

DRAFT

Environmental Assessment / Initial Study

and

Finding of No Significant Impact /

Mitigated Negative Declaration

Mill Creek Fish Passage Restoration Project



Tehama County, California

May 2015

Project Proponent and Federal Lead Agency for NEPA
U.S. Fish and Wildlife Service
Red Bluff Fish and Wildlife Office
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List of Acronyms and Abbreviations

AFRP	Anadromous Fish Restoration Program
AG-1	Agriculture / Upland District
AG-2	Agricultural / Valley District
BA	Biological Assessment
BMP	Best Management Practice
BOR	U.S. Department of the Interior, Bureau of Reclamation
BRE	Biological Resources Evaluation
CA	State of California
CALFED	CALFED Bay-Delta Program
CAL FIRE	California Department of Forestry and Fire Protection
CALTRANS	California Department of Transportation
CARB	California Air Resources Board
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife
CDWR	California Department of Water Resources
Central Valley Water Board	Central Valley Regional Water Quality Control Board
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulation
cfs	Cubic Feet per Second
CH	Critical Habitat
CH ₄	Methane
CHP	California Highway Patrol
CNDDB	California Natural Diversity Data Base
CNPS	California Native Plant Society
CO ₂	Carbon Dioxide
CSRL	California Soil Resource Lab
CVPIA	Central Valley Project Improvement Act
D ₅₀	Rock diameter larger than 50 percent of the rock
D ₉₀	Rock diameter larger than 90 percent of the rock
DDT	Dichlorodiphenyltrichloroethane
DOORS	Diesel Off-Road On-Line Reporting System
DPS	Distinct Population Segment
DWR	California Department of Water Resources
EA / IS	Environmental Assessment / Initial Study
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
EIS	Environmental Impact Study
EPA	U.S. Environmental Protection Agency
ERPP	CALFED Bay-Delta Program Ecosystem Restoration Program Plan
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
fps	Feet per Second
FONSI	Finding of No Significant Impact
ft / ft	Feet per foot

fps	Feet per second
GHG	Greenhouse Gas
HDPE	High-density Polyethylene
I 5	Interstate Highway 5
HEC-RAS	Hydrologic Engineering Center River Analysis System
L	Liter
LEQ	Energy-Equivalent Level
LMMWC	Los Molinos Mutual Water Company
LVNP	Lassen Volcanic National Park
MDBM	Mount Diablo Base and Meridian
mg	Milligram
MMRP	Mitigation Monitoring and Reporting Program
MND	Mitigated Negative Declaration
N ₂ O	Nitrous Oxide
NEPA	National Environmental Policy Act
NHC	Northwest Hydraulic Consultants, Inc.
NMFS	National Marine Fisheries Service
NRCS	U.S. Department of Agriculture, Natural Resources Conservation Service
NSVAB	Northern Sacramento Valley Air Basin
OHWM	Ordinary High Water Mark
PCE	Primary Constituent Element
PEIS	Programmatic Environmental Impact Statement
PERP	Portable Equipment Registration Program
PM ₁₀	Particulate Matter less than 10 Microns in Diameter
RPM	Resource Protection Measure
SR	State Route
SVGB	Sacramento Valley Groundwater Basin
TAC	Project Technical Advisory Committee
TCAPCD	Tehama County Air Pollution Control District
TDS	Total Dissolved Solids
TES	Tehama Environmental Solutions, Inc.
UA	Upland Agriculture
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USDA	U.S. Department of Agriculture
USDA-SCS	U.S. Department of Agriculture - Soil Conservation Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VELB	Valley Elderberry Longhorn Beetle
VFA	Valley Floor Agriculture
VRSS	Vegetation Reinforced Soil Slope
WSRCD	Western Shasta Resource Conservation District
YOY	Young-of-the-Year

Finding of No Significant Impact

MILL CREEK FISH PASSAGE RESTORATION PROJECT – WARD DAM

Lead Federal Agency:
U.S. Fish and Wildlife Service
2800 Cottage Way, Room W-2605
Sacramento, CA 95825

The U.S. Fish and Wildlife Service (USFWS) proposes to grant funds, under the authority of the Central Valley Project Improvement Act's (CVPIA) Anadromous Fish Restoration Program (AFRP) to implement a fish passage improvement project on Mill Creek at one of three sites known as the Ward Dam site. Improving fish passage at this site will improve anadromous fish access to spawning, rearing and holding stream habitat upstream of the project site through fish ladder replacement and will improve fish passage downstream of the project site through fish screen and bypass pipe upgrades. The project includes improving fish passage conditions that currently hinder fish passage, by replacing the Ward Dam fish ladder, upgrading fish screens and bypass pipes and adding scour protection to improve fish passage while continuing to address the water needs of the landowners and the Los Molinos Mutual Water Company (LMMWC), the owners of the infrastructure. The California Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board) is the lead agency for the project under the California Environmental Quality Act (CEQA). The proposed action supports objectives of the AFRP Final Restoration Plan, complements other ongoing efforts to improve important aquatic habitats for the benefit of naturally-producing anadromous salmonids in the Central Valley, and may assist in the recovery of Central Valley steelhead and Central Valley spring-run Chinook salmon which are listed as threatened under the Endangered Species Act.

Documents reviewed in the preparation of this Finding of No Significant Impact (FONSI) include:

- CVPIA Programmatic Environmental Impact Statement (PEIS)
- AFRP Final Restoration Plan
- Environmental Assessment / Initial Study (EA / IS): Mill Creek Fish Passage Improvement Project
- Intra-USFWS Section 7 Evaluation Form
- Section 7 Biological Opinion from National Marine Fisheries Service
- Intra-USFWS Section 106 Consultation Compliance Memo

These documents are incorporated by reference, as described in 40 CFR 1508.13.

Two additional fish passage improvement sites were analyzed in the EA / IS including the Exposed Siphon and the Upper Dam. Due to timing constraints, the Upper Dam will be covered in a separate FONSI. The Exposed Siphon is currently unfunded is therefore not proposed by the USFWS at this time. If funding becomes available for the Exposed Siphon site, a FONSI will be prepared by the appropriate federal lead agency and reanalyzed, as needed under the National Environmental Policy Act (NEPA).

Alternatives

In July of 2013, an Alternatives Analysis Report was prepared by Northwest Hydraulic Consultants for the Ward Dam site that discussed potential project alternatives. The alternatives that were described and discussed by the Mill Creek Technical Advisory Committee included:

1. Remove the dam and construct a pump station
2. Remove dam and construct a roughened channel, downstream of the lowered dam crest
3. Replace the existing fish ladder

A No Action alternative was not chosen because a lack of action would continue to restrict and / or hinder upstream and downstream passage for anadromous salmonid fish species. No water system modifications would be necessary because the current diversion structure would continue to address the water needs of the landowner.

The Proposed Action alternative was selected over other alternatives for best meeting the following project goals:

- Improve fish passage at the Ward Dam site
- Addressing the landowner's and the LMMWC's water needs
- Minimize maintenance needs for public agencies, the landowners and the LMMWC

Fish passage improvement has been identified as priority actions in the CVPIA PEIS, AFRP Final Restoration Plan and CALFED's Ecosystem Restoration Plan, as well as several California Department of Fish and Wildlife publications and plans.

Environmental Impacts

Based upon information contained in the EA / IS, we have determined this Federal action would not significantly affect the quality of the human environment. The basis for a Finding of No Significant Impact is as follows:

1. As a result of formal consultation under the Endangered Species Act and inclusion of project design features / resource protection measures into the proposed action, short-term adverse impacts to federally listed or special-status species may occur; however long-term benefits would be realized. The short-term adverse effects would not significantly affect the recovery of Central Valley spring-run Chinook salmon or Central Valley steelhead. No adverse impacts to designated critical habitats are expected. The short-term negative impacts are minimal compared to the potential net increase in production due to:
 - a. Improved anadromous fish access to spawning, rearing and holding stream habitat upstream of the project sites through fish ladder replacements and improved downstream passage project through fish screen and bypass pipe upgrades.
2. Short-term, minor impacts to wildlife and fisheries may occur from implementing activities related to the fish passage improvements. However, resource protection measures have been incorporated into the proposed action to minimize effects. The intent of this project is to provide improved salmonid fish passage during most flows. The proposed activities would improve the current passage constraints by replacing the Ward Dam fish ladder, upgrading fish screens and bypass pipes and adding scour protection to improve fish passage while continuing to address the water needs of the landowners and the LMMWC, the owners of the infrastructure.
3. The proposed action is not expected to have long-term adverse effects on wildlife or fisheries, and most effects are expected to be beneficial. The passage impediments will be improved and the replanting of riparian vegetation will ensure that the action does not result in a net loss of wetlands or riparian habitat.
4. Resource protection measures have been incorporated into the project as project design features to minimize adverse effects on air quality / greenhouse gas emissions, biological resources, cultural resources, hazards and hazardous waste materials, hydrology and water quality, noise, and soils and geology. The proposed action is expected to have no negative impact on flooding potential.

5. The proposed action is not expected to have adverse effects on wetlands or floodplains pursuant to Executive Orders 11990 and 11988.
6. Neither short- nor long-term adverse effects on human health or the environment, nor disproportionate adverse effects to low-income or minority populations are expected, pursuant to Executive Order 12898.
7. Based on field surveys and a cultural resources evaluation, the project would not significantly affect cultural resources. However, unknown subsurface cultural resources could be impacted during ground-disturbing activities associated with the proposed project. In the event subsurface cultural remains over 45 years of age are encountered, the project will cease work at the general area of discovery and a professional archaeologist on staff with the USFWS will be consulted.

In addition to analyzing effects on biological and cultural resources, the EA / IS evaluated the following aspects of the physical and human environment for potential significant effects as a result of the proposed action alternative:

- Air Quality / Greenhouse Gas Emissions
- Aesthetics
- Agricultural Resources
- Cumulative Impacts
- Environmental Justice
- Hazards and Hazardous Waste Materials
- Hydrology and Water Quality
- Land Use / Planning
- Mineral Resources
- Noise
- Population and Housing
- Public Services
- Public Utilities
- Recreation
- Soils and Geology
- Transportation

Project design features to minimize environmental effects were incorporated into the proposed action alternative to reduce impacts to a level below significance for those issues for which potentially negative impacts were anticipated.

Public Review and Comment

An initial public scoping notice was published in the legal section of the Red Bluff Daily News on January 12, 2015. The Draft EA IS was circulated through the State Clearinghouse for a 30 day public review. Concurrent with this public review, a public notice was published in the legal section of the Red Bluff Daily News on May 20, 2015 to solicit additional comments from the public and interested parties.

Conclusion

Therefore, the USFWS, as lead Federal agency for the proposed AFRP funding of, has determined that the Mill Creek Fish Passage Restoration Project – Ward Dam proposal does not constitute a major Federal action significantly affecting the quality of the human environment under the meaning of section 102(2)(c) of the National Environmental Policy Act of 1969 (as amended). As such, an Environmental Impact Statement is not required. An EA / IS has been prepared in support of this finding and is available upon request to the U.S. Fish and Wildlife Service, Red Bluff Fish and Wildlife Office, 10950 Tyler Road, Red Bluff, CA 96080.

Assistant Regional Director, Fisheries and Aquatic Conservation

Date

Finding of No Significant Impact

MILL CREEK FISH PASSAGE RESTORATION PROJECT – UPPER DAM

Lead Federal Agency:
U.S. Fish and Wildlife Service
2800 Cottage Way, Room W-2605
Sacramento, CA 95825

The U.S. Fish and Wildlife Service (USFWS) proposes to grant funds, under the authority of the Central Valley Project Improvement Act's (CVPIA) Anadromous Fish Restoration Program (AFRP) to implement a fish passage improvement project on Mill Creek at one of three sites known as the Upper Dam site. Improving fish passage at this site will improve anadromous fish access to spawning, rearing and holding stream habitat upstream of the project site through fish ladder replacement and will improve fish passage downstream of the project site through fish screen and bypass pipe upgrades. The project includes improving fish passage conditions that currently hinder fish passage, by replacing the Upper Dam fish ladder, upgrading fish screens and bypass pipes and adding scour protection to improve fish passage while continuing to address the water needs of the landowners and the Los Molinos Mutual Water Company (LMMWC), the owners of the infrastructure. The Central Valley Regional Water Control Board (Central Valley Water Board) is the lead agency for the project under the California Environmental Quality Act (CEQA). The proposed action supports objectives of the AFRP Final Restoration Plan, complements other ongoing efforts to improve important aquatic habitats for the benefit of naturally-producing anadromous salmonids in the Central Valley, and may assist in the recovery of Central Valley steelhead and Central Valley spring-run Chinook salmon which are listed as threatened under the Endangered Species Act.

Documents reviewed in the preparation of this Finding of No Significant Impact (FONSI) include:

- CVPIA Programmatic Environmental Impact Statement (PEIS)
- AFRP Final Restoration Plan
- Environmental Assessment / Initial Study (EA / IS): Mill Creek Fish Passage Improvement Project
- Intra-USFWS Section 7 Evaluation Form
- Section 7 Biological Opinion from National Marine Fisheries Service
- Intra-USFWS Section 106 Consultation Compliance Memo

These documents are incorporated by reference, as described in 40 CFR 1508.13.

Two additional fish passage improvement sites were analyzed in the EA / IS including the Exposed Siphon and the Ward Dam. Due to timing constraints, the Ward Dam was covered in a separate FONSI. The Exposed Siphon is currently unfunded is therefore not proposed by the USFWS at this time. If funding becomes available for the Exposed Siphon site, a FONSI will be prepared by the appropriate federal lead agency and reanalyzed, as needed under the National Environmental Policy Act (NEPA).

Alternatives

In August of 2013, an Alternatives Analysis Report was prepared by Northwest Hydraulic Consultants for the Upper Dam site that discussed potential project alternatives. The alternatives that were described and discussed by the Mill Creek Technical Advisory Committee included:

1. Remove existing dam and construct pump station
2. Remove existing dam and construct roughened channel
3. Relocate fish ladder and fish screen, fish ladder would be cut into the existing dam

4. Relocate fish ladder and fish screen downstream of the dam. Flow which bypassed the screen, rather than going through a juvenile bypass pipe, would go down a fish ladder and back into the river. The canal upstream of the fish screens would be an upstream adult fish migration corridor.
5. Replace existing dam with an Obermeyer Weir (inflatable dam).
6. Leave dam in place, replace the existing fish ladder with a large fish ladder requiring excavation of hillslope and use of a wall to stabilize the hillslope.
7. Replace the existing fish ladder without hillslope excavation, or dam modifications, move fish screens closer to the point of diversion, pipe diversion canal and move the diversion control downstream of the fish screens

A No Action alternative was not chosen because a lack of action would continue to restrict and / or hinder upstream and downstream passage for anadromous salmonid fish species. No water system modifications would be necessary because the current diversion structure would continue to address the water needs of the landowner.

The Proposed Action alternative was selected over other alternatives for best meeting the following project goals:

- Improve fish passage at the Upper Dam site
- Addressing the landowner's and the LMMWC's water needs
- Minimize maintenance needs for public agencies, the landowners and the LMMWC

Fish passage improvement has been identified as priority actions in the CVPIA PEIS, AFRP Final Restoration Plan and CALFED's Ecosystem Restoration Plan, as well as several California Department of Fish and Wildlife publications and plans.

Environmental Impacts

Based upon information contained in the EA / IS, we have determined this Federal action would not significantly affect the quality of the human environment. The basis for a Finding of No Significant Impact is as follows:

1. As a result of formal consultation under the Endangered Species Act and inclusion of project design features / resource protection measures into the proposed action, short-term adverse impacts to federally listed or special-status species may occur; however long-term benefits would be realized. The short-term adverse effects would not significantly affect the recovery of Central Valley spring-run Chinook salmon or Central Valley steelhead. No adverse impacts to designated critical habitats are expected. The short-term negative impacts are minimal compared to the potential net increase in production due to:
 - a. Improved anadromous fish access to spawning, rearing and holding stream habitat upstream of the project sites through fish ladder replacements and improved downstream passage project through fish screen and bypass pipe upgrades.
2. Short-term, minor impacts to wildlife and fisheries may occur from implementing activities related to the fish passage improvements. However, resource protection measures have been incorporated into the proposed action to minimize effects. The intent of this project is to provide improved salmonid fish passage during most flows. The proposed activities would improve the current passage constraints by replacing the Upper Dam fish ladder, upgrading fish screens and bypass pipes and adding scour protection to improve fish passage while continuing to address the water needs of the landowners and the LMMWC, the owners of the infrastructure.

3. The proposed action is not expected to have long-term adverse effects on wildlife or fisheries, and most effects are expected to be beneficial. The passage impediments will be improved and the replanting of riparian vegetation will ensure that the action does not result in a net loss of wetlands or riparian habitat.
4. Resource protection measures have been incorporated into the project as project design features to minimize adverse effects on air quality / greenhouse gas emissions, biological resources, cultural resources, hazards and hazardous waste materials, hydrology and water quality, noise, and soils and geology. The proposed action is expected to have no negative impact on flooding potential.
5. The proposed action is not expected to have adverse effects on wetlands or floodplains pursuant to Executive Orders 11990 and 11988.
6. Neither short- nor long-term adverse effects on human health or the environment, nor disproportionate adverse effects to low-income or minority populations are expected, pursuant to Executive Order 12898.
7. Based on field surveys and a cultural resources evaluation, the project would not significantly affect cultural resources. However, unknown subsurface cultural resources could be impacted during ground-disturbing activities associated with the proposed project. In the event subsurface cultural remains over 45 years of age are encountered, the project will cease work at the general area of discovery and a professional archaeologist on staff with the USFWS will be consulted.

In addition to analyzing effects on biological and cultural resources, the EA / IS evaluated the following aspects of the physical and human environment for potential significant effects as a result of the proposed action alternative:

- Air Quality / Greenhouse Gas Emissions
- Aesthetics
- Agricultural Resources
- Cumulative Impacts
- Environmental Justice
- Hazards and Hazardous Waste Materials
- Hydrology and Water Quality
- Land Use / Planning
- Mineral Resources
- Noise
- Population and Housing
- Public Services
- Public Utilities
- Recreation
- Soils and Geology
- Transportation

Project design features to minimize environmental effects were incorporated into the proposed action alternative to reduce impacts to a level below significance for those issues for which potentially negative impacts were anticipated.

Public Review and Comment

An initial public scoping notice was published in the legal section of the Red Bluff Daily News on January 12, 2015. The Draft EA IS was circulated through the State Clearinghouse for a 30 day public review. Concurrent with this public review, a public notice was published in the legal section of the Red Bluff Daily News on May 20, 2015 to solicit additional comments from the public and interested parties.

Conclusion

Therefore, the USFWS, as lead Federal agency for the proposed AFRP funding of, has determined that the Mill Creek Fish Passage Restoration Project – Upper Dam proposal does not constitute a major Federal action significantly affecting the quality of the human environment under the meaning of section 102(2)(c) of the National Environmental Policy Act of 1969 (as amended). As such, an Environmental Impact Statement is not required. An EA / IS has been prepared in support of this finding and is available upon request to the U.S. Fish and Wildlife Service, Red Bluff Fish and Wildlife Office, 10950 Tyler Road, Red Bluff, CA 96080.

Assistant Regional Director, Fisheries and Aquatic Conservation

Date

MITIGATED NEGATIVE DECLARATION

PROJECT TITLE:

MILL CREEK FISH PASSAGE RESTORATION PROJECT

(Ward Dam and Upper Dam)

Project Description

The U.S. Fish and Wildlife Service (USFWS) has proposed a fish passage improvement project on Mill Creek at two sites known as the Ward Dam and the Upper Dam, herein referred to as the project. One additional fish passage improvement site referred to as the Exposed Siphon, was also analyzed in the Environmental Assessment / Initial Study (EA / IS). The Exposed Siphon is currently unfunded with no lead agency designations and is not proposed by the USFWS at this time. If funding becomes available for the Exposed Siphon site, a Mitigated Negative Declaration will be prepared by the appropriate state lead agency and reanalyzed, as needed under the California Environmental Quality Act (CEQA).

The project includes improving fish passage conditions at two separate sites that currently hinder fish passage, by replacing the Ward Dam and Upper Dam fish ladders, upgrading fish screens and bypass pipes at the Ward and Upper Dam sites and adding scour protection at both project sites to meet fish passage while continuing to address the water needs of the landowners and the Los Molinos Mutual Water Company, the owners of the infrastructure. Improving fish passage at these sites will improve anadromous fish access to spawning, rearing and holding stream habitat upstream of the project sites through fish ladder replacements and will improve anadromous fish passage, downstream of the project sites through fish screen and bypass pipe modifications. The project is being funded by USFWS through the Anadromous Fisheries Restoration Program. The USFWS is the lead agency under the National Environmental Policy Act. The Central Valley Regional Water Control Board (Central Valley Water Board) is the lead agency for the project under CEQA.

Findings

The USFWS and Central Valley Water Board have prepared an EA / IS for this project, and the Central Valley Water Board has determined from this study that the proposed project would not have a significant effect on the environment for the following reasons:

- The project will result in a net benefit to Chinook salmon, steelhead and other aquatic fish and wildlife species by improving fish passage conditions.
- Improving fish passage at these sites will improve anadromous fish access to spawning, rearing and holding stream habitat upstream of the project sites through fish ladder replacements, and will improve anadromous fish passage, downstream of the project sites through fish screen and bypass pipe modifications.
- Project impacts will be temporary in nature.
- The project incorporates all applicable mitigation measures, as listed below and described in the EA / IS.

The following mitigation measures will be implemented as part of the project to avoid or minimize potential environmental impacts. Implementation of these mitigation measures would reduce the potential environmental impacts of the proposed project to a less-than-significant level.

- **AIR-1:** A Fugitive Dust Permit will be obtained from the Tehama County Air Pollution Control District (TCAPCD) for each of the three project sites.
- **AIR-2:** All construction equipment will be maintained in proper tune according to manufacturer's specifications.

To the extent feasible, the use of diesel construction equipment meeting the California Air Resources Board's (CARB) 1996 or newer certification standard for off-road heavy-duty diesel engines will be maximized.

If required by the TCAPCD, verify that owners or operators of vehicles are registered with the California Air Resources Board Diesel Off-Road On-Line Reporting System (DOORS) program: (www.arb.ca.gov/msprog/ordiesel/ordiesel.htm). The DOORS program assists fleet owners in reporting their off-road diesel vehicle inventories to reduce vehicle emissions, as required by the In-Use Off-Road Diesel Regulation.

If required by the TCAPCD, verify that owners or operators of portable engines and certain other types of equipment are registered under the California Air Resources Board's Statewide Portable Equipment Registration Program (PERP) in order to operate their equipment throughout California without having to obtain individual permits from local air districts (www.arb.ca.gov/portable/portable.htm).

- **VEGETATION-1:** Disturbance to existing vegetation will be avoided or minimized to the extent possible.
- **VEGETATION-2:** Disturbance to riparian vegetation will be avoided or minimized to the extent possible.
- **VEGETATION-3:** All heavy equipment shall be thoroughly cleaned prior to mobilization onsite to remove any soil, weed seeds and plant parts in order to reduce the importation and spread of invasive exotic plant species.
- **VEGETATION-4:** Only certified weed-free straw shall be used for erosion control or other purposes to reduce the importation and spread of invasive exotic plant species.
- **VEGETATION-5:** A revegetation plan will be prepared to replace impacted riparian wetlands and riparian habitat by a measure of quantity and quality equal to, or exceeding impacts of the project using appropriate native riparian trees and shrubs.
- **VEGETATION-6:** Areas with woody vegetation that have been disturbed will be revegetated in accordance with the revegetation plan.
- **VEGETATION-7:** (Upper Dam Site Only) Vehicle traffic at the Upper Dam project site will be limited to the existing disturbed road prism. The condition of the road post-project will be coordinated with the landowner and all measures will be taken to return the road to pre-project conditions. If truck passing areas are necessary, they will be established in areas away from populations of Tehama navarretia and wooly meadowfoam and away from aquatic sites. Truck passing areas will be clearly mapped in the field with high visibility fencing or flagging and all construction personnel will be made aware of the sensitive resources and avoidance measures.
- **VEGETATION-8:** No smoking will be allowed on the construction site or within the Action Area, for fire prevention purposes.

- **WILDLIFE-1:** Prior to work in aquatic habitats, water bodies shall be surveyed by a qualified biologist to determine if any foothill yellow-legged frogs or western pond turtles are present. If any individuals of these species are found, a qualified and permitted biologist shall determine and implement appropriate relocation procedures. Herpetological exclusion fencing shall be erected around the perimeter of the instream work area prior to construction initiation. Fencing shall remain until work in aquatic habitats is complete.
- **WILDLIFE-2:** A qualified biologist experienced in the identification of amphibian species (particularly Rana species) will conduct survey(s) for California red-legged frogs at a frequency / rate deemed acceptable by the California Department of Fish and Wildlife to determine if this species is present within any of the disturbance areas. If any California red-legged frogs are found to be present, all potentially disturbing construction activities will be suspended until appropriate protective measures can be developed in consultation with the USFWS ESA staff.
- **WILDLIFE-3:** Any tree removal, vegetation clearing, or the onset of potentially disturbing construction activities shall occur between August 31 and January 1 (outside of the nesting season for avian species).

If tree removal, vegetation clearing, or the onset of potentially disturbing construction activities must occur during the nesting season for non-raptor avian species (March 1 through July 31), a nesting survey of the construction area and adjacent suitable habitat shall be conducted by a qualified biologist no more than seven days prior to the initiation of the onset of these activities. If active avian nests are found to be present, tree removal, vegetation clearing and the onset of potentially disturbing construction activities shall be suspended until a qualified biologist, in consultation with California Department of Fish and Wildlife (CDFW) and / or the U.S. Fish and Wildlife Service (USFWS), can establish an appropriate protective buffer area to minimize impacts to the nesting birds. No construction activities shall commence within the buffer area until the qualified biologist determines that the young birds have fledged or the nest is no longer active.

If tree removal, vegetation clearing, or the onset of potentially disturbing construction activities must occur during the raptor nesting season January 1 through August 31, a raptor nesting survey of the construction area and a 0.25 mile buffer (as access allows) shall be conducted by a qualified biologist no more than seven days prior to the initiation of the onset of these activities. If active raptor nests are found to be present, tree removal, vegetation clearing and the onset of potentially disturbing construction activities shall be suspended until a qualified biologist, in consultation with CDFW and / or USFWS can establish an appropriate protective buffer area to minimize impacts to the nesting raptors. No construction activities should commence within the buffer area until the qualified biologist determines that the young birds have fledged or the nest is no longer active.

- **WILDLIFE-4:** Prior to any construction work, a survey shall be conducted by a qualified biologist to ensure that pallid bats are not roosting within the areas to be disturbed.
If pallid bats are found to be roosting within the area to be disturbed, construction activities shall be suspended until a qualified biologist, in consultation with CDFW, can establish appropriate measures to minimize impacts to pallid bats.
- **WILDLIFE-5:** Prior to construction, a qualified biologist will inspect the area to be disturbed to determine if potential ringtail denning is occurring.

If potential ringtail denning is found to be occurring, construction activities should be suspended until a qualified biologist, in consultation with CDFW, can establish appropriate measures to minimize impacts to ringtail.

- **WILDLIFE-6:** Prior to construction, all elderberry shrubs within 150 feet of any project activity will be clearly flagged, marked and maintained throughout construction in order to avoid impacts to the valley elderberry longhorn beetle. All elderberry shrubs within 100 feet of project activity will be marked with high-visibility orange fencing.
- **WILDLIFE-7:** (Upper Dam Site Only) At the Upper Dam site, project activities shall avoid impacts to vernal pools and other potential large branchiopod (fairy shrimp, tadpole shrimp) habitats to the extent possible.

High-visibility fencing shall be installed in areas where equipment will be working near any potential large branchiopod habitat that are not to be disturbed.

No road grading or road improvements shall be allowed in or near potential large branchiopod habitat.

Dust control water applications will not be applied to potential large branchiopod habitats.

All transporters of potentially hazardous materials (fuel, oil, cement, etc.) will be notified as to the presence of potential large branchiopod habitat and required to inspect their vehicles prior to entry and exit of these habitats, to prevent accidental discharge.

All vehicular traffic will be restricted to the designated work boundaries. The condition of the road post-project will be coordinated with the landowner and all measures will be taken to return the road to pre-project conditions. The work boundaries will be flagged or fenced and identified on construction drawings to limit equipment and personnel to the minimum area necessary to perform the project work and minimize impacts to potential large branchiopod habitats.

- **WILDLIFE-8:** A qualified biologist (biological monitor) shall regularly inspect construction-related activities to ensure that no unnecessary disturbance to special-status species and / or their associated habitats occurs. The biological monitor should have the authority to stop all activities that may result in such disturbance until appropriate corrective measures have been completed. The biologist will also be required to report any unauthorized take to CDFW, USFWS and / or NMFS immediately.
- **WILDLIFE-9:** A construction worker education program shall be implemented that includes an explanation of all special-status animal species, identification, avoidance measures, and federal and state laws that protect the species. This shall include, at a minimum, those species listed in the environmental documents.
- **WILDLIFE-10:** An Endangered Species Act Section 7 consultation will occur with the USFWS for each of the three project sites for impacts to yellow-billed cuckoo, valley elderberry longhorn beetle, vernal pool fairy shrimp and / or vernal pool tadpole shrimp. All protective measures imposed by USFWS through the consultation will be adhered to.
- **WILDLIFE-11:** Appropriate measures will be used to avoid the spread of Aquatic Invasive Species (AIS) such as Zebra / Quagga mussels, New Zealand mudsnails and Chytrid Fungus to and from the project area and could include such measures as physical removal from equipment, freezing equipment and saturation of equipment in chemical solution(s).
- **WETLAND-1:** Project activities will avoid impacts to wetlands and other aquatic habitats to the extent possible.

- **WETLAND-2:** High-visibility fencing will be installed in areas where equipment will be working near any wetlands or other aquatic habitats that are not to be disturbed
- **WETLAND-3:** Construction crews will be informed about the importance of avoiding sensitive areas, including wetlands.
- **WETLAND-4:** A Clean Water Act Section 404 Permit will be obtained from the U.S. Army Corps of Engineers and a Clean Water Act Section 401 Certification will be obtained from the Central Valley Water Board for each of the three project sites.
- **WETLAND-5:** A California Fish and Game Code Section 1600 Lake and Streambed Alteration Agreement will be obtained from CDFW for the Exposed Siphon site, if deemed applicable. It is anticipated that a 1600 Agreement will not be required for the Ward Dam or the Upper Dam sites.
- **FISH-1:** Instream construction work shall be conducted between July 15 and October 14 to minimize impacts to anadromous fish by working when water temperatures are warmer and anadromous fish are less likely to be present. Work within the channel and banks, outside of this instream work window must be isolated from flowing water and fish passage will be accommodated through the project site after October 14.
- **FISH-2:** All construction debris already on site and generated as a result of construction activity (concrete, metal, etc.) from the fish passage improvement-related construction activities will be removed from the active stream channel post-construction.
- **FISH-3:** Prior to construction, exclusionary fish netting shall be installed upstream and downstream of the construction area. USFWS, in coordination and consultation with NMFS and CDFW, will ensure that qualified fish biologists are onsite to implement fish rescue operations through the use of herding, seining and / or electrofishing, if necessary. Best professional determination will be used to decide which method(s) of rescue and location of exclusionary netting is most appropriate. Biologists will first try to haze and herd fish out of the fish exclusion area. If fish biologists determine that the use of electrofishing is necessary for the efficient and successful removal of fish, the NMFS electrofishing guidelines (NMFS 2000) will be strictly followed. The fish rescue team will be comprised of fishery biologists with professional experience using seines and electrofishing equipment.
- **FISH-4:** An Endangered Species Act Section 7 consultation and a Magnuson Stevens Act Essential Fish Habitat consultation will occur with NMFS for each of the three project sites for impacts to Central Valley steelhead, Central Valley spring-run salmon, winter-run salmon and /or fall- late fall-run salmon.
- **FISH-5:** All dewatering and rewatering activities will be conducted slowly, in order to minimize disturbance to fish.
- **FISH-6:** All pumps used during dewatering or other construction activities will be screened to meet CDFW and NMFS criteria.
- **FISH-7:** Appropriate measures will be used to avoid the spread of Aquatic Invasive Species (AIS) such as Zebra / Quagga mussels, New Zealand mudsnails and Chytrid Fungus to and from the project area and could include such measures as physical removal from equipment, freezing equipment and saturation of equipment in a chemical solution(s).
- **CULTURAL-1:** In the event subsurface cultural remains over 45 years of age are encountered during ground-disturbing activities, all work will cease at the general area of discovery and the U.S. Fish and Wildlife Service regional archaeologist, or other lead agency archaeologist, will be

notified immediately. A field exam by a professional archaeologist may be required and further steps for resource protection will be implemented, including mitigation and consultation with the Native American Indian community if human remains are encountered (following Native American Graves Protection and Repatriation Act procedures).

