be returning Clear Creek to its more natural historic drainage pattern and improve floodplain function in this part of lower Clear Creek. Construction of the new channel would be completed prior to gradually diverting Clear Creek flows into the new channel. This would minimize erosion potential. In addition, the Project would adhere to the Clean Water Act, Section 401 Water Quality Certification which requires monitoring of turbidity upstream and downstream of the Project during construction (*Mitigation Measures TURB-1* through *TURB-9*). The Project would be required to meet Basin Plan criteria for turbidity and settleable material; therefore, the Project would not substantially increase the rate or amount of runoff that would result in flooding on or off-site or increased sedimentation. This impact is considered less than significant with mitigation incorporated.

e) *No Impact*. The Project does not involve installation or replacement of stormwater drainage systems and would not result in additional sources of polluted runoff.

g, h, i) *No Impact*. The Project does not involve construction of housing or placement of housing within the 100-year flood hazard area. In addition, the new channel would not impede or redirect flood flows that would result in downstream flooding exposing people or structures to a significant risk of loss or death from failure of a levee or dam.

j) *No Impact*. The Project would not result in a seiche, tsunami or mudflow.

D.2.9.2.1 Mitigation Measures: Turbidity and Erosion (TURB)
Measures to avoid and minimize the potential for adverse effects of turbidity or resuspension of sediment during instream work on the listed anadromous species shall include the following:

- TURB-1. The contractor would develop and implement a Storm Water Pollution Prevention Plan (SWPPP) in coordination with the CV Water Board and other regulatory

agencies. The SWPPP would include measures to minimize erosion and storm water sediment runoff to Clear Creek, such as sediment containment devices, protection of construction spoils, and proper installation of diversion berms. This may include but is not limited to straw bales, straw wattles and silt fences around ground disturbance and stockpiles.

- TURB-2. During in-water work, turbidity would be monitored to remain within criteria established by the CV Water Board in the Clean Water Act, Section 401 Water Quality Certification obtained for the Project. Requirements may include, but not be limited to the following:
    - In-water work would occur during periods of low flow and no precipitation.
    - Monitoring turbidity levels so that activities do not cause turbidity increases in surface water to exceed:
        - Where natural turbidity is between 0 and 5 Nephelometric Turbidity Units (NTUs), increases shall not exceed 1 NTU;
        - Where natural turbidity is between 5 and 50 NTUs, increases shall not exceed 20 percent;
        - Where natural turbidity is between 50 and 100 NTUs, increases shall not exceed 10 NTUs; and
        - Where natural turbidity is greater than 100 NTUs, increases shall not exceed 10 percent.
    - An additional 15 NTUs exceedance over ambient conditions during in-water construction may be granted along with appropriate averaging periods that may be applied provided that beneficial uses would be fully protected, as approved by CV Water Board staff.
    - Activities would not cause settleable matter to exceed 0.1 mL/L in surface waters as measured in surface waters within approximately 300 feet downstream of the Project.
    - Reclamation would notify the CV Water Board immediately if the above criteria for turbidity, settleable matter or other water quality objectives are exceeded.

- TURB-3. A standing water removal plan would be prepared and implemented by the contractor, as approved by the CV Water Board. Removed water is anticipated to either be pumped to water trucks to be used for dust abatement throughout the Project site, or discharged to a settling basin excavated on-site to allow infiltration or evaporation. The settling basin would be located east of the existing pond, at least 50 feet away from the main Clear Creek channel, and pumping velocities would be adjusted to ensure discharge does not exceed infiltration or evaporation. A berm and silt fence would be constructed around the settling basin to ensure no runoff water discharges into waters of the U.S/State. The settling basin would be located within the footprint of the proposed channel alignment; therefore, settled sediments would eventually be excavated during

channel creation, and the area may be covered with native material 2.5 to 5 inches in diameter.

- TURB-4. Mature riparian vegetation would be avoided as much as feasible. All areas of ground disturbance would be revegetated with native plant species. Vegetative cover reduces the potential for erosion and storm water sediment runoff.
- TURB-5. Construction of the new channel alignment would be isolated from the existing channel by first constructing diversion berms and turbidity curtains before working in-water and potentially causing turbidity in the creek.
- TURB-6. Either diversion berms would be lined with a plastic material or turbidity curtains would be used, as necessary, around in-water work areas to minimize turbidity such as for constructing the alcoves, temporary stream crossings, and the logjam.
- TURB-7. Temporary stream crossings would be constructed to have minimal effect on water quality and flows; they could consist of either a railroad flat car bridge or clean spawning gravel and cobble with culverts, or something similar. Following completion of restoration activities, any spawning gravel used for crossings would either be removed from the stream channel or spread evenly across the bottom of the channel.
- TURB-8. Removal of diversion berms and allowing of creek flows to occupy the new channel would occur gradually to minimize turbidity downstream.
- TURB-9. Disturbed areas not revegetated immediately after construction completion and that would be monitored under an adaptive management plan for revegetation would be stabilized with erosion control mats or similar devices until the next revegetation period. The next anticipated revegetation period is two springs after construction completion.

D.2.10 Land Use and Planning

Would the Project?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
(a) Physically divide an established community?	☐	☐	☐	☒
(b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the Project (including, but not limited to the General Plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒
(c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒

D.2.10.1 Affected Environment

The lower Clear Creek watershed consists of approximately 31,300 acres of publicly and privately owned lands below Whiskeytown Dam. Approximately 42 percent of the lower Clear Creek watershed is publicly owned, and 58 percent is privately owned (Western Shasta Resource Conservation District 1996). Public agencies that manage land in the lower watershed include the BLM, National Park Service, CDFW, and the City of Redding. The National Park Service manages the bulk of the public lands (92 percent), with BLM and CDFW managing the majority of the remaining public land. The private lands in the lower Clear Creek watershed are primarily owned by timber companies, mining companies, and private landowners; there is a diverse array of residential properties within the watershed.

The Project area consists of rural undeveloped land and gravel mining operations. There are only 5 residences within 2300 feet of the area proposed for restoration. The Project area primarily consists of public lands owned by BLM and CDFW. There are several access roads on private parcels that are included in the Project area under existing easements. Some of the surrounding lands are in private ownership. Land use and planning on BLM lands are guided by the agency's Redding Resource Management Plan (U.S. Bureau of Land Management 1993). Shasta County has zoned the specific Phase 3C area as M-DR (General Industrial, Design Review), M-DR-IMR (General Industrial, Design Review, Interim Mineral District), and HP-IMR (Habitat Protection, Interim Mineral Resources District).

D.2.10.2 Environmental Consequences

a) *No Impact*. The Construction and transportation associated with the Proposed Project could produce minor effects (i.e., air quality, aesthetics, and noise) at some nearby residences; however, such impacts would be temporary and would not significantly affect the ability to use adjacent lands. The Proposed Action would not physically divide an established community. Construction activities would not conflict or impair the adjacent land uses.

b) *No Impact*. The proposed Project fits within in the Shasta County land use zones for the vicinity and Project implementation would not interfere with, preclude, or conflict with existing land uses adjacent to the Project area.

c) *No Impact*. There would be no conflicts with any applicable habitat conservation plan or natural community conservation plan.