- **SOIL / GEO-1:** After ground-disturbing activities are complete, all disturbed areas (outside of the active stream channel and the ditch bottom) shall be seeded with native plant species and mulched as described in the revegetation plan.
- **SOIL / GEO-2:** Construction of all project actions shall comply with Central Valley Water Board Basin Plan Objectives. Standard Best Management Practices (BMPs) will be incorporated into the project designs.
- **SOIL / GEO-3:** If the total disturbance area is greater than one acre for any of the three project sites, a Notice of Intent will be submitted to the State Water Resources Control Board to obtain coverage under the National Pollution Discharge Elimination System General Permit for Discharges of Stormwater Associated with Construction Activity.
- **HAZ-1:** A designated concrete washout area will be located at least 100 feet from any high water mark within adjacent waterways and will be developed and used following the U.S. EPA Stormwater BMP for a Concrete Washout.
- **WATER-1:** All construction shall be conducted in the summer / early fall during the low flow period. Any work within the channel and banks, outside of this instream work window must be isolated from flowing water and dewatering will be required.
- **WATER-2:** BMP's will be developed and implemented to ensure that wet concrete does not enter Mill Creek during construction.
- **WATER-3:** Monitoring of water turbidity and settleable materials shall be conducted in accordance with the Clean Water Act Section 401 Certification through consultation with the Central Valley Regional Water Quality Control Board.
- **WATER-4:** All equipment and machinery that contains fuel, oil or other petroleum products used during construction related activities shall be checked for petroleum leaks immediately prior to being mobilized to the project site and again each day prior to use.
- **WATER-5:** All equipment refueling and / or maintenance shall take place within a secondary containment structure and a minimum of 100 feet away from Mill Creek or other aquatic sites.
- **WATER-6:** An emergency spill kit and absorbent oil booms will be onsite during construction activities.
- **WATER-7:** All equipment operations within the channel and banks of Mill Creek will be required to use readily biodegradable hydraulic oil.
- **WATER-8:** A dewatering permit will be obtained from the Central Valley Water Board for each project site, if deemed necessary, based on the dewatering methods used.

- **NOISE-1:** Construction work (including arrival and departure of trucks hauling materials) will generally be conducted from 7:00 am to 7:00 pm Monday through Friday. Weekend work will only be allowed, if necessary to complete the projects within the established environmental time frames.

Chief

Date

Storm Water & Water Quality Certification Unit
Central Valley Regional Water Quality Control Board

Project Title:

Mill Creek Fish Passage Restoration Project

Lead Agencies Name and Address:

The project applicant is the U.S. Fish and Wildlife Service (USFWS). USFWS is the lead agency under the National Environmental Policy Act. The Central Valley Regional Water Control Board is the lead agency under the California Environmental Quality Act. Contact information for the lead agencies are listed below:

U.S. Fish and Wildlife Service

Ms. Patricia Parker Hamelberg
Red Bluff Fish and Wildlife Office
10950 Tyler Road
Red Bluff, CA 96080
(530) 527-3043, ext. 248
Tricia_Parker@fws.gov

Central Valley Regional Water Quality Control Board

Mr. Guy Chetelat
Central Valley Regional Water Quality Control Board
364 Knollcrest Drive, Suite 205
Redding, CA 96002
(530) 224-4997
Guy.Chetelat@waterboards.ca.gov

Project Location:

The proposed project is located in the foothills of the Sacramento Valley, approximately three miles northeast of Los Molinos, in Tehama County, California. The project site is located on private property in the Sacramento Valley portion of the Mill Creek watershed, in Section 3, Township 25 North, Range 2 West (Ward Dam); in Sections 35 and 36, Township 26 North, Range 2 West, Section 31, Township 26 North, Range 1 West, and Section 1, Township 25 North, Range 2 West (Upper Dam) and in Section 4, Township 25 North, Range 2 West (Exposed Siphon).

General Plan Designation:

The Tehama County General Plan designation for the site is Valley Floor Agriculture.

Zoning:

The Tehama County zoning designation for the project site is zoned Agricultural / Upland district and Agricultural / Valley district.

1.0 Introduction

1.1 Overview

Under the authority of the Central Valley Project Improvement Act (CVPIA), the U.S. Fish and Wildlife Service (USFWS) has developed an Anadromous Fish Restoration Program (AFRP) with the broad goal of doubling natural production of anadromous fish (those that spawn in fresh water but spend their adult life in salt water) in the rivers and streams of the Central Valley of California (CA). The AFRP and other ecosystem restoration programs have recommended improving facilitated passage, spawning habitat conditions and riparian habitat in the Mill Creek watershed as a priority for the CVPIA, because Mill Creek supports three runs of Central Valley Chinook salmon (*Oncorhynchus tshawytscha*), as well as Central Valley steelhead (*Oncorhynchus mykiss*).

The USFWS has proposed a fish passage improvement project (hereafter referred to as project, proposed project or proposed action) on Mill Creek at three sites referred to as the Exposed Siphon, Ward Dam and Upper Dam. Improving fish passage at these sites would improve anadromous fish access to additional spawning, rearing and holding stream habitat. The project is being funded by USFWS through the AFRP.

1.2 Purpose of This Document

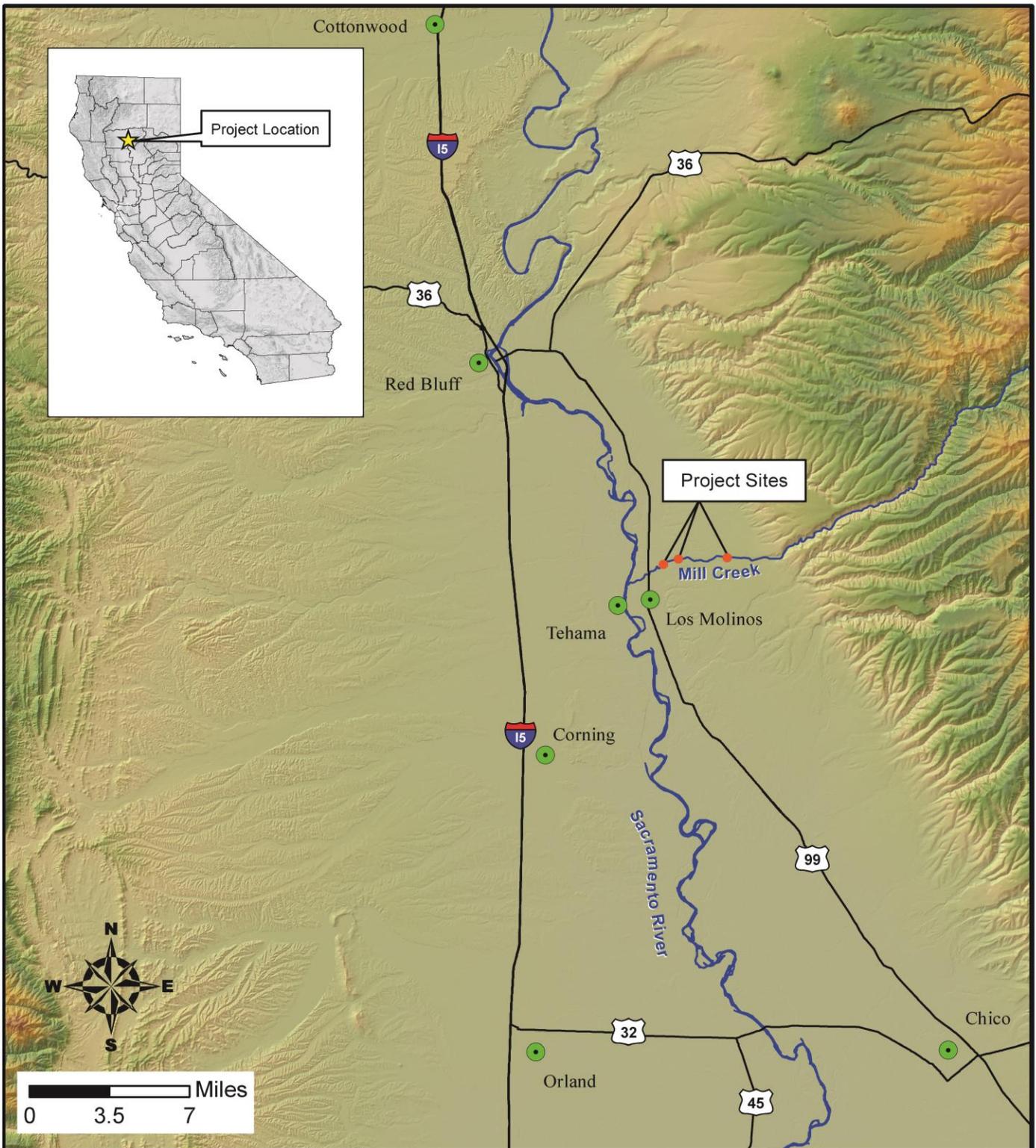
This Joint Environmental Assessment / Initial Study (EA / IS) was prepared by Tehama Environmental Solutions, Inc. (TES) under subcontract to Northwest Hydraulic Consultants, Inc. (NHC) under agreement number 81330-B-G845 with the USFWS. The EA / IS has been prepared to comply with both the National Environmental Policy Act (NEPA) (42 United States Code [U.S.C.] 4331 *et seq.*) and the California Environmental Quality Act (CEQA) (California Public Resources Code, Sections 21000 *et seq.*). The USFWS is the lead agency under NEPA and the Central Valley Regional Water Quality Control Board (Central Valley Water Board) is the lead agency under CEQA.

The purpose of this EA / IS is twofold. Under NEPA, the purpose is to determine whether the proposed action would result in significant effects on the environment, which would then require the preparation of an Environmental Impact Statement (EIS), or alternatively, whether the level of effects on the environment are such that a Finding of No Significant Impact (FONSI) can be supported by the federal lead agency. Similarly, under CEQA, the purpose is to determine whether the proposed project would result in significant effects on the environment, which would require the preparation of an Environmental Impact Report (EIR), or alternatively, whether the level of effects on the environment are such that a Negative Declaration or a Mitigated Negative Declaration (MND) can be supported by the state lead agency.

This EA / IS describes the environmental resources in the project area, analyzes the effects of the proposed action and a No Action alternative on the environment, and proposes avoidance, minimization and / or mitigation measures to reduce any effects to less than significant levels.

1.3 Project Location

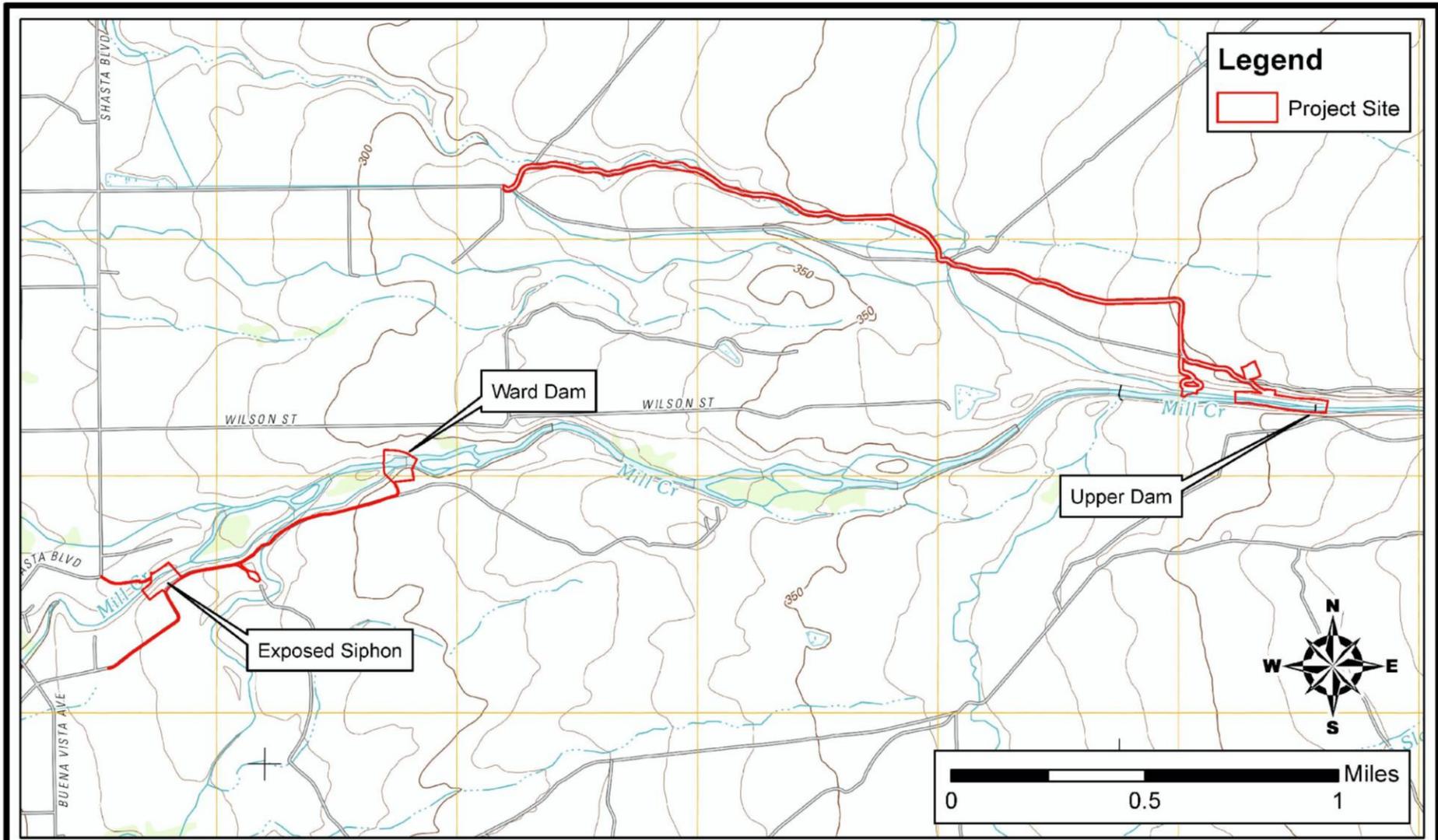
The proposed project is located in the Sacramento Valley portion of the Mill Creek watershed, approximately three miles northeast of Los Molinos, in Tehama County, California (Figure 1). Specifically, the proposed project is located in Section 3, Township 25 North, Range 2 West (Ward Dam); in Sections 35 and 36, Township 26 North, Range 2 West, Section 31, Township 26 North, Range 1 West, and Section 1, Township 25 North, Range 2 West (Upper Dam) and in Section 4, Township 25 North, Range 2 West (Exposed Siphon). The proposed project is located at three separate sites on Mill Creek, at approximately River Miles 1.9 (Exposed Siphon), 2.6 (Ward Dam), and 5.0 (Upper Dam), upstream of the confluence with the Sacramento River (Figure 3). Photos of these sites are provided as Figure 4 through Figure 12.



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**Mill Creek Fish Passage
 Restoration Project**
 Tehama County, California
 March 2015

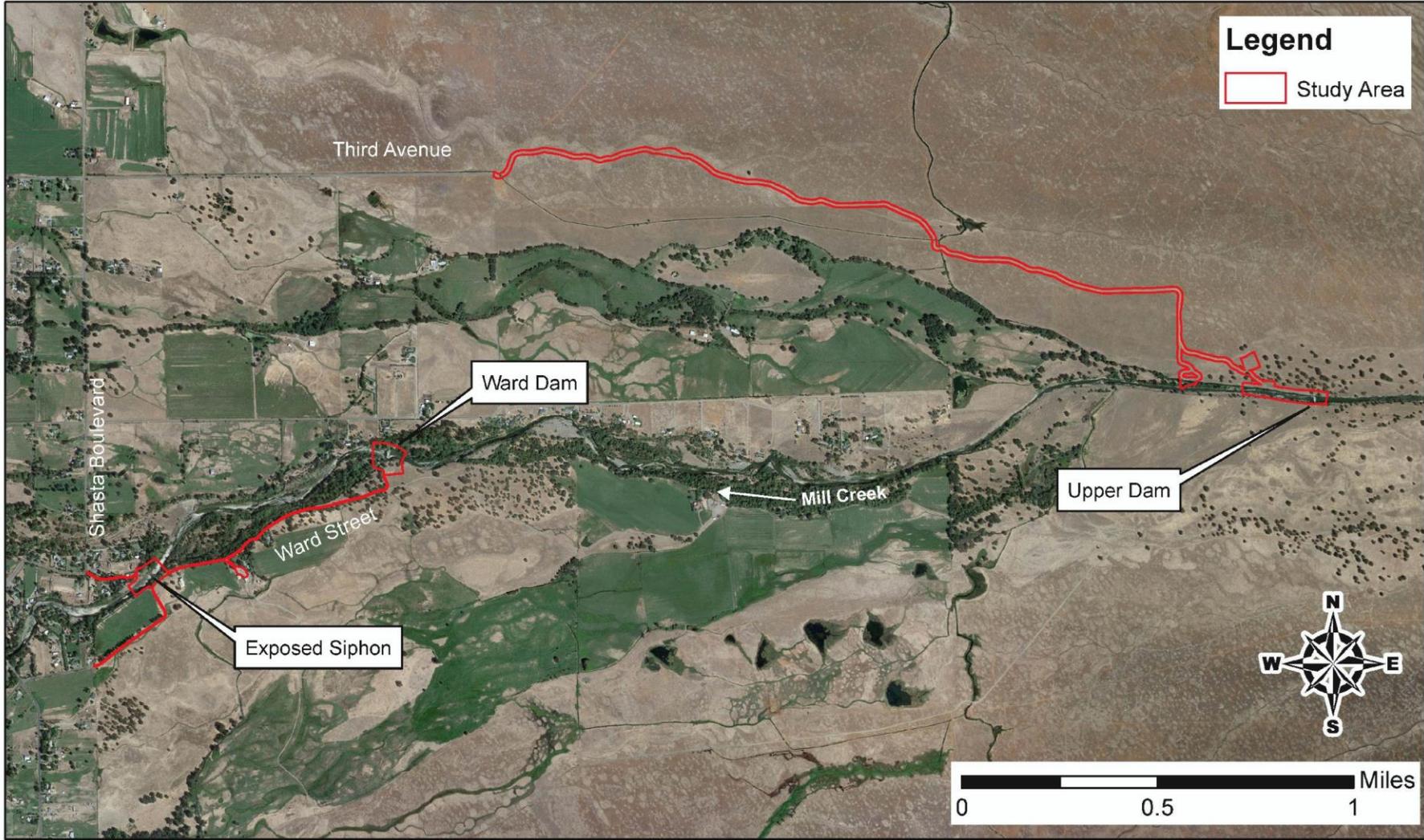
FIGURE 1
 Site Vicinity Map



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FIGURE 2
 Site Location Map



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 Restoration Project**

Tehama County, California
 March, 2015

FIGURE 3

Site Aerial Photo

PHOTO SOURCE: Google Earth, 8/27/2013



**Figure 4. View of the Exposed Siphon
View of Exposed Siphon and
instream and riparian habitat on
Mill Creek, looking northwest from
the south bank.**

Photo date: December 2, 2014.



**Figure 5. View of the Exposed Siphon
Instream and riparian habitat, on Mill
Creek, looking west from the south
bank.**

Photo date: June 30, 2014.



Figure 6. View of Ward Dam

View of Ward Dam, fish ladder,
diversion canal wall and riparian
habitat on Mill Creek, looking east.

Photo date: June 30, 2014.

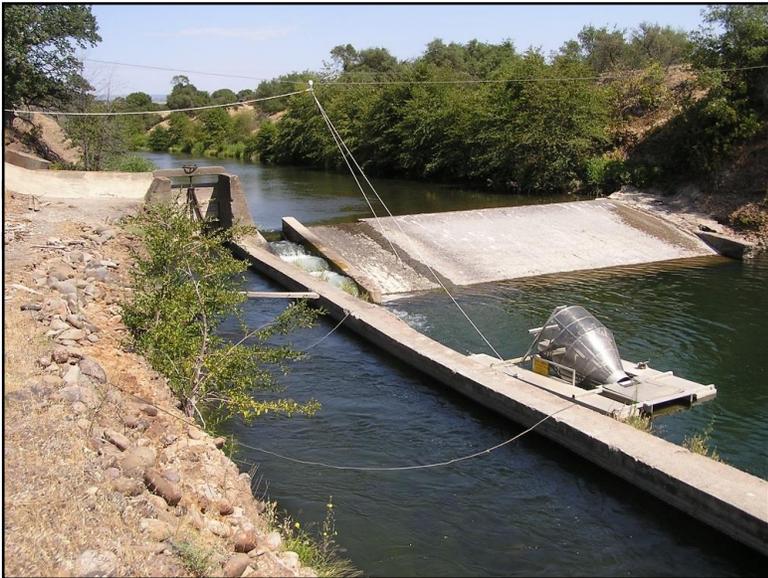


Figure 7. View of the Upper Dam

View of the Upper Dam, fish ladder, head gate and diversion canal on Mill Creek, looking east-southeast.

Photo date: June 30, 2014.



Figure 8. View of Ward Dam

View of Ward Dam fish screen and canal, looking northeast.

Photo date: June 30, 2014.



Figure 9. View of the Upper Dam

View of the Upper Dam fish screen, diversion canal and riparian habitat on Mill Creek, looking east-southeast.

Photo date: June 30, 2014.



Figure 10. View of the Upper Dam

View of the Upper Dam canal and riparian habitat on Mill Creek, looking east-southeast.

Photo date: December 2, 2014.



Figure 11. View of a Vernal Pool

View of an ephemeral stream road crossing on the access road to the Upper Dam site on Mill Creek, within annual grassland habitat.

Photo date: May 14, 2014.



Figure 12. View of an Ephemeral Stream

View of a vernal pool created by road traffic on the access road to the Upper Dam site on Mill Creek, within annual grassland habitat.

Photo date: January 7, 2014.

The proposed project is located on several remote private parcels of varying acreage which comprise all three project sites and the unpaved access haul roads to reach the sites. The Tehama County Assessor's Parcel Numbers are 078-041-030 (Exposed Siphon), 078-140-034 (Ward Dam) 078-140-005, 078-140-006 (Upper Dam) and 051-210-005, 047-210-003, 047-210-011, 047-210-001 (access haul roads to the Upper Dam site).

1.4 Purpose and Need for Action

NEPA regulations require the federal lead agency to describe the underlying purpose and need to which the agency is responding, when considering a project, while the CEQA Guidelines require that the state lead agency provide a "statement of objectives sought by the proposed project" (Council on Environmental Quality [CEQ] and Governor's Office of Planning and Research 2014). The information in this section addresses both of these requirements by providing information as to why USFWS and the Central Valley Water Board are considering the proposed project.

Purpose

The purpose of the proposed project is to improve passage for anadromous fish in Lower Mill Creek while continuing to address the agricultural and residential water needs of the Los Molinos Mutual Water Company (LMMWC). The project includes three sites: the Exposed Siphon, Ward Dam and Upper Dam. The modifications of these features would improve upstream and downstream (through fish screens and bypass pipes) fish passage conditions for anadromous and other native fish species.

Need

The AFRP and other ecosystem restoration programs have recommended improving fish passage in Central Valley streams as a high priority for the CVPIA. One of the High Priority Actions in the *Final Restoration Plan for the Anadromous Fish Restoration Plan* (USFWS 2001) included "Encourage the restoration of small tributaries by evaluating the feasibility of screening or relocating diversions, switching to alternative sources of water for upstream diversions, replacing bridge and ford combinations with bridges or larger culverts and installing siphons to prevent truncation of small streams at irrigation canals." The USFWS has identified the Exposed Siphon, Ward Dam and Upper Dam on Mill Creek as potential sites for improving passage conditions for several species of anadromous fish.

The Exposed Siphon is estimated to have been originally constructed during the 1920s. It includes an underground pipe and concrete cap, which was exposed during a large flood event in 1997 as a result of streambed incision downstream of the siphon crossing. It is now approximately two feet higher in elevation than the channel bed elevation. It has been determined to be a fish passage barrier during certain flow conditions.

The Ward Dam is estimated to have been originally constructed during the 1920s. In 1997, the California Department of Fish and Wildlife (CDFW), formerly the California Department of Fish and Game (CDFG), constructed the downstream slope on the face of the Ward Dam, the 80-foot-long open diversion canal, fish screen and bypass pipe. The fish ladder on the Ward Dam is functional and meets CDFW (Flosi et al. 2010) and National Marine Fisheries Service (NMFS) adult fish passage criteria (NMFS 1997) at flows equal to or less than 90 cubic feet per second (cfs); however, during higher flows it does not. The fish screen and bypass are also currently not meeting CDFW or NMFS criteria at certain flows.

It is estimated that Upper Dam was originally constructed in the 1910s to 1920s. Numerous repairs have been made to the structure over the years. It has also been determined to be a fish passage barrier during

certain flow conditions. The fish screen and bypass are also currently not meeting CDFW or NMFS criteria at certain flows.

Improving fish passage at these three sites is needed to enable anadromous fish to access upstream spawning, rearing and holding habitat, over a wider range of flows as well as to enable unimpeded bypass for juvenile salmon and adult and juvenile steelhead during downstream migrations.

The Exposed Siphon, Ward Dam and Upper Dam are part of a private stream diversion system that supplies irrigation water for agricultural and residential uses through LMMWC. There is a continued need by the LMMWC customers for water, so the project must be designed to address this need.

As a result of the needs identified above, the objectives for this proposed project are as follows:

- Improve fish passage at the Exposed Siphon, Ward Dam and Upper Dam,
- Address LMMWC’s water needs, and
- Minimize maintenance needs for public agencies and LMMWC

1.5 Mill Creek Technical Advisory Committee

The project was developed through a collaborative process by the Mill Creek Fish Passage Restoration Project Technical Advisory Committee (TAC), which includes representatives from USFWS, U.S. Bureau of Reclamation (BOR), NMFS, CDFW, California Department of Water Resources (DWR), Mill Creek Conservancy, LMMWC, multiple private landowners and several private consulting firms.

1.6 Regulatory Framework

In addition to CEQA and NEPA, the proposed project is subject to a variety of federal, state, and local laws, regulations and policies as identified in Section 5 of this document. The proposed project would require several federal, state, and local agency permits and approvals prior to implementation (Table 1).

Table 1. Required Permits and Approvals	
PERMITS AND APPROVALS	AGENCY
FEDERAL	
Clean Water Act Section 404 Permit	U.S. Army Corps of Engineers
Endangered Species Act Section 7 Consultation	National Marine Fisheries Service & U.S. Fish and Wildlife Service
STATE	
Clean Water Act Section 401 Water Quality Certification	Central Valley Regional Water Quality Control Board
National Historic Preservation Act Section 106 Consultation	California State Historic Preservation Office
Construction General Stormwater Permit*	Central Valley Regional Water Quality Control Board
NPDES Dewatering And Other Low Threat Discharges To Surface Waters Permit**	Central Valley Regional Water Quality Control Board
LOCAL	
Tehama County Fugitive Dust Permit	Tehama County Air Pollution Control District

*May be required if any of the three project sites are determined to cause disturbance to one or more acres of soil.

**May be required depending on the method of dewatering proposed.

2.0 Proposed Action and Alternatives

2.1 Alternative Development

The project was developed as a collaborative effort with participation from many different disciplines represented by local, state and federal entities. The TAC was made up of engineers, geologists and environmental scientists, water managers and landowners that were involved with the design process and instrumental with the selection of a preferred alternative.

In 2011, a kick-off meeting was held with the consulting firm NHC and the TAC to introduce themselves and become familiar with the project steps and objectives. NHC staff coordinated with the landowners to perform site visits. NHC staff then gathered information for the engineering alternatives analyses to provide fish passage improvements at the Exposed Siphon, Ward Dam and Upper Dam sites. The first step included the performance of a hydrologic analysis of fish passage and flood flows to identify all deficiencies for adult and juvenile passage at the three project sites. NHC staff also conducted topographic surveys including longitudinal profiles of the creek, cross section surveys and longitudinal profiles of other associated project areas to describe the existing conditions at all three sites. A geotechnical investigation was also performed and incorporated into the Predesign Report (NHC 2011) as well as Alternative Analysis Reports for each site (NHC 2013a, NHC 2013b, NHC 2013c). In July, August and October of 2013, drafts of the Alternatives Analysis Reports for the Exposed Siphon, Ward Dam and Upper Dam, respectively, were shared with the TAC. The alternatives that were described and discussed by the TAC included:

Exposed Siphon

1. Construct a roughened channel over the existing siphon
2. Remove and reconstruct the siphon at a lower elevation (including two options)
 - a. The crown of the pipe and cap to be placed below the 100-year minimum scour elevation
 - b. The crown of the pipe to be placed below the 25-year minimum scour elevation and a buried riprap apron placed for additional protection

Ward Dam

1. Remove the dam and construct a pump station
2. Remove dam and construct a roughened channel, downstream of the lowered dam crest
3. Replace the existing fish ladder

Upper Dam

1. Remove existing dam and construct pump station
2. Remove existing dam and construct roughened channel
3. Relocate fish ladder and fish screen, fish ladder would be cut into the existing dam
4. Relocate fish ladder and fish screen downstream of the dam. Flow which bypassed the screen, rather than going through a juvenile bypass pipe, would go down a fish ladder and back into the river. The canal upstream of the fish screens would be an upstream adult fish migration corridor.
5. Replace existing dam with an Obermeyer Weir (inflatable dam).
6. Leave dam in place, replace the existing fish ladder with a large fish ladder requiring excavation of hillslope and use of a wall to stabilize the hillslope.
7. Replace the existing fish ladder without hillslope excavation, or dam modifications, move fish screens closer to the point of diversion, pipe diversion canal and move the diversion control downstream of the fish screens

2.2 Alternative 1 – No Action

Under this alternative, no changes would occur to the existing Exposed Siphon, Ward Dam or Upper Dam, or other diversion-related infrastructure at each site. No changes would occur to any of the fish ladders, fish screens, diversion canals, bypass pipes or diversion practices at any of the sites. Flows would continue to be diverted between spring and late fall / early winter, and provisions for improved passage and protection of fishes would not be implemented. The hydraulic characteristics of the flows over the Exposed Siphon and fish ladders, and through the fish screens would continue to be deficient in meeting NMFS and CDFW fish passage criteria during certain flows. The structures at the project sites would continue to act as partial barriers for adult salmonids fish and as complete barriers to juvenile salmonids for upstream passage and downstream bypass via the fish screens.

2.3 Alternative 2 – Proposed Action

TAC members agreed that the preferred alternative would involve:

- Removal and reconstruction of the Exposed Siphon at a lower elevation, where the crown of the pipe and cap would be placed below the 100-year minimum scour elevation.
- Replacement of the existing fish ladder at Ward Dam
- Replace the existing fish ladder without hillslope excavation, or dam modifications, move fish screens closer to the point of diversion, pipe diversion canal and move the diversion control downstream of the fish screens at the Upper Dam

This alternative was then further developed through a design process (NHC 2014, NHC 2015a, NHC 2015b). An agreement would be coordinated and prepared between the USFWS, CDFW, LMMWC and the landowner that memorializes responsibility for maintaining the condition of the fish screen and bypass pipe and for keeping the diversion in a fish-friendly operational state.

Exposed Siphon

Below is a bulleted list of the proposed action design features for the Exposed Siphon, followed by a more detailed description of each aspect of the action. The 100 percent Design Plans are included in Appendix A.

- Construction Diversion and Dewatering
- Removal of Existing and Installation of New Siphon / Cap
- Streambed Restoration
- Low Flow Channel Grading
- Stream Bank Restoration
- Floodplain Restoration

Construction Diversion and Dewatering

Installation of the new pipeline is anticipated to occur in two phases. The first phase would construct the new pipeline across the north bank floodplain. During this phase, diversion of Mill Creek flows would not be required. However, seepage flows into the excavation trench are expected. The rate of flow would depend on stream flow and porosity of the streambed material. The contractor would be required to maintain and operate sump pumps to keep the trench in working condition.

The proposed treatment plan for construction water from the excavation is to pump it to a pond or basin on the floodplain where it would infiltrate into the coarse substrate and return to Mill Creek via groundwater flow. If discharges exceed infiltration capacity, a sediment detention pond would be

required to minimize turbidity in Mill Creek downstream of the work site. Permit conditions from the Central Valley Water Board or other agencies may ultimately require a different treatment plan.

The second phase would construct the new pipeline across the channel of Mill Creek, requiring diversion of surface flows. The proposed approach is to divert flows around the construction site via in-channel coffer dams and a pipe on the north floodplain that would carry these flows past the construction site. The pipe would be buried or otherwise protected from work site traffic and the outlet from the pipe would also be lined with a filter and riprap to dissipate energy and prevent erosion of the existing stream channel during diversion. It is assumed that no water quality treatment would be required for the diverted flows. Design details for diversion and dewatering would be prepared by the contractor to meet conditions in the environmental documents and permits and submitted to the project owner for approval.

Removal of Existing and Installation of New Siphon / Cap

The 24-inch siphon pipe would be encased in a four-foot-wide by four-foot-high concrete cap. The crest of the cap would be set at or below the 100-year minimum scour elevation across the channel and north floodplain. As described in the Alternatives Analysis Report (NHC 2013a), the main channel of Mill Creek has shifted back and forth between the valley walls over the past 60 years, so it is necessary to bury the pipe below 100-year minimum scour elevations from the south to the north valley wall. Appendix A provides a profile for the siphon pipe and cap.

Streambed Restoration

The typical width of the top of the excavation, perpendicular to the pipe alignment, would be approximately 25 to 30 feet. The streambed materials excavated for the pipe installation would be stored on the floodplain and used to backfill the excavation. If consolidated material is encountered in the excavation that is not suitable for backfill, it would be removed from the site and additional gravel and cobble would be imported, as needed. The restored bed would be sloped at 1.25 percent from the upstream to downstream edges of the excavation area, and set to match elevations of the grading described below.

The top 18 inches of the backfill would consist of alluvium sorted to match the existing streambed material and would have the following distribution:

- 100 percent finer than 1.5 feet
- 80 percent finer than 0.9 feet
- 50 percent finer than 0.6 feet
- 0 percent finer than 0.1 feet

Low Flow Channel Grading

In order to improve fish passage at low flows in Mill Creek, the restored streambed would be graded so that a low flow channel is established near the center of the channel. The grading would also extend upstream of the pipeline crossing and approximately 120 feet downstream of the crossing to connect to the downstream pool or to the upstream existing low flow channel.

The project would also add six boulder clusters to the low flow channel after the grading to improve fish passage at the low fish passage design flow. Appendix A provides details on rock sizes and arrangement.

Stream Bank Restoration

The excavation for removal of the Exposed Siphon and installation of the new siphon would temporarily impact approximately 30 to 40 feet of stream bank on each side of Mill Creek. The south stream bank is

moderately steep and would be re-formed with the excavated material. For stability following construction, the lower part of this bank would be backfilled and reinforced with Vegetated Reinforced Soil Slope (VRSS) erosion control (Sotir and Fischenich 2003). The VRSS uses vegetation plantings and geosynthetic fabrics to stabilize the slope. The re-constructed south stream bank would follow the general alignment and meet the elevations of the existing bank, blending into the upstream and downstream unaltered banks. Excavated soil would be replaced on the stream bank above the VRSS and revegetated under separate contract following construction. The north bank would be reconstructed with alluvium and revegetated. Appendix A shows construction details for north and south bank restoration.

Floodplain Restoration

The typical extent of excavation perpendicular to the pipe alignment across the north floodplain would be approximately 30 feet. After clearing vegetation, soils would be stripped from the floodplain and stockpiled. Sediments below the soils (assumed to be alluvium) would also be stockpiled for backfill.

Once the pipe is installed, the excavation would be backfilled with compacted excavated material, leaving sufficient space at the top to replace the soils. After placing soils, the floodplain would be graded to the average slope of the existing floodplain, matching elevations at the upstream and downstream sides of the excavation. The soil would be protected from erosion with degradable fabric and revegetated with appropriate native species under a separate contract.

Ward Dam

Below is a bulleted list of the proposed action design features for the Ward Dam, followed by a more detailed description of each aspect of the action. The 100 percent Design Plans are included in Appendix B.

Phase 1 - Instream Work (Mid-Summer)

- Placement of the rock scour apron
- Demolition of the existing / construction of new fish ladder
- Construction of the instream portion of the new diversion intake and the new bank upstream of the diversion
- Installation of the new bypass pipe

Phase 2 – Post-diversion Work (Fall)

- Retrofitting of fish screen and construction of new diversion canal
- Connection of bypass pipe inlet to canal

Other Project Items

- Site access
- Flow diversions during construction, dewatering and rewatering
- Diversion operations
- Revegetation

Rock Scour Apron

Initial designs for the Ward Dam improvements had included a rock apron to minimize the effects of existing local scour on the downstream edge of the dam to improve the stability and useful lifetime of the dam. During the February 2015 TAC meeting, the resource agencies responsible for project oversight, directed NHC to limit rock stabilization and scour protection to the amount necessary to protect Ward

Dam from potential additional impacts caused by installation of the wider fish ladder and related project components. Based on the direction provided by the TAC, NHC reviewed and reassessed the scour analyses for Ward Dam. The Ward Dam Alternatives Analysis Report (NHC 2013c) utilized relationships provided in Bormann and Julien (1991) to predict scour depths expected from a 100-year peak flow event. Under existing conditions, maximum scour depths are expected to be between four- and six-foot-deep along the structure face. The dam toe is exposed where scour is the deepest. The scour hole starts at the toe of the dam and extends approximately 50 feet downstream. Scour protection to address the existing issues with scour at the toe of the dam is not included in the final design.

Near the new fish ladder wall on the left bank, scour is expected to be enhanced by the interaction of the jet with the wall on the downstream end of the ladder. The hydraulics at this location are complex and typical methods for predicting scour depths are not well suited for this type of hydraulic situation.

Based on existing conditions, the presence of the wall increases the local scour depth by a factor of two. The proposed condition is expected to be consistent with the existing hydraulics, and it is expected that approximately ten to twelve feet of scour may occur near the fish ladder wall during a 100-year peak flow event. To protect against this scour affecting the new fish ladder, rock toe protection has been included in the design at the fish ladder as discussed below. The revised 95 percent design plans include a rock toe along the proposed fish ladder wall. The rock toe will begin at an approximate elevation of 281 feet, approximately one to two feet below the existing grade, and extend down an additional six feet at a 2H:1V slope to an elevation of 275 feet. This is equivalent to a scour depth of approximately ten feet. A short six-foot extension will be placed at an elevation of 275 feet, providing rock protection within approximately a 30-foot extent around the proposed fish ladder. The area will be temporarily excavated to install the rock toe, and then backfilled to existing elevations. The design will ensure a stable footing for the fish ladder and dam at this location, and limit the total scour depth near the dam. The sloping toe will allow a scour hole of significant depth to form for energy dissipation, but will limit the lateral extent of the scour from reaching the footing.

There is no standard guidance for calculating a stable bed material size for a rock toe below a grade control structure. The stable size was estimated by selecting the minimum rock size that resulted in zero scour from the Bormann and Julien scour equation. This resulted in a D_{90} (rock diameter larger than 90 percent of the rock) of 3 feet. Visual observations at the existing site show rocks as large as 1.5 feet in diameter in the riffle downstream of the dam, indicating rock should be larger than 1.5 feet. The California Department of Transportation (Caltrans) standard ½-ton riprap gradation is specified for rock stabilization. The angular rock will have a maximum rock size of approximately 2.9 feet, a median rock diameter of 2.25 feet and a minimum rock diameter of 1.8 feet.

As a rough check on the above rock gradation, the stable stone size for the velocity and depth downstream of the dam was also calculated. At Section 103.28, the Hydrologic Engineering Center River Analysis System (HEC-RAS) model calculates a 100-year average velocity of 12 feet per second (fps) at a depth of 12 feet. For these conditions, the stable stone size has a diameter of approximately 0.5 to 0.6 feet (Neill 2004). The above analysis is not very appropriate at the toe of the dam because many of the assumptions that it is based on do not apply there. However, given that the stable size is much smaller than the proposed D_{50} (rock diameter larger than 50 percent of the rock) for the rock toe, it provides some assurance that the selected rock gradation is appropriately sized.

Fish Ladder

The existing fish ladder would be removed and a new fish ladder would be constructed. The new fish ladder would meet the hydraulic design criteria outlined in Flosi et al. (2010) for upstream migrating adult salmonids, which includes maintaining jump heights of one foot or less, providing adequate attraction flow through the ladder, and ensuring adequate pool volume to allow for turbulence dissipation. A pool-

and-chute fish ladder is proposed for the project. The proposed design would extend the fish ladder downstream approximately nine feet and upstream approximately 18.5 feet. The ladder would have nine weirs and would have a 0.9-foot drop between the eight-foot-long pools. Appendix B shows the typical weir dimensions. The typical notch height is 0.25 feet, with the notch height of the upstream two weirs increased to 0.5 feet at the second weir and 0.75 feet at the upstream weir. The increased notch height follows the recommendations of Bates (1991) to account for the increased drop in water levels over the first two weirs due to the increasing velocity head. NMFS (2011) recommends a one- to 1.5-foot drop at fish ladder entrances to increase attraction. The entrance weir has an invert elevation of 284.8 feet, and should have a 0.5-foot drop under existing conditions. The low weir elevation ensures that the jump height into the fish ladder would be less than 1.5 feet, should water levels at the entrance decrease by one foot due to future changes in the downstream channel. The exit weir crest is at elevation 290.4 feet.

Flow through the center notch of the fish ladder would begin to transition to streaming flow at approximately nine cfs. The depth of flow over the notch on the upstream weir would be just over one foot at this flow rate, submerging the lower 0.25 feet of the sloping weirs. The nine cfs streaming depth over the downstream weirs is expected to be 0.5 feet which would maintain a 0.25-foot submergence on the sloping weirs. At the design high flow, flow depth over the upstream-most weir is approximately 3.1 feet and the fishway flow is approximately 140 cfs. The streaming flow depth is two feet, resulting in an average drop of approximately 1.15 feet over the first two weirs. Appendix B provides further details of the typical section of the fish ladder design. The design meets all NMFS (2011) fish ladder criteria. Wall heights are set to one foot above the computed two-year event water level, and four feet above the upper limit flow water surface elevations.

Diversion Intake / New Bank

The diversion intake would be realigned and moved upstream of the new fish ladder to reduce sediment deposition. The new diversion intake would be located approximately 40 feet upstream of the existing intake. The proposed design aligns the gate to be parallel to the stream flow and, during high flow events, sweeping velocities would push sediment past the gate structure. The intake would be controlled by two ten-foot-wide weir gates. A trash rack with 11-inch spaced bars would protect the diversion infrastructure from large debris.

The adjustments to the diversion intake require excavation of the existing bank and construction of new diversion canal walls and floor. The bank near the intake would be excavated back to a 2H:1V slope, and reconstructed as a VRSS.

Fish Screen and Diversion Canal

The retrofits to the existing fish screen meet the guidelines defined in Volume 1, Appendix S of the *California Salmonid Stream Habitat Restoration Manual* (Flosi et al. 2010) and NMFS Southwest Region's *Fish Screening Criteria for Anadromous Salmonids* (NMFS 1997). The newly constructed diversion canal walls would extend down to the fish screen and would be reconstructed to decrease the width in front of the fish screen in order to meet screen criteria. The new diversion wall would be built to equivalent wall heights as the existing diversion walls, and would be concrete. The canal near the fish screen would maintain sweeping velocities in front of the screen of one-to-two fps.

The existing fish screen would be fitted with a steel plate to isolate each five-foot length of screen bay. The upgrades to the screen also include louver frames constructed to fit into the existing flashboard slots behind the screen. When in place, the louvers would allow for flow to be balanced across the face of the screen.

Bypass Return Pipe

The existing 15-inch diameter return pipe would be replaced with a 115-foot-long and 20-inch-diameter high-density polyethylene (HDPE) pipe. The 20-inch outside diameter pipe would have an inside diameter of approximately 18 inches. The new bypass outlet would be located in the riffle approximately 100 feet downstream of the dam. The pipe outlet would drain into a steep ditch with a slope of approximately ten percent. The ditch is approximately 30 feet long. The pipe will have approximately six inches of cover beneath a gravel floodplain that is inundated annually during high flow events. To ensure the pipe remains stable during large events, it will be anchored at 10-foot increments with precast concrete sleepers. The pipe inlet and outlet invert elevations will be at 287.6 and 286.5, respectively.

The pipe slope is approximately 0.01 feet per foot (ft / ft). Flow in the pipe will remain open channel flow until the non-diverted stream flow exceeds approximately 2,000 cfs. Such a flow is unlikely to occur during the diversion season. A minimum bypass flow of 7.5 cfs will be required to meet NMFS (1997) depth criteria. The design considerations are detailed in Appendix B.

Site Access

Access to the site is via Ward Street. The Ward Dam staging area is proposed for the south bank adjacent to the project site. A temporary bridge over the diversion canal for instream construction access would be required. The access route to the dam face would be constructed for trucks and heavy machinery and would be located from a temporary bridge, across the existing gravel bar, to the area downstream of the dam. This route would require approximately seven yards of temporary fill which would be local alluvium excavated from the project site. Some clearing of the vegetation on the floodplain would be required.

The contractor would be responsible for developing a traffic and temporary site access plan, including restoring all access roads to the condition prior to construction. LMMWC would be responsible for negotiating access, rights of way, and other issues with local property owners.

Flow Diversions during Construction, Dewatering and Rewatering

The instream portion of Phase 1 work would include placement of the rock scour apron, demolition of the existing fish ladder, construction of the new fish ladder, construction of the new bypass pipe and outlet, construction of the instream portion of the new diversion intake and construction of the new VRSS bank upstream of the diversion.

Phase 1 work would begin during the mid-summer and is targeted to begin when the LMMWC diverts all stream flow at Ward Dam. This phase is expected to take approximately two months to complete. Based on the timing of Mill Creek flows in typical years, the instream work of Phase 1 could be completed with all instream flow passing through the LMMWC diversion canal. If all flows are able to be diverted, during the timing of Phase 1 construction, Mill Creek below Ward Dam would have dry instream conditions. Demolition and construction of the existing and new fish ladder, construction of the diversion intake and construction of the VRSS bank would require isolation of the construction areas from water in Mill Creek. The isolation structures would likely consist of a water-filled bladder or gravel bags, or other suitable materials and would be placed so that flows would continue to enter the existing Ward Dam diversion. During the fish ladder construction, stream flow would pass over the dam crest and it would be necessary to isolate the construction site from these flows also. Localized site dewatering is anticipated during this portion of construction as well.

In wet years, such as 2011, flows remain above the LMMWC diversion capacity until late in September. In such a year, additional bypass capacity would be required to construct the rock scour apron with dry instream construction conditions. Approximately 20 cfs to 30 cfs would need to be routed around the construction in typical wet year flows. Bladder dams would be used to direct water toward the north

bank, allowing construction of most of the rock scour apron, and then moved to direct water to the south bank to complete the construction. If needed, flows could potentially be diverted through the Ward Dam diversion and spilled into Mill Creek further downstream.

Seepage is anticipated at both sites and construction water would be pumped onto the adjacent floodplains so that it infiltrates and returns to Mill Creek as groundwater downstream of the construction site. Permit conditions may require a different approach. Design details for diversion, dewatering and rewatering would be prepared by the contractor to meet the conditions in the environmental documents and permits, and submitted to the project owner and engineer for approval.

LMMWC typically reduces their diversion rates from early to late October, using October 15 as the target date for the end of the diversion season. The decision to end the diversion season is made in close coordination with CDFW and is based on various factors. Overall precipitation for the year influences the decision to stop diverting irrigation water, as rainfall not only influences LMMWC's irrigation demand, but also influences Mill Creek's water temperatures and hydrologic connectivity to the Sacramento River. A natural sediment bar forms at the mouth of Mill Creek in most years and depending on conditions, forms a partial barrier for fish entering Mill Creek. The diversion season end dates are targeted to coincide with natural rainfall events in an effort to maximize flows. In low rainfall years, the irrigation season has been known to continue into the month of November.

After the diversion season ends, typically in late October, and the diversion canal is dry, the new diversion canal would be constructed, the fish screen would be retrofitted, and the new bypass pipe inlet would be connected into the diversion canal and installed, comprising the instream portion of Phase 2 construction activities. Some local dewatering is anticipated near the new diversion intake to allow for finishing of the diversion canal and placement of the new weir gates and trash rack. This instream work is expected to take approximately one month to complete. All other Phase 2 work would take place in the dry diversion canal and on the bank above, and is expected to take approximately one additional month.

Upon completion of each phase of the project, the construction site would be slowly rewatered to prevent a sudden increase in stream turbidity.

Diversion Hydraulics under Project Conditions

The flow into the diversion canal is controlled by a Parshall flume located approximately 80 feet downstream of the existing fish screen. The flume has a six-foot throat width with an invert elevation of 288.6 feet. For the maximum diversion flow of 50 cfs, the flume would create a backwater elevation of 290.3 feet. The exit weir of the fish ladder is set to 290.4 feet. These elevations are approximately 0.5 feet lower than the crest of the dam.

The proposed flow control structures would be located on the diversion canal; hence, LMMWC would be able to reduce diversion flows and increase flows through the fish ladder or over the dam, if required. Flashboards would not be required in the fish ladder to ensure flow requirements are met.

The weir gate at the diversion intake would be set with a bottom elevation of 290.0 feet and would be adjusted to control flow into the diversion. The bypass pipe would also have a slide gate to allow for adjustment of bypass flows. The fish ladder would pass 100 percent of the non-diverted stream flow up to approximately four cfs. Above four cfs, the fish ladder would pass approximately eight percent of the total stream flow.

Under current operations, LMMWC often diverts all of the stream flow during late summer. In previous years, instream flow agreements have been put into place through a memorandum of understanding between both LMMWC and CDFW, and LMMWC and NMFS. These are in the process of being drafted to outline future operations, but at this time, no formal agreements exist.

Revegetation

A revegetation plan would be prepared for this project to replace impacted vegetation by a measure of quantity and quality equal to or exceeding impacts of the project using appropriate native species. Following construction, vegetated areas that have been disturbed, would be revegetated in accordance with the revegetation plan.

Upper Dam

Below is a bulleted list of the proposed action design features for the Ward Dam, followed by a more detailed description of each aspect of the action. The 100 percent Design Plans are included in Appendix C.

- Install New Fish Ladder
- Install New Fish Screen
- Install New Juvenile Bypass
- Install New Diversion Pipe
- Design Operation
- Anticipated Construction Sequence
- Flow Diversions During Construction
- Revegetation and Mitigation

Install New Fish Ladder

The existing fish ladder would be replaced with a vertical slot-pool fish ladder design. To facilitate debris passage past the fishway exit, a trash rack would be constructed upstream of the fishway and diversion entrances. The diversion canal wall would be raised from the section near the upstream extent of the fishway, to approximately 200 feet below the dam. A lateral weir would be installed on the wall near the fishway entrance to increase attraction flow to the ladder and a sediment sluice would be built into the wall to allow sluicing of sediment out of the diversion canal, upstream of the screens.

The proposed vertical slot fishway is based on the design provided in Flosi et al. (2010). The slot width would be 12 inches. The fishway would have a width of eight feet, and a pool length of ten feet. The fishway would have a constant slope of 0.1 ft / ft. The proposed fishway is composed of five pools. The fishway entrance would be located approximately 20 feet downstream of the downstream edge of the existing dam. This location is in the deepest portion of the scour hole below the dam and provides an adequate resting location for fish prior to entering the fishway. The fishway exit is approximately five feet upstream of the dam crest.

The invert of the upstream fishway exit is 377.5 feet in elevation. The invert upstream of the diversion inlet would have an elevation of 376.0 feet. This should reduce ingestion of sediment bed load into the fishway. The sediment sluice would be used to prevent the entrance from silting-in. The proposed operation of the fish screens would require an upstream head of 379.1 feet in elevation, upstream of the fish screens. Bell (1991) determined that a vertical slot-pool design with a one-foot notch would have 6.4 cfs per foot of pool depth. This would result in approximately ten cfs passing the fishway when the full 90 cfs flow was being diverted. Similarly, this would ensure 16 cfs would be passing through the ladder when the dam crest begins to overtop at elevation 380.0 feet.

At the upper fish passage design flow, the water surface upstream of the dam is approximately 385 feet in elevation. This would result in approximately 48 cfs passing through the fish ladder. This only accounts for approximately 2.5 percent of the total flow. To increase attraction at the fishway entrance, a lateral weir at elevation 379.5 feet would be placed on the diversion wall near the fishway entrance. The lateral

weir would be 5.5 feet wide and would also help to sweep flow and debris past the fishway exit. There is a specified flow split between the weir, fishway and dam (NHC 2015d).

Install New Fish Screen

The proposed fish screen design uses chevron-shaped screens on both sides of the diversion canal directing unscreened flows down to an 18-inch-diameter juvenile bypass pipe. The chevron screen design was used to reduce exposure time to the screen face. The screen bay floor would be 376.0 feet and the top elevation of the screens would be 385 feet. This elevation corresponds to the expected water level upstream of the dam during the one percent annual average daily exceedance flow. This elevation would prevent the screen face from being overtopped in all but the largest storm events. The screens would be sealed overhead from overtopping by diamond plating, which would also serve as a maintenance walkway to the screen face. The diamond plating would be removable to allow maintenance behind the screens.

Backwater curves downstream of the screens show depths at the screens should be approximately 3.1 feet during the maximum 90 cfs diversion. The screen on both the south and north canal wall are 48 feet long providing 298 square feet of screen area below the 3.1 foot of depth at 90 cfs. This allows up to 3 percent of the screen area to be lost to structural support during later phases of design without compromising the approach velocity. Louvers would be placed in four-foot sections behind the screen face to allow for balancing of flow through the screen face.

No power utility is located near the Upper Dam facilities so the proposed design includes paddlewheels for driving the screen brush system. The paddlewheels would be located behind the diversion flow control gates. Standard nine-foot paddlewheel designs would be used to drive a gang brush system. The fish screen design would include four gates. A ten-foot-wide by four-foot-high undershot gate would be mounted on a headwall upstream of the screens. This gate would be closed during large events to protect the screen bay, and allow for dewatering of the screen bay for maintenance. Two smaller five-foot-wide by four-foot-high gates would be installed downstream of each screen on either side of the channel to control diversion flow during screen operation, and another 18-inch by 18-inch gate would be installed to control flow through the juvenile bypass channel.

Install New Juvenile Bypass

The juvenile bypass pipe entrance is located at the downstream terminus of the screens. The chevron screen design requires the juvenile bypass pipe to dip below the invert of the diversion canal to avoid blocking diverted flow. The low invert of the entrance requires the pipe to be routed approximately 300 feet downstream to prevent the pipe and screens from being backwatered during the one percent daily average exceedance flow. The pipe would be buried beneath the existing diversion canal with a 0.001 ft / ft slope. To minimize the amount of flow required to meet the NMFS (1997) velocity and depth criteria, an 18-inch-diameter pipe is proposed. The 18-inch-diameter is consistent with the final design at Ward Dam downstream on Mill Creek, and would allow more flow to be routed through the fishway rather than the bypass in low flow conditions.

The pipe outfall is located in a riffle downstream where the channel thalweg (deepest part of the channel) pushes close to the north bank of Mill Creek. During low flow conditions when only ten cfs is flowing through the fishway, and ten cfs is being routed through the juvenile bypass pipe, the depth at the outfall would be approximately two feet. Stream velocity at the outfall would be 2.5 fps. During the 50 percent daily average exceedance flow, the depth and velocity at this location would be 2.5 fps and three fps, respectively. For the ten cfs bypass flow, the 18-inch-diameter pipe would be flowing full with a velocity of 5.6 fps.

Install New Diversion Pipe

The diversion canal would be concrete-lined from the diversion inlet to downstream of the new fish screen structure. The proposed design routes the diversion flow into two 42-inch-diameter pipes downstream of the paddlewheels. Each pipe would carry up to 45 cfs of diversion flow. The 42-inch-diameter pipes would run approximately 1,000 feet in length to a location where the diversion canal is no longer at risk for overtopping and would then empty into the open channel canal system. The 42-inch pipes would be placed approximately one foot below the invert of the existing canal and have a 0.001 ft / ft slope consistent with the existing canal. The existing concrete wall would be removed and replaced with a vegetated streambank which would stabilize the toe along the pipes, and the cover placed over the pipes. The design process is currently at 30 percent. The final designs may not include the piping of the existing ditch. This document analyzes the effects of the ditch piping to account for the greatest potential environmental impact.

Design Operation

The design would allow LMMWC to divert the existing capacity of 90 cfs while improving upstream adult salmonid and downstream juvenile salmonid passage via fish screens. The construction of the trash rack and piping of the canal would reduce the operational requirements of removing debris from less accessible points in the diversion system. When diverting flow, LMMWC would keep the gate of the juvenile bypass pipe open at least 12 inches to ensure ten cfs of bypass flow. The ten-foot-wide gate upstream of the screens would be fully open, and the gates downstream of the screens would be operated to adjust the diversion flow. When 90 cfs is being diverted, the backwater for the downstream canal would be enough to produce 1.5 feet of head at the fishway exit and push ten cfs through the fishway.

Anticipated Construction Sequence

Construction mobilization and site access is expected to begin in early August 2016 with the project work taking place in two distinct phases. Phase 1 would involve construction of instream improvements and Phase 2 would involve construction of improvements to the diversion canal.

Phase 1: Instream Improvements

Instream work would occur during the late summer months when flows in Mill Creek are relatively low and LMMWC is actively diverting stream flow at Upper Dam. Instream work would begin with construction of a temporary instream barrier to isolate and dewater the area around the existing fish ladder and direct all flows through the existing diversion. A temporary return flow pipe would be installed in the existing concrete wall, downstream of the fish ladder to return baseflow to Mill Creek. The location of the temporary return flow pipe would be selected to minimize the distance of stream channel that would be required to be dewatered for construction, while avoiding backwater effects in the work area. After construction of a temporary bridge over the diversion canal for channel access, the existing fish ladder and sections of the diversion headwall and canal wall would be demolished. The new fish ladder and new diversion channel walls would then be constructed. Additional in-channel features such as rock toe protection associated with the new fish ladder and bank stabilization would also be completed. Construction of instream improvements would take approximately two months to complete.

Phase 2: Diversion Canal Improvements

After the diversion season ends in October, the new diversion and fish screen would be constructed. Instream work would require construction of a temporary instream barrier to isolate and dewater the area around the existing diversion structure and direct flows through the new fish ladder and over the dam crest. The new diversion structure, fish screens and new juvenile bypass pipe would then be

installed. The existing concrete wall would be removed and the two large diameter diversion pipes would be installed along the existing canal alignment. The north bank would be regraded to cover the diversion piping and planted with riparian vegetation. Construction of instream improvements would take approximately two months to complete.

Flow Diversions During Construction

The instream work is planned to occur in August and September of 2016. The capacity of the existing diversion at Upper Dam is approximately 95 cfs. Daily flows for 2011 (above average water year) and 2014 (below average water year) as well as the average daily flow recorded at the USGS gage approximately 0.5 miles upstream of the Upper Dam were reviewed (NHC 2015d). It shows that in an average water year, daily flows are approximately equal to the LMMWC diversion capacity by early August. Hence, in typical years, the instream work could be completed with all instream flow passing through the LMMWC diversion at Upper Dam. In wetter years, such as 2011, flows at the USGS gage remain above the LMMWC diversion capacity until late in September. In such a year, additional bypass capacity would be required. It is expected that in a wetter year, an additional 20 cfs to 30 cfs would need to be routed around the construction site using alternative methods.

Construction of the new fish ladder and diversion facilities would require isolation of the construction areas from water impounded by Upper Dam. Isolation structures would likely consist of a water-filled bladder dam, gravel bags, or other suitable materials. Seepage is anticipated into the construction area and seepage water would be pumped onto the south floodplain or gravel bar so that it infiltrates and returns to Mill Creek as groundwater downstream of the construction site. Permit conditions may require a different approach.

A diversion and dewatering plan would be prepared by the contractor as required to meet the conditions in the environmental permits and would be subject to the approval of the project owner and engineer.

Revegetation

A revegetation plan would be prepared for this project to replace impacted vegetation by a measure of quantity and quality equal to or exceeding impacts of the project using appropriate native species. Following construction, vegetated areas that have been disturbed, would be revegetated in accordance with the revegetation plan.

2.3.1 Requirements and Mitigations Incorporated into the Proposed Action

The project includes a number of Resource Protection Measures (RPMs) that were developed to protect sensitive resources that could potentially be impacted by the project and are hereby incorporated into the project description and plans. These RPMs and project components are summarized below:

AIR-1: A Fugitive Dust Permit will be obtained from the Tehama County Air Pollution Control District (TCAPCD) for each of the three project sites.

AIR-2: All construction equipment will be maintained in proper tune according to manufacturer's specifications.

To the extent feasible, the use of diesel construction equipment meeting the California Air Resources Board's (CARB) 1996 or newer certification standard for off-road heavy-duty diesel engines will be maximized.

If required by the TCAPCD, verify that owners or operators of vehicles are registered with the California Air Resources Board Diesel Off-Road On-Line Reporting System (DOORS) program: (www.arb.ca.gov/msprog/ordiesel/ordiesel.htm). The DOORS program assists fleet owners in

reporting their off-road diesel vehicle inventories to reduce vehicle emissions, as required by the In-Use Off-Road Diesel Regulation.

If required by the TCAPCD, verify that owners or operators of portable engines and certain other types of equipment are registered under the California Air Resources Board's Statewide Portable Equipment Registration Program (PERP) in order to operate their equipment throughout California without having to obtain individual permits from local air districts (www.arb.ca.gov/portable/portable.htm).

VEGETATION-1: Disturbance to existing vegetation will be avoided or minimized to the extent possible.

VEGETATION-2: Disturbance to riparian vegetation will be avoided or minimized to the extent possible.

VEGETATION-3: All heavy equipment shall be thoroughly cleaned prior to mobilization onsite to remove any soil, weed seeds and plant parts in order to reduce the importation and spread of invasive exotic plant species.

VEGETATION-4: Only certified weed-free straw shall be used for erosion control or other purposes to reduce the importation and spread of invasive exotic plant species.

VEGETATION-5: A revegetation plan will be prepared to replace impacted riparian wetlands and riparian habitat by a measure of quantity and quality equal to, or exceeding impacts of the project using appropriate native riparian trees and shrubs.

VEGETATION-6: Areas with woody vegetation that have been disturbed will be revegetated in accordance with the revegetation plan.

VEGETATION-7: (Upper Dam Site Only) Vehicle traffic at the Upper Dam project site will be limited to the existing disturbed road prism. The condition of the road post-project will be coordinated with the landowner and all measures will be taken to return the road to pre-project conditions. If truck passing areas are necessary, they will be established in areas away from populations of Tehama navarretia and wooly meadowfoam and away from aquatic sites. Truck passing areas will be clearly mapped in the field with high visibility fencing or flagging and all construction personnel will be made aware of the sensitive resources and avoidance measures.

VEGETATION-8: No smoking will be allowed on the construction site or within the Action Area, for fire prevention purposes.

WILDLIFE-1: Prior to work in aquatic habitats, water bodies shall be surveyed by a qualified biologist to determine if any foothill yellow-legged frogs or western pond turtles are present. If any individuals of these species are found, a qualified and permitted biologist shall determine and implement appropriate relocation procedures. Herpetological exclusion fencing shall be erected around the perimeter of the instream work area prior to construction initiation. Fencing shall remain until work in aquatic habitats is complete.

WILDLIFE-2: A qualified biologist experienced in the identification of amphibian species (particularly Rana species) will conduct survey(s) for California red-legged frogs at a frequency / rate deemed acceptable by the California Department of Fish and Wildlife to determine if this species is present within any of the disturbance areas. If any California red-legged frogs are found to be present, all potentially disturbing construction activities will be suspended until appropriate protective measures can be developed in consultation with the USFWS Endangered Species Act staff.

WILDLIFE-3: Any tree removal, vegetation clearing, or the onset of potentially disturbing construction activities shall occur between August 31 and January 1 (outside of the nesting season for avian species).

If tree removal, vegetation clearing, or the onset of potentially disturbing construction activities must occur during the nesting season for non-raptor avian species (March 1 through July 31), a nesting survey of the construction area and adjacent suitable habitat shall be conducted by a qualified biologist no more than seven days prior to the initiation of the onset of these activities. If active avian nests are found to be present, tree removal, vegetation clearing and the onset of potentially disturbing construction activities shall be suspended until a qualified biologist, in consultation with California Department of Fish and Wildlife (CDFW) and / or the U.S. Fish and Wildlife Service (USFWS), can establish an appropriate protective buffer area to minimize impacts to the nesting birds. No construction activities shall commence within the buffer area until the qualified biologist determines that the young birds have fledged or the nest is no longer active.

If tree removal, vegetation clearing, or the onset of potentially disturbing construction activities must occur during the raptor nesting season January 1 through August 31, a raptor nesting survey of the construction area and a 0.25 mile buffer (as access allows) shall be conducted by a qualified biologist no more than seven days prior to the initiation of the onset of these activities. If active raptor nests are found to be present, tree removal, vegetation clearing and the onset of potentially disturbing construction activities shall be suspended until a qualified biologist, in consultation with CDFW and / or USFWS can establish an appropriate protective buffer area to minimize impacts to the nesting raptors. No construction activities should commence within the buffer area until the qualified biologist determines that the young birds have fledged or the nest is no longer active.

WILDLIFE-4: Prior to any construction work, a survey shall be conducted by a qualified biologist to ensure that pallid bats are not roosting within the areas to be disturbed.

If pallid bats are found to be roosting within the area to be disturbed, construction activities shall be suspended until a qualified biologist, in consultation with CDFW, can establish appropriate measures to minimize impacts to pallid bats.

WILDLIFE-5: Prior to construction, a qualified biologist will inspect the area to be disturbed to determine if potential ringtail denning is occurring.

If potential ringtail denning is found to be occurring, construction activities should be suspended until a qualified biologist, in consultation with CDFW, can establish appropriate measures to minimize impacts to ringtail.

WILDLIFE-6: Prior to construction, all elderberry shrubs within 150 feet of any project activity will be clearly flagged, marked and maintained throughout construction in order to avoid impacts to the valley elderberry longhorn beetle. All elderberry shrubs within 100 feet of project activity will be marked with high-visibility orange fencing.

WILDLIFE-7: (Upper Dam Site Only) At the Upper Dam site, project activities shall avoid impacts to vernal pools and other potential large branchiopod (fairy shrimp, tadpole shrimp) habitats to the extent possible.

High-visibility fencing shall be installed in areas where equipment will be working near any potential large branchiopod habitat that are not to be disturbed.

No road grading or road improvements shall be allowed in or near potential large branchiopod habitat.

Dust control water applications will not be applied to potential large branchiopod habitats.

All transporters of potentially hazardous materials (fuel, oil, cement, etc.) will be notified as to the presence of potential large branchiopod habitat and required to inspect their vehicles prior to entry and exit of these habitats, to prevent accidental discharge.

All vehicular traffic will be restricted to the designated work boundaries. The condition of the road post-project will be coordinated with the landowner and all measures will be taken to return the

road to pre-project conditions. The work boundaries will be flagged or fenced and identified on construction drawings to limit equipment and personnel to the minimum area necessary to perform the project work and minimize impacts to potential large branchiopod habitats.

WILDLIFE-8: A qualified biologist (biological monitor) shall regularly inspect construction-related activities to ensure that no unnecessary disturbance to special-status species and / or their associated habitats occurs. The biological monitor should have the authority to stop all activities that may result in such disturbance until appropriate corrective measures have been completed. The biologist will also be required to report any unauthorized take to CDFW, USFWS and / or NMFS immediately.