D.2.11 Mineral Resources

Would the Project?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
(a) 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?	☐	☐	☐	☒
(b) 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?	☐	☐	☐	☒

D.2.11.1 Affected Environment

Since the 1850s, gold has been mined via both placer and lode mining in the lower Clear Creek watershed (Western Shasta Resource Conservation District 1996). Placer mining and dredger mining for gold continued through the 1940s. Although no active claims have been documented in the Project area, two placer mining claims are documented on the north side of Clear Creek Road, and two lode claims are documented farther upstream, north of County Route A16 (U.S. Bureau of Land Management 2010, Dominique Brough, personnal communication, January 8, 2018).

Commercial in-stream aggregate mining was prevalent in the lower reaches of Clear Creek through the mid-1980s. Alluvial materials, primarily sand and gravel, have historically been extracted from floodplain deposits along lower Clear Creek (Western Shasta Resource Conservation District 1996). Several commercial sand and gravel operations exist in the vicinity of the Project area and are regulated by Shasta County.

D.2.11.2 Environmental Consequences

a) *No Impact*. The Shasta County General Plan (2004) includes Chapter 6.3 “Minerals”, which listed the Sacramento River as one of the primary identified locations for alluvial sand and gravel resources for Portland cement concrete grade aggregate. The Proposed Action would relocate a channel which would result in excavating gravel from the old channel. The majority of materials excavated would be reused as fill in the existing pond and low points of the floodplain to discourage focused overbank flow paths and to also provide soil necessary for revegetation. However, there are no active sand and gravel operations in the channel.

b) *No Impact*. The proposed Project would not remove gravel and potentially gold-bearing material from Clear Creek and therefore there would be no impact.

D.2.12 Noise

Would the Project?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
(a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☒	☐	☐
(b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☐	☒
(c) A substantial permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project?	☐	☐	☐	☒
(d) A substantial temporary or periodic increase in ambient noise levels in the Project vicinity above levels existing without the Project?	☐	☒	☐	☐
(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 expose people residing or working in the Project area to excessive noise levels?	☐	☐	☐	☒

D.2.12.1 Affected Environment

The proposed Project is located adjacent to existing gravel processing plants where noise generation from heavy equipment is common. Vehicles traveling along Clear Creek Road near the Project area are the other source of noise. Noise levels near Clear Creek Road are estimated to be 65 decibels (dB) within 60 feet of the center of Clear Creek Road, and 60 dB within 126 feet of the centerline (average noise levels for a 24-hour period) (Shasta County 1998). As distance from Clear Creek Road increases, noise levels decrease. Intervening dense vegetation and topography between the road and Project area and the nearby residences and Project area also help mask noise levels.

Noise concerns are typically described in terms of effects on noise-sensitive land uses that are located within hearing range of a noise-producing activity. These noise-sensitive land uses are referred to as “sensitive receptors” and include residences, schools, hospitals, child-care facilities, and other similar land uses. Noise sources that are generally of concern include heavy equipment, gas or diesel motors, and conveyor systems. Sensitive receptors near the Project area include residences located immediately east, west, and south of the Project area. The nearest residence to the Project site is 220 feet from the construction area.

D.2.12.2 Environmental Consequences

a) *Less Than Significant with Mitigation Incorporated*. The Shasta County General Plan establishes acceptable noise standards for non-transportation and transportation activities that generate noise. In rural areas where large lots exist, such as in the Project vicinity, construction equipment (e.g., conveyer belt, gravel sorter) and other non-transportation activities must be operated or implemented at least 100 feet from any residence. Transportation-related noise near a

residence should not exceed the following maximum allowable noise exposure levels: 60 decibels (dB) in the outdoor activity area and 45 dB inside the residence. The City of Redding General Plan has the same standards (City of Redding 2000). Noise generated from new projects, affected by or including non-transportation sources, should not exceed 55 dB during daytime hours (7 a.m. to 10 p.m.) or 50 dB during nighttime hours (10 p.m. to 7 a.m.) (Shasta County 1998). These noise thresholds are based on a 24-hour average. Average noise levels of construction equipment range from about 77 dB to 85 dB at 50 feet from the source (FHWA 2006).

Construction activities under the proposed action would temporarily increase noise levels in and near the Project area. Increased traffic associated with transporting heavy construction equipment and materials along local roads would temporarily increase transportation-related noise during construction. The maximum noise level at the nearest residence during construction is estimated to be 68.9 dBA, using the Roadway Construction Noise Model (FHWA 2006). This residence is about 220 feet northwest of the construction area. This would exceed the Shasta County General Plan Noise Element. The other four nearby residences are between about 1,400 feet to 2,300 feet away from the construction area. Noise levels at those residences would be less than 55 dB and not exceed the Shasta County General Plan Noise element. The impacts to the nearby residences would be mitigated to a less than significant level by implementing Mitigation Measures *NOISE-1* through *NOISE-5*.

b) *No Impact*. The main sources of man-made vibration are sonic booms, blasting, pile driving, pavement breaking, demolition, diesel locomotives, and rail-car coupling. None of these sources are anticipated with the Project. The primary vibratory source during the Project could be from front end loaders, a bulldozer, or excavator. Typical bulldozer or loaded truck activities generate an approximate vibration level of 80-87 Vdb at a distance of 25 feet. Typically, vibration levels must exceed 80 Vdb before annoyance occurs or 100 VdB before building damage occurs. There are no residences or structures within 25 feet of any proposed construction activity. There would be no impact.

c) *No Impact*. The noise levels are temporary during construction of the Project and would return to existing conditions after the Project is completed.

d) *Less Than Significant Impact with Mitigation Incorporated*. No additional noise would be generated by the Project except for the temporary use of equipment during the construction activities. As discussed in (a) above, *Mitigation Measures NOISE-1* through *NOISE-4* would be implemented to reduce potential impacts to a less than significant impact.

e) *No Impact*. The proposed Project area is not located within an airport land use plan or within two miles of a public airport or public use airport. There would be no impact.

f) *No Impact*. The proposed Project area is not within the vicinity of a private airstrip. There would be no impact.

D.2.12.2.1 Mitigation Measures: Noise (NOISE)

- NOISE-1. Construction activities would be limited to 7 a.m. to 7 p.m., Monday through Friday, with the option of working through Saturday.

- NOISE-2. The inhabitants of the residence near the construction area would be notified in advance about the proposed construction timing and duration.
- NOISE-3 – Reclamation would require placement of all stationary noise-generating equipment as far away as feasibly possible from sensitive noise receptors or in an orientation minimizing noise impacts (e.g., behind existing barriers, storage piles, unused equipment).
- NOISE-4. All construction equipment would be properly maintained and equipped with noise-reduction intake and exhaust mufflers and engine shrouds, in accordance with manufacturers' recommendations. Equipment engine shrouds would be closed during equipment operation.
- NOISE-5. All motorized construction equipment would be shut down when not in use to prevent idling.
- NOISE-6. The contractor would designate a "disturbance coordinator" who would be responsible for responding to any local complaints about construction noise. The disturbance coordinator would determine the cause of the noise complaint (e.g., starting too early, bad muffler, etc.) and would require that reasonable measures warranted to correct the problem be implemented. A flyer with the telephone number for the disturbance coordinator would be provided to nearby residences and posted at the construction administration area to allow for reporting of excessive noise.

D.2.13 Population and Housing

Would the Project?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
(a) Induce substantial 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)?	☐	☐	☐	☒
(b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
(c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

D.2.13.1 Affected Environment

The Project area is mostly open space with only 5 residences within 2300 feet of proposed construction.