WILDLIFE-9: A construction worker education program shall be implemented that includes an explanation of all special-status animal species, identification, avoidance measures, and federal and state laws that protect the species. This shall include, at a minimum, those species listed in the environmental documents.

WILDLIFE-10: An Endangered Species Act Section 7 consultation will occur with the USFWS for each of the three project sites for impacts to yellow-billed cuckoo, valley elderberry longhorn beetle, vernal pool fairy shrimp and / or vernal pool tadpole shrimp. All protective measures imposed by USFWS through the consultation will be adhered to.

WILDLIFE-11: Appropriate measures will be used to avoid the spread of Aquatic Invasive Species (AIS) such as Zebra / Quagga mussels, New Zealand mudsnails and Chytrid Fungus to and from the project area and could include such measures as physical removal from equipment, freezing equipment and saturation of equipment in chemical solution(s).

WETLAND-1: Project activities will avoid impacts to wetlands and other aquatic habitats to the extent possible.

WETLAND-2: High-visibility fencing will be installed in areas where equipment will be working near any wetlands or other aquatic habitats that are not to be disturbed

WETLAND-3: Construction crews will be informed about the importance of avoiding sensitive areas, including wetlands.

WETLAND-4: A Clean Water Act Section 404 Permit will be obtained from the U.S. Army Corps of Engineers and a Clean Water Act Section 401 Certification will be obtained from the Central Valley Water Board for each of the three project sites.

WETLAND-5: A California Fish and Game Code Section 1600 Lake and Streambed Alteration Agreement will be obtained from CDFW for the Exposed Siphon site, if deemed applicable. It is anticipated that a 1600 Agreement will not be required for the Ward Dam or the Upper Dam sites.

FISH-1: Instream construction work shall be conducted between July 15 and October 14 to minimize impacts to anadromous fish by working when water temperatures are warmer and anadromous fish are less likely to be present. Work within the channel and banks, outside of this instream work window must be isolated from flowing water and fish passage will be accommodated through the project site after October 14.

FISH-2: All construction debris already on site and generated as a result of construction activity (concrete, metal, etc.) from the fish passage improvement-related construction activities will be removed from the active stream channel post-construction.

FISH-3: Prior to construction, exclusionary fish netting shall be installed upstream and downstream of the construction area. USFWS, in coordination and consultation with NMFS and CDFW, will ensure that qualified fish biologists are onsite to implement fish rescue operations through the use of herding, seining and / or electrofishing, if necessary. Best professional determination will be used to decide which method(s) of rescue and location of exclusionary netting is most appropriate.

Biologists will first try to haze and herd fish out of the fish exclusion area. If fish biologists determine that the use of electrofishing is necessary for the efficient and successful removal of fish, the NMFS electrofishing guidelines (NMFS 2000) will be strictly followed. The fish rescue team will be comprised of fishery biologists with professional experience using seines and electrofishing equipment.

FISH-4: An Endangered Species Act Section 7 consultation and a Magnuson Stevens Act Essential Fish Habitat consultation will occur with NMFS for each of the three project sites for impacts to Central Valley steelhead, Central Valley spring-run salmon, winter-run salmon and /or fall- late fall-run salmon.

FISH-5: All dewatering and rewatering activities will be conducted slowly, in order to minimize disturbance to fish.

FISH-6: All pumps used during dewatering or other construction activities will be screened to meet CDFW and NMFS criteria.

FISH-7: Appropriate measures will be used to avoid the spread of Aquatic Invasive Species (AIS) such as Zebra / Quagga mussels, New Zealand mudsnails and Chytrid Fungus to and from the project area and could include such measures as physical removal from equipment, freezing equipment and saturation of equipment in a chemical solution(s).

CULTURAL-1: In the event subsurface cultural remains over 45 years of age are encountered during ground-disturbing activities, all work will cease at the general area of discovery and the U.S. Fish and Wildlife Service regional archaeologist, or other lead agency archaeologist, will be notified immediately. A field exam by a professional archaeologist may be required and further steps for resource protection will be implemented, including mitigation and consultation with the Native American Indian community if human remains are encountered (following Native American Graves Protection and Repatriation Act procedures).

SOIL / GEO-1: After ground-disturbing activities are complete, all disturbed areas (outside of the active stream channel and the ditch bottom) shall be seeded with native plant species and mulched as described in the revegetation plan.

SOIL / GEO-2: Construction of all project actions shall comply with Central Valley Water Board Basin Plan Objectives. Standard Best Management Practices (BMPs) will be incorporated into the project designs.

SOIL / GEO-3: If the total disturbance area is greater than one acre for any of the three project sites, a Notice of Intent will be submitted to the State Water Resources Control Board to obtain coverage under the National Pollution Discharge Elimination System General Permit for Discharges of Stormwater Associated with Construction Activity.

HAZ-1: A designated concrete washout area will be located at least 100 feet from any high water mark within adjacent waterways and will be developed and used following the U.S. EPA Stormwater BMP for a Concrete Washout.

WATER-1: All construction shall be conducted in the summer / early fall during the low flow period. Any work within the channel and banks, outside of this instream work window must be isolated from flowing water and dewatering will be required.

WATER-2: BMP's will be developed and implemented to ensure that wet concrete does not enter Mill Creek during construction.

WATER-3: Monitoring of water turbidity and settleable materials shall be conducted in accordance with the Clean Water Act Section 401 Certification through consultation with the Central Valley Regional Water Quality Control Board.

WATER-4: All equipment and machinery that contains fuel, oil or other petroleum products used during construction related activities shall be checked for petroleum leaks immediately prior to being mobilized to the project site and again each day prior to use.

WATER-5: All equipment refueling and / or maintenance shall take place within a secondary containment structure and a minimum of 100 feet away from Mill Creek or other aquatic sites.

WATER-6: An emergency spill kit and absorbent oil booms will be onsite during construction activities.

WATER-7: All equipment operations within the channel and banks of Mill Creek will be required to use readily biodegradable hydraulic oil.

WATER-8: A dewatering permit will be obtained from the Central Valley Water Board for each project site, if deemed necessary, based on the dewatering methods used.

NOISE-1: Construction work (including arrival and departure of trucks hauling materials) will generally be conducted from 7:00 am to 7:00 pm Monday through Friday. Weekend work will only be allowed, if necessary to complete the projects within the established environmental time frames.

2.4 Alternatives Considered but Dismissed

2.4.1 Exposed Siphon

The following additional alternative, developed in the alternatives analysis for the Exposed Siphon (NHC 2013a) was considered by the TAC but was dismissed due to the following reasons. Alternative 1, which was the alternative to construct a roughened channel over the existing siphon, was rejected because it did not meet the depth criteria for fish passage at the minimum flows or the velocity criteria for fish passage at the upper limit fisheries flow.

Alternative 2 had two options and the shallower burial of the new siphon pipe was considered by the TAC, but rejected because it was determined that the shallower burial would be not be advantageous in preventing re-exposure of the siphon and cap.

2.4.2 Ward Dam

The following additional alternatives that were developed in the alternatives analysis for the Ward Dam (NHC 2013c) were considered by the TAC but were dismissed due to the following reasons. Alternative 1 which was the alternative to remove the dam and construct a pump station, was rejected because it did not meet the various criteria imposed by the project including feasible operational costs. LMMWC was not in favor of removing the dam, so this alternative was not selected.

Alternative 2, which was the alternative to remove the dam and construct a roughened channel downstream of the lowered dam crest, was rejected because it did not meet the various criteria imposed by the project including maintaining the stability of the channel bed, or feasible construction costs. LMMWC was not in favor of removing the dam, so this alternative was not selected.

2.4.3 Upper Dam

The following additional alternatives that were developed in the alternatives analysis for the Upper Dam (NHC 2013b) were considered by the TAC but were dismissed due to the following reasons. Alternative 1, which included removal of the existing dam, installation of a pump station and channel regrading, was rejected because of the high operation cost for this alternative and because dam removal made this option infeasible.

Alternative 2, which included removal of the existing dam, installation of a roughened channel and fish screen relocation, was rejected because of the high construction costs for this alternative and because dam removal made this option infeasible.

Alternative 3, which included a fish ladder and screen relocation, was rejected because it did not provide stream-wide passage condition.

Alternative 4, which included fish ladder and fish screen relocation downstream of the dam, was rejected because of the obvious short comings relative to the other alternatives.

Alternative 5 included replacement of the existing dam with an Obermeyer Weir (inflatable dam) that could be optimize operations for diversion flow and fish passage, was rejected because the LMMWC was not in favor of removing the dam.

Alternative 6, which included leaving the dam in place, replacing the existing fish ladder with a large fish ladder requiring excavation of hillslope and use of a wall to stabilize the hillslope, was rejected because of the high cost in constructing the wall.

3.0 Affected Environment and Environmental Consequences

This section contains background information and descriptions of the natural and cultural resources found in the project area that could be affected by the proposed project and the No Action alternative. This is followed by a description of the methods used to determine the environmental impacts to the affected environment for each resource type. An analysis is then provided of the environmental impacts that can be expected to the affected environment for each resource type under the two alternatives discussed in this document. The analyses of anticipated environmental impacts include those required by both CEQA and NEPA. Mitigation measures that would reduce significant impacts to less than significant levels are listed, if applicable. California law requires lead agencies under CEQA to adopt a reporting and mitigation monitoring program. Environmental commitments in conjunction with any mitigation measures needed as conditions of project approval would be included in a Mitigation Monitoring and Reporting Program (MMRP) to verify compliance.

3.1 Aesthetics

3.1.1 Affected Environment

Mill Creek originates in Lassen Volcanic National Park (LVNP), flows west out of the Ishi Wilderness and west to its confluence with the Sacramento River in Tehama County. The project area is within the lower segment of the creek, from approximately two to five miles upstream of the confluence. In 1986, Mill Creek was added as a potential addition to the California Wild and Scenic Rivers System (Sher 1996). In 1995, a report on the suitability of the inclusion of this creek to the CA Governor and Legislature found that Mill Creek was eligible for wild and scenic status (Sher 1995). The Mill Creek Conservancy and conservation groups represented by Friends of the River worked together to find a “functionally equivalent” agreement that did not include a wild and scenic designation (CH2MHill 1997). This agreement sought to provide the benefits of state designation, in particular, prohibition of new dams and diversions, without the potential impacts associated with increased intensity of use due to the designation. The Deer and Mill Creek Protection Act, Assembly Bill 1413, was the product of this agreement. As it passed the Assembly, the bill provided protections for the entire stream, from its headwaters to the confluence with the Sacramento River. In the Senate, the bill was amended to delete protections for the approximate five-mile portion of the stream on the valley floor (Sher 1996).

The bill was passed in an effort to balance the potential beneficial uses of achieving protection of the unique fishery resources and protecting the existing water rights of Mill Creek. In lieu of including Mill Creek in the California Wild and Scenic Rivers system, the state Legislature determined that the continued management of the stream resources in their existing natural condition represented the best way to protect the unique fishery of Mill Creek. It was also determined that maintaining the existing, mostly free flowing conditions of Mill Creek to protect its fisheries was the highest and most beneficial use of the unappropriated waters of Mill Creek and was a reasonable use of water within the California Constitution.

Mill Creek is nationally recognized for scenic values which include large geologic formations in higher elevations. Mill Creek has exceptional water quality, is mostly free flowing and nearly pristine near its headwaters on the slopes of Mount Lassen. The Upper Dam site has relatively high aesthetic values due to its remote nature. Farther downstream, at the Ward Dam site and the Exposed Siphon, aesthetic conditions of the general area are lower. Aesthetic conditions, in particular scenic resources of the creek decrease lower in the watershed, closer to the Sacramento River as warmer water temperatures, urban features and impounded waters, which result in reduced instream flows, are encountered.

3.1.2 Environmental Consequences / Impacts and Mitigation Measures

Methodology

An aesthetic resource impact analysis in the project area was based on document review, site analysis and the CEQA significance criteria. Significance thresholds are used to evaluate the proposed project's potential impact on the visual character of the project area.

The project would have a significant impact if it would:

- 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.

No Action Alternative

Under this alternative, no impacts to the visual character of the project area would occur. No changes would occur to the character of the aesthetic features and existing land uses. The existing upstream visual characteristics related to the presence of the existing diversion dams and siphon would remain.

Proposed Action Alternative

Under this alternative, any direct impacts to aesthetics would be considered short-term and minor in intensity. The project is located on private land and not included in a National Wild and Scenic Rivers System management plan. The Ward and Upper Dams and the Exposed Siphon are not in consideration for National Register listing, therefore the proposed project would not visually impact any historic structure characteristics.

The relatively isolated nature and topography and vegetation of the project area helps shield temporary visual construction impacts from view. The proposed project construction would have a short-term impact on the visual environment. The project is not located within a state scenic highway. The general aesthetic nature of the three sites would not be altered. No new light sources would result from the

proposed project. The impacts of project implementation on aesthetic resources would therefore be less than significant.

3.2 Agricultural Resources

3.2.1 Affected Environment

The project sites are located in a valley and foothill setting in Central Tehama County. The Tehama County General Plan designation for the site is Upland Agriculture (UA).

Nine different soil map units occur within the study area according to the local soil survey (U.S. Department of Agriculture [USDA] – Soil Conservation Service [SCS] et al. 1967). The soils mapped within the project sites include the following map units (Table 2).

Soil	Land Capability Classification	Capability Classification Description
Berrendos clay loam, 0 to 3 percent slopes	IIs-5	Soils have moderate limitations that restrict the choice of plants or that require moderate conservation practices. Soil is limited mainly because it is shallow, droughty or stony.
Inks cobbly loam, 3 to 30 percent slopes	VIIs-8	Soils have severe limitations that make them generally unsuitable for cultivation and that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat. Soil is limited mainly because it is shallow, droughty or stony.
Keefers loam, 0 to 3 percent slopes	IIIs-3	Soils have severe limitations that restrict the choice of plants or that require special conservation practices, or both. Soil is limited mainly because it is shallow, droughty or stony.
Molinos complex, channeled	VIW-1	Soils have severe limitations that make them generally unsuitable for cultivation and that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat. Water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage).
Molinos gravelly fine sandy loam	IIs-4	Soils have moderate limitations that restrict the choice of plants or that require moderate conservation practices. Soil is limited mainly because it is shallow,

		droughty or stony.
Riverwash	VIIIw-4	Soils and miscellaneous areas have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or aesthetic purposes. Water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage).
Tehama loam, 3 to 8 percent slopes	Ile-3	Soils have moderate limitations that restrict the choice of plants or that require moderate conservation practices. The main hazard is the risk of erosion unless close-growing plant cover is maintained.
Tuscan cobbly loam, 1 to 5 percent slopes	IVs-8	Soils have very severe limitations that restrict the choice of plants or that require very careful management, or both. Soil is limited mainly because it is shallow, droughty or stony.
Vina loam, 0 to 3 percent slopes	IIs-8	Soils have moderate limitations that restrict the choice of plants or that require moderate conservation practices. Soil is limited mainly because it is shallow, droughty or stony.

Agricultural uses in the general area include limited livestock grazing. Diversions serve other various agricultural users. No Prime Farmland, Unique Farmland, or Farmland of Statewide Importance is present within or near the project site. A portion of the project near the Ward Dam is enrolled in the Williamson Act. Water from the existing diversions and siphon are used by LMMWC customers for irrigation and livestock water.

3.2.2 Environmental Consequences / Impacts and Mitigation Measures

Methodology

The methodology used for an agricultural related analysis involved an assessment of the agricultural resources, production capabilities and current agricultural uses of the project site and surrounding area. The analysis was conducted through document review and site visits.

Impacts to Agriculture Resources would be significant if they would:

- 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; or
- c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use.

No Action Alternative

Under this alternative, no change from the existing agricultural uses would occur. Diverted flows from Mill Creek would continue to service the LMMWC customers and no changes would occur to the diversion system. There would be no conflict impacts to the agricultural land uses in the project area.

Proposed Project Alternative

Under this alternative, the amount of water that is diverted would not be reduced. The proposed project would have no impact on any surrounding land agricultural land uses nor would it convert any Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. The proposed alternative would not conflict with any existing zoning for agricultural use, or a Williamson Act contract or involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use. Because there would be no impacts to agricultural resources, no mitigation is required.

3.3 Air Quality / Greenhouse Gas Emissions

3.3.1 Affected Environment

The 1977 federal Clean Air Act requires the U.S. Environmental Protection Agency to identify National Ambient Air Quality Standards to protect public health and welfare. Tehama County is part of the Northern Sacramento Valley Air Basin (NSVAB), and is under the jurisdiction of the Tehama County Air Pollution Control District (TCAPCD). Similar to federal requirements, the 1988 California Clean Air Act outlines a program to attain the California Ambient Air Quality Standards. The CARB, California's state air quality management agency, regulates mobile source emissions and oversees the activities of the TCAPCD. Within Tehama County, the TCAPCD is responsible for adopting and enforcing controls on stationary sources of air pollutants through its permit and inspection programs. Other TCAPCD responsibilities include monitoring air quality, regulating agricultural burning, preparation of clean air plans and responding to air quality complaints from citizens.

Tehama County is currently in attainment or unclassified status for all national criteria pollutant standards. Tehama County is a nonattainment area for state standards for ozone and particulate matter less than 10 microns in diameter (PM₁₀).

Proximity to sensitive receptors is a concern in air quality analyses. A sensitive receptor is a location where human populations, particularly children, seniors, and sick individuals, are present and where there is a reasonable expectation of continuous human exposure to pollutants. The project is not located near a school, hospital or senior housing. There are areas of the project which are located near a number of residences, some of which are stakeholders in the project.

Climate Change and Greenhouse Gases

Climate change refers to a significant change in measures of climate, such as average temperatures, precipitation and wind patterns over time. Significant changes in global climate patterns have recently been associated with global warming, an average increase in the temperature of the atmosphere near the earth's surface, attributed to the accumulation of greenhouse gas (GHG) emissions in the atmosphere.

In February 2010, the CEQ prepared NEPA guidance on consideration of the effects of climate change and GHG emissions. The guidance identifies ways in which Federal agencies can improve consideration of GHG emissions and climate change for federal actions. The guidance states that NEPA documents should provide decision-makers with relevant and timely information and should consider 1) GHG emissions of a

proposed action and alternative actions and 2) the relationship of climate change effects to a proposed action or alternatives. Specifically, if a proposed action would be reasonably anticipated to cause direct emissions of 25,000 metric tons or more of carbon dioxide (CO₂)-equivalent GHG emissions on an annual basis, agencies should consider this as an indicator that a quantitative assessment may be meaningful to decision-makers and the public (CEQ 2014).

As of August 2007, CEQA lead agencies are required by law to analyze the potential of a proposed action to produce GHG emissions, which consist primarily of CO₂, nitrous oxide (N₂O), and methane (CH₄) (Public Resources Code Section 21083.05). The Governor's Office of Planning and Research released a Technical Advisory in June 2008 (California Office of Planning and Research 2008) that provides guidance for addressing CEQA GHG environmental impacts. In particular, "Lead agencies should make a good faith effort, based on available information, to calculate, model, or estimate the amount of CO₂ and other GHG emissions associated with vehicular traffic, energy consumption, water usage and construction activities." (California Office of Planning and Research 2008)

3.3.2 Environmental Consequences / Impacts and Mitigation Measures

Data for the impacts analysis were taken from the following reports on local and regional air quality: *Northern Sacramento Valley Planning Area 2012 Triennial Air Quality Attainment Plan, Planning and Permitting Air Quality Handbook* (Sacramento Valley Air Quality Engineering and Enforcement Professionals 2009), and the *Tehama County General Plan EIR* (Pacific Municipal Consultants 2008). The air quality analysis is qualitative, and was conducted by assessing anticipated construction-related impacts of the project and comparing them to existing and anticipated future air quality conditions.

The project would have a significant impact if it would:

- a) Conflict with or obstruct implementation of the applicable air quality plan;
- b) Violate any air quality standard;
- c) Contribute substantially to an existing or projected air quality violation;
- d) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard;
- e) Result in sources of toxic air contaminants that may affect surrounding land uses;
- f) Expose sensitive receptors to substantial pollutant concentrations;
- g) Create objectionable odors affecting a substantial number of people;
- h) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment; or
- i) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHG.

No Action Alternative

Under this alternative, the two separate dam retrofitting activities, siphon replacement and all construction related activities would not occur. Because this alternative would not cause any direct short-term emissions, emissions would remain consistent with, and in conformity with applicable plans. Because no activities would occur, this alternative would not adversely affect any sensitive receptors and no long-term indirect impacts to air quality would occur.

Proposed Action

Activities associated with the proposed project would require the retrofitting of two of the existing diversion dams and the replacement of the Exposed Siphon. The proposed construction and retrofitting would occur over a one-year time period at each site. The Ward Dam would occur in 2015 and the Upper

Dam would occur in 2016. The Exposed Siphon is currently unfunded so the potential timing of construction is unknown. Equipment and materials for the proposed project would be transported to the three different sites using haul trucks. Types of construction equipment to be used would be excavators, a front-end loader, truck cranes, concrete trucks, a concrete pumping truck and truck and trailer combinations with end dumps.

Construction related activities would generate criteria air pollutants, including carbon monoxide; sulfur dioxide; PM₁₀; precursors such as reactive organic gases and oxides of nitrogen; GHG from exhaust and fugitive dust emissions. Sources of exhaust emissions include delivery trucks, commuting worker's motor vehicles and off-road heavy-duty equipment. Sources of fugitive dust emissions such as particulate matter dust include construction related activities such as soil disturbance, grading and material hauling.

The project would involve the use of equipment and travel on unpaved roads to access the sites, which would temporarily contribute fugitive dust in the project area. This source of fugitive dust is associated with PM₁₀, a criteria pollutant, for which the air basin is in non-attainment. Construction activities associated with the project are expected to take approximately one to four months at each site. Once activities cease at the project area, the resulting impact on air quality and increase in GHG emissions would also cease.

Construction associated with the proposed project would require the use of equipment that would temporarily contribute to air pollution in the local area but not affect an existing or projected air quality violation. Exhaust emissions from heavy equipment during construction could contribute to air emissions. Construction activities would generate emissions from diesel- and gasoline-powered equipment and vehicles. Diesel particulate is an identified Hazardous Air Pollutant and Toxic Air Contaminant, emissions of which should be minimized. In addition, vehicles traveling to the site and construction activities would generate GHG emissions from diesel- and gasoline-powered vehicles and equipment. The estimated number of vehicle trips and types of equipment that would be used for the project for each individual project site is listed below.

Exposed Siphon

Vehicle trips

- 20 trips with concrete trucks (standard nine-yard capacity)
- 5 trips with dump truck to haul debris and rock (ten-wheel truck, pulling a 20-cubic-yard trailer)
- 12 trips with flatbed trailer for equipment to and from site

Equipment

- 1 large front-end loader
- 1 large excavator
- 1 concrete pump truck

Ward Dam

Vehicle trips

- 35 trips with concrete trucks (standard nine-yard capacity)
- 38 trips with dump truck to haul debris and rock (ten-wheel truck, pulling a 20-cubic-yard trailer)
- 25 trips with flatbed trailer for equipment to and from site

Equipment

- 2 large excavators
- 1 large front-end loader
- 1 concrete pump truck

Upper Dam

Vehicle trips

- 35 trips with concrete trucks (standard nine-yard capacity)
- 20 trips with dump truck to haul debris and rock (ten-wheel truck, pulling a 20-cubic-yard trailer)
- 20 trips with flatbed trailer for equipment to and from site

Equipment

- 2 large excavators
- 1 large front-end loader
- 1 concrete pump truck
- 2 truck cranes

While project construction activities and vehicular travel to and from the work sites by employees would result in GHG emissions, the exhaust from construction activities and vehicle traffic would be a temporary single source of GHG generated by the proposed project over pre-project conditions. The nature of the proposed project is not indicative of potential long-term air emissions and increases in greenhouse gases. The increase in GHG emissions due to construction, demolition and grading activities would be short-term and would not exceed the 25,000 metric tons of CO₂-equivalent GHG emissions' threshold.

GHG emissions and any effects on global climate change would not be cumulatively significant considering the amount of GHG emissions generated by the project and the current local air quality conditions. The proposed project is consistent with the USFWS Climate Change Strategy's goals and objectives, including the promotion of habitat connectivity and integrity (USFWS 2010). The retrofitting of the dams and the replacement of the siphon would facilitate the movement of native fish species. As primarily a dam retrofit project and siphon replacement, the proposed project would not result in land use changes within the project area.

Opportunities for reducing GHG emissions, from construction equipment and vehicular travel to and from the work sites and associated fuel consumption, are addressed in the mitigation below. The proposed project would not conflict with any identified plans adopted for the reduction of GHG emissions. Therefore, relative to GHG emissions, the proposed project would result in less than significant impacts.

The project is not anticipated to produce toxic air contaminants which could affect surrounding land uses. Also the project will not produce odors that will create a nuisance for any substantial number of people in the immediate area. There are no sensitive receptors located in the areas of the three project sites.

The following measure would be implemented to avoid and minimize impacts to air quality and to mitigate potentially significant impacts to air quality to less than significant levels:

AIR-1: A Fugitive Dust Permit will be obtained from the Tehama County Air Pollution Control District (TCAPCD) for each of the three project sites.

AIR-2: All construction equipment will be maintained in proper tune according to manufacturer's specifications.

To the extent feasible, the use of diesel construction equipment meeting the California Air Resources Board's (CARB) 1996 or newer certification standard for off-road heavy-duty diesel engines will be maximized.

If required by the TCAPCD, verify that owners or operators of vehicles are registered with the California Air Resources Board Diesel Off-Road On-Line Reporting System (DOORS) program: (www.arb.ca.gov/msprog/ordiesel/ordiesel.htm). The DOORS program assists fleet owners in reporting their off-road diesel vehicle inventories to reduce vehicle emissions, as required by the In-Use Off-Road Diesel Regulation.

If required by the TCAPCD, verify that owners or operators of portable engines and certain other types of equipment are registered under the California Air Resources Board's Statewide Portable Equipment Registration Program (PERP) in order to operate their equipment throughout California without having to obtain individual permits from local air districts: (www.arb.ca.gov/portable/portable.htm).

3.4 Biological Resources

3.4.1 Vegetation and Plant Communities

3.4.1.1 Affected Environment

The predominant vegetation types in the project area are mixed riparian woodland / scrub, blue oak savannah, valley annual grassland and seasonal wetland and vernal pool vegetation. Mixed riparian woodland / scrub vegetation is supported by the active channel and floodplain of Mill Creek. Blue oak woodland / savannah and annual grassland are associated with the upland terraces and the seasonal wetland and vernal pool vegetation are associated with the haul road to access the Upper Dam project site. Species composition and habitat associations are depicted in Figure 13 through Figure 15 and a list of all plant species encountered during site surveys is included in Appendix D. General characteristics for each of the project sites and species composition of each of the vegetation types are as follows:

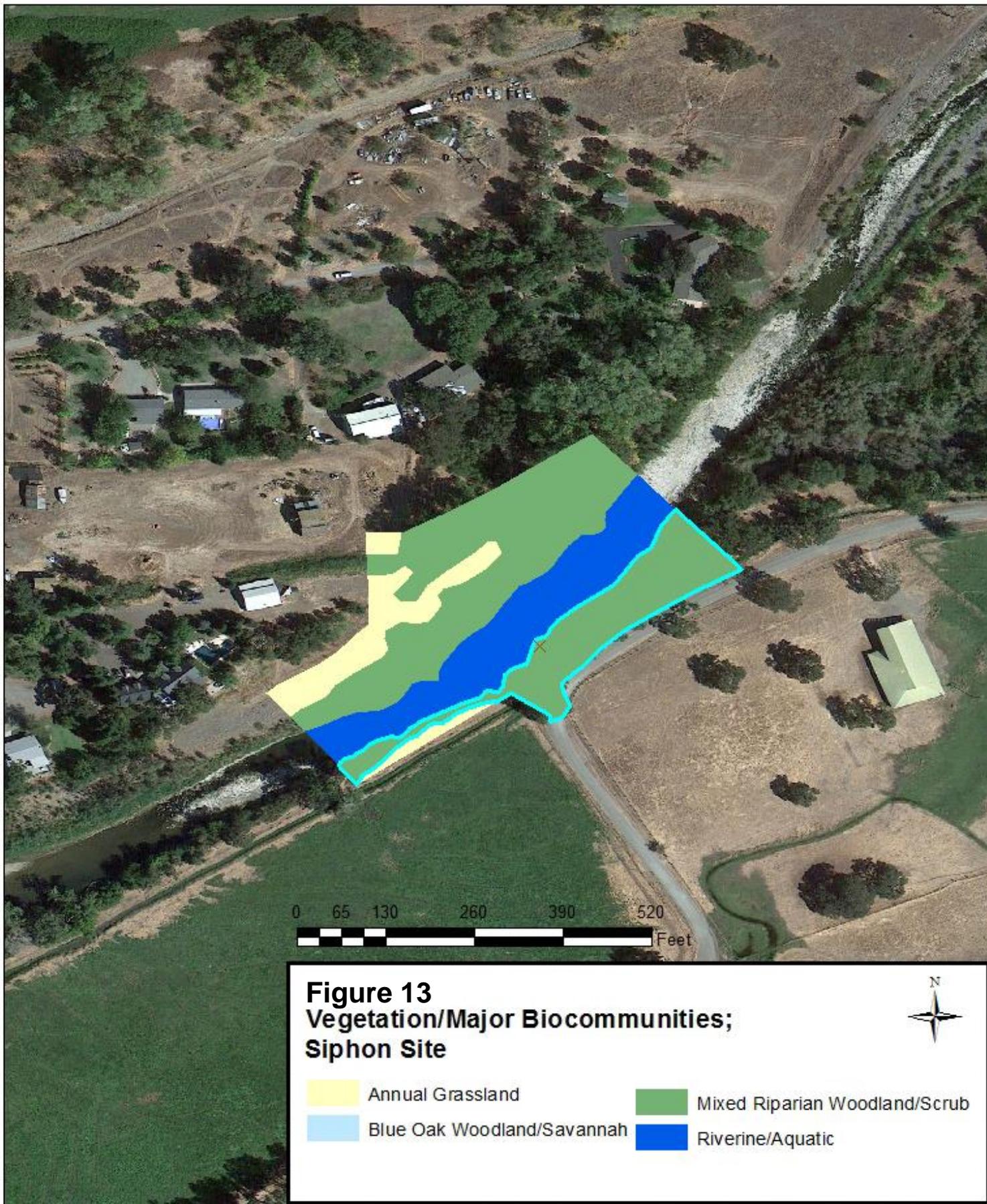
The Upper Dam project site abuts the nearly vertical, approximately 80-foot-tall canyon walls of the creek. Riparian vegetation is limited to very narrow bands of mixed riparian scrub vegetation and discontinuous patches of emergent herbaceous wetland vegetation occurring along the immediate banks. The upland terrace on the north side of the creek supports blue oak savannah and annual grassland. The access road extending from the end of Third Avenue traverses annual grassland, within which are areas of seasonal wetland and vernal pool vegetation, mostly associated with shallow swales and seasonally mesic flats.

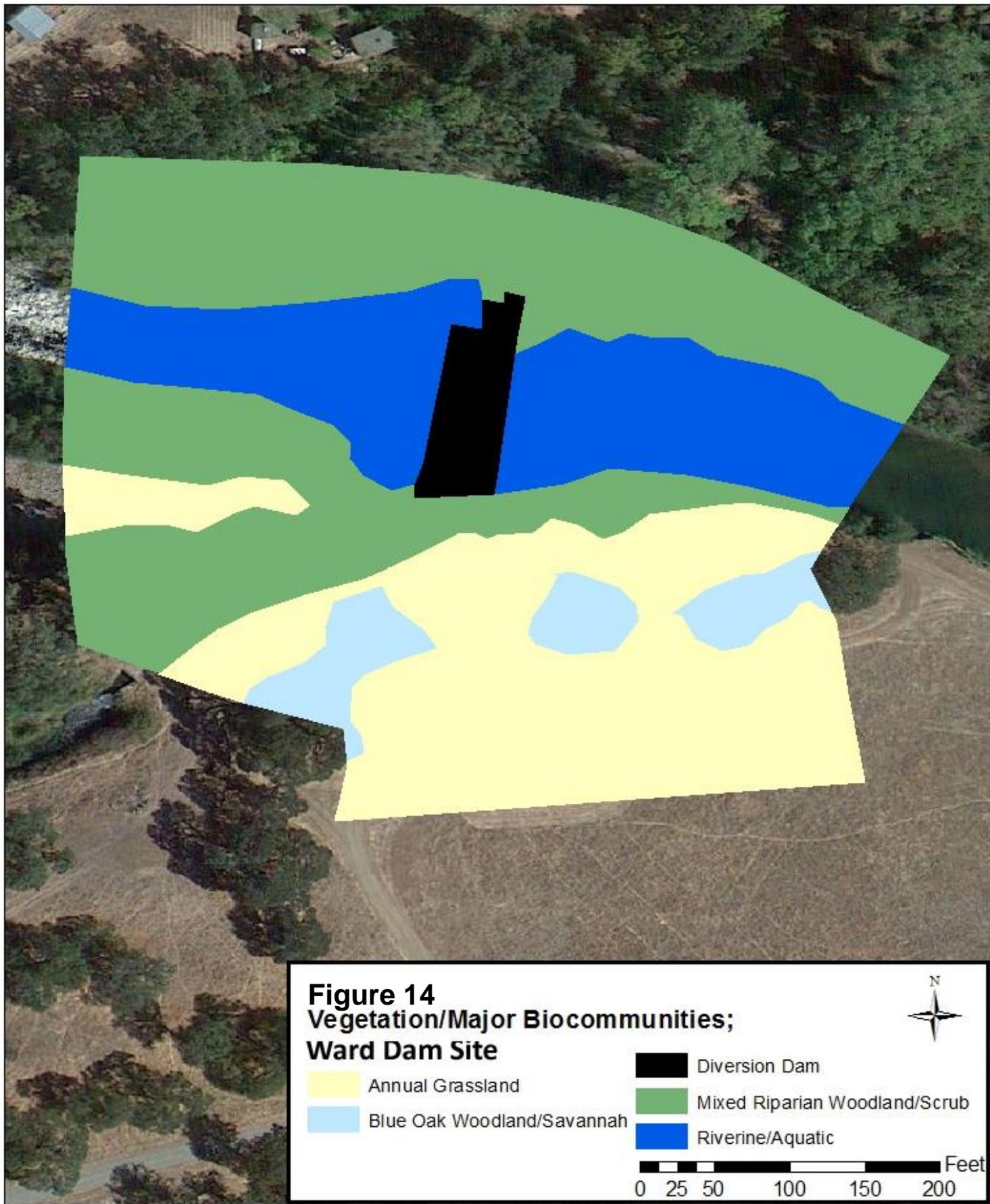
The Ward Dam project site encompasses blue oak woodland / savannah and annual grassland on the upland terrace on the south side of the creek. Well-developed mixed riparian woodland / scrub and small areas of herbaceous riparian wetland vegetation exist within the upper banks of the creek.

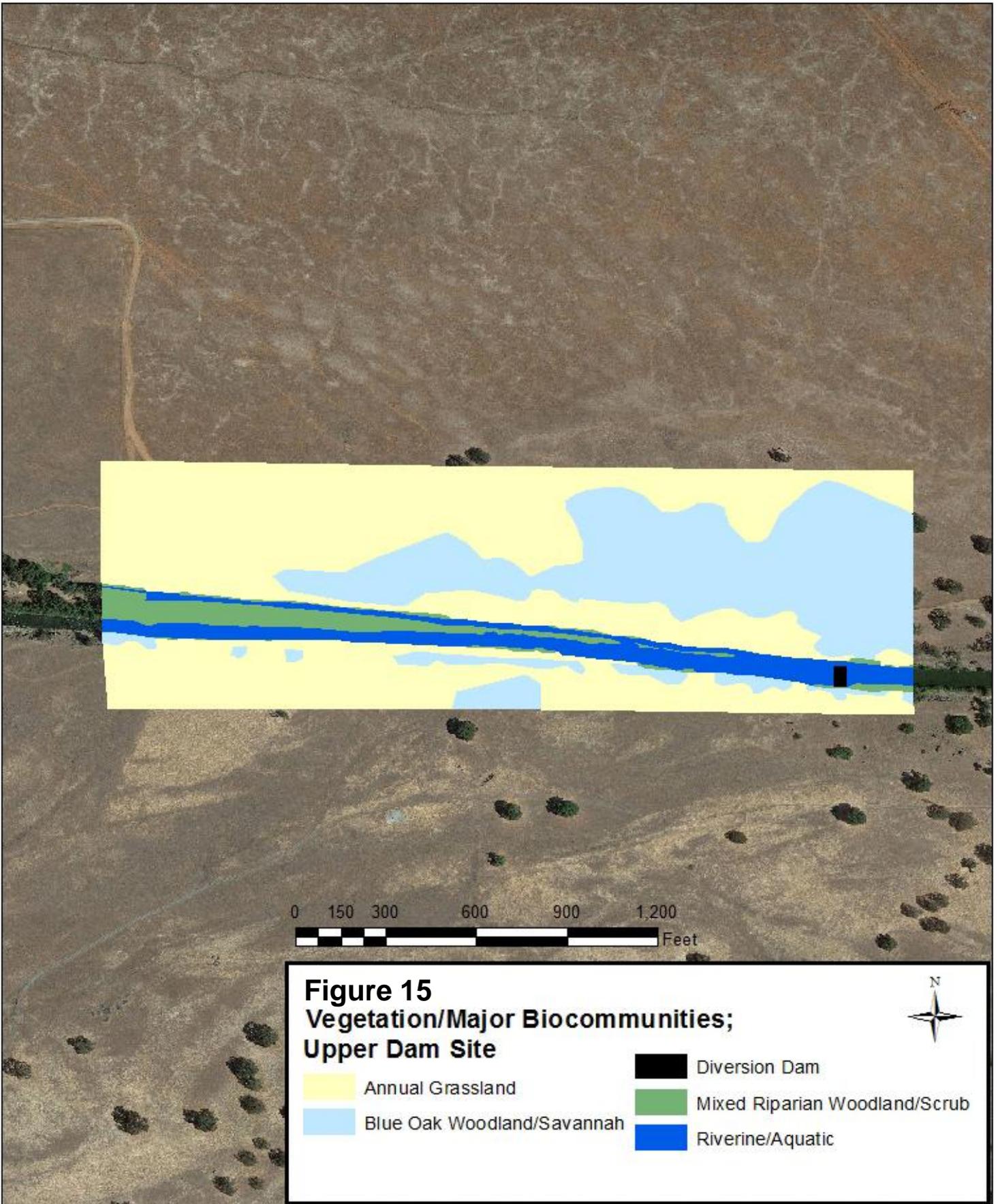
The Exposed Siphon encompasses mixed riparian woodland / scrub vegetation which exists within the upper banks on both sides of the creek. The western-most portion of the project footprint encompasses disturbed habitat associated with the residential area.

Annual Grassland

This plant community occurs in small openings and along edges of chaparral and mixed foothill woodland. Depending on the site, it best corresponds to the *Bromus (diandrus, hordeaceus)-Brachypodium distachyon* semi-natural stand of Sawyer et al. (2009). Non-native annual grasses observed include soft chess (*Bromus hordeaceus*), foxtail chess (*Bromus madritensis*), riggut (*Bromus diandrus*), poverty brome (*Bromus sterilis*), silver European hairgrass (*Aira caryophyllea*), and rattail fescue (*Festuca myuros*). Native grasses observed include few-flowered fescue (*Festuca microstachys*) and, in a few places, one-sided bluegrass (*Poa secunda* ssp. *secunda*) and California melic (*Melica californica*). Frequently observed forbs include grasspink (*Petrorhagia dubia*) and narrow-leaved logfia (*Logfia gallica*). Rosinweed (*Calycadenia truncata*) was seen at scattered sites. Yellow starthistle (*Centaurea solstitialis*) and tocalote (*C. melitensis*) were also observed.







Seasonal / Vernal Wetland

Seasonally mesic habitats (swales and poorly-drained depressions / flats) are associated with the annual grassland habitat traversed by the access road to the Upper Dam project area. Although there are areas supporting native vernal pool species, well-developed vernal pools (with defined slope and basin morphology) are not present in the surveyed corridor along the road. Seasonal wetlands support hydrophytic annual grass species, including Italian rye (*Festuca perennis*), Mediterranean barley (*Hordeum marinum ssp. gussoneanum*) and annual hairgrass (*Deschampsia danthonoides*). Native forbes include Fremont's goldfields (*Lasthenia fremontii*), yellow-carpet (*Blennosperma nana*), hawkbit (*Leontodon saxatilis*), toadrush (*Juncus bufonius*), white-tipped clover (*Trifolium variegatum*), tomcat clover (*Trifolium wildenovii*), cowbag clover (*Trifolium depauperatum*), elongate plantain (*Plantago elongata*), white-head navarretia (*Navarretia leucocephala*), marigold navarretia (*Navarretia tagetina*), dwarf wooly marbles (*Psilocarphus brevissimus*), Oregon wooly marbles (*Psilocarphus oregonus*), Greene's popcorn-flower (*Plagiobothrys greenei*), stipitate popcorn-flower (*Plagiobothrys stipitatus ssp. micranthus*), scribe's popcorn-flower (*Psilocarphus scriptus*), Sacramento Valley pogogyne (*Pogogyne zizyphoroides*), hyssop loosestrife (*Lythrum hyssopifolium*), small quaking grass (*Briza minor*) and others.

Mixed Riparian Woodland / Scrub

This woodland type is associated with the banks and, in places, the bed of Mill Creek. Composition varies by location; this type corresponds to the *Alnus rhombifolia* Woodland Alliance, and where larger trees are lacking, to the *Salix exigua* and *Salix lasiolepis* Shrubland Alliances of Sawyer et al. (2009). Trees observed among the three project sites include white alder (*Alnus rhombifolia*), Fremont cottonwood (*Populus fremontii*), Oregon ash (*Fraxinus latifolia*), western sycamore (*Platanus racemosa*), valley oak (*Quercus lobata*) and occasional interior live oak (*Quercus wislizenii*). Shrubs and subshrubs include sandbar willow (*Salix exigua*), arroyo willow (*Salix lasiolepis*), dusky willow (*Salix melanopsis*), mulefat (*Baccharis salicifolia*), California rose (*Rosa californica*), western spicebush (*Calycanthus occidentalis*), buttonwillow (*Cephalanthus occidentalis*), hoary coffeeberry (*Frangula californica ssp. tomentella*), California bricklebush (*Brickellia californica*), poison oak (*Toxicodendron diversilobum*) and skunkbrush (*Rhus aromatica*).

Vines observed include California grape (*Vitis californica*), pipevine (*Aristolochia californica*), California blackberry (*Rubus ursinus*) and Himalayan blackberry (*Rubus armeniacus*). Graminoids include torrent sedge (*Carex nudata*), baltic rush (*Juncus balticus ssp. ater*), pacific rush (*Juncus effusus*), rice cutgrass (*Leersia oryzoides*), deer grass (*Muhlenbergia rigens*), bluestem (*Andropogon sp.*), dallisgrass (*Paspalum dilatatum*), johnsongrass (*Sorghum halapense*) and beardgrass (*Polypogon monspeliensis, Polypogon interruptus*). Herbaceous forbs observed include mugwort (*Artemisia douglasiana*), sticktight (*Bidens frondosa*), western goldenrod (*Euthamia occidentalis*), Spanish lotus (*Acmispon americanus var. americanus*), white sweet-clover (*Melilotus albus*), bird's-foot trefoil (*Lotus corniculatus*), cocklebur (*Xanthium strumarium*), canadian horseweed (*Erigeron canadensis*) and smooth scouring-rush (*Erigeron laevigatum*).

Emergent Wetland

Small areas of emergent wetland are associated with the immediate margins, and in places, the bed of Mill Creek (this was not mapped as a separate type). Depending on site, this vegetation best corresponds to the *Carex nudata* Herbland Alliance of Sawyer et al. (2009). In addition to torrent sedge, and some species mentioned under mixed riparian woodland / scrub, others include scattered cattail (*Typha spp.*), hard-stemmed bulrush (*Schoenoplectus acutus var. occidentalis*) and pale spikerush (*Eleocharis macrostachya*), Canadian waterweed (*Elodea canadensis*) was the only submersed aquatic plant seen.

Blue Oak Woodland / Savannah

A small area of blue oak savannah is associated with the upland terrace on the north side of the Upper Dam site, and on the south side of the Ward Dam site; the latter has a denser canopy and so qualifies as blue oak woodland. The woodland corresponds closest to the *Quercus douglasii* Woodland Alliance of Sawyer et al. (2009). The dominant / sole tree species present is blue oak (*Quercus douglasii*); shrubs are lacking and the herbaceous component is mostly non-native annual grasses (see description of annual grassland).

3.4.1.2 Environmental Consequences / Impacts and Mitigation Measures

Methodology

The assessment of potential impacts of the proposed project on vegetation and plant communities is based on a review of databases and pertinent literature, consultation with resource agency staff, and field studies that are documented in a *Survey for Special-status Vascular Plant Species* (Dittes and Guardino Consulting 2014) that was prepared for the proposed project. This document is available on the Red Bluff Fish and Wildlife Office website on the AFRP webpage (<http://www.fws.gov/redbluff/afrp.html>). A preliminary investigation was performed that included a query of The California Native Plant Society's (CNPS) Inventory of Rare and Endangered Plants (CNPS 2014) for Tehama County. The California Department of Fish and Wildlife California Natural Diversity Database (CNDDDB) was also queried for special-status plant species from the Los Molinos and surrounding eight USGS 7.5-minute topographic quadrangles including Tuscan Springs, Dewitt Peak, Acorn Hollow, Richardson Springs NW, Vina, Corning, Gerber, Red Bluff East (CDFG 2014). In addition, the Consortium of California Herbaria (<http://ucjeps.berkeley.edu/consortium/>) was queried for special-status species potentially recorded from the vicinity, but not included in the CNDDDB. The results of these database queries were used, along with consideration of site location and habitat (including parent material / soils), to compile a list of vascular plant species with potential to occur in the project area (Appendix E).

Field surveys were conducted by Mr. John Dittes, Senior Botanist of Dittes and Guardino Consulting, on May 16-18, and July 18, 2014. An intuitive-controlled survey was performed within the study area. All areas subject to potential disturbance were assessed, along with a minimal 30-foot buffer. This included all project construction footprints, staging areas and along access roads where potential rare-plant habitat was present. A 30-foot-wide corridor was surveyed on foot on both sides of the 3.2-mile dirt access road extending to the Upper Dam. Similarly, 30-foot corridors were surveyed on segments of Ward Street that extended through suitable native plant habitat. All plant species encountered were identified to the taxonomic level necessary to determine legal status and scientific significance.

An impact related to Vegetation and Plant Communities would be significant if the project would:

- 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 CDFW, USFWS or NMFS;
- 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 CDFW or USFWS;

- 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; or
- f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plans.

The thresholds of significance listed above will be used to evaluate the potential for significant impacts on all of the remaining biological sections including Wildlife, Wetlands and Other Jurisdictional Waters of the U.S., and Fisheries.

No Action Alternative

Under this alternative, no project activities would occur, therefore no impacts would occur to special-status plant species or existing vegetation, and no additional exotic plant species would potentially become established at the site, over and above existing land uses.

Proposed Action Alternative

Under this alternative, implementation of the proposed project has potential to directly or indirectly impact multiple sub-populations of Tehama navarretia (*Navarretia heterandra*), CNPS Rank 4.3 and woolly meadowfoam (*Limnanthes floccosa ssp. Floccosa*) CNPS Rank 4.2. Both of these are associated with the edges of the haul road to access the Upper Dam project site, on the north side of Mill Creek and may be subject to disturbances incurred by road improvement activities, or by vehicles leaving the road-bed. This is considered a potentially significant impact. No other rare plant species were encountered within the project construction footprints.

Direct impacts to mixed riparian woodland / scrub and vernal pool / seasonal wetlands may occur within portions of the construction footprint incurred by road improvement activities, and / or construction at the three sites. These sensitive habitat areas are potentially jurisdictional and under regulation of the United States Army Corps of Engineers (USACE) under authority of Section 404 of the Clean Water Act, and of CDFW under Section 1600 of the Fish and Game Code. These potential impacts and proposed mitigation measures for riparian and wetland habitats is addressed in a separate report (TES 2015). This is considered a potentially significant impact.

Invasive exotic plant species could potentially be introduced to the project area by the importation of plant seeds and tissues during the mobilization of equipment and could be spread by movement of equipment from one location to another within the project area. This is considered a potentially significant impact.

There are no adopted habitat conservation plans, natural community conservation plans or other conservation plans in the project area. The proposed project would not be in conflict with any local policies or ordinances protecting biological resources.

The following measures would be implemented to avoid and minimize impacts to vegetation and plant communities and to mitigate potentially significant impacts to vegetation and plant communities to less than significant levels:

VEGETATION-1: Disturbance to existing vegetation will be avoided or minimized to the extent possible.

VEGETATION-2: Disturbance to riparian vegetation will be avoided or minimized to the extent possible.

VEGETATION-3: All heavy equipment shall be thoroughly cleaned prior to mobilization onsite to remove any soil, weed seeds and plant parts in order to reduce the importation and spread of invasive exotic plant species.

VEGETATION-4: Only certified weed-free straw shall be used for erosion control or other purposes to reduce the importation and spread of invasive exotic plant species.

VEGETATION-5: A revegetation plan will be prepared to replace impacted riparian wetlands and riparian habitat by a measure of quantity and quality equal to, or exceeding impacts of the project using appropriate native riparian trees and shrubs.

VEGETATION-6: Areas with woody vegetation that have been disturbed will be revegetated in accordance with the revegetation plan.

VEGETATION-7: (Upper Dam Site Only) Vehicle traffic at the Upper Dam project site will be limited to the existing disturbed road prism. The condition of the road post-project will be coordinated with the landowner and all measures will be taken to return the road to pre-project conditions. If truck passing areas are necessary, they will be established in areas away from populations of Tehama navarretia and wooly meadowfoam and away from aquatic sites. Truck passing areas will be clearly mapped in the field with high visibility fencing or flagging and all construction personnel will be made aware of the sensitive resources and avoidance measures.

VEGETATION-8: No smoking will be allowed on the construction site or within the Action Area, for fire prevention purposes.

3.4.2 Wildlife

3.4.2.1 Affected Environment

Six habitat types generally occur within the project area as defined by the California Wildlife-Habitat Relationships classification system (Mayer and Laudenslayer 1988). The habitat types include: Valley Foothill Riparian, Annual Grassland, Blue Oak Woodland, Valley Oak Woodland, Riverine and Fresh Emergent Wetland habitats. The wildlife that potentially inhabit the area are those species that would normally be expected to use these habitats for food, shelter and cover within the general region (Sacramento Valley and foothills). A list of all wildlife species observed during site surveys is included as Appendix F.

A Biological Resources Evaluation (BRE) (TES 2015a) was conducted to identify and address potential impacts of the proposed project on special-status faunal species. This document is available on the Red Bluff Fish and Wildlife Office website on the AFRP webpage (<http://www.fws.gov/redbluff/afrp.html>). An evaluation of the potential presence of special-status species is included in Appendix G. Based on the results of the evaluation in Appendix G, the BRE further evaluated the potential impacts of the proposed project on those species with the potential to occur within, or near the proposed project site. Based on that further evaluation, the following special-status wildlife species, or groups of species, are known to, likely to, or may occur within the project area, and could potentially be impacted by the proposed project:

- Western Pond Turtle (*Emys marmorata*)
- Foothill Yellow-legged Frog (*Rana boylei*)
- Grasshopper Sparrow (*Ammodramus savannarum*)

- Golden Eagle (*Aquila chrysaetos*)
- Long-eared Owl (*Asio otus*)
- Burrowing Owl (*Athene cunicularia*)
- Swainson's Hawk (*Buteo swainsoni*)
- Northern Harrier (*Circus cyaneus*)
- White-tailed Kite (*Elanus caeruleus*)
- American Bald Eagle (*Haliaeetus leucocephalus*)
- Yellow-breasted Chat (*Icteria virens*)
- Yellow Warbler (*Setophaga petechia*)
- Loggerhead Shrike (*Lanius ludovicianus*)
- Other Nesting Raptors
- Other Nesting Migratory Birds
- Vernal Pool Fairy Shrimp (*Branchinecta lynchi*)
- Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*)
- Vernal Pool Tadpole Shrimp (*Lepidurus packardii*)
- Pallid Bat (*Antrozous pallidus*)
- Ringtail (*Bassariscus astutus*)

Three of these species (vernal pool fairy shrimp, valley elderberry longhorn beetle and vernal pool tadpole shrimp) are federally listed as Threatened or Endangered. Under Section 7 of the ESA, federal agencies are required to consult with the USFWS regarding impacts from a proposed action to listed species or species proposed for listing, and their designated Critical Habitat (CH). A Biological Assessment (BA) (TES 2015b) has been prepared for the Ward Dam site and consultation with the USFWS has been initiated. A BA will be prepared for the other two sites, and consultation with USFWS will occur prior to their implementation.

Western Pond Turtle

The western pond turtle is designated as a CDFW Species of Special Concern. Population declines are attributed to impacts to nesting habitat, nest and juvenile predation by non-native aquatic species, human-induced predator population increases and historic human overexploitation (Jennings and Hayes 1994). This species inhabits quiet waters of ponds, lakes, streams, etc., where there are rocks or logs for basking and safe underwater retreat areas (Stebbins 1972). They are closely tied to water except when females move overland to lay eggs or when either sex may move overland to upland sites to overwinter. They may overwinter on land or in water but are thought to be more likely to overwinter in water when inhabiting pond habitats. Egg-laying typically occurs in May and June but can occur from late April to early August, while overwintering generally begins in October or November (Jennings and Hayes 1994). Hatchlings are thought to overwinter in the nest and emerge to migrate to aquatic habitats the following spring (Jennings and Hayes 1994). The aquatic habitats within Mill Creek provide favorable breeding and overwintering habitat for this species. Adult turtles were observed during site surveys.

Foothill Yellow-legged Frog

The foothill yellow-legged frog is designated as a CDFW Species of Special Concern. The main reported threat to the species is predation by introduced aquatic predators including fish and bullfrogs (Jennings and Hayes 1994). This species inhabits shallow flowing water in small- to moderate-sized streams with some cobble-sized substrate (Jennings and Hayes 1994) in a variety of habitats including valley-foothill hardwood, valley-foothill hardwood-conifer, valley-foothill riparian, ponderosa pine, mixed conifer, coastal scrub, mixed chaparral and wet meadow from sea level to 6,000 feet in elevation (Ziener et al. 1988). Breeding occurs following the end of spring flooding from mid-March to May (Ziener et al. 1988). Adults

forage on aquatic and terrestrial invertebrates and are rarely found far from permanent water (Ziener et al. 1988). The aquatic habitats within Mill Creek provide potential breeding and / or foraging habitat for this species. Foothill yellow-legged frogs were observed during site surveys.

Grasshopper Sparrow

The grasshopper sparrow is a CDFW Species of Special Concern. Reported potential threats to the species include urbanization, expansion of vineyards and fire suppression, if it leads to grassland converting into unsuitable habitats such as dense scrub (Shuford and Gardali 2008). The grasshopper sparrow is more likely to be found in large tracts of habitat than in small ones. Minimum area requirements are approximately 100 hectares (247 acres) in Maine and 30 hectares (74 acres) in Illinois. In general, grasshopper sparrows in California prefer short- to middle-height, moderately open grasslands with scattered shrubs (Shuford and Gardali 2008). The breeding season for this species extends from mid-March to August. This species builds nests domed with grasses and forbs with a side entrance, in a slight depression in the ground (Shuford and Gardali 2008). Grasshopper sparrow diet is roughly 63 percent animal matter (mainly grasshoppers) and 37 percent vegetable (plants seeds) and they forage primarily on the ground (bare ground is critical microhabitat for effective foraging) or from low vegetation (Shuford and Gardali 2008). Grassland habitat within the project site provides potential nesting and foraging habitat for this species. Grasshopper sparrows were not observed during site surveys; however, this species is known to occur north of the project sites within the Dye Creek Preserve. The species may forage within the project sites if nesting or roosting in the general area.

Golden Eagle

The golden eagle is designated as a Fully Protected Species under the California Fish and Game Code and is protected by the Bald and Golden Eagle Protection Act. This species has declined near human population centers (Remsen 1978). The loss and alteration of grasslands, shooting, and human disturbance at nest sites are reported to have contributed to the decline of the species (Remsen 1978). The golden eagle is a permanent resident throughout California, except in the center of the Central Valley, although it winters in this area (Zeiner et al. 1990). Golden eagles typically inhabit rolling foothills, mountainous areas, sage-juniper flats, and deserts (Zeiner et al. 1990). It breeds from late January through August, peaking from March through July, and nests on cliffs and in large trees near open areas. Golden eagles often maintain alternative nest sites and old nests are often reused (Zeiner et al. 1990). The golden eagle needs open areas for hunting and their diet consists mostly of lagomorphs and rodents, but also includes other mammals, reptiles, birds, and some carrion (Zeiner et al. 1990). Potential nesting and foraging habitat is present within, and in the vicinity of the project sites for this species. Golden eagles were observed during site surveys and this species is known to nest north of the project site within the Dye Creek Preserve. There is a low likelihood that golden eagles would nest in the project site, due to the fact that no nests were observed during surveys; however, the potential for nesting cannot be discounted as new territories could be established prior to construction. This species may forage within the project sites if birds are nesting in the general area.

Long-eared Owl

The long-eared owl is designated as a Species of Special Concern by CDFW. Declines in long-eared owl populations have been attributed to destruction of lowland riparian woodland habitats; however, other unknown factors such as automobile collisions and human harassment may also be contributing factors (Remsen 1978). This species nests and roosts in riparian, live oak or other thickets with small, densely-canopied trees and primarily hunts in open areas for rodents, as well as birds, smaller owls and other vertebrates (Zeiner et al. 1990). Breeding occurs from early March to late July (Zeiner et al. 1990). Potential nesting and foraging habitat is present within the project site for this species. The species was

not observed during site surveys. The species may forage within the project sites if nesting or roosting in the general area.

Burrowing Owl

The burrowing owl is a CDFW Species of Special Concern. Population declines are attributed to conversion of grassland to agriculture, other habitat destruction, and poisoning of ground squirrels (Remsen 1978). Collisions with automobiles may also be a significant cause of mortality. Burrowing owls are yearlong residents of open, dry grassland, desert habitats, and open shrub stages of pinyon-juniper and ponderosa pine habitats. This species eats mostly insects, small mammals, reptiles, birds, and carrion. They use ground squirrel or other burrows for roosting and nesting cover, or they may dig their own burrow in soft soil. No burrowing owls were observed during site surveys and the project site is outside of the known breeding range for this species; however, recent studies at the Dye Creek Preserve indicate that this species is wintering on the preserve and may be breeding (J. Shedd pers. comm. 2014). The open grasslands of the study area near the Upper Dam represent potential nesting, roosting and foraging habitat for the burrowing owl. The species may forage within the project sites if nesting or roosting in the general area.

Swainson's Hawk

The Swainson's hawk was listed as Threatened by the State of California in 1983. Threats include loss and conversion of native grasslands and agricultural lands to development, loss of mature riparian forest habitat, shooting, pesticide poisoning and human disturbance at nest sites (Remsen 1978, CDFG 2005). Recovery efforts are focused on preservation of riparian systems and other nesting habitat, conservation of foraging habitat, maintenance of agricultural practices that are compatible with foraging requirements and minimizing disturbance near nests (CDFG 2005). In California, they now nest primarily in the Central Valley and the Great Basin regions (CDFG 2005). Some individuals are neotropical migrants that winter in Mexico and South America. They typically nest March through August in large trees in riparian habitat, in scattered trees, or small groves in sparsely vegetated flatlands (Zeiner et al. 1990). They forage in large open grasslands, open agricultural fields and livestock pastures taking mice, gophers, ground squirrels, rabbits, large arthropods, amphibians, reptiles, birds, and rarely, fish (Zeiner et al. 1990). The study area is within the northern end of the geographical breeding range for this species. Potential nesting and foraging habitat for the Swainson's hawk is present within the study area near the Exposed Siphon, Ward Dam and Upper Dam. A single Swainson's hawk was observed flying at high elevations during site surveys and they are known to occur north of the project site in the Dye Creek Preserve. The species may forage within the project sites if nesting or roosting in the general area.

Northern Harrier

The northern harrier is a CDFW Species of Special Concern. Reported threats to the species include destruction of marsh habitat, burning and plowing of nesting areas and grazing in grassland nesting habitat (Remsen 1978, Zeiner et al. 1990). This species nests from April to September on the ground in emergent wetlands, grasslands, agricultural fields or on sagebrush flats (Zeiner et al. 1990). They forage in open areas consuming small mammals, birds, frogs, small reptiles, crustaceans, insects and rarely, fish (Zeiner et al. 1990). Potential nesting and foraging habitat for the northern harrier is present in the open grasslands within the study area. A northern harrier was observed during site surveys and they are known to occur north of the project site in the Dye Creek Preserve. The species may forage within the project sites if nesting in the general area.

White-tailed Kite

The white-tailed kite is designated as Fully Protected by CDFW. The species has extended its range and increased in numbers in recent decades (Zeiner et al. 1990). They are rarely found away from agricultural areas and nest from February to October near tops of trees in dense oak, willow or other tree stands, near open foraging areas (Zeiner et al. 1990). They forage on small mammals and occasionally on birds, insects, reptiles and amphibians in undisturbed open grasslands, meadows, farmlands and emergent wetlands (Zeiner et al. 1990). Potential foraging and nesting habitat is present within the study area. There were no white-tailed kites observed during field surveys; however, they are known to occur north of the project site in the Dye Creek Preserve. The species may forage within the project sites if nesting in the general area.

American Bald Eagle

The American bald eagle was listed as Endangered by the State of California in 1971, is designated as a Fully Protected species under the California Fish and Game Code, and is protected by the Bald and Golden Eagle Protection Act. The species was originally listed as Endangered by USFWS in 1967, was downlisted to Threatened in 1995, and delisted in 2007. Past declines in bald eagle populations are attributed to the effects of dichlorodiphenyltrichloroethane (DDT), lead shot and habitat disturbance; however, in California, the number of territories has increased and the species range has expanded (CDFG 2005). Recovery efforts have focused on the protection of nesting areas and restrictions on the use of DDT. The bald eagle is a large bird of prey that winters throughout California. They nest in the upper canopy of large trees normally in mountain and foothill habitats near rivers, streams and reservoirs. They forage opportunistically on fish and waterfowl but also prey on other small animals and eat carrion (CDFG 2005). Potential nesting habitat is present within the study area; however, there is a low likelihood that bald eagles would nest within the study area due to the lack of established existing nests. No bald eagle nesting activity is known to occur in the general area; however, potential still exists for new nesting territories to be established. Bald eagles were observed in the area during site surveys, and it is likely that bald eagles are present at various times of the year foraging and / or roosting within, or near, the project sites. Foraging habitat is present within the project sites.

Yellow-breasted Chat

The yellow-breasted chat is designated as a CDFW Species of Special Concern. Threats to the species include destruction of riparian habitat and nest parasitism by brown-headed cowbirds (Remsen 1978). Yellow-breasted chats are neotropical migrant songbirds that nest in dense shrubs along streams and rivers and require dense, brushy thickets and tangles near water for cover. They nest from early May to early August with peak nesting activity in June, and forage on insects, spiders, berries and other fruit (Zeiner et al. 1990). This species was observed during site surveys and is known to occur north of the Ward Dam site in the Dye Creek Preserve. Potential nesting and foraging habitat is present within the riparian areas within the project sites. Potential foraging habitat is present within the project sites.

Loggerhead Shrike

The loggerhead shrike is a CDFW Species of Special Concern. Potential threats and reasons for population declines are not well-documented for this species although habitat loss on breeding and wintering grounds, as well as along migratory routes is a major threat to the species. Loggerhead shrikes construct nests in dense foliage in trees or shrubs, or in areas with open habitat and scattered shrubs, trees, or other perches. They are found primarily in valley foothill hardwood, hardwood-conifer and riparian habitats as well as pinyon-juniper, juniper and desert riparian Joshua tree habitats (Zeiner et al. 1990). Nesting occurs from March into May, with young becoming independent in July and August (Zeiner et al.

1990). They feed primarily on large insects but also take small birds, mammals, amphibians, reptiles, fish, carrion and other invertebrates (Zeiner et al. 1990). Potential foraging and nesting habitat exist within the project sites for loggerhead shrike. Loggerhead shrikes were observed during site surveys near the entrance to the Upper Dam access haul roads. Potential foraging habitat is present within the project sites.

Yellow Warbler

The yellow warbler is designated as a CDFW Species of Special Concern. Threats to the species include destruction of riparian habitat and nest parasitism by brown-headed cowbirds (Remsen 1978). Numbers of breeding pairs have declined dramatically in recent decades in lowland areas. Yellow warblers are neotropical migrant songbirds that nest in riparian woodlands as well as in montane chaparral and in the shrubby understory of ponderosa pine and mixed conifer forests (Zeiner et al. 1990, Shuford and Gardali 2008). They nest from mid-April into early August, with peak nesting activity in June, and eat insects, spiders and occasionally berries (Zeiner et al. 1990). Potential nesting habitat is present in the riparian areas within and near the project sites along Mill Creek. No yellow warblers were observed during site surveys; however, they are known to occur north of the project sites in the Dye Creek Preserve. Potential foraging habitat is present within the project sites.

Other Nesting Raptors

Nesting habitat exists within, and near the project sites for several additional raptor species (eagles, hawks, and owls) protected under several sections of the California Fish and Game Code. Several raptor species were observed during site surveys (Appendix F). A number of additional raptor species, while not observed, may potentially nest within, or near the project sites. Several large and medium-sized nests were observed within, or in the vicinity of the project sites that could potentially serve as raptor nests.

Other Nesting Migratory Birds

Nesting habitat exists within the project site for a number of additional migratory bird species that are not identified as special-status species, but are protected under the federal Migratory Bird Treaty Act.

Vernal Pool Fairy Shrimp

The vernal pool fairy shrimp was listed as Threatened by USFWS on September 19, 1994. CH was initially designated on August 06, 2003. Additional CH was designated on February 10, 2006. Population declines are attributed to destruction and degradation of vernal pool habitats. Vernal pool fairy shrimp occur exclusively in vernal pool and vernal pool-like habitats. Although the species has been collected from larger pools, it generally tends to occur in smaller pools less than 0.05 acres and is typically found in pools with low to moderate salinity or total dissolved solids (TDS) (USFWS 2004). Vernal pool fairy shrimp eggs, or cysts, remain dormant in the soil when the pools are dry and several separate hatches can occur in a single wet season. Adults can reach sexual maturity in as few as 18 days at optimal water temperatures and feed on algae, bacteria, protozoa, rotifers and detritus (USFWS 2004). The project is not located in or near the currently designated CH, but is located within the current known range of the species. Vernal pool fairy shrimp were observed in a pool within the access road to Upper Dam during a focused survey conducted by TES and USFWS in January 2015. The existing bare-earth haul roads are highly impacted and are devoid of vegetation (Figure 8). No potential habitat is present within the Ward Dam or Exposed Siphon project sites or haul roads.