D.2.13.2 Environmental Consequences

a) *No Impact*. The proposed Project involves neither the extension of roads and other infrastructure nor the proposition of new homes and businesses; thus would not induce population growth.

b) *No Impact*. The proposed Project is not located in a residential area and would not displace existing housing.

c) *No Impact*. The proposed Project is not located in a residential area, and would not displace people.

D.2.14 Public Services

Would the Project?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	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, 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 any of the public services	☐	☐	☐	☒

D.2.14.1 Affected Environment

Public services include fire and police protection, schools, parks, and other public facilities. The Project area does not contain any public facilities.

D.2.14.2 Environmental Consequences

a) *No Impact*. The proposed action would not increase the demand for public services in the local community. Appropriate measures would be taken during Project implementation and rehabilitation activities to prevent the potential for wildfires; this hazard is discussed under Hazards and Hazardous Materials, including the ability of local service providers to respond to an incident in the Project area.

D.2.15 Recreation

Would the Project?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	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?	☐	☐	☒	☐
(b) Does the Project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☒	☐

D.2.15.1 Affected Environment

The Clear Creek Greenway offers hiking, biking, horseback riding, wildlife viewing and swimming all within a short drive from Redding. This area covers over 5,000 acres of public land running from the mouth of the Sacramento River to the boundary of the Whiskeytown NRA, which is managed by the National Park Service. One of access points to the Greenway is the China Gardens Trailhead on Clear Creek Road which is adjacent to the Proposed Action area.

D.2.15.2 Environmental Consequences

a) *Less Than Significant Impact*. Visitors to the Clear Creek area for fishing, birding, or hiking would experience a dead end on the China Gardens trailhead where it reaches Clear Creek and construction equipment would be mobilized. Visitors could also experience elevated noise levels caused by heavy machinery during construction, which would disrupt bird or wildlife viewing. Visitors could still use the China Gardens picnic tables and access other parts of lower Clear Creek around the Project site. However, they would have to cross a busy haul road, which would probably limit use during the week. There would not be construction on Sunday and visitors would be more likely to use picnic tables and adjacent Clear Creek. These impacts would be temporary over one four-month season of construction.

b) *Less Than Significant Impact*. The proposed 0.5 mile recreational trail would enhance recreation in the area. Trail construction would only occur when soil moisture levels are optimal for adequate compaction (generally in the spring or during windows of dry weather during the winter). Work shall be suspended during precipitation events or when observations indicate that saturated soils exist to the extent that there is visible runoff or a potential for causing soil erosion. Vegetation would be removed approximately 10 feet vertically and 10-15 feet horizontally on each side of the alignment for trail construction. Trees would not be cut unless they pose a safety hazard. This vegetative clearing would be maintained for safety reasons (sight distance).

D.2.16 Transportation

Would the Project?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
(a) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?	☐	☐	☒	☐
(b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?	☐	☐	☐	☒
(c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☒
(d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒

Would the Project?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
(e) Result in inadequate emergency access?	☐	☐	☐	☒
(f) Result in inadequate parking capacity?	☐	☐	☐	☒
(g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	☐	☐	☐	☒

D.2.16.1 Affected Environment

Clear Creek Road is a two-lane rural arterial that provides access to rural communities and recreational areas west and south of the city of Redding. This road winds through the area with limited passing opportunities and is designed for low speeds. Clear Creek Road is used by rural residents, recreationists, and service providers and also used as a haul route for local mining companies transporting materials between commercial aggregate mines and nearby cities.

D.2.16.2 Environmental Consequences

a-b) *Less Than Significant Impact*. Construction of the Project could cause a minor increase in truck traffic along Clear Creek Road. Several gravel operators, landscape companies, trucking companies, and other industrial uses are present along Clear Creek Road. Due to the industrial character of the road and its low use, minimal impacts to traffic are expected to occur. The large majority of material excavated in the Project site would be reused or stockpiled on-site, and a small amount of materials (boulders, logs, and riffle material) is anticipated to be imported, and wastes exported. The primary period of construction is anticipated to occur between June 1 and October 15. However, some road restoration and revegetation actions on-site may remain after October 15 and may resume and conclude within two years, under an adaptive management plan for revegetation efforts. Signs would be placed along the road, warning of large equipment entering/exiting Clear Creek Road (*Mitigation Measure HAZ-5*). A Traffic Control Plan would be developed (*Mitigation Measure TRAFFIC-1*).

c) *No Impact*. No air traffic involved.

d) *No Impact*. There are no hazardous design features associated with the proposed Project. No alterations to road features would be involved.

e) *No Impact*. The proposed Project would incorporate adequate emergency access (*Mitigation Measure TRAFFIC-1*). There would be no impact.

f) *No Impact*. As discussed in "a," the proposed Project would not change the existing land use in the area.

D.2.16.2.1 Mitigation Measures: Traffic

- TRAFFIC-1. A Traffic Control Plan would be developed when the final design is completed. The following general requirements shall be addressed in the traffic control plan:

- Meet requirements of Reclamation Safety and Health Standards Sections 9 and 20; and Manual on Uniform Traffic Control Devices, Part 6.
- Provide cones, delineators, concrete safety barriers, barricades, flasher lights, danger signals, signs, and other temporary traffic control devices, as required, to protect work and public safety on roads and waterways.
- Provide flaggers and guards as required to prevent accidents and damage or injury to passing traffic.
- Do not begin work along public or private roads until proper traffic control devices for warning, channeling, and protecting motorists are in place in accordance with reviewed traffic control plan.
- Maintain traffic flow on roads and waterways and conduct implementation operations to minimize obstruction and inconvenience to public traffic in accordance with reviewed plan. Protect roads closed to traffic with effective barricades and warning signs.
- Illuminate barricades and obstructions from sunset to sunrise.
- Remove traffic control devices on as-needed basis.

D.2.17 Utilities and Service Systems

Would the Project?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
(a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒
(b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
(c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
(d) Have sufficient water supplies available to serve the Project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	☒
(e) Result in a determination by the wastewater treatment provider which serves or may serve the Project that it has adequate capacity to serve the Project's Projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
(f) Be served by a landfill with sufficient permitted capacity to accommodate the Project's solid waste disposal needs?	☐	☐	☐	☒
(g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☒

D.2.17.1 Affected Environment

Water supply in Shasta County comes primarily from surface flows stored in lakes in the mountainous regions of the county and to a lesser extent from groundwater basins (Shasta County 1998). The majority of the water supply in Shasta County comes from surface flows impounded in or conveyed through Shasta Lake and Whiskeytown Reservoir. Water is diverted from Whiskeytown Reservoir before entering lower Clear Creek to supply water to users throughout the region. Lower Clear Creek conveys flows into the Sacramento River, and some surface water from the creek is used by local property owners and others as a source of water supply (Shasta County 1998). Rights to the impounded waters in Shasta Lake and Whiskeytown Reservoir are allocated under Reclamation's Central Valley Project. Reclamation maintains contracts for the sale of this water to local service districts in Shasta County and other entities throughout the state.

The Project area is in the Redding groundwater basin, which is estimated to contain approximately 5.5 million acre-feet of groundwater, only a small fraction of which can be used under safe yield management.

Two landfills serve people and businesses in the Project vicinity: the West Central Landfill and the Anderson Landfill. The West Central Landfill, operated by Shasta County, is located at 14095 Clear Creek Road, Redding, California, approximately 3 miles east of the Project area. The Anderson Landfill is operated by Waste Management, Inc., and is located at 18703 Cambridge Road, Anderson, California, approximately 20 miles southeast of the Project area. Both landfills accept construction waste and debris and have available capacity to accept waste that may be generated by the proposed action.

D.2.17.2 Environmental Consequences

a-c, e) *No Impact*. The proposed action would not generate wastewater that would need to be treated at a treatment facility. Wastewater treatment facility improvements or modifications are not involved nor required as part of the proposed action.

The proposed action does not involve construction of or modification to storm water drainage facilities.

d) *No Impact*. Either the water from the pond on-site would be pumped to water trucks and used for dust abatement during construction, or water would be brought in from existing resources. No new or expanded entitlements would be needed.

f, g) *Less Than Significant Impact*. The proposed action would comply with all applicable laws and regulations regarding disposal of solid waste and would dispose of the waste in an approved landfill that can accept the waste. Both the West Central Landfill and Anderson Landfill accept construction waste and debris (e.g., trash, and vegetation and rock that is not needed), and have available capacity to accept waste that may be generated by the proposed action, if any. Limited waste is anticipated from the proposed action as 58,780 cy of fill would be excavated and all but 700 cy would be reused throughout the Project site. The remainder would be stockpiled for future use. Impacts on the local landfills would be less than significant.

D.2.18 Tribal Cultural Resources

Would the Project?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	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 section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:	☐	☐	☐	☒
(i) 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	☐	☐	☐	☒
(ii) 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 the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☐	☐	☒

D.2.18.1 Affected Environment

See the *Prehistoric/Ethnographic Context* subheading in *Section 3.2.5.1, Affected Environment of the Cultural Resources* section above.

D.2.18.2 Environmental Consequences

a) *No Impact*. Reclamation coordinated with the Redding Rancheria by sending a letter on November 14, 2016 requesting information regarding cultural resources, pursuant to 36 CFR § 800.3(f)(2), as well as comments or concerns regarding sacred sites on Federal land or access to sacred sites on Federal land under Executive Order 13007. Reclamation's contractor has been working with the Redding Rancheria and they have attended technical meetings. Reclamation also sent a letter to the Winnemum Wintu Tribe requesting information regarding cultural resources in the Project area, pursuant to 36 CFR § 800.4(a)(3). The Winnemum Wintu Tribe has not replied with interest in the Proposed Action Alternative. Therefore, no other resources of significance to a California Native American tribe were determined to be present.

D.2.19 Mandatory Findings of Significance

Would the Project?	Potentially Significant Impact	Less than Significant with Mitigation Incorporation	Less than Significant Impact	No Impact
(a) Does the Project have the potential to 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, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐
(b) Does 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)?	☐	☐	☒	☐
(c) Does the Project have environmental effects which would cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☐	☒

a) *Less than Significant With Mitigation Incorporation*. The purpose of the proposed Project is to restore and improve riparian habitat for salmonids in lower Clear Creek by creating a channel and floodplain that provides the necessary hydrology and connectivity. The analysis of this EA/IS shows that any potential biological habitats, or archaeological findings would be avoided and mitigated per the previous impact section discussions. There would be a less than significant impact with avoidance and mitigation incorporation

b) *Less Than Significant Impact*. According to Council of Environmental Quality (CEQ) regulations for implementing the procedural provisions of NEPA, a cumulative impact is defined as the impact on *the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time* (40 CFR 1508.7).

A project which contributes to cumulative water quality impacts similar to the Proposed Action is the Lower Clear Creek Anadromous Fish Restoration & Management Project (LCCAFRM). Spawning gravel would be added to lower Clear Creek at 14 specific sites located between Whiskeytown Dam and the lower Clear Creek/Sacramento River confluence. Up to 15,000 tons of gravel are proposed to be injected at some of these sites in 2018. For analysis purposes, it is assumed that the three closest sites totaling up to 15,000 tons of spawning gravel injections would occur simultaneously with the Proposed Action, sometime between June 1 and September 30. Construction activities for both the Proposed Action and the LCCAFRM Project would be implemented in full compliance with the Water Quality Control Plan (Basin Plan) and in

consultation with the Central Valley Regional Water Quality Control Board. Compliance with the standards, terms and conditions of the Water Quality Certification and the General Construction Activity Storm Water Permit issued by the CV Water Board would also be required for the LCCAFRM Project. If thresholds are exceeded during construction of both projects, activities are expected to halt until turbidity levels drop below the threshold. Therefore, turbidity standards and limits would be maintained for both projects and there would not be a cumulatively significant water quality impact.

See Section 3.2.3.2 (c) for cumulative effects for air quality.

See Section 3.2.7.2 for cumulative effects for GHG.

c) *Less Than Significant with Mitigation Incorporated*. The Proposed Action Alternative has the potential to have adverse impacts on aesthetics, air quality, biological resources, geology and soils, hazards and hazardous materials, hydrology and water quality, and noise. However, mitigation measures AQ, VEG, BIRD, BAT, FISH, TURT, VELB, TURB, WOUS, HAZ, and NOISE would be implemented before, during, or after construction to prevent and reduce the impacts of the Proposed Action Alternative to below the level of significance.

D.3 Federal Disclosure Requirements

Department of the Interior Regulations, Executive Orders, and BLM and Reclamation guidelines require a discussion of the following items when preparing environmental documentation:

D.3.1 Indian Sacred Sites

Sacred sites are defined in Executive Order 13007 (May 24, 1996) as "any specific, discrete, narrowly delineated location on Federal land that is identified by an Indian tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site." No Indian Sacred Sites have been identified in the project area; therefore, the Proposed Action would not affect nor prohibit access to and ceremonial use of Indian sacred sites.

D.3.2 Indian Trust Assets

Indian Trust Assets (ITAs) are legal interests in assets that are held in trust by the United States for federally recognized Indian tribes or individuals. There are no Indian reservations, rancherias or allotments in the Project area. The nearest ITA is the Redding Rancheria, which is 0.33 miles to the east of the Project site. The Proposed Action would not affect ITAs (See Appendix C).

D.3.3 Environmental Justice

Executive Order 12898 requires each Federal agency to identify and address disproportionately high and adverse human health or environmental effects, including social and economic effects of its program, policies, and activities on minority populations and low-income populations. No

significant changes in agricultural communities or practices would result from the Proposed Action. Therefore, the Proposed Action would not have disproportionately negative impacts on low-income or minority individuals or populations within the Project area.

D.3.4 Wilderness Characteristics

BLM Instruction Memorandum 2011-154 and Manuals 6310 and 6320 set out the BLM's approach to protecting wilderness characteristics on BLM public lands. This guidance acknowledges that wilderness is a resource that is part of BLM's multiple use mission, requires the BLM to keep a current inventory of wilderness characteristics, and directs the agency to consider protection of these values in land use planning decisions.

The BLM has not designated any lands as Lands with Wilderness Characteristics (LWC), within the Redding Field Office, beyond those previously established as wilderness study areas. Lands that lack wilderness characteristics are those that do not meet the naturalness criterion (BLM Manual 6310) because they have extensive surface disturbance and/or do not meet the size criterion of 5,000 acres or larger. Areas less than 5,000 acres may have wilderness characteristics and require protective actions if BLM determines that wilderness characteristics are present. No areas of this nature have been identified at this time.