Valley Elderberry Longhorn Beetle

The valley elderberry longhorn beetle (VELB) was federally listed as a Threatened species by USFWS on August 8, 1980. CH was designated by USFWS on August 8, 1980. Suggested threats to the existence of this species include loss of elderberry shrubs and associated riparian habitat, pesticide use, grazing and other mismanagement of riparian habitat. Current recovery efforts are primarily focused on revegetating riparian habitats. The VELB is endemic to the Central Valley of California. They are associated with elderberry (*Sambucus spp.*) shrubs during their entire life cycle. VELB larvae bore into and feed on the pithy core of elderberry stems for up to two years before emerging as adults after chewing an exit hole through the stem and bark. The adult beetles feed on elderberry foliage until they mate in early summer. The female then lays eggs in crevices in the bark of the elderberry plant. The project sites are not located in or near the currently designated CH. Suitable habitat (elderberry shrubs with stems greater than, or equal to, one inch in diameter at ground level) exists within 100 feet of the project boundaries at the Upper Dam site and the Exposed siphon site. No suitable habitat was observed at the Ward Dam site. No exit holes were observed during surveys.

Vernal Pool Tadpole Shrimp

The vernal pool tadpole shrimp was listed as Endangered by USFWS on September 19, 1994. CH was initially designated on August 06, 2003. Additional CH was designated on February 10, 2006. Population declines are attributed to destruction and degradation of vernal pool habitats. Vernal pool fairy shrimp occur in a wide variety of ephemeral habitats and have been collected in pools ranging in size from 6.5 square feet to 88 acres (USFWS 2004). Vernal pool tadpole shrimp eggs, or cysts, remain dormant in the soil when the pools are dry and hatch in as few as four days after winter rains fill the vernal habitats (USFWS 2004). Adults reach sexual maturity in three to four weeks and females can deposit as many as six clutches of eggs in a single wet season (USFWS 2004). They feed on organic debris and living organisms such as fairy shrimp and other invertebrates (USFWS 2006). The project site is not located in or near the currently designated CH, but is located within the current known range of the species. Vernal pool tadpole shrimp were not observed during surveys; however, protocol-level surveys were not conducted. In the absence of protocol-level surveys, presence must be assumed. The seasonal wetland habitat along the haul road to access the Upper Dam project site remains inundated long enough in the spring to provide potential habitat for vernal pool fairy shrimp. The existing bare-earth haul roads are highly impacted and are devoid of vegetation. No potential habitat is present within the Ward Dam or Exposed Siphon project sites or haul roads.

Pallid Bat

The pallid bat is designated as a CDFW Species of Special Concern. Threats to the species include destruction and disturbance of roosting sites which include caves, crevices, mines, and occasionally, hollow trees and buildings (Zeiner et al. 1990a). This species is most common in open, dry areas near rocky sites for roosting in a wide variety of habitats including grasslands, shrublands, woodlands and forests from sea level up through mixed conifer forests (Zeiner et al. 1990a). Females give birth in the early summer in nursery colony roosts and the young are not weaned until the fall. Pallid bats feed on large arthropods including scorpions, cicadas, katydids, beetles, crickets, grasshoppers, praying mantids and moths (Bolster et al. 1998). Pallid bats were detected within the study area during acoustical site surveys and may be roosting in potential habitat within the project sites. Pallid bats are likely to be foraging in the area.

Ringtail

The ringtail is designated as a Fully Protected species under the California Fish and Game Code. Threats to the species include urbanization and loss and degradation of riparian communities (Williams 1986). This medium-sized carnivore inhabits forests and shrublands in close association with riparian habitats or rocky areas. They are usually found within 0.6 miles of permanent water (Zeiner et al. 1990a) in low to middle elevations. Ringtails den and nest in hollow trees, snags, cavities in rocks, abandoned burrows and human structures. Suitable ringtail denning, nesting and foraging habitat is present within the project sites in riparian and upland habitats. No ringtail were observed during site surveys; however, they are seldom observed without the use of specialized survey methods due to their strongly nocturnal nature. Foraging is likely to occur within the project sites.

3.4.2.2 Environmental Consequences / Impacts and Mitigation Measures

Methodology

The assessment of potential impacts of the proposed project on wildlife is based on a review of databases and pertinent literature, consultation with resource agency staff, and field studies that are documented in a BRE (TES 2015a) that was prepared for the proposed project and a BA (TES 2015b) that was prepared for the Ward Dam site. Prior to the initiation of field studies, a records search of the CNDDDB (CDFW 2014) was conducted to determine if any special-status wildlife species, or rare terrestrial natural communities had previously been documented within the project sites, or in the vicinity of the project sites. The query was conducted using the USGS Los Molinos 7.5-minute quadrangle, in which the project is located, as well as the eight adjoining quadrangles (Dewitt Peak, Tuscan Springs, Red Bluff East, Gerber, Corning, Acorn Hollow, Vina and Richardson Springs NW). In addition, a species list was generated using the USFWS Sacramento Fish and Wildlife Office website (USFWS 2015) for the Los Molinos quadrangle.

Based on the results of the CNDDDB and USFWS database searches, and TES's staff knowledge of the site and local area, a list of potentially occurring special-status wildlife species and terrestrial natural communities was developed for the proposed project, as well as an evaluation of their potential presence (Appendix G). For the purposes of this evaluation, special-status species were defined as:

1. Those species listed by the USFWS or NMFS as Endangered, Threatened, Proposed as Endangered or Threatened, Candidate to become Proposed, or Species of Concern.
2. Those species listed by the CDFW as Endangered, Threatened, Candidate for listing as Endangered or Threatened, Species of Special Concern, or Fully Protected.

Field surveys were conducted on May 21 and June 30, 2014, by TES staff. A focused large branchiopod (fairy shrimp and tadpole shrimp) survey was also conducted of the Upper Dam access road on January 9, 2015 by TES and USFWS staff. Additional observations were made during work conducted at the project site for other purposes in April, July, September, October and December of 2014. The study area included the entire project footprint, as well as a varying surrounding buffer area. The surveys were conducted by walking the entire study area and recording direct wildlife observations. Observations were made using the unaided eye, binoculars and identification of vocalizations. Other methods included vocal solicitations and observations of animal tracks, scat, bird feathers and other identification methods. Two professional game cameras (Reconyx PC900 Hyperfire Professional IR) were deployed in May 2014. Cameras were placed only at the Upper Dam site per the request of the Mill Creek Ranch land manager. No protocol-level wildlife or fisheries surveys were conducted.

In addition, to survey for bat species, two Pettersson DX-500 full spectrum, ultrasound, acoustical recording devices were deployed during the evening hours of May 9 and 10, 2014, and one unit was deployed again on May 13 and 14, 2014. The survey was performed at a time of year that was favorable

for detection of all bat species that could potentially occur at the site. The recording devices were deployed at a total of three different locations in order to sample varying habitats. The habitats sampled included riparian / riverine, blue oak savannah and annual grassland. The sampling occurred from approximately sundown to sunrise. Once recorded, the potential bat calls were then analyzed using SonoBat™ 3.1 software to identify calls to the species level. Only those calls, for which the software was able to reach a consensus decision, were used to generate a bat species list for the survey results (Appendix F). Recording devices were placed only at the Upper Dam site per the request of the Mill Creek Ranch land manager.

A focused large branchiopod (fairy shrimp and tadpole shrimp) survey was also conducted of the Upper Dam access road on January 9, 2015 by TES and USFWS staff. The list of species evaluated in this document were derived as a result of further evaluations in the BRE of potential impacts to the list of potentially-occurring special-status wildlife species in Appendix G.

No Action Alternative

Under this alternative, there would be no impacts to wildlife, including special-status wildlife species because the project would not be implemented.

Proposed Action Alternative

Western Pond Turtle

Under this alternative, western pond turtles could be harmed or killed if they were present within the project area during construction activities. This is considered a potentially significant impact.

Foothill Yellow-legged Frog

Under this alternative, foothill yellow-legged frog could be harmed or killed if they were present within the project area during construction activities. This is considered a potentially significant impact.

Grasshopper Sparrow

Under this alternative, project activities could cause nest abandonment if active grasshopper sparrow nests were present within or near the project area and were disturbed by project construction activities. Potential activities that could cause nest abandonment include people and equipment working at the project sites, vegetation removal and noise from construction activities. This is considered a potentially significant impact.

Golden Eagle

Under this alternative, project activities could cause nest abandonment if active golden eagle nests were present within or near the project area and were disturbed by project construction activities. Potential activities that could cause nest abandonment include people and equipment working at the project sites, vegetation removal and noise from construction activities. This is considered a potentially significant impact.

Long-eared Owl

Under this alternative, project activities could cause nest abandonment if active long-eared owl nests were present within or near the project area and were disturbed by project construction activities. Potential activities that could cause nest abandonment include people and equipment working at the project sites, vegetation removal and noise from construction activities. This is considered a potentially significant impact.

Burrowing Owl

Under this alternative, project activities could cause nest abandonment if active burrowing owl burrows were present within or near the project area and were disturbed by project construction activities. Potential activities that could cause nest abandonment include people and equipment working at the project sites, vegetation removal and noise from construction activities. This is considered a potentially significant impact.

Swainson's Hawk

Under this alternative, project activities could cause harassment, habitat modification or nest abandonment if active Swainson's hawk nests were present within or near the project area and were disturbed by project construction activities. Potential activities that could cause harassment, habitat modification or nest abandonment include people and equipment working at the project sites, vegetation removal and noise from construction activities. This is considered a potentially significant impact.

Northern Harrier

Under this alternative, project activities could cause nest abandonment if active northern harrier nests were present within or near the project area and were disturbed by project construction activities. Potential activities that could cause nest abandonment include people and equipment working at the project sites, vegetation removal and noise from construction activities. This is considered a potentially significant impact.

White-tailed Kite

Under this alternative, project activities could cause nest abandonment if active white-tailed kite nests were present within or near the project area and were disturbed by project construction activities. Potential activities that could cause nest abandonment include people and equipment working at the project sites, vegetation removal and noise from construction activities. This is considered a potentially significant impact.

American Bald Eagle

Under this alternative, project activities could cause harassment, habitat modification or nest abandonment if active American bald eagle nests were present within or near the project area and were disturbed by project construction activities. Potential activities that could cause harassment, habitat modification or nest abandonment include people and equipment working at the project sites, vegetation removal and noise from construction activities. This is considered a potentially significant impact.

Yellow-breasted Chat

Under this alternative, project activities could cause nest abandonment if active yellow-breasted chat nests were present within or near the project area and were disturbed by project construction activities. Potential activities that could cause nest abandonment include people and equipment working at the project sites, vegetation removal and noise from construction activities. This is considered a potentially significant impact.

Yellow Warbler

Under this alternative, project activities could cause nest abandonment if active yellow warbler nests were present within or near the project area and were disturbed by project construction activities. Potential activities that could cause nest abandonment include people and equipment working at the

project sites, vegetation removal and noise from construction activities. This is considered a potentially significant impact.

Loggerhead Shrike

Under this alternative, project activities could cause nest abandonment if active loggerhead shrike nests were present within or near the project area and were disturbed by project construction activities. Potential activities that could cause nest abandonment include people and equipment working at the project sites, vegetation removal and noise from construction activities. This is considered a potentially significant impact.

Nesting Raptors

Under this alternative, project activities could cause nest abandonment if other active raptor nests were present within or near the project area and were disturbed by project activities. Potential activities that could cause nest abandonment include people and equipment working throughout the project site, vegetation removal and noise from construction activities. This is considered a potentially significant impact.

Other Nesting Migratory Birds

Under this alternative, project activities could cause nest abandonment if other active migratory bird nests were present in the project vicinity. Potential activities that could cause nest abandonment include people and equipment working throughout the project site, vegetation removal and noise from construction activities. This is considered a potentially significant impact.

Vernal Pool Fairy Shrimp

Under this alternative, vernal pool fairy shrimp could be impacted through mortality to cysts through destruction or modification of the pools in which they exist along the haul road to the Upper Dam site. While the current access road is regularly used for fish screen maintenance, irrigation system maintenance, fish surveys and livestock operations, a significant increase in traffic would occur during project construction as a result of equipment and material hauling and personnel mobilization traffic. Potential impacts include filling of the pools or changes in hydrology due to road grading, premature hydration and hatching of the cysts from excessive dust control road watering, and movement of cysts out of pool habitats due to erosion of the pool sediments following construction. Additional potential impacts include contamination of the pool sediments from petroleum products or other contaminant spills. In addition, impacts to adult and / or juvenile shrimp could occur if construction continued into the rainy season after the pools became inundated. This is considered a potentially significant impact.

Valley Elderberry Longhorn Beetle

Under this alternative, valley elderberry longhorn beetle could be impacted through harassment, modifications to suitable habitat and injury or mortality from project construction activities if they were present within the Exposed Siphon and / or Upper Dam project areas during construction activities. No suitable habitat was observed within 100 feet of the Ward Dam site. Project activities that could potentially impact this species include direct disturbance to existing elderberry shrubs or disturbance within 100 feet of the drip line of the elderberry shrubs. This is considered a potentially significant impact.

Vernal Pool Tadpole Shrimp

Under this alternative, potential impacts to vernal pool tadpole shrimp and their cysts are expected to be similar to those described above for vernal pool fairy shrimp. This is considered a potentially significant impact.

Pallid Bat

Under this alternative, project activities could cause pallid bats to abandon their roost if bats were roosting within or in close proximity to the project sites. Potential activities that could cause roost abandonment include people and equipment working throughout the project site, vegetation removal and noise from construction activities at all three project sites. This is considered a potentially significant impact.

Ringtail

Under this alternative, ringtail could be harmed or killed if active ringtail dens or nests were present within the project sites and were disturbed by project construction activities. Potential activities that could cause harm involve equipment physically disturbing active dens or nests. This is considered a potentially significant impact.

There are no adopted habitat conservation plans, natural community conservation plans or other conservation plans in the project area. The proposed project would not be in conflict with any local policies or ordinances protecting biological resources.

The following measure would be implemented to avoid and minimize impacts to wildlife and to mitigate potentially significant impacts to wildlife to less than significant levels:

WILDLIFE-1: Prior to work in aquatic habitats, water bodies shall be surveyed by a qualified biologist to determine if any foothill yellow-legged frogs or western pond turtles are present. If any individuals of these species are found, a qualified and permitted biologist shall determine and implement appropriate relocation procedures. Herpetological exclusion fencing shall be erected around the perimeter of the instream work area prior to construction initiation. Fencing shall remain until work in aquatic habitats is complete.

WILDLIFE-2: A qualified biologist experienced in the identification of amphibian species (particularly Rana species) will conduct survey(s) for California red-legged frogs at a frequency / rate deemed acceptable by the California Department of Fish and Wildlife to determine if this species is present within any of the disturbance areas. If any California red-legged frogs are found to be present, all potentially disturbing construction activities will be suspended until appropriate protective measures can be developed in consultation with the USFWS ESA staff.

WILDLIFE-3: Any tree removal, vegetation clearing, or the onset of potentially disturbing construction activities shall occur between August 31 and January 1 (outside of the nesting season for avian species).

If tree removal, vegetation clearing, or the onset of potentially disturbing construction activities must occur during the nesting season for non-raptor avian species (March 1 through July 31), a nesting survey of the construction area and adjacent suitable habitat shall be conducted by a qualified biologist no more than seven days prior to the initiation of the onset of these activities. If active avian nests are found to be present, tree removal, vegetation clearing and the onset of potentially disturbing construction activities shall be suspended until a qualified biologist, in consultation with California Department of Fish and Wildlife (CDFW) and / or the U.S. Fish and Wildlife Service (USFWS), can establish an appropriate protective buffer area to minimize impacts to

the nesting birds. No construction activities shall commence within the buffer area until the qualified biologist determines that the young birds have fledged or the nest is no longer active. If tree removal, vegetation clearing, or the onset of potentially disturbing construction activities must occur during the raptor nesting season January 1 through August 31, a raptor nesting survey of the construction area and a 0.25 mile buffer (as access allows) shall be conducted by a qualified biologist no more than seven days prior to the initiation of the onset of these activities. If active raptor nests are found to be present, tree removal, vegetation clearing and the onset of potentially disturbing construction activities shall be suspended until a qualified biologist, in consultation with CDFW and / or USFWS can establish an appropriate protective buffer area to minimize impacts to the nesting raptors. No construction activities should commence within the buffer area until the qualified biologist determines that the young birds have fledged or the nest is no longer active.

WILDLIFE-4: Prior to any construction work, a survey shall be conducted by a qualified biologist to ensure that pallid bats are not roosting within the areas to be disturbed.

If pallid bats are found to be roosting within the area to be disturbed, construction activities shall be suspended until a qualified biologist, in consultation with CDFW, can establish appropriate measures to minimize impacts to pallid bats.

WILDLIFE-5: Prior to construction, a qualified biologist will inspect the area to be disturbed to determine if potential ringtail denning is occurring.

If potential ringtail denning is found to be occurring, construction activities should be suspended until a qualified biologist, in consultation with CDFW, can establish appropriate measures to minimize impacts to ringtail.

WILDLIFE-6: Prior to construction, all elderberry shrubs within 150 feet of any project activity will be clearly flagged, marked and maintained throughout construction in order to avoid impacts to the valley elderberry longhorn beetle. All elderberry shrubs within 100 feet of project activity will be marked with high-visibility orange fencing.

WILDLIFE-7: (Upper Dam Site Only) At the Upper Dam site, project activities shall avoid impacts to vernal pools and other potential large branchiopod (fairy shrimp, tadpole shrimp) habitats to the extent possible.

High-visibility fencing shall be installed in areas where equipment will be working near any potential large branchiopod habitat that are not to be disturbed.

No road grading or road improvements shall be allowed in or near potential large branchiopod habitat.

Dust control water applications will not be applied to potential large branchiopod habitats.

All transporters of potentially hazardous materials (fuel, oil, cement, etc.) will be notified as to the presence of potential large branchiopod habitat and required to inspect their vehicles prior to entry and exit of these habitats, to prevent accidental discharge.

All vehicular traffic will be restricted to the designated work boundaries. The condition of the road post-project will be coordinated with the landowner and all measures will be taken to return the road to pre-project conditions. The work boundaries will be flagged or fenced and identified on construction drawings to limit equipment and personnel to the minimum area necessary to perform the project work and minimize impacts to potential large branchiopod habitats.

WILDLIFE-8: A qualified biologist (biological monitor) shall regularly inspect construction-related activities to ensure that no unnecessary disturbance to special-status species and / or their associated habitats occurs. The biological monitor should have the authority to stop all activities that may result in such disturbance until appropriate corrective measures have been completed.

The biologist will also be required to report any unauthorized take to CDFW, USFWS and / or NMFS immediately.

WILDLIFE-9: A construction worker education program shall be implemented that includes an explanation of all special-status animal species, identification, avoidance measures, and federal and state laws that protect the species. This shall include, at a minimum, those species listed in the environmental documents.

WILDLIFE-10: An Endangered Species Act Section 7 consultation will occur with the USFWS for each of the three project sites for impacts to yellow-billed cuckoo, valley elderberry longhorn beetle, vernal pool fairy shrimp and / or vernal pool tadpole shrimp. All protective measures imposed by USFWS through the consultation will be adhered to.

WILDLIFE-11: Appropriate measures will be used to avoid the spread of Aquatic Invasive Species (AIS) such as Zebra / Quagga mussels, New Zealand mudsnails and Chytrid Fungus to and from the project area and could include such measures as physical removal from equipment, freezing equipment and saturation of equipment in a chemical solution(s).

With incorporation of the mitigation measures (Appendix H), no significant impacts to state or federally listed animal species (with the exception of vernal pool fairy shrimp and vernal pool tadpole shrimp), special-status animal species or rare natural communities are expected to occur as a result of the proposed project. An unavoidable “may affect, likely to adversely affect” determination is anticipated for vernal pool fairy shrimp and vernal pool tadpole shrimp, at the Upper Dam site only. This will be addressed as part of the consultation with USFWS under Section 7 of the Endangered Species Act. With incorporation of the mitigation measures listed in Appendix H, and measures identified in the agency issued Biological Opinion and / or concurrence letter, the project is not expected to jeopardize the continued existence of any listed species.

3.4.3 Wetlands and Other Jurisdictional Waters of the U.S.

3.4.3.1 Affected Environment

Wetlands and other potentially jurisdictional waters of the U.S. (other waters) are present within the project area, associated with Mill Creek, ephemeral drainages and vernal pools in grasslands and human-made features associated with the diversion system that carries the water diverted by the diversion dams. Table 3 through Table 5 present the acreage of wetlands and other waters identified within the Exposed Siphon site, the Ward Dam site and the Upper Dam site respectively, followed by a description of the wetlands and other waters that are present within the project site.

Based on the presence / absence of indicators of wetland hydrology, hydrophytic vegetation and hydric soils, 2.77 acres of potentially jurisdictional wetlands were identified and delineated between the three separate study areas. Based on the presence of an ordinary high water mark (OHWM), 4.08 acres of potentially jurisdictional other waters were also identified and delineated within the three separate study areas. Table 3 through Table 5 present a summary of the total acreage for each separate area of the jurisdictional waters of the U.S. The Exposed Siphon has 0.67 acres of potentially jurisdictional wetlands. Ward Dam has 0.78 acres of potentially jurisdictional wetlands and the Upper Dam has 1.32 acres of potentially jurisdictional wetlands. The Exposed Siphon has 0.93 acres of potentially jurisdictional other waters of the U.S. the Ward Dam has 0.97 acres of potentially jurisdictional other waters of the U.S. and the Upper Dam has 2.18 acres of potentially jurisdictional other waters of the U.S.

Table 3. Summary of Preliminary Delineated Waters of the U.S. Exposed Siphon	
Wetlands	Total Acreage
Riparian Wetland	0.67
Total Wetlands	0.67
Other Waters	Total Acreage
Perennial Stream	0.90
Ditch	0.03
Total Other Waters	0.93
TOTAL WATERS OF THE U. S.	1.60

Table 4. Summary of Preliminary Delineated Waters of the U.S. Ward Dam	
Wetlands	Total Acreage
Riparian Wetland	0.78
Total Wetlands	0.78
Other Waters	Total Acreage
Ditch	0.07
Perennial Stream	0.90
Total Other Waters	0.97
TOTAL WATERS OF THE U. S.	1.75

Table 5. Summary of Preliminary Delineated Waters of the U.S. Upper Dam	
Wetlands	Total Acreage
Vernal Pool	0.15
Disturbed Vernal Pool	0.10
Vernal Swale	0.35
Disturbed Vernal Swale	0.05
Ephemeral Stream	0.09
Disturbed Ephemeral Stream	0.02
Wet Meadow	0.03
Riparian Wetland	0.53
Total Wetlands	1.32
Other Waters	Total Acreage
Ditch	0.61
Perennial Stream	1.57
Total Other Waters	2.18
TOTAL WATERS OF THE U. S.	3.50

Wetlands

Riparian Wetland

The riparian wetland features are present at all three project sites, in various locations associated with Mill Creek (TES 2015). The vegetation in the riparian wetland features of the Exposed Siphon are dominated by white alder and narrow-leaved willow. Other woody species include Fremont cottonwood, valley oak, mulefat, California grape, arroyo willow and Himalayan blackberry. Herbaceous species include deergrass, horsetail (*Equisetum sp.*) and mugwort.

The vegetation in the riparian wetland features of the Ward Dam is dominated by white alder and Oregon ash. Other woody species include Fremont cottonwood, valley oak, western sycamore, California grape and arroyo willow. Herbaceous species include deer grass, horsetail and mugwort along with other native and non-native grasses and forbs.

The vegetation in the riparian wetland features of the Upper Dam is dominated by white alder and arroyo willow. The herbaceous layer includes mostly non-native grasses and forbs.

Vernal Pool, Disturbed Vernal Pool, Vernal Swale, Disturbed Vernal Swale and Wet Meadow

The vernal pool, disturbed vernal pool, vernal swale, disturbed vernal swale and wet meadow features are present along the haul road to the Upper Dam project site, in various locations (TES 2015). The disturbed features include the existing roads that meet the definition of a wetland or are essentially devoid of vegetation.

Other Waters of the U.S.

Perennial Stream

A perennial stream is present within the channel of Mill Creek at all three project sites (TES 2015). A continuous corridor of riverine habitat occurs associated with Mill Creek. Fresh emergent habitat, where present, occurs in thin discontinuous bands along the creek channel margin and along the exposed barren rock and gravel along banks of the stream. Islands in the channel support scattered woody and herbaceous species such as willows and torrent sedge.

Ephemeral Stream and Disturbed Ephemeral Stream

The ephemeral stream and disturbed ephemeral stream features are present along the haul road to the Upper Dam project site, in various locations (TES 2015).

Ditch

The ditch system represents potentially jurisdictional waters of the U.S. due to the fact that it carries water from and / or to a jurisdictional feature (perennial stream). The ditches are regularly maintained but do support emergent vegetation, and rarely, scattered woody vegetation in some areas.

3.4.3.2 Environmental Consequences / Impacts and Mitigation Measures

Methodology

A delineation of waters of the U.S. was conducted for the project sites on various days during the months of May, June and July, 2014, by TES staff including Mr. Jeff Souza, Senior Biologist, Mr. Ben Myhre, Associate Biologist, and Mr. John Dittes, Senior Botanist of Dittes and Guardino Consulting (TES 2015). This document is available on the Red Bluff Fish and Wildlife Office website on the AFRP webpage (<http://www.fws.gov/redbluff/afrp.html>). The delineation was conducted in accordance with the *1987 Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (USACE 2008) using a Routine Determination Method. Based on the results of the delineation, maps of all identified wetlands and other waters were prepared. The maps are considered preliminary until verified by the USACE.

No Action Alternative

Under this alternative, there would be no impacts to wetlands or other waters. The Exposed Siphon, Ward Dam and Upper Dam project structures would remain in place and the fish ladders, diversion canals and other components of the fish passage and irrigation systems would remain in their existing state.

Proposed Action Alternative

Under this alternative, as a result of the modifications to the Exposed Siphon, Ward Dam and Upper Dam structures, some of the wetland and other waters of the U.S. features would be impacted as represented below in Table 6.

Table 6. Summary of Impacts to Preliminary Delineated Waters of the U.S.

Mill Creek Fish Passage Restoration Project

Site	Impacts (acres)	Wetlands						Other Waters				Totals
		Riparian Wetland	Vernal Pool	Disturbed Vernal Pool	Vernal Swale	Disturbed Vernal Swale	Wet Meadow	Ephemeral Stream	Disturbed Ephemeral Stream	Perennial Stream	Ditch	
Exposed Siphon	Type											
	Temporary	0.10								0.11		0.11
	Permanent	0.19								0.36		0.55
	Total	0.29								0.47		0.86
Ward Dam	Temporary	0.04								0.05	0.002	0.092
	Permanent	0.03								0.11	0.03	0.17
	Total	0.07								0.16	0.03	0.26
Upper Dam	Temporary	0.04		0.10		0.05			0.02	0.22	0.09	0.51
	Permanent	0.03								0.03	0.41	0.47
	Total	0.07		0.10		0.05			0.02	0.25	0.50	0.52
Project Totals		0.43	0.00	0.10	0.00	0.05	0.00	0.00	0.02	0.88	0.53	1.64

The following measures would be implemented to avoid and minimize impacts to wetlands and other jurisdictional waters of the U.S. and to mitigate potentially significant impacts to wetlands and other jurisdictional waters of the U.S. to less than significant levels:

WETLAND-1: Project activities will avoid impacts to wetlands and other aquatic habitats to the extent possible.

WETLAND-2: High-visibility fencing will be installed in areas where equipment will be working near any wetlands or other aquatic habitats that are not to be disturbed

WETLAND-3: Construction crews will be informed about the importance of avoiding sensitive areas, including wetlands.

WETLAND-4: A Clean Water Act Section 404 Permit will be obtained from the U.S. Army Corps of Engineers and a Clean Water Act Section 401 Certification will be obtained from the Regional Water Quality Control Board (Central Valley Water Board) for each of the three project sites.

WETLAND-5: A California Fish and Game Code Section 1600 Lake and Streambed Alteration Agreement will be obtained from CDFW for the Exposed Siphon site, if deemed applicable. It is anticipated that a 1600 Agreement will not be required for the Ward Dam or the Upper Dam sites.

3.4.4 Fisheries

3.4.4.1 Affected Environment

Mill Creek is an especially important watershed, as it is one of the few remaining spawning habitats for the Central Valley spring-run Chinook (herein referred to as spring-run salmon or spring-run), which are federally and state listed as Threatened. Mill Creek may be the cornerstone in protecting and restoring this run (USFWS 2000). Because of its steep topography and relative inaccessibility, most of the Mill Creek watershed in the higher elevations has remained fairly pristine, however protection and enhancement of Mill Creek's existing habitat, along with other fisheries conservation measures in the Sacramento River Basin and the Delta, would provide a better opportunity for species recovery (USFWS 2000).

The project would contribute toward the implementation goals of several existing Central Valley fish and wildlife restoration plans to create a healthier, more natural functioning ecosystem; enhance and restore aquatic and riparian habitats; protect threatened and endangered species; and augment cumulative efforts to at least double populations of anadromous fish in Central Valley streams. The proposed project is consistent with recommendations for Mill Creek in the *AFRP Final Restoration Plan* (USFWS 2001). The proposed project is also consistent with Senate Bill 1086, passed into law in 1986, to help reverse trends of declining salmon runs and loss of riparian habitat in the upper Sacramento River system. This required development of a plan to establish priority actions for the upper Sacramento River and its tributaries between the Feather River and Keswick Dam. The project is also consistent with a number of other pertinent fisheries planning documents including the goals stated in *Restoring Central Valley Stream: A Plan for Action* (Reynolds et al. 1993), goals stated in the *Report to the Fish and Game Commission: A Status Review of the Spring-run Chinook Salmon (*Oncorhynchus tshawytscha*) in the Sacramento River Drainage* (CDFG 1998), measures to protect habitat for anadromous and resident fisheries along Mill Creek as stated in the *Lassen Resource Management Plan* (USDA-Forest Service 1992) and the goals and mission of the *CALFED Bay-Delta Program's Ecosystem Restoration Program Plan* (ERPP). The foundation of this program is restoration of ecological processes that are associated with stream flow, stream channels watersheds, and floodplains.

The proposed project is located at three separate sites within and along the valley reach of Mill Creek, at approximately River Miles 1.9 (Exposed Siphon), 2.6 (Ward Dam), and 5.0 (Upper Dam), upstream of the confluence with the Sacramento River. Water flows and temperatures vary significantly based on the amount and timing of fall, winter and spring rainfall, as well as irrigation / diversion timing.

Fisheries in Mill Creek include resident and anadromous species. Anadromous fish in Mill Creek include spring-run, fall-run, and occasionally late fall-run Chinook salmon and Central Valley steelhead (USFWS 2000). Some of the resident fish in Mill Creek include riffle sculpin (*Cottus gulosus*), rainbow trout, brown trout (*Salmo trutta*), Sacramento sucker (*Catostomus occidentalis*), Sacramento pike minnow (*Ptychocheilus grandis*), hardhead minnow (*Mylopharodon conocephalus*), and California roach (*Hesperoleucus symmetricus*). Sacramento sucker, Sacramento pike minnow, and California roach are present only in the lower reaches of the creek (USFWS 2000).

Mill Creek supports runs of Central Valley spring-run Chinook salmon, listed as Threatened under both the federal Endangered Species Act (ESA) and the California Endangered Species Acts (CESA). Mill Creek also supports resident rainbow trout and the anadromous form of steelhead belonging to the Central Valley Distinct Population Segment (DPS) which is listed as Threatened under the federal ESA. Mill Creek also supports populations of fall- / late fall-run Chinook salmon designated a state Species of Special Concern by CDFW and winter-run Chinook salmon, state and federally designated as Endangered.

A substantial amount of fisheries data from Mill Creek have been collected since the early 1950's.

Table 7. below provides a summary of the reported annual Mill Creek fall-run and spring-run salmon and steelhead escapement (the portion of the population that reaches freshwater spawning grounds) into Mill Creek from 1953 to present. From 1953 to 1963, a fish trap operated at the Clough Dam (destroyed in a flood in 1997), provided annual escapement estimates for Central Valley fall-run and spring-run salmon and steelhead. Since 1963, no steelhead population estimates have been made, while fall and spring-run salmon population estimates have been conducted in most years using a variety of methodologies including carcass surveys, snorkel counts and redd (nest made in gravel, consisting of a depression dug by a fish for egg deposition) counts.

Table 7. Central Valley Chinook Salmon and Steelhead Escapement Numbers

Fall-run and Spring-run Chinook salmon and steelhead escapement summary into Mill Creek from 1952 to 2014 (Source: Azat 2014 and M. Johnson pers. comm.)