An inventory of *Lands with Wilderness Characteristics* within the Redding Field Office was completed in December of 2016. Although some areas within the Redding Field Office were found to meet LWC criterion, the project area does not fall within an area that meets the criteria for LWC. Currently there are no land use decisions for the protection or management of these LWC. Therefore, this resource would not be discussed or analyzed in this document.

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Appendix E, Federally and State Listed Species

Table 1. Federally and State Listed Species that may be Affected by the Proposed Action

Common Name (*Scientific name)*	Status Federal/State[a]	Status Other[b]	General Habitat	Presence or Absence of Species or Designated Critical Habitat
Central Valley spring-run Chino ok salmon (*Oncorhynchus tshawytscha*)	**T/T**	-	Freshwater rivers and streams (Sacramento River and its tributaries)	**Present**. Occur in the mainstem Sacramento River and its major perennial tributary streams. Adults move through the action area in lower Clear Creek during its up-stream migration beginning mid-March to mid-August. Juveniles emigrate through the action area November through June. Critical habitat is present.
Central Valley fall-run Chinook salmon (*Oncorhynchus tshawytscha*)	**-/-**	**SSC**	Freshwater rivers and streams (Sacramento River and its tributaries)	**Present**. Occur in the mainstem Sacramento River and its major perennial tributary streams. Adults move through the action area in lower Clear Creek during its up-stream migration from September to December. Majority of juveniles emigrate through the action area within a few months of emergence, mid-January through May, but some rear in freshwater and emigrate the following year. Different life stages can occur in Clear Creek year round.
Central Valley late fall-run Chinook salmon (*Oncorhynchus tsawytscha*)	**-/-**	**SSC**	Freshwater rivers and streams (Sacramento River and its tributaries)	**Present**. Occur in the mainstem Sacramento River and its major perennial tributary streams. Adults move through the action area in lower Clear Creek during its up-stream migration from December to March. Majority of juveniles emigrate through the action area within a few months of emergence, mid-April through May, but some rear in freshwater and emigrate the following year. Different life stages can occur in Clear Creek year round.
Sacramento River winter-run Chinook salmon	**E/E**	-	Freshwater rivers and streams (Sacramento River and its tributaries)	**Potentially Present.** Clear Creek does not support a winter-run population, although it is occasionally used by straying adults for spawning and there may be some non-natal

(*Oncorhynchus tshawytscha*)				rearing in lower reaches. Critical habitat is absent
steelhead, Central Valley Distinct Population Segment (*Oncorhynchus mykiss*)	**T/-**	-	Freshwater rivers and streams (Sacramento and San Joaquin rivers and their tributaries)	**Present**. Occur in the mainstem Sacramento River and its major perennial tributary streams. Adults move through the action area in lower Clear Creek during its up-stream migration mid-September through June. Rearing and emigration of juveniles occur year-round in the action area. Critical habitat is present.

foothill yellow-legged frog (*Rana boylii*)	**-/CT**	-	Streams with many rocks for both shelter and basking, as well as slow-moving water sections for tadpole nurseries.	**Potentially Present**. Higher pulse flows and colder water temperatures preclude this frog species from occupying the action area. The main creek is too fast-moving for breeding or adult residency, while the back water channels are too slow-moving and allow competitive or predatory species to breed. CNDDB showed a number of detections in the tributaries feeding into Clear Creek below the dam, but only one historical detection in Clear Creek itself. Most of the creek is not suitable FHYLF habitat because the cold pulse flows would put most of the water temperature below what literature suggested FHYLF prefer, the side channels were full of bullfrogs that would be incompatible with an established FHYLF population, and the creek itself lacked specific features observed in every creek where FHYLF has been found. BLM biologists surveyed the project area in 2017 and did not find any adult frogs, tadpoles, or egg masses. It is possible that from time to time a frog is washed downstream at high water, but the FHYLF is not found in this portion of the Clear Creek watershed. In the unlikely event that FHYLF are found during the project, appropriate mitigation measures will be taken to avoid or minimize impact to the greatest extent possible.
valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)	**T/-**	-	Below elevation 500 feet in elderberry shrubs with stems at least 1.0-inch in diameter as measured at the base, in contiguous riparian habitat.	**Present**. The action area is below 500 feet elevation, is within the species' range, and contains VELB-eligible elderberry shrubs in riparian habitat throughout the action area. Critical habitat is absent.
western Distinct Population Segment yellow-billed cuckoo (*Coccyzus americanus occidentalis*)	**T/E**	-	Dense riparian habitat of willows for nesting and cottonwoods to forage along Sacramento River and some tributaries.	**Potentially Present.** The action area contains suitable foraging habitat and potential nesting habitat. A foraging individual was documented on Clear Creek in 2004; however, protocol surveys conducted in June and July 2017 did not document presence of this species. Foraging yellow-billed cuckoos may be present. Critical habitat is absent.

bald eagle (*Haliaeetus leucocephalus*)	**-/E**	**BGEPA; FP**	Large trees normally in mountain and foothill habitats near rivers, streams and reservoirs that support adequate fish or water bird prey. Mature trees or large snags available for perch sites.	**Present.** Bald eagles occasionally occur within the lower Clear Creek corridor, but have not been observed nesting in or near the action area. The nearest known nesting location is at Whiskeytown Reservoir. Use of the action area is believed to consist of foraging and perching, mainly in fall and winter, and potential new nest establishment.
little willow flycatcher (*Empidonax trailii brewsteri*)	**-/T**	**SSC; MBTA**	Nests in dense willow thickets in upper elevations in montane meadows and streams with meadows. The species forages in riparian and meadow habitats during the nesting season.	**Present.** Little willow flycatchers have been regularly observed foraging within the vicinity of the action area during spring and fall migration. No nesting has been observed in the lower Clear Creek watershed and the species is not believed to nest within the project site or surrounding area (Young and Burnett 2010). This species could forage in the action area from May to August.
osprey (*Pandion haliaetus*)	**-/-**	**SSC; MBTA**	Nest in large trees, snags, cliffs or human-made structures near fish-producing waters.	**Present.** Ospreys have been observed foraging throughout lower Clear Creek. A nest, potentially active, exists on a nesting platform on private property approximately 1,600 feet west of the action area.
yellow-breasted chat (*Icteria virens*)	**-/-**	**SSC; MBTA**	Nest in dense shrubs along streams and rivers and require dense, brushy thickets and tangles near water for cover.	**Present.** This species is known to breed in lower Clear Creek, and the action area contains suitable nesting and foraging habitat (PRBO 2005 as cited in WSRCD, *et al* 2006). This bird could be nesting in the action area early May to early August.
yellow warbler (*Dendroica petechial brewsteri*)	-/-	**SSC; MBTA**	Nest in riparian woodlands as well as in montane chaparral, open ponderosa pine and mixed conifer habitats with substantial brush.	**Potentially Present.** Yellow warblers are known to breed in lower Clear Creek, and the action area contains suitable habitat (PRBO 2005 as cited in WSRCD, *et al* 2006). This species could be nesting in the action area mid-April to early August.
burrowing owl (*Athene cunicularia*)	-/-	**SSC**	Typically nest in grassland burrows. Generally in expanded rodent burrows.	Low Potential for presence. Relative small isolated grassland within the project area.