Year	Fall-Run Chinook	Spring-Run Chinook	Steelhead	Year	Fall-Run Chinook	Spring-Run Chinook	Steelhead
1952	16000	n/a	n/a	1984	5800	191	n/a
1953	10000	n/a	n/a	1985	3840	121	n/a
1954	7000	1789	715	1986	574	291	n/a
1955	3000	2967	1492	1987	282	90	n/a
1956	896	2233	1213	1988	1487	572	n/a
1957	5316	1203	1443	1989	1565	563	n/a
1958	4340	2212	1301	1990	n/a	844	n/a
1959	837	1580	790	1991	n/a	319	n/a
1960	940	2368	417	1992	999	237	n/a
1961	1689	1245	742	1993	1975	61	n/a
1962	4384	1692	1222	1994	1081	723	n/a
1963	1285	1315	2268	1995	n/a	320	n/a
1964	450	1539	n/a	1996	n/a	253	n/a
1965	150	n/a	n/a	1997	478	202	n/a
1966	500	n/a	n/a	1998	546	424	n/a
1967	500	n/a	n/a	1999	n/a	260	n/a
1968	750	n/a	n/a	2000	n/a	244	n/a
1969	1700	n/a	n/a	2001	n/a	1100	n/a
1970	690	1500	n/a	2002	2611	1594	n/a
1971	980	1000	n/a	2003	2426	1426	n/a
1972	631	500	n/a	2004	1192	998	n/a
1973	420	1700	n/a	2005	2426	1150	n/a
1974	944	1500	n/a	2006	1403	1002	n/a
1975	1208	3500	n/a	2007	851	920	n/a
1976	245	n/a	n/a	2008	218	381	125
1977	318	460	n/a	2009	102	220	n/a
1978	300	925	n/a	2010	144	482	n/a
1979	810	n/a	n/a	2011	1231	366	202
1980	320	500	n/a	2012	890	768	43
1981	1020	n/a	n/a	2013	2197	644	99
1982	1290	700	n/a	2014	2488	679	329
1983	200	n/a	n/a				

Additionally, the CDFG Upper Sacramento River Salmon and Steelhead Assessment project monitored juvenile salmonids in Mill Creek using rotary screw traps from 1994 through 2010. Data collected over the period 1996 through 2010 (summarized below in Table 8) on Mill Creek presents a comprehensive record of juvenile spring-run salmon and steelhead life history information, including overall trends in juvenile abundance and the out-migration timing of those juveniles (CDFW 2013). Young-of-the-year (YOY) fish (those less than one year in age) were also included in the counts. The Mill Creek rotary screw trap was located immediately below Upper Dam at river kilometer 8.6 (River Mile 5.3) at an elevation of 119 meters (390 feet). A summary table of Mill Creek rotary screw trap catches, organized by month and year, are presented in Table 8.

Table 8. Mill Creek Rotary Screw Trap Catch Summary for Years 1996 – 2010.

Juvenile Salmonid Monitoring Using Rotary Screw Traps in Deer Creek and Mill Creek, Tehama County, California Summary Report: 1994 – 2010 (Source: CDFW 2013)

Month	Days Fished Total	Yearling Chinook Total	YOY Chinook Total	O. mykiss Total
October	208	946	0	149
November	382	1,533	2	417
December	316	927	240	127
January	281	268	6,837	59
February	219	127	15,161	122
March	233	171	22,460	302
April	256	156	5,797	796
May	274	32	8,328	632
June	170	4	540	225
Totals:	2339	4164	59365	2829

In 2013, CDFG in collaboration with local landowners operated a fish counting video station on Mill Creek to count steelhead trout, Chinook salmon and Sacramento sucker (Killam and Johnson 2014). The station was located on the Ward Dam, a private irrigation diversion dam and operated October 19, 2012 through June 17, 2013 and October 15, 2013 through June 30, 2014. Results from monitoring after December 15, 2013 will be presented in the 2014 annual report, not yet published. A summary of passage by date for daily passage of steelhead and spring-run salmon and daily water temperature and flow at the 2007 Mill Creek video station is presented below in Table 9.

Table 9. Mill Creek 2013 Video Fish Weir Data Summary

Daily information on salmonid passage, average flow and water temperature during the 2013 Mill Creek fall-run video station period. (Source: Killam et al. 2014)

2013 Mill Creek Video Station Fall Salmonid Passage									
Date	Salmon	Steelhead	Flow	Water °F	Date	Salmon	Steelhead	Flow	Water °F
15-Oct	20	0	31	59	20-Nov	12	1	135	51
16-Oct	299	5	66	56	21-Nov	13	7	157	49
17-Oct	226	3	65	55	22-Nov	-2	0	101	46
18-Oct	149	5	64	56	23-Nov	1	1	88	44
19-Oct	155	6	63	56	24-Nov	0	0	83	44
20-Oct	216	4	63	56	25-Nov	0	0	82	43
21-Oct	102	8	62	56	26-Nov	0	0	81	43
22-Oct	107	9	62	56	27-Nov	-2	0	84	44
23-Oct	119	3	58	56	28-Nov	2	1	87	46
24-Oct	69	2	50	55	29-Nov	1	0	86	46
25-Oct	37	3	50	55	30-Nov	0	1	85	47
26-Oct	35	4	50	54	1-Dec	-2	0	86	46
27-Oct	45	3	50	54	2-Dec	2	0	87	47
28-Oct	64	2	54	53	3-Dec	1	1	90	47
29-Oct	44	1	58	54	4-Dec	0	1	89	42
30-Oct	57	1	61	52	5-Dec	0	0	87	38
31-Oct	18	3	55	51	6-Dec	-2	0	87	37
1-Nov	28	3	54	52	7-Dec	-1	0	92	38
2-Nov	55	9	53	52	8-Dec	0	0	90	36
3-Nov	22	0	53	50	9-Dec	-1	0	85	35
4-Nov	25	1	52	49	10-Dec	0	0	91	35
5-Nov	13	0	52	49	11-Dec	0	0	97	36
6-Nov	22	1	52	50	12-Dec	0	0	96	37
7-Nov	41	5	53	52	13-Dec	-4	0	94	39
8-Nov	19	0	57	52	14-Dec	0	0	93	39
9-Nov	3	2	60	52	15-Dec	0	0	93	40
10-Nov	12	-1	61	51	TOTALS	2,003 video	99	MCH AVG	MCH AVG
11-Nov	5	1	61	51	Final fall-run Chinook estimate is: 2,197				
12-Nov	-3	0	60	52	Final number includes video count of 2,003 plus a downstream of the video counting station redd expansion of 194 fish.				
13-Nov	-2	2	61	52					
14-Nov	3	0	60	52					
15-Nov	-14	1	60	51					
16-Nov	-4	-1	60	50					
17-Nov	0	-2	61	48	90% Salmon lower confidence interval 2,033				
18-Nov	-2	1	61	47	90% Salmon upper confidence interval 2,468				
19-Nov	-4	2	79	49					

A BRE (TES 2015a) was conducted to identify and address potential impacts of the proposed project on special-status fish species. This document is available on the Red Bluff Fish and Wildlife Office website on the AFRP webpage (<http://www.fws.gov/redbluff/afrp.html>). An evaluation of the potential presence of special-status species is included in Appendix G. Based on the results of the evaluation in Appendix G, the BRE further evaluated the potential impacts of the proposed project on those species with the potential to occur within, or near the proposed project site. Based on that further evaluation, the following special-status fish species, designated CH and Essential Fish Habitat (EFH) are known to, likely to, or have the potential to occur within the project area, and could potentially be impacted by the proposed project:

- River Lamprey (*Lampetra ayresii*)
- Hardhead (*Mylopharadon conocephalus*)
- Central Valley Steelhead (*Oncorhynchus mykiss*)
- Central Valley Fall- / Late Fall-run Chinook Salmon (*Oncorhynchus tshawytscha*)
- Central Valley Spring-run Chinook Salmon (*Oncorhynchus tshawytscha*)
- Sacramento River Winter-run Chinook Salmon (*Oncorhynchus tshawytscha*)
- Central Valley Steelhead Critical Habitat
- Central Valley Spring-run Chinook Salmon Critical Habitat
- Pacific Salmon Essential Fish Habitat

Three of these species are federally listed (of which two are also state listed) and three species are state designated as Species of Special Concern. The spring-run Chinook salmon are state and federally listed as Threatened. Steelhead are federally listed as Threatened and winter-run Chinook salmon is state and federally listed as Endangered. River lamprey, hardhead and Central Valley fall- / late fall-run Chinook salmon are state designated as Species of Special Concern by CDFW and a species of concern by NMFS. Under Section 7 of the ESA, federal agencies are required to consult with NMFS regarding impacts from a proposed action to listed species or species proposed for listing and their CH and EFH. A BA (TES 2015b) has been prepared for the Ward Dam site and consultation with the USFWS has been initiated. A BA will be prepared for the other two sites, and consultation with USFWS will occur prior to their implementation.

River Lamprey

The river lamprey is designated as a CDFW Species of Special Concern. It is reported that the populations are likely decreasing due to the decline of suitable spawning and rearing habitat in the lower reaches of larger rivers (Moyle 2002). This species has become uncommon in California, recorded only in the lower Sacramento, San Joaquin and Russian Rivers. The biology of river lampreys has not been well studied in California so information is based on studies in British Columbia where the timing of events in the life history may not be the same as in California. In the three-to-five year ammocoete (juvenile) stage, river lamprey require sandy backwaters or stream edges in which to bury themselves, where water quality is continuously high and temperatures do not exceed 25° Celsius. In the final stages of metamorphosis, river lamprey out-migrate through freshwater, congregate immediately upstream from salt water and enter the ocean in late spring (Moyle 2002). Adults spend three to four months in saltwater, where they grow rapidly and then migrate back into freshwater in the fall to spawn in tributaries from February to May. Adults dig saucer-shaped depressions in gravelly riffles and die after spawning. In the ammocoete stage, river lampreys feed on algae and microorganisms and in the adult stage prey on a variety of fishes.

River lamprey is not well studied in Mill Creek, and current survey methods are insufficient for determining their presence. This species may be present within the project area in the ammocoete stage and may spawn within the project area. They were not observed during TES site surveys; however, intensive fish surveys were not conducted.

Hardhead

The hardhead is a CDFW Species of Special Concern. This species inhabits undisturbed mid- to low-elevation streams that have clear, deep pools with sand, gravel and boulder substrates and low water velocities (Moyle et al. 1995). Threats to the species include loss of habitat from changes in stream flows and temperature regimes, elimination of habitat due to dams, and predation by non-native fish species (Moyle et al. 1995). In the Sacramento River system, they are widely distributed in most of the larger tributaries as well as the river. Hardhead are known to occur in Mill Creek from the confluence of Mill Creek and the Sacramento River, to above the Upper Dam site (M. Johnson pers. comm.). No hardhead were observed during TES 2014 field surveys, however this species is likely to occur within the project area.

Central Valley Steelhead

The Central Valley steelhead DPS was listed as Threatened by NMFS on May 18, 1998 and February 6, 2006. CH was designated by NMFS on September 2, 2005. EFH has not been designated by NMFS. Population declines are attributed to blockage from upstream habitats, entrainment from unscreened diversions, hatchery practices, and degraded habitat conditions due to water development and land use practices. Steelhead are generally distributed from southern California to the Aleutian Islands. In the Central Valley, naturally producing populations only occur in the Sacramento River and its tributaries. Steelhead stocks in the Central Valley are considered winter-run steelhead (McEwan and Jackson 1996). Steelhead adult migration occurs from October through February. Spawning occurs from December through April in streams with cool, year-round, well-oxygenated water. Incubation generally occurs from December through April. Emigration occurs in the spring and early summer as one-year-old fish.

A substantial amount of fisheries data from Mill Creek have been collected since the early 1950's. Steelhead begin migration into Mill Creek during the late-fall and winter, when flows are high enough to promote passage. This was observed as early as September and as late as June in a study reviewing data from 1953 - 1964 (Van Woert 1964). During those ten years, two distinct migration peaks of steelhead appear to occur, the first from late October to mid-November (30 percent of the run), followed by a smaller peak in the first two weeks of February (accounting for 11 percent of the run). More recent observations indicate that adult steelhead ascend Mill Creek from October through April with peak migration periods characterized by fall entry (October through early December) and winter entry (late December through February) (CDFW 2013). A smaller, less organized migration occurs in the spring, with fish migrating from April into early May during high water years (CDFW 2013).

The historic and current distribution of steelhead spawning in Mill Creek is thought to coincide with the range of spring-run salmon which have been observed holding and spawning from Little Mill Creek (approximately 9.5 miles upstream of Upper Dam) to approximately 0.5 miles downstream of the LVNP boundary (USFS 1999). Rotary screw trap data collected between 1996 and 2010 by CDFW provides a definitive record of out-migration timing for steelhead for Mill Creek (CDFW 2013). Based on the rotary screw trap data, the out-migration of juvenile steelhead begins in October and extends into June on Mill Creek, with a peak out-migration in April and May, and a lesser secondary peak in November.

Central Valley Fall- / Late Fall-Run Chinook Salmon

The Central Valley fall-run and late fall-run Chinook salmon are designated as a NMFS Species of Concern and as a CDFW Species of Special Concern. EFH was designated by NMFS on June 28, 2005. Population declines are attributed primarily to overfishing, unscreened diversions, and stream spawning and rearing habitat degradation. Fall-run salmon adult migration occurs in the Sacramento River from July through December. The peak of spawning occurs in October and November, incubation occurs from October

through March, and rearing and emigration occurs from January through June. A majority of juvenile fish out-migrate within the first few months after emergence, but a small number remain in freshwater and out-migrate the following year. Late fall-run salmon overlap the fall-run spawning migration and enter the Sacramento River from mid-October through mid-April. Spawning occurs in the Sacramento River and tributaries from January through mid-April, incubation occurs from January through June, and rearing and emigration occurs from April through mid-December.

Fall- / late fall-run salmon are known to occur in Mill Creek from the confluence with the Sacramento River to above the Upper Dam site (M. Johnson pers. comm.). Fall-run salmon were observed during TES site surveys.

Central Valley Spring-run Chinook Salmon

The Central Valley spring-run Chinook salmon was listed as Threatened by the State of California on February 5, 1999. NMFS listed the Central Valley spring-run Chinook salmon Evolutionary Significant Unit (ESU) as Threatened on September 16, 1999. CH was designated by NMFS on January 2, 2005. EFH was designated for Pacific salmon, which includes this ESU, by NMFS on June 28, 2005. Population declines are attributed primarily to altered stream flows and blocked access to upper elevation headwaters due to dams. Spring-run salmon are thought, by some, to once have been the most abundant run of salmon in the Central Valley. This race once migrated into the headwaters of tributaries to the Sacramento and San Joaquin Rivers. They now only exist in the mainstem and a few tributaries to the Sacramento River. Spring-run salmon adult migration occurs in the Sacramento River from late March to September. The fish over-summer in coldwater habitats and then spawn from August to October with peak spawning occurring in September. Incubation occurs from mid-August to mid-March with rearing and emigration occurring from mid-August through April.

Spring-run salmon utilize Mill Creek for holding, spawning and rearing. Counts of spring-run salmon monitored by CDFW between 1953 and 1964 at the Clough Dam (previously located approximately 1.5 miles upstream of the Ward Dam) provide information on migration timing for Mill Creek. Spring-run salmon were documented migrating upstream on Mill Creek from February through September, with 94 percent of the population migrating between mid-April and the end of June (Armentrout et al. 1998). The months of May and June represented 85 percent of the migrating adults counted and the peak migration (33 percent of the total number of adults counted) occurred from around the last week in May into the first week of June. More recent data suggest that adult spring-run salmon have a peak migration occurring in April and May (CDFW 2013).

Upon reaching their chosen tributary, spring-run quickly pass through the valley floor reach of the creeks or rivers, to gain access to headwater reaches where water temperatures are cool enough to allow the adult fish to over-summer until spawning commences in late August through October (CDFW 2013). The known range of the habitat that spring-run use to hold and spawn in, extends from near the Little Mill Creek confluence (River Mile 15), upstream to within 0.5 miles of the LVNP boundary, a distance of approximately 48 miles (Armentrout et al. 1998) and from 366 to 1585 meters (1,200 to 5,200 feet) in elevation (CDFW 2013).

The Mill Creek rotary screw trap data set shows that “yearling” spring-run salmon juveniles (individuals that have spent at least one summer in freshwater, typically in the upper watershed, before exiting the tributary in fall through spring of the following year) out-migrate in greatest numbers from October through December and continue at lesser rates through the winter and spring (CDFW 2013). The variation in elevation has significant effect on egg incubation timing in the watershed. As a result, depending upon the elevation at which an adult female spawned, spring-run salmon fry from a given brood year may emerge over a six-month period, from November through the following May.

Sacramento River Winter-Run Chinook Salmon

The Sacramento River winter-run Chinook salmon was listed as Endangered by the State of California on September 22, 1989. NMFS listed the Sacramento River winter-run Chinook salmon ESU as Endangered on February 3, 1994. CH was designated by NMFS on March 23, 1999. EFH was designated for Pacific salmon, which includes this ESU, by NMFS on June 28, 2005. Population declines are attributed primarily to blocked access of historic spawning habitat from the construction of Shasta Dam. Winter-run salmon adult migration occurs in the Sacramento River from late November through early August. Spawning occurs from late April through mid-August peaking in May and June. Fry emergence occurs from mid-June through mid-October. Emigration past Red Bluff generally peaks in September but is highly dependent on stream flow conditions.

At the closest boundary, the project area is located approximately two miles upstream of Mill Creek's confluence with the main stem of the Sacramento River, the CH designation boundary for this species. Sacramento River winter-run salmon adults are not known to occur in Mill Creek; however, juveniles are known to use Mill Creek as non-natal rearing habitat from the confluence to the Sherwood Avenue bridge which is approximately 0.5 miles downstream from the Exposed Siphon site. Non-natal rearing could potentially occur as far upstream as Ward Dam (M. Johnson, pers. comm.).

Central Valley Steelhead Critical Habitat

The stream reach in which the project is located is within the designated CH for Central Valley steelhead. CH for steelhead is defined as specific areas that contain Primary Constituent Elements (PCE) and physical habitat elements essential to the conservation of the species. The inland habitat types present within the project area that are used as PCEs for steelhead include spawning habitat, freshwater habitat and freshwater migration corridors.

Central Valley Spring-run Chinook Salmon Critical Habitat

The stream reach in which the project is located is within the designated CH for Central Valley spring-run Chinook salmon. CH for steelhead is defined as specific areas that contain PCE and physical habitat elements essential to the conservation of the species. The inland habitat types present within the project area that are used as PCEs for steelhead include spawning habitat, freshwater habitat and freshwater migration corridors.

Essential Fish Habitat

The proposed project is within the EFH of "Pacific Salmon". EFH occurs within the project area for winter-run salmon, spring-run salmon and fall- and late fall-run salmon. EFH has not been designated for steelhead.

3.4.4.2 Environmental Consequences / Impacts and Mitigation Measures

Methodology

The assessment of potential impacts of the proposed project on fisheries is based on a review of databases and pertinent literature, consultation with resource agency staff, and field studies documented in a BRE (TES 2015a) prepared for the proposed project and a BA (TES 2015b) prepared for the Ward Dam site. Prior to the initiation of field studies, a records search of the CNDDDB (CDFW 2014) was conducted to determine if any special-status fish, or rare natural communities had previously been documented within the project sites, or in the vicinity of the project sites. The query was conducted using the USGS Los Molinos 7.5-minute quadrangle, in which the project is located, as well as the eight adjoining quadrangles

(Dewitt Peak, Tuscan Springs, Red Bluff East, Gerber, Corning, Acorn Hollow, Vina and Richardson Springs NW). In addition, a species list was generated using the USFWS Sacramento Fish and Wildlife Office website (USFWS 2015) for the Los Molinos quadrangle.

Based on the results of the CNDDDB and USFWS database searches, and TES's staff knowledge of the site and local area, a list of potentially occurring special-status fish species and aquatic natural communities was developed for the proposed project, as well as an evaluation of their potential presence (Appendix G). For the purposes of this evaluation, special-status species were defined as:

1. Those species listed by the USFWS or NMFS as Endangered, Threatened, Proposed as Endangered or Threatened, Candidate to become Proposed, or Species of Concern.
2. Those species listed by the CDFW as Endangered, Threatened, Candidate for listing as Endangered or Threatened, Species of Special Concern, or Fully Protected.

A biological survey was conducted on May 21 and June 30, 2014 by Mr. Jeff Souza, TES Senior Biologist and Mr. Ben Myhre, TES Associate Biologist. Additional observations were made during work conducted at the project site for other purposes in April, July, September, October and December of 2014. The project area included all aquatic sites within the project boundaries. The surveys were conducted by walking the entire project site and recording fisheries observations. No snorkel surveys, or other intensive fisheries surveys were conducted. A list of all fish species observed during the 2014 TES field surveys is included in Appendix F.

The list of species evaluated in this document were derived as a result of further evaluations in the BRE of potential impacts to the list of special-status fish species in Appendix G.

No Action Alternative

River Lamprey

Under this alternative, all existing project components would remain unchanged, which would continue to potentially impact the ability for river lamprey to migrate upstream and out-migrate downstream of the sites. Under this alternative, potential injury or mortality would not occur to river lamprey as a result of the construction activities.

Hardhead

Under this alternative, all existing project components would remain unchanged, which would continue to impact the ability for hardhead to migrate upstream and out-migrate downstream of the sites. Under this alternative, potential injury or mortality would not occur to hardhead as a result of the construction activities. Beneficial effects to hardhead as a result of improved passage would also not occur.

Central Valley Steelhead

Under this alternative, all existing project components would remain unchanged, which would continue to impact the ability for steelhead to migrate upstream and out-migrate downstream of the sites. Beneficial impacts from improved passage for steelhead to access upstream areas that have favorable temperatures for holding, which could improve the populations in Mill Creek, would not occur. Improved juvenile emigration for steelhead as a result of improved fish screens and bypass systems would not occur.

Central Valley Fall- / Late Fall-Run Chinook Salmon

Under this alternative, all existing project components would remain unchanged, which would continue to potentially impact the ability for fall- / late fall-run salmon to migrate upstream and out-migrate downstream of the sites. Beneficial impacts from the increased potential for fall- / late fall-run salmon to access upstream areas that have favorable temperatures for holding, which could improve the populations in Mill Creek, would not occur. Improved juvenile emigration for fall- / late fall-run salmon as a result of improved fish screens and bypass systems would not occur.

Central Valley Spring-run Chinook Salmon

Under this alternative, all existing project components would remain unchanged, which would continue to impact the ability for spring-run salmon to migrate upstream and out-migrate downstream of the sites. Beneficial impacts from improved passage for spring-run salmon to access upstream areas that have favorable temperatures for holding, which could improve the populations in Mill Creek, would not occur. Improved juvenile emigration for spring-run salmon as a result of improved fish screens and bypass systems would not occur.

Sacramento River Winter-Run Chinook Salmon

Under this alternative, all existing project components would remain unchanged. This run is not known, or expected to use Mill Creek for spawning. Juveniles are known to use Mill Creek as non-natal rearing habitat from the confluence to the Sherwood Avenue bridge which is approximately 0.5 miles downstream from the Exposed Siphon site, and non-natal rearing could potentially occur as far upstream as Ward Dam (M. Johnson, pers. comm.).

Central Valley Steelhead Critical Habitat

Under this alternative, all existing project components would remain unchanged, therefore no modifications would occur to Central Valley steelhead CH. Beneficial effects to Central Valley steelhead CH as a result of improved passage would not occur.

Central Valley Spring-run Chinook Salmon Critical Habitat

Under this alternative, all existing project components would remain unchanged, therefore no modifications would occur to Central Valley spring-run Chinook salmon CH. Beneficial effects to Central Valley spring-run Chinook salmon, as a result of improved passage would not occur.

Essential Fish Habitat

Under this alternative, all existing project components would remain unchanged, therefore no modifications would occur to EFH. Beneficial effects to EFH as result of improved passage would not occur.

Proposed Action Alternative

River Lamprey

Under this alternative, river lamprey could be harmed or killed by construction activities if they were present within the project area. This is considered a potentially significant impact.

Hardhead

Under this alternative, hardhead could be harmed or killed by construction activities if they were present within the project area. This is considered a potentially significant impact. Beneficial impacts of this alternative are expected to be similar to the beneficial impacts described below for steelhead.

Central Valley Steelhead

The project sites are located in currently designated CH for steelhead. They are not known to spawn near the project sites; however, they are known to migrate and emigrate through the project areas. Juvenile steelhead have been observed near the Exposed Siphon, Ward Dam and Upper Dam in summer months and are present above Upper Dam year-round (M. Johnson pers. comm.). Rainbow trout / steelhead were observed during TES site surveys.

Baseline conditions expected at the project sites would entail full diversion of Mill Creek flows through the diversion canal during the initial phase of the mid-summer instream construction work. Full diversion baseline conditions would result in Mill Creek becoming almost completely dewatered, aside from seepage under the dams or the siphon. During normal years, these are the baseline conditions during this time of year. Mill Creek water temperatures downstream of the Ward Dam are expected to be at lethal levels for fish during this time. No migration would therefore be expected to be occurring during the baseline conditions of the initial construction period. It is possible that there may be direct impacts to juveniles emigrating from upstream of dam during construction.

No water diversions would be expected to be conveyed through the diversion canals, at the time proposed for the early fall instream construction portion of the projects (estimated to begin mid-October). The start of this construction would be scheduled to coincide with the end of the diversion season, to ensure that all Mill Creek flows are sent down the fish ladders and / or dams depending on flow conditions. This would provide dry diversion canal conditions. During the post-diversion construction phase, the majority of the construction work would be out of the stream, however small localized areas may be required to be dewatered. The majority of Mill Creek would remain unimpeded, allowing for fish to migrate upstream and emigrate downstream through the project sites unhindered.

Potential direct effects to adult or juvenile steelhead during post-diversion construction and above baseline conditions would include construction activities related to the final tasks for replacement of the siphon, reconstruction of the new fish ladders, retrofitting of the fish screens and components (canal and bypass pipes) and the installation of water diversion control infrastructure improvements and include effects due to:

- delays in migration, emigration or avoidance of habitat due to project activities,
- construction activities, and
- fish rescue operations.

During post-diversion construction (approximately mid-October), adults may be migrating through the project areas but would not be expected to be spawning in these areas. Emigrating juveniles are also expected to potentially be in project areas. Fish that may potentially be migrating or emigrating through the project reaches in above baseline conditions, could be impacted by delays caused by noise and visual disturbances, during the approximately one-month instream construction portion of the two-month total construction period. Any potential delays would be short-term due to the fact that construction would only occur for eight to ten hours per day, which would allow fish to migrate and emigrate during daily non-construction periods. Juvenile fish that may be emigrating through the project areas, given the time of year, would be larger and more apt and able to avoid the areas, given their mobility.

During rewatering, a plume of turbidity would be anticipated immediately following construction activities as the channel immediately begins to adjust to the new conditions. This turbidity and small amount of suspended sediment would likely persist in the water column for several hours until channel conditions stabilize; however, rewatering activities would occur slowly, in order to prevent and minimize turbid conditions in Mill Creek. Turbidity and settleable matter are not expected to exceed the likely conditions in the Clean Water Act Section 401 Certification issued by the Central Valley Water Board. If juvenile steelhead are present in the immediate areas of construction, it is believed that the number of fish affected would be few and most would volitionally leave the areas until activities cease or turbidity diminishes. Juvenile fish should be able to escape to available refugia near the areas, a non-lethal behavioral response. Because the work at all three sites would occur downstream of the known spawning areas, no steelhead redds are expected to be affected.

A fish exclusion zone upstream and downstream of the construction areas, as needed, would be implemented prior to the onset of any instream construction activities. The actions necessary to remove fish out of the construction area are expected to result in some form of fish capture and handling. A permitted crew would be responsible for the seining, dip-netting, and / or electroshocking. Actions would be taken first to encourage fish to volitionally move out of the area prior to implementing other methods. If electrofishing is required, NMFS electrofishing guidelines (NMFS 2000) would be used. Any capture and handling associated with electrofishing is likely to result in direct effects to juvenile steelhead rearing in the fish exclusion zones. It is expected that capture, handling and release of the juvenile steelhead would disrupt normal behavior and cause temporary stress, injury, and occasional mortality. It is anticipated that fish capture / relocation would not last more than one to two days at each site; however, additional capture / relocation would occur over several additional days if additional fish are observed within the exclusion zone as a result of daily monitoring. The fish exclusion zones would be maintained until the construction is completed and instream turbidity has dissipated.

In creating the fish exclusion zones, crews would herd any fish present out of the work areas, and block nets would be set to keep fish out of the work areas. To remove remaining juvenile fish, snorkeling, dip-netting, and electroshocking would be used. All captured fish would be held in buckets filled with stream water for a period only long enough to transport them to an appropriate release site upstream or downstream of the project sites. It is expected that, although NMFS electroshocking guidelines would be used, direct effects to individual fish would occur.

During the initial time period following construction and the initial winter, a small amount of sediment that would be disturbed by project construction activities would likely be redistributed by high flows. Because the anticipated amount of sediment is very small, and mobilization would occur slowly post-construction and during high flows of the initial winter (when background turbidity and sediment transport is relatively high), only minimal affects to adult or juvenile steelhead are anticipated.

As a result of the siphon replacement, relocation of the diversion intake structures and head gates, removal and replacement of the fish ladders, reconstruction of the diversion canals and relocation of the bypass pipes, some of the wetland riparian habitat that has become established along the stream banks would likely be temporarily disturbed. It is estimated that approximately 0.18 acres of riparian wetland identified in a preliminary wetland delineation (TES 2015) conducted for the project may be temporarily disturbed as a result of the construction related project activities. This would result in a temporary reduction of shaded aquatic habitat. To minimize this effect, riparian vegetation would be replanted as detailed in the RPMs outlined in Appendix H and the revegetation plan to be prepared for this project.

The purpose of the proposed project is to improve passage condition for native fish, including steelhead. However, potentially significant impacts could occur if steelhead were present within the project area and were harmed or killed by project construction activities. This is considered a significant impact.

Central Valley Fall- / Late Fall-Run Chinook Salmon

Under this alternative, the impacts to fall- / late fall-run salmon are expected to be similar to the impacts listed for steelhead. This is considered a significant impact.

Central Valley Spring-run Chinook Salmon

Under this alternative, the impacts to spring-run salmon are expected to be similar to the impacts listed for steelhead, with the exception that there would be less of an impact to spring-run salmon due to the fact that no adult spring-run salmon fish are expected to be present during the post-diversion portion of construction work. High water temperatures prevent summer rearing of juvenile spring-run salmon in the reach near Ward Dam (NHC 2015d). The area farthest downstream in Mill Creek, where spring-run salmon begin spawning (the Little Mill Creek confluence) is approximately 9.5 miles upstream of the project areas. This is considered a significant impact. The purpose of the proposed project is to improve passage condition for native fish, including spring-run salmon.

Sacramento River Winter-Run Chinook Salmon

Under this alternative, the impacts to winter-run salmon are expected to be similar to the impacts listed for Central Valley steelhead, with the exception that there would be less of an impact to winter-run salmon, due to the fact that no adult winter-run salmon are expected to be present during construction work. Sacramento River winter-run salmon are not known to spawn within the project area; however, juveniles are known to use Mill Creek as non-natal rearing habitat from the confluence to the Sherwood Avenue bridge which is approximately 0.5 miles downstream from the Exposed Siphon site. Non-natal rearing could potentially occur as far upstream as Ward Dam (M. Johnson, pers. comm.). This is considered a significant impact.

Central Valley Steelhead Critical Habitat

Under this alternative, while there would be some minor changes to the habitat that currently exists upstream and downstream of the three project sites as a result of the instream grading and scour protection, no net loss of CH would be expected as a result of project implementation. Turbidity generated by construction activities could have an effect on the CH elements that address water quality, however the impact to this element is considered very minimal because 1) the impact is considered very small in quantity; and 2) the project would make additional habitat accessible to fish. As a result of the siphon replacement, relocation of the diversion intake structures and head gates, removal and replacement of the fish ladders, reconstruction of the diversion canals and relocation of the bypass pipes, some of the wetland riparian habitat that has become established along the stream banks would likely be temporarily disturbed. This would result in a temporary reduction of shaded aquatic habitat. To minimize this effect, riparian vegetation would be replanted as detailed in the RPMs outlined in Appendix H and the revegetation plan to be prepared for this project. A BA would be prepared to address potential impacts to Central Valley steelhead CH and an ESA consultation would occur with NMFS.

Central Valley Spring-run Chinook Salmon Critical Habitat

Under this alternative, the impacts to Central Valley spring-run Chinook salmon CH are expected to be similar to the impacts listed for Central Valley steelhead CH.

Essential Fish Habitat

Under this alternative, no net loss of EFH is expected as a result of project implementation. The effects would be expected to be similar to the effects described under the Central Valley steelhead CH section above.

The following measures would be implemented to avoid and minimize impacts to fisheries and to mitigate potentially significant impacts to fisheries to less than significant levels:

FISH-1: Instream construction work shall be conducted between July 15 and October 14 to minimize impacts to anadromous fish by working when water temperatures are warmer and anadromous fish are less likely to be present. Work within the channel and banks, outside of this instream work window must be isolated from flowing water and fish passage will be accommodated through the project site after October 14.

FISH-2: All construction debris already on site and generated as a result of construction activity (concrete, metal, etc.) from the fish passage improvement-related construction activities will be removed from the active stream channel post-construction.

FISH-3: Prior to construction, exclusionary fish netting shall be installed upstream and downstream of the construction area. USFWS, in coordination and consultation with NMFS and CDFW, will ensure that qualified fish biologists are onsite to implement fish rescue operations through the use of herding, seining and / or electrofishing, if necessary. Best professional determination will be used to decide which method(s) of rescue and location of exclusionary netting is most appropriate. Biologists will first try to haze and herd fish out of the fish exclusion area. If fish biologists determine that the use of electrofishing is necessary for the efficient and successful removal of fish, the NMFS electrofishing guidelines (NMFS 2000) will be strictly followed. The fish rescue team will be comprised of fishery biologists with professional experience using seines and electrofishing equipment.