western red bat (*Lasiurus blossevilii*)	**-/-**	**SSC**	Prefers sites with a mosaic of riparian edge habitats that include trees for roosting (in foliage), adjacent to streams, fields, or urban areas. Open areas for foraging.	**Potentially Present.** The action area contains potential roosting trees and foraging habitat.
pallid bat (*Antrozous pallidus*)	**-/-**	**BLM SS; SSC**	Occupies variety of habitats like grasslands, shrublands, woodlands, and forests. Prefers open, dry habitats with rocky areas for roosting. Day roosts are in caves, crevices, mines, and occasionally in hollow trees and buildings.	**Potentially Present.** The action area contains potential marginal habitat of roosting trees and foraging habitat.
spotted bat (*Euderma maculatum*)	**-/-**	**BLM SS; SSC**	Not found in Sacramento Valley. Occupies arid deserts, grasslands and mixed conifer forests of Southern California. Prefers roosting in cliff rock crevices, and occasionally caves and buildings.	**Potentially Present.** The action area does not contain cliff rock crevices or caves for roosting, but contains potential foraging habitat.
Townsend's western big-eared bat (*Corynorhinus townsendii*)	**-/-**	**BLM SS; SSC**	Found in numerous habitats except subalpine and alpine. Only one record of a presumed migrant in Central Valley and none in Tehama or Shasta counties. Roosts in caves, mines, tunnels, buildings, and human-made structures.	**Potentially Present.** The action area does not contain caves, mines, tunnels or human-made structures for roosting, but contains potential foraging habitat. Occurrence is not likely and would only be at night when there is no construction.
western mastiff bat (*Eumops perotis californicus*)	**-/-**	**BLM SS; SSC**	Prefers open, semi-arid to arid habitats, including conifer and deciduous woodlands, coastal scrub, grasslands, and chaparral. Roosts in crevices in cliff faces, buildings.	**Potentially Present.** The action area contains potential foraging habitat.

northwestern pond turtle (*Emys marmorata marmorata*)	**-/-**	**SSC**	Quiet waters of ponds, lakes, streams, etc., where there are rocks or logs for basking. Nearby upland sites for nesting and overwintering.	**Potentially Present.** Northwestern pond turtles have been observed along lower Clear Creek. The action area contains a pond and backwater area with surrounding upland sites for potential nesting. The Project could occur during the upland egg-laying season of late April to early August. Overwintering occurs November to January and would be avoided.
ringtail cat (*Bassariscus astutus*)	**-/-**	FP	Inhabits rocky habitat associated with water, including riparian canyons, caves, and mineshafts.	**Potentially Present.** The action area contains lowland riparian habitat. This species may be found in or near the project area although there are no known records of ringtail cat occurrences in the action .

[a] T = threatened; E = endangered; CT = candidate threatened; CE = candidate endangered
[b] SSC = California listed as species of special concern; FP = California fully protected; BLM SS = BLM sensitive species; MBTA = Migratory Bird Treaty Acted protected; Bald and Golden Eagle Protection Act

Table 2. Species Eliminated from Further Analysis

Common Name (*Scientific name)*	Status Federal/State[a]	Status Other[b]	General Habitat	Presence or Absence of Species or Critical Habitat
green sturgeon, southern DPS (*Acipenser medirostris*)	**T/-**	-	Spawn in the mainstem Sacramento and Feather rivers; juveniles are thought to rear mainly in the estuary..	**Absent**. The action area is outside of the species' known range. Critical habitat not designated.
delta smelt (*Hypomesus transpacificus*	**T/-**	-	Inhabit the Sacramento-San Joaquin Delta estuary in open, shallow waters.	**Absent**. The action area is upstream and well outside of the species' known range. Critical habitat is absent.
California red-legged frog (*Rana draytonii*)	**T/-**	-	Shallow permanent waters of streams, marshes, ponds, lakes, and other quiet bodies of water with emergent vegetation.	**Absent**. Bull frogs and predatory fish are present in the pond, the nearest California red-legged frog occurrence is 30 miles to the south, and previous protocol surveys in the general project area did not observe the species. Critical habitat is absent.
Long-eared myotis bat (*Myotis evotis*)	**-/SSC**	-	Roosts in buildings, crevices, under bark, and in snags (wildlife.ca.gov)	**Absent**. Generally avoids the arid Central Valley of California and is more commonly found in the Sierras and coastal regions.

Vaux's Swift *(Chaetura vauxi)*	---	CSC	Nests in large hollow trees and snags in redwood, Douglas fir and other conifer habitats. Often nests in large colonies. Forages widely, but prefers rivers and lakes.	**(Possible breeder)**
northern spotted owl (*Strix occidentalis caurina*)	**T/T**	-	Old growth forests with multi-layered canopies with trees of varying size and age, both standing and fallen dead trees, and open space among the lower branches. Old growth forests with these characteristics are often around 150 to 200 years old.	**Absent**. The action area is located in patchy valley oak woodland and cottonwood-willow vegetation communities, which do not provide the necessary roost and nest sites for the owl. The nearest known occurrence is at a much higher elevation in the Trinity Mountains, 16 miles west. Critical habitat is absent.
Long-eared Owl *(Asio otus)*	–	CSC	Riparian, live oak or conifer thickets with small, densely canopied trees used for roosting and nesting. Generally forages in open areas.	
bank swallow (*Riparia riparia*)	**-/T**	-	Burrows into fine-textured vertical streambanks to construct nests. Arrives in mid-March, young hatch in May, and remain on riverbanks until fall. They forage by hawking insects in-flight primarily over riparian areas or water.	**Absent**. No bank swallow nesting colonies have been observed within, or near the action area, and streambanks that would be disturbed from the Project do not contain the vertical fine-textured streambanks necessary for nesting.
tricolored blackbird (*Agelaius tricolor*)	**-/CE**	-	Tricolored blackbirds nest in breeding colonies in thorny or spiny vegetation such as cattails, tules, willow, blackberry, wild rose, and tall herbs, with access to open water. This bird also forages in croplands, pastures, grassy fields, flooded land, and along edges of ponds.	**Absent**. Although the action area contains a pond for potential nesting or foraging, it lacks dense enough thorny vegetation, tules or cattails sufficient to support breeding colonies. The pond is dominated by surface-floating mats of vegetation. The nearest tricolored blackbird occurrence was a colony of 1,000 nests observed in a cattail and tule marsh one approximately mile east of the action area, at the confluence of Clear Creek and Sacramento River. However, this record is presumed extirpated.

vernal pool fairy shrimp (*Branchinecta lynchi*)	**T/-**	-	Vernal pools	**Absent**. There are no vernal pools present in the action area. Critical habitat is absent.
Vernal pool tadpole shrimp (*Lepidurus packardi*)	**E/-**	-	Vernal pools	**Absent**. There are no vernal pools present in the action area. Critical habitat is absent.
West Coast DPS fisher (*Pekania pennant*)	**-/CT**	-	Inhabits large blocks of dense, late-successional stage coniferous forest with a high number of downed logs, high canopy closure, and multiple canopy layers. They den in protected cavities such as hollow logs, trees, and snags, and brush piles.	**Absent**. The nearest recorded west coast DPS fisher occurrence (EONDX 71764, CNDDB) is approximately eight miles northwest of the action area, which is in habitat containing fairly consistent coniferous and deciduous-riparian areas with large canopy closure. The action area contains coniferous and deciduous-riparian areas; however, the majority of the action area lacks the dense consistent canopy and downed logs needed by the fisher. In addition, the summer temperature range is higher than fishers are able to tolerate.
slender Orcutt grass (*Orcuttia tenuis*)	**T/E**	-	Vernal pools	**Absent.** There are no vernal pools present in the action area. Critical habitat is absent.

[a] T = threatened; E = endangered; CT = candidate threatened; CE = candidate endangered

[b] SSC = California listed as species of special concern; FP = California fully protected; BLM SS = BLM sensitive species; MBTA = Migratory Bird Treaty Acted protected; Bald and Golden Eagle Protection Act

Eagle Protection Act

Appendix F, Indian Trust Assets Compliance

Indian Trust Assets
Request Form (MP Region)

Submit your request to your office's ITA designee or to MP-400, attention Kevin Clancy.

Date:

Requested by (Office/Program)	Doug Kleinsmith
Fund	17XR5173F3
WBS	RX174167031000B12
Fund Cost Center	2015200
Region# (if other than MP)	
Project Name	Clear Creek Restoration Program Phase 3C
CEC or EA Number	
Project Description (attach additional sheets if needed and include photos if appropriate)	Phase 3C is the last phase of the lower Clear Creek Floodplain and Stream Channel Restoration Project (SCRP). The SCRP primary goals were to improve salmonid spawning and rearing habitat, reduce fish stranding and improve fish passage. For Phase 3C, Reclamation and BLM propose to construct a channel plug and redirect flows to a new channel constructed along the historic alignment with a variety of islands, riffles, side channels, and backwater alcoves. Clear Creek is about 10 miles south of Redding (see map).
*Project Location (Township, Range, Section, e.g., T12 RSE S10, or Lat/Long cords, DD-MM-SS or decimal degrees). Include map(s)	T 122.3955 R40.50734

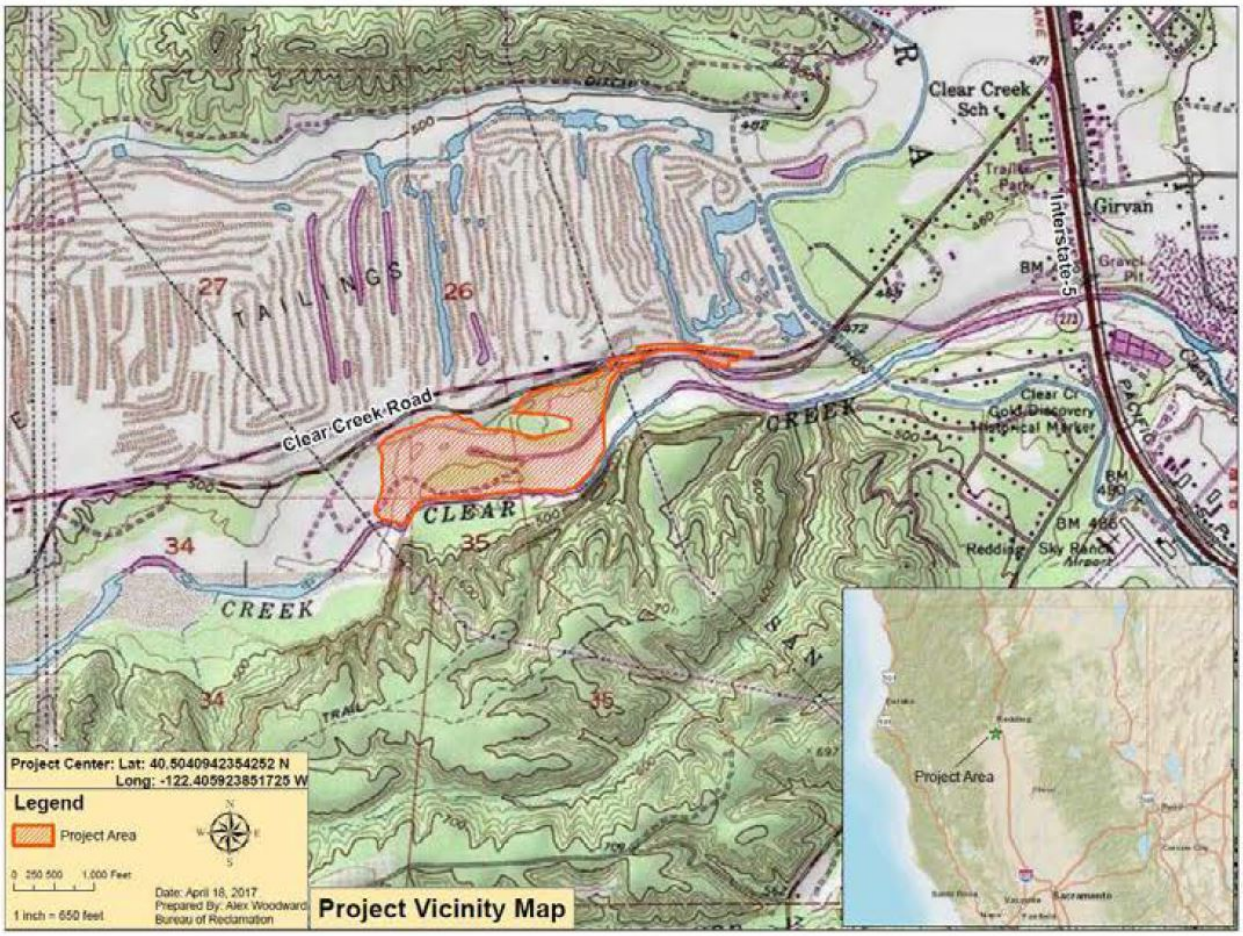
/s/ Doug Kleinsmith	Doug Kleinsmith	8/8/17
Signature	Printed name of preparer	Date

ITA Determination:

The closest ITA to Clear Creek Restoration Program Phase 3C is the Redding Rancheria about 0.33 miles to the east. (See attached image).

Based on the nature of the planned work it does not appear to be in an area that will impact Indian hunting or fishing resources or water rights nor is the proposed activity on actual Indian lands. It is reasonable to assume that the proposed action will not have any impacts on ITAs.

/s/ K.Clancy	Kevin Clancy	8/10/17
Signature	Printed name of preparer	Date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Legend
Project Area
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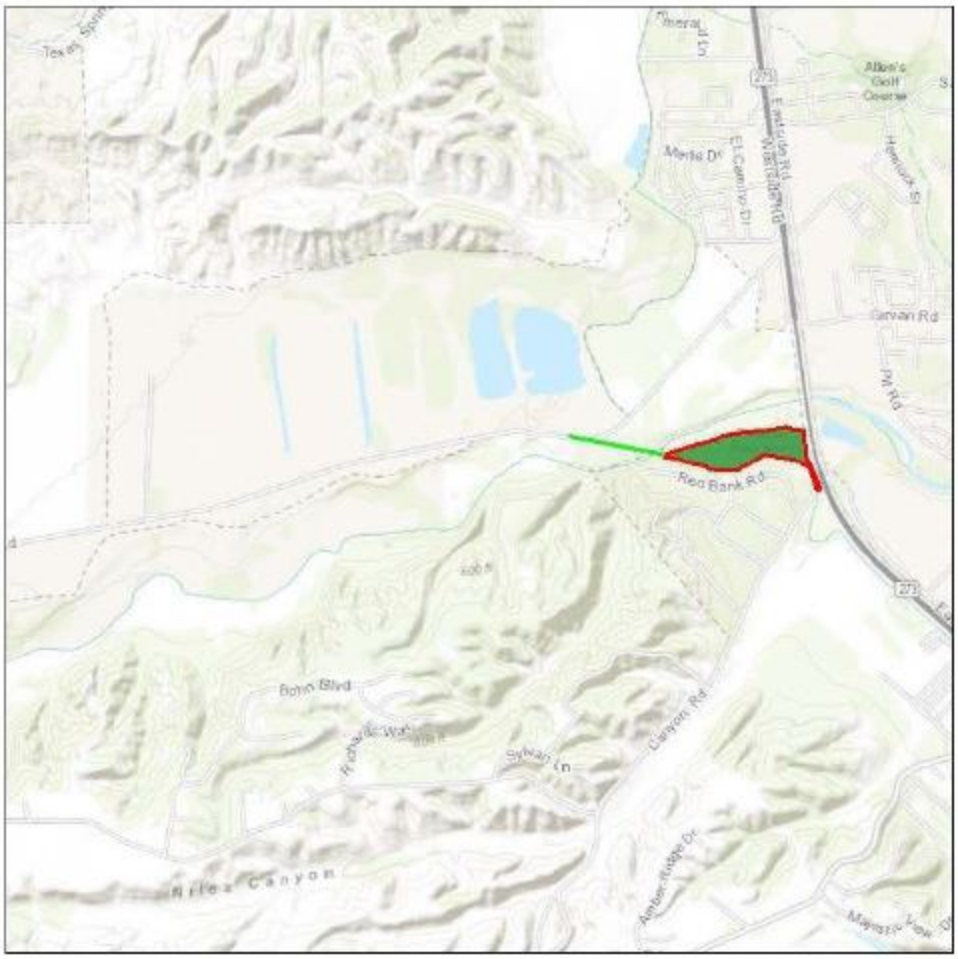
1 inch = 650 feet
Date: April 18, 2017
Prepared By: Alex Woodward
Bureau of Reclamation
Project Vicinity Map
Clear Creek Road
TAILINGS
CLEAR CREEK
Clear Creek Sch
Girvan
Interstate 5
Project Area
Redding
Sacramento

Nearest ITA to Clear Creek Phase 3C



Native American Lands FL
Rancheria

Native American Lands
- <all other values>
- Alaska Native Regional Corporation
- Alaska Native Village Statistical Area
- American Indian Reservation
- Colony
- Community

0 0.275 0.55 1.1 Miles

RECLAMATION
Managing Water in the West

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Section G, ESA Consultation Correspondence

(To be inserted)

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Appendix H, Cultural Resources Compliance

CULTURAL RESOURCE COMPLIANCE
Mid-Pacific Region
Division of Environmental Affairs
Cultural Resources Branch

MP-153 Tracking Number: 16-NCAO-051
Project Name: Lower Clear Creek Restoration Project - Phase 3C
NEPA Document: EA 19-04-MP
MP 153 Cultural Resources Reviewer: Mark Carper
NEPA Contact: Doug Kleinsmith
Determination: No Historic Properties Affected
Date: January 31, 2019

Reclamation proposes to improve salmonid spawning and rearing habitat along Lower Clear Creek in Shasta County near the city of Anderson, California. The proposed project is a joint action with Reclamation and the Bureau of Land Management (BLM). BLM is the underlying land owner while Reclamation is proposing to fund and conduct these activities. Reclamation determined that the expenditure of Federal funds and the implementation of construction activities on Federal lands constitutes an undertaking as defined in 36 CFR § 800.16(y) and involves the types of activities that have the potential to cause effects on historic properties under 36 CFR § 800.3(a).

Reclamation was designated the technical lead for National Environmental Policy Act compliance. BLM requested the U.S. Army Corps of Engineers (USACE) participate as a cooperating agency for the proposed Project. The Project requires authorization through the USACE in compliance with the Clean Water Act Sections 401 and 404. For the purposes of this undertaking, the USACE and the BLM have designated Reclamation as Lead Federal Agency for the Section 106 process pursuant to 36 CFR § 800.2(a)(2).

To restore aquatic habitat in the Lower Clear Creek channel, Reclamation proposes to construct a channel plug and redirect flows to a new channel constructed along the historic alignment. Construction components will include creating a variety of islands, riffles, side channels, and backwater alcoves. Construction will also require temporary access roads, contractor staging areas, gravel stockpiling and processing areas, and post construction revegetation.

Reclamation determined the area of potential effects (APE) consists of an area which encapsulates all proposed construction activities. The vertical APE will vary, with the greatest depth reaching 9 to 10 feet for historic channel restoration and creation of backwater alcoves. The APE is located in Sections 26, 27, 34, and 35, T. 31 N., R. 5 W., Mount Diablo Base and

Meridian, as depicted on the Redding and Olinda, California 7.5' U.S. Geological Survey topographic quadrangle maps. The APE totals approximately 76 acres.

Efforts to identify historic properties in the APE consisted of searching internal records and archives and conducting a record search through the Northeast Information Center of the California Historic Resources Information System (IC File# G16-4). Reclamation also completed a pedestrian survey of the APE. Two documented resources were identified near or adjacent to the APE. Due to the close proximity of the adjacent site, targeted shovel testing was conducted outside the define site boundary to confirm buried components did not extend into the proposed APE. One resource, Reclamation designated 16-NCSl-01, which is a segment of the asphalted old Clear Creek Road, was recorded and evaluated for inclusion in the National Register of Historic Places (National Register) and determined ineligible. No historic properties were identified within the APE.

Pursuant to the regulations at 36 CFR § 800.3 (f)(2), Reclamation identified the Redding Rancheria as an Indian tribe who might attach religious and cultural significance to historic properties within the APE. On December 14, 2016, we sent a letter to the tribe inviting their participation in the Section 106 process pursuant to 36 CFR § 800.4(a)(4). We also sent a letter to the Winnemem Wintu Tribe which we identified as a Native American organization likely to have knowledge of or concerns with historic properties in the area requesting their assistance in identifying historic properties which may be affected by the proposed undertaking pursuant to 36 CFR § 800.4(a)(3). To date there have been no responses. Reclamation will work to address any concerns that may be raised in the future and notify your office as appropriate.

Reclamation initiated consultation with the California State Preservation Office (SHPO) by letter dated December 17, 2018, notifying the office of Reclamation's determination of no historic properties affected for the proposed project. SHPO responded by letter dated January 14, 2019, with no objection to the defined APE, the evaluation of 16-NCSl-01, and the determination of no historic properties affected for the proposed project.

After reviewing EA 19-04-MP, I concur that this action would not have significant impacts on properties listed, or eligible for listing, on the National Register of Historic Places

This memorandum is intended to convey the completion of the NHPA Section 106 process for this undertaking. Please retain a copy in the administrative record for this action. Should changes be made to this project, additional NHPA Section 106 review, possibly including consultation with the State Historic Preservation Officer, may be necessary. Thank you for providing the opportunity to comment.