FISH-4: An Endangered Species Act Section 7 consultation and a Magnuson Stevens Act Essential Fish Habitat consultation will occur with NMFS for each of the three project sites for impacts to Central Valley steelhead, Central Valley spring-run salmon, winter-run salmon and /or fall- late fall-run salmon.

FISH-5: All dewatering and rewatering activities will be conducted slowly, in order to minimize disturbance to fish.

FISH-6: All pumps used during dewatering or other construction activities will be screened to meet CDFW and NMFS criteria.

FISH-7: Appropriate measures will be used to avoid the spread of Aquatic Invasive Species (AIS) such as Zebra / Quagga mussels, New Zealand mudsnails and Chytrid Fungus to and from the project area and could include such measures as physical removal from equipment, freezing equipment and saturation of equipment in a chemical solution(s).

With incorporation of the mitigation measures (Appendix H), no significant impacts to state or federally listed fish species (with the exception of Central Valley steelhead and Spring-run Chinook salmon), special-status animal species or rare natural communities are expected to occur as a result of the proposed project. An unavoidable “may affect, likely to adversely affect” determination is anticipated for Central Valley steelhead and Spring-run Chinook salmon, at all three sites. This will be addressed as part of the consultation with NMFS under Section 7 of the Endangered Species Act. With incorporation of the mitigation measures listed in Appendix H, and measures identified in the agency issued Biological

Opinion and / or concurrence letter, the project is not expected to jeopardize the continued existence of any listed species.

3.5 Cultural Resources

3.5.1 Affected Environment

Several cultural resources exist within the project area. These include two concrete stream diversion dams, the Upper Dam and Ward Dam respectively, and an exposed concrete siphon, referred to as the Exposed Siphon. The construction materials for these features include concrete, rebar, pipe and scrap iron. These three features were originally constructed in the 1910s and 1920s and still retain some original elements.

The Coneland Water Company, established in 1907 in the Los Molinos area, dramatically increased irrigation and agriculture in the Mill Creek bottomlands through a systematic water conveyance system which provided water through contract to the Los Molinos Land Company. Construction of the water conveyance system that included canals, diversion dams, flumes etc., began in 1907 and was completed six years later. Five diversion dams were initially built, four diverting water from Mill Creek (Upper Dam, Ward Dam, Clough Dam, and Subdivision 7 Dam) and one from Antelope Creek (Antelope Main Dam). After the 1938 flood, only two dams (Upper and Ward) remained on Mill Creek. Coneland Water Company created an extensive 130-mile system of main canals (18 miles) and smaller feeder ditches (112 miles). The Coneland Water Company was sold to the LMMWC in 1948 (Eaton 1941, Bauer 1992). A 1912 irrigation map of Northern California shows three main canals diverting water from the lower reaches of Mill Creek in a westerly direction, to the north and to the Los Molinos area. Water diversion systems for the Mill Creek watershed were developed primarily for the irrigation of valley lands for agriculture and settlement (Adams 1913).

Upper Dam

The Upper Dam structure consists of a streamwide concrete dam, fish ladder, sluice gate diversion inlet on the north bank and a 1,600-foot-long concrete diversion canal. The concrete dam is 55 feet wide and has a crest elevation of 380.5 feet. The bottom of the dam spillway is at an elevation of 375.9 feet and the dam face is 20 feet wide measured along the streamline. There is a scour hole at the toe of the dam with a maximum measured depth of approximately five feet below the toe of the dam. The existing fish ladder at the Upper Dam consists of three pools and four rectangular weirs. Each weir crest has a crest-to-crest vertical drop of one foot.

Historic documentation is lacking for the construction sequence of the Upper Dam. It is assumed that the Upper Dam was originally constructed in the 1910s to 1920s. Though numerous alterations and repairs are evident, a single piece of amethyst glass impressed into concrete of the diversion gate structure eludes to this original construction date.

As with nearly all diversion structures in this system, subsequent repairs and reconstruction to the dam were required when flooding washed out portions of the dam. This is almost certain for the historic floods in 1930 and once again in 1938. In addition to these flood repairs, improvements to Upper Dam have certainly included the reconstruction of the dam apron from a vertical to sloping face in the 1980s, and the construction and subsequent reconfiguration of a fish ladder (1980s and 1990s). Reconstruction is directly evidenced at the dam with the date of December 13, 1989 etched into modern concrete repairs along the diversion channel.

Another flood, in 1997, may have impacted the diversion structure as well. Additional concrete diversion extensions south of the diversion gate structure appear to represent recent attempts at reducing overtopping of the diversion. Different types of concrete present in different portions of the dam are consistent with a dam that has been repaired and patched numerous times. Elements of the original cement structure are present only near the diversion gate structure on the south end.

Ward Dam

The Ward Dam consists of a channel-wide concrete dam, fish ladder, sluice gate diversion inlet on the south bank, and a 140-foot-long concrete diversion channel. The concrete dam is 85 feet wide and has a crest elevation of 290.9 feet. The bottom of the dam spillway is at an elevation of 285.1 feet. The existing fish ladder consists of a modified pool-and-chute ladder with four pools and five weirs. The weir farthest upstream on the fish ladder has a crest elevation of 290.1 feet. The remaining weirs are trapezoidal, with a three-foot-wide rectangular notch along the fish ladder flow line.

Historic documentation is lacking for the construction sequence of the Ward Dam on Mill Creek; however, the original Ward Dam was presumably constructed by the 1920s after all water claims and interests were settled on Mill Creek in 1917 (Western Shasta Resource Conservation District [WSRCD] 2015). Repairs and reconstruction to the Ward Dam were more than likely required after flooding in 1930 and 1938. The Ward Dam is indirectly noted as destroyed in 1938, as it is not listed as one of the two dams still remaining after this flood event.

There are two subsequent fish passage improvements noted at the Ward Diversion (Armentrout et al. 1998, NHC 2011). At a minimum, these improvements have included the reconstruction of the dam apron from a vertical to sloping face in 1987 and the construction and subsequent reconfiguration of a fish ladder in the 1980s and 1990s. Over the years, repairs to the dam have included grouting the north abutment to repair erosion damage that occurred during floods. The repair effectively lengthened the dam crest by 50 feet. In 1997, CDFW reconstructed the downstream face of the dam and added a new low-head fish ladder on the south side of the dam.

As with the Upper Dam, different types of concrete present in different portions of the dam are consistent with numerous repairs and patches over time. Elements that may be original concrete construction are not apparent.

Exposed Siphon

As with the Upper Dam, historic documentation is lacking for the construction sequence of the concrete Exposed Siphon. It is assumed that the Exposed Siphon was constructed near the time of the Ward Dam (1920s). Repairs and reconstruction to the Exposed Siphon were more than likely required after flooding in 1930 and 1938. The Exposed Siphon was exposed during the 1997 flood as a result of streambed incision downstream of the siphon crossing (NHC 2011). Following the 1997 event, rock riprap was placed along the downstream edge of the Exposed Siphon to arrest the incision and protect the siphon. A scour hole about 30 feet downstream of the siphon and near the south bank appears to have formed as a result of the Exposed Siphon directing and concentrating flows toward the south bank. As with both diversions, different types of concrete present in different portions of the structure are consistent with repairs and patches over time. Original concrete construction, though potentially present, is not apparent.

3.5.2 Environmental Consequences / Impacts and Mitigation Measures

Methodology

A comprehensive review and evaluation of potential levels of significant impacts on cultural resources was conducted by the WSRCD for the project site (WSRCD 2015). Site surveys were conducted on July 10, 24 and 31, 2014 by WSRCD staff in accordance with the Secretary of the Interior Professional Qualifications standards (48 Federal Register 44716). A literature search for previous cultural resources work near the project area was completed by the Northeast Information Center of the California Historical Resources Information System. The results of the literature search indicated that one historic site and two prehistoric sites has previously been recorded in the general area of the proposed project. A Sacred Lands File and Native American Contacts List Request was sent to the Native American Heritage Commission by the WSRCD. The record search of the sacred land file failed to indicate the presence of any Native American cultural resources within the immediate project area; however a list of Native American individuals / organizations who may have had knowledge about cultural resources within the project location were provided. The Native American Heritage Commission provided WSRCD with a recommendation to contact those on the list. Local tribal groups identified by the Native American Heritage Commission were contacted by the WSRCD with a request for information on the existence of any archaeological or cultural sites within the project boundaries. No responses were received from any individuals or organizations on the list in regards to the request for information.

The project would have a significant impact if it would:

- a. Cause a substantial adverse change in the significance of a historical resource as defined in § 15064.5;
- 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; or
- d. Disturb any human remains, including those interred outside of formal cemeteries.

No Action Alternative

Under this alternative, no impacts or changes would occur to existing cultural resources that were identified and evaluated in the project area. The identified cultural resources, including the Ward and Upper Dams and the Exposed Siphon would remain unchanged.

Proposed Action Alternative

The Ward and Upper Dams and Exposed Siphon are historic and have historical roots in Tehama County. They still retain some of their original elements; however, they do not appear to retain much of their original integrity. In consideration of 36 Code of Federal Regulation (CFR) 60 criteria for potential listing of the property to the National Register, the dams and associated ditches are related to the agricultural development of Tehama County as a whole. The elements of the concrete stream diversion dams and Exposed Siphon include construction dates in the 1900s through 1920s, requiring consideration as historic properties. The Upper and Ward Dams and Exposed Siphon do not appear to possess “integrity of location, feeling and association”, some of the aspects that are considered when following 36 CFR 60. These aspects have been diminished by reconstruction. The aspects of integrity comprised by design, materials and workmanship have been diminished by the reconstruction and maintenance of the structures since its initial construction in the 1900s.

The Ward and Upper Dams and the Exposed Siphon are associated with past events; however, they do not appear to have made a significant contribution to the broad patterns of our history beyond a local

level. In addition, they do not appear to be associated with the lives of significant persons in our past and do not embody distinctive architectural characteristics. There is also no additional archaeological data beyond that already collected from the site documentation and photography. Given these findings, the Ward Dam, Upper Dam and the Exposed Siphon diversion dam do not wholly meet the 36 CFR 60 criteria to appear eligible for listing in the National Register (WSRCD 2015).

The proposed project would include modifications or destruction of structural elements that post-date 1975. This would not significantly alter any feature integrity. Under this alternative, no significant impacts would occur to any known cultural resource. The Upper and Ward Dams and Exposed Siphon are evolving structures, as confirmed by a 2014 field visit which found a patchwork of materials and modifications dating up to the present day. With respect to the original structure, materials and workmanship were likely compromised by flood damage that occurred in 1930, 1938, and 1997 and the subsequent reconstructions and repair necessitated by that damage (NHC 2011). Additionally, large scale modifications to the dam for fish passage improvement in the 1980s and 1990s have all but created an entirely new structure. Though undocumented, the Exposed Siphon has visibly undergone modifications over time as well. It does not appear that the Upper and Ward Dams and Exposed Siphon have any historical significance outside the context of the pattern of irrigation along Mill Creek, and the feature's research significance can be adequately addressed by further consulting the documentation reviewed by this study. As such, they do not meet the 50-year guideline for consideration as historic properties.

The historic and prehistoric resources identified in the literature search by the Northeast Information Center was evaluated by the WSRCD and it was found that they would not be affected by the project. Based on the information provided above, the proposed project would not cause a substantial adverse change in the significance of a historical resource or in the significance of an archaeological resource. The project would not directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

No known archaeological or cultural sites were identified from the local tribal groups contacted by the WSRCD. No known human remains will be disturbed within the project area; however, unknown subsurface cultural resources could be impacted during ground-disturbing activities associated with the proposed project. This is considered a potentially significant impact.

The following measure would be implemented to avoid and minimize impacts to cultural resources and to mitigate potentially significant impacts to cultural resources to less than significant levels:

CULTURAL-1: In the event subsurface cultural remains over 45 years of age are encountered during ground-disturbing activities, all work will cease at the general area of discovery and the U.S. Fish and Wildlife Service regional archaeologist, or other lead agency archaeologist, will be notified immediately. A field exam by a professional archaeologist may be required and further steps for resource protection will be implemented, including mitigation and consultation with the Native American Indian community if human remains are encountered (following Native American Graves Protection and Repatriation Act procedures).

3.6 Cumulative Effects and Other CEQA and NEPA Considerations

This EA / IS includes a discussion of statutory considerations required under CEQA, such as cumulative impacts, the significant environmental effects of the proposed project, the significant effects that cannot be avoided if the proposed project is implemented, and growth-inducing effects of the project. Additional discussions are also required under NEPA, such as the significant irreversible and irretrievable commitments of resources and the relationship between local short-term uses of the environment and the maintenance of long-term productivity. These considerations are addressed below.

3.6.1 Cumulative Effects

This section provides a description of other actions in the area and a discussion of the cumulative impacts of those projects, in combination with the previously identified effects of the proposed project. 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). CEQA Guidelines Section 15355 states that “cumulative impacts refers to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts.

- a) The individual effects may be changes resulting from a single project or a number of separate projects.
- b) The cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.”

Changes to the local environment will be made through project construction activities at the Exposed Siphon, Ward Dam and Upper Dam. The proposed project is intended to provide long-term improvements to the environment through improved fish passage. The proposed project would improve fish passage for native species and alleviate the current fish passage restrictions during certain flows. Improving habitat connectivity is an important factor that helps reduce the risk of extinction of species and populations during environmental changes such as climate change. Effects of the proposed project would be positive towards maintaining the quality of the human environment. Overall, the proposed project would cause short-term impacts to some environmental resources. Mitigation measures would result in these impacts being less than significant. Analysis for the individual resources considered in this EA / IS are described within the individual sections of this document.

There are several watershed restoration projects and RPMs that have been implemented by the Mill Creek Conservancy, LMMWC, CDFW and / or the USFWS over the past approximately 20 years. These projects include but are not limited to, development of a water exchange program, fish passage restoration, development of conservation easements, riparian habitat restoration, outdoor education, pasture restoration, agricultural and timber preservation zoning, stream bank stabilization, non-native vegetation control and fuels management.

The cumulative impacts of these projects and the Mill Creek Fish Passage Restoration Project are not anticipated to be negative, and in fact should improve natural resource conditions for anadromous fish and other native species in the Mill Creek watershed. In addition, AFRP has recently implemented, and is planning several other anadromous fish passage improvement projects on several Sacramento River tributary streams. The cumulative impacts of these projects and the Mill Creek Fish Passage Restoration Project are not anticipated to be negative, and in fact should improve natural resource conditions for anadromous fish and other native species in the larger Sacramento River watershed.

3.6.2 Irreversible and Irretrievable Commitments of Resources

NEPA (Section 102) and the CEQ NEPA implementing regulations (40 CFR 1502.16), require a discussion of “any irreversible and irretrievable commitments of resources which would be involved in a proposed project should it be implemented.” Section 15126.2(c) of the CEQA Guidelines also requires a discussion of the significant irreversible environmental changes that would result from implementation of a proposed project.

Implementation of the proposed project would not involve the substantial use of nonrenewable resources in such a way that would result in conditions which would be irreversible though removal or nonuse thereafter. Implementation of the proposed project would result in the use of fossil fuels, a nonrenewable form of energy for construction activities. A relatively minor amount of nonrenewable resources would be used in the project construction, transport of equipment and personnel, and related activities at the project area. The material requirements for this project would be relatively minor compared to the overall demand for such materials, and the use of these materials would not have a significant adverse effect on their continued availability. Future generations would not be committed to irreversible consequences or uses; the effect on future generations would be beneficial as a result of the restored stream ecosystem and related fishery resources. No irreversible damage from environmental accidents would be foreseeable in association with the proposed project.

3.6.3 Local Short-Term Uses and Long-Term Productivity Relationship

Section 102 of the CEQ NEPA Regulations and CFR 1501.16 require that an environmental document include a discussion of “the relationship between local short-term uses of man’s environment and the maintenance and enhancement of long-term productivity.” The proposed project does not involve a trade-off between a “local short-term use” of the environment and the maintenance and enhancement of the environment in the sense contemplated by NEPA. Implementation of the proposed project is intentionally aimed at restoring and enhancing the long-term biological and environmental productivity of the fishery resource in Mill Creek and downstream in the Sacramento River system. Construction impacts associated with the proposed project would be short-term and temporary. Short-term effects to the environment from construction include soil erosion, air quality emissions, noise, disturbance to fish, wildlife, vegetation and wetlands, and temporary surface water quality impacts. In the long-term, however, the proposed project would improve passage conditions for native fish species. Implementation of the proposed project would not sacrifice the long-term productivity of the project area for short-term uses during construction.

3.6.4 Growth-Inducing Impacts

Under CEQA, growth itself is not assumed to be particularly beneficial, detrimental, or insignificant to the environment. If an action is determined to be growth-inducing, an evaluation is made to determine whether significant impacts on the physical environment would result from that growth. Analysis of growth-inducing impacts includes those characteristics of an action that may encourage and facilitate activities which would affect the environment, either individually or cumulatively. For example, an increase in population may impose new burdens on community service facilities. Similarly, access route improvements may encourage growth in previously undeveloped areas. Implementation of the proposed project would not contribute to significant development or economic growth in the vicinity. No businesses would be established or housing required as a result of this project. Therefore, no growth inducement would result from implementing the proposed project.

3.6.5 Environmental Commitments and Mitigation Measures

Because this document is a joint NEPA / CEQA document, mitigation measures have been identified for potentially significant impacts in compliance with CEQA requirements. Under CEQA, lead agencies are required to adopt a program for monitoring or reporting on the revisions that they required to be made part of the project, and other measures required to mitigate or avoid significant environmental effects. An MMRP for implementation of the proposed project will be developed to comply with CEQA. The mitigation measures that were identified as part of this analysis, and that will be included in the MMRP, are listed in Appendix H.

3.6.6 Significant Effects

CEQA establishes a duty for public agencies to avoid or minimize environmental damage where feasible (CEQA Guidelines Section 15021), and determinations of significance play a critical role in the CEQA process (CEQA Guidelines 15064). Potentially significant effects associated with implementation of the proposed project have been identified in the areas of soils / minerals and geology, hydrology and water quality, biological resources, hazards and hazardous waste, cultural resources, noise, and air quality / GHG emissions. These potential effects are discussed in the individual resource sections in this document. As part of the environmental impact assessment for each resource area, mitigation measures have been identified that reduce potential impacts to less-than-significant levels. The environmental analysis conducted for the proposed project did not identify any effects that, after mitigation, remained significant and therefore unavoidable. No significant irreversible effects were identified associated with the proposed project.

3.7 Environmental Justice

3.7.1 Affected Environment

On February 11, 1994, President Clinton issued Executive Order 12898, “Federal Actions to Address Environmental Justice in Minority and Low-Income Populations.” Environmental justice refers to “nondiscrimination in federal programs substantially affecting human health and the environment” and “providing minority communities and low income communities access to public information on, and an opportunity for public participation in, matters relating to human health or the environment”. In particular, it involves preventing minority and low-income communities from being subjected to disproportionately high and adverse environmental effects of federal actions. In complying with NEPA, federal agencies are required to consider human health, economic, and social impacts of the proposed project on minority and low-income communities.

In 2013, the majority (90.9 percent) of Tehama County’s population was Caucasian (U.S. Census Bureau 2015). Minorities of African American, Asian, Hawaiian or Pacific Islander, and Hispanic ethnicity comprises the remaining 9.1 percent of the county’s population. Per capita personal income for Tehama County was \$20,439, below the State average of \$29,527. Tehama County had an unemployment rate (not seasonally adjusted) of 9.4 percent in January 2015 (U.S. Department of Labor 2015). There are several residences located in the vicinity of the Exposed Siphon and Ward Dam sites, including two that are associated with the Mill Creek Ranch. There are no residences in the nearby vicinity of the Upper Dam site.

3.7.2 Environmental Consequences / Impacts and Mitigation Measures

Because environmental justice is not a CEQA issue, specific significance criteria were not applied in evaluating potential environmental justice consequences. Instead, any modification or change in environmental justice factors that would occur in response to the proposed action is evaluated in accordance with NEPA requirements. Incorporation of environmental justice principles throughout the planning and decision-making processes implements the principles of NEPA, Title VI of the Civil Rights Act, and the Uniform Relocation Act.

No Action Alternative

Under this alternative, no direct impact to a minority or low-income population or community would take place because the project would not be implemented. Therefore, there would be no impact.

Proposed Action Alternative

Under this alternative, the proposed project would result in fish passage improvements to the LMMWC diversion and water conveyance system. The water conveyance system would continue to convey water from the Upper and Ward Dams and through the Exposed Siphon to LMMWC customers. The diversion and water conveyance structures would be upgraded to improve native fish passage at all three project sites.

Minority and low-income residents live in the general vicinity of the project area; however, there is no evidence to suggest that the project would cause a disproportionately high adverse human health or environmental effect on minority and low-income populations compared to other residents of the area. The known health risks to residents that could be associated with the project are evaluated in the sections of this document related to water quality, air quality, hazardous materials, transportation and noise. For the most part, these health risks are associated with the construction aspects of the project, in that residents could be exposed to hazardous materials that may be associated with the project. The project would be managed through RPMs to minimize these risks, and also as required by applicable federal and state safety regulations. The proposed project's potential effects on environmental justice would be negligible, because it would have no significant unmitigatable impacts, and would be a relatively small, short-term project with no negative effect on any minority or low-income population.

3.8 Soils / Minerals and Geology

3.8.1 Affected Environment

Soils

Nine different soil map units occur within the project site (Figure 16) according to the local soil survey (USDA-SCS et al. 1967). The nine identified map units are listed below:

Berrendos clay loam, 0 to 3 percent slopes (Bq)

These soils are located east of the Sacramento River on narrow floodplains and are formed in alluvium, derived from basic volcanic rock. These soils are usually six feet deep, but in some areas there is a cemented layer at approximately three feet. This soil is moderately well drained and permeability and runoff are slow. According to the California Soil Resource Lab (CSRL) website (UC Davis 2015), the taxonomy of the series is fine, montmorillonitic, thermic, Chromic Pelloxerents.

Inks cobbly loam, 3 to 30 percent slopes (IcD)

This soil is located on low rounded hills east of the Sacramento River and is formed of sediments washed from areas of volcanic rocks which are mostly andesite and basalt. The soil is well drained and permeability is moderate through the profile, but is slow through the underlying material. Runoff is slow to medium. According to the USDA-Natural Resource Conservation Service (NRCS) Official Soil Series Descriptions website (USDA-NRCS 2015), the taxonomy of the series is loamy-skeletal, mixed, superactive, thermic, Lithic Argixerolls.

Keefers loam, 0 to 3 percent slopes (Kf)

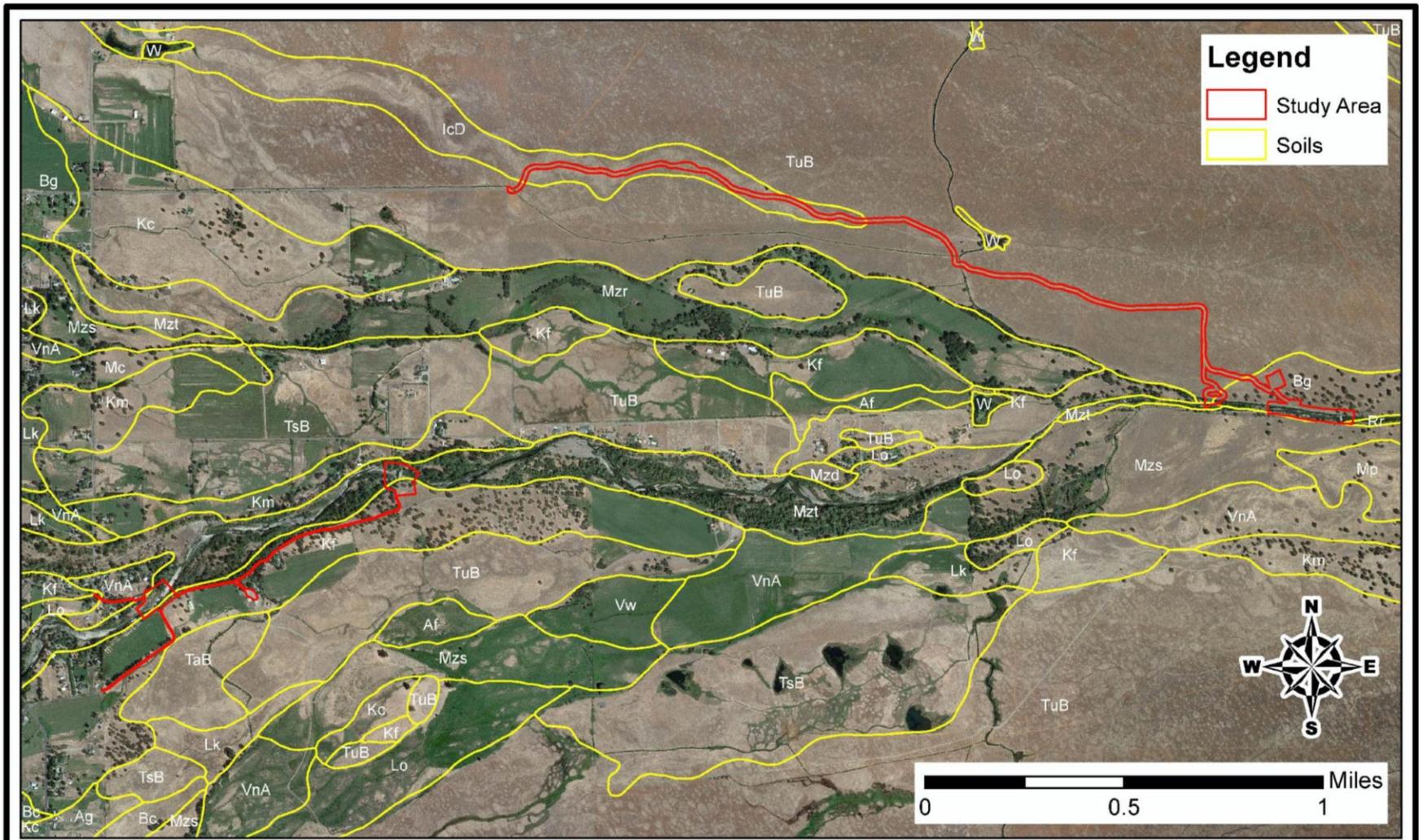
This soil map unit is located on the eastern side of the Sacramento River on old stream terraces. They are formed on old alluvium, derived from basic igneous rock, mainly andesite and basalt. Roots and water are restricted due to the clay subsoil. The soil is well drained with slow runoff and permeability. According to the USDA-NRCS Official Soil Series Descriptions website (USDA-NRCS 2015), the taxonomy of the series is clayey-skeletal, smectitic, thermic, Mollic Haploxeralfs.

Molinos complex, channeled (Mzt)

These soils are located along active streams east of the Sacramento River between 200 and 1,000 feet in elevation. The soils are from recent alluvium which is derived from basic igneous rocks, mainly andesite and basalt. This nearly level complex consists of well drained to somewhat excessively drained soils. This complex can consist of any of the Molinos soils. According to the CSRL website (UC Davis 2015), the taxonomy of the series is coarse-loamy, mixed, nonacid, thermic, Aquic Xerofluvents.

Molinos gravelly fine sandy loam (Mzs)

These soils are located along active streams east of the Sacramento River between 200 and 1,000 feet in elevation. The soils are from recent alluvium which is derived from basic igneous rocks, mainly andesite and basalt. Molinos fine sandy loam is well drained to excessively drained. Runoff is very slow and permeability is moderately rapid. According to the CSRL website (UC Davis 2015), the taxonomy of the series is coarse-loamy, mixed, nonacid, thermic, Typic Xerorthents.



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Mill Creek Fish Passage Restoration Project

Tehama County, California
 April, 2015

Figure 16
 Soil Survey Map

DATA SOURCE: USDA Natural Resources Conservation Service, January, 2015

PHOTO SOURCE: Google Earth, 8/27/2013

Riverwash (Rr)

This soil map unit is made up of deposits of sand and gravel. It consists of channels of intermittent streams and of active streams where the water is high. The series is not classified by higher categories in the soil survey.

Tehama loam, 3 to 8 percent slopes (TaB)

These soils are located along the edges of terraces, mostly west of the Sacramento River in elevations ranging from 200 to 1,000 feet. Tehama loam is formed in mixed alluvium, chiefly from sedimentary rock. These soils are well drained. According to the USDA-NRCS Official Soil Series Descriptions website (USDA-NRCS 2015), the taxonomy of the series is fine-silty, mixed, superactive, thermic, Typic Haploxeralfs.

Tuscan cobbly loam, 1 to 5 percent slopes (Tub)

This series is located on the tops of old gently sloping terraces east of the Sacramento River. The soils are formed from old alluvium washed from areas of volcanic rock. The subsoil is underlain by an indurated cobbly hardpan located at 10 to 20 inches in depth. The soil is well drained and permeability is very slow. Runoff is slow. According to the USDA-NRCS Official Soil Series Descriptions website (USDA-NRCS 2015), the taxonomy of the series is clayey, smectitic, thermic, shallow Typic Durixeralfs.

Vina loam, 0 to 3 percent slopes (VnA)

This soil is found east of the Sacramento River from 200 to 1,000 feet in elevation and was formed from recent alluvium washed from areas of volcanic rock. This soil is well drained and permeability is moderate. Runoff is very slow. According to the USDA-NRCS Official Soil Series Descriptions website (USDA-NRCS 2015), the taxonomy of the series is coarse-loamy, mixed, superactive, thermic, Pachic Haploxerolls.

Geology

The project site is located in the Great Valley geomorphic province of California, which is an alluvial plain approximately 50 miles wide and 400 miles long in the central part of California. The Great Valley is a structural depression that has been filled with a thick sequence of Mesozoic and Tertiary marine sediments covered by Quaternary alluvial sediments. Subsequent deformation has folded these older sediments into a northwest-trending asymmetrical syncline with its axis off-center toward the Coast Range. The sedimentary deposits are up to 50,000 feet thick along the axis of the syncline.

The project sites are located on the perimeter of the valley at elevations ranging from approximately 275 to 385 feet above sea level. The deposits at the project sites are primarily composed of coarse grained materials of cobbles and gravel within a sandy matrix. The surficial deposits within and adjacent to the active stream channel are loose / unconsolidated and may substantially change during high flow or flood events. Pleistocene-aged alluvial deposits (Modesto, Riverbank, and Red Bluff Formations) of unconsolidated to consolidated cobble, gravel and sand mixtures make up the scoured channel bottom and stream terraces which form the banks of the creek.

Site Geology

The lower eight miles of Mill Creek to the junction with the Sacramento River are incised into a Pleistocene-age alluvial fan. The creek itself is contained between high banks of cemented fan deposits that are mostly erosion resistant.

The Exposed Siphon lies in a narrow section of Mill Creek where the stream width is about 200 feet between cemented deposits that form high banks or bluffs. There is a 50-foot-wide floodplain located along the north bank and an 80-foot-wide low-flow channel bed. The Exposed Siphon is located about 1,300 feet downstream of where the North Fork of Mill Creek splits off from the main channel. Approximately 30 feet below the siphon, a scour hole has developed as a result of the Exposed Siphon directing and concentrating water flows into the south bank.

Mill Creek at the Ward Dam is located between relatively inerodible banks developed by Pleistocene-age fan deposits. Below the dam apron there is a deep scour hole developed as a result of the dam. The south floodplain near the dam is tree-covered grazing ground and the north floodplain is residential houses and agricultural ground. The dam is constructed with the existing fish ladder and diversion canal placed in between the south bank and the dam spillway.

The Upper Dam lies in a long straight section of creek bed which has steep banks and bluffs resulting in little to no floodplain on either bank. The creek channel appears to be formed in bedrock and the creek does not appear to meander at all. The dam is constructed with the existing fish ladder and diversion canal located against the north bank of the creek.

Geologic Observations

There are primary geotechnical issues for the site improvements proposed for the three separate project sites. The older alluvial deposits are consolidated, and in most of the exposed areas, clast-supported with smaller finer-grained sand materials between well-rounded cobble and gravel clasts. These materials would be extremely difficult to impossible to excavate by hand or with smaller equipment and would require larger excavators. This material would most likely be encountered at all three sites. Any excavations will likely extend below the existing thalweg of the creek channel, resulting in a significant amount of dewatering in order for the installation of the footings and structures to occur. Also, at the Ward Dam site, sediments comprised of cobble and gravel buildup behind the dam from the material located in the upstream portions of the creek. It may be impossible to halt the buildup of material behind the head gate, but adjustment of the location and orientation of the new head gate could minimize sediment buildup in the canal.

3.8.2 Environmental Consequences / Impacts and Mitigation Measures

Methodology

The geology and soils analysis is based on information in a *Geologic Reconnaissance Letter* (Sanders and Associates Geotechnical Engineering 2011) that was prepared for the project, the *Soil Survey of Tehama County, California* (USDA-SCS et al. 1967), and a review of reports regarding regional geology, soils, and mineral resources, as well as the Alquist-Priolo Earthquake Fault Zoning Map (California Department of Conservation 2013).

Significant impacts would occur if the project would:

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving earthquake fault rupture, seismic ground shaking, liquefaction or landslides.
- Result in substantial soil erosion or the loss of topsoil.
- Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in onsite or offsite landslide, lateral spreading, subsidence, liquefaction or collapse.
- Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property.

- Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state.
- Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan.

No Action Alternative

Under this alternative, there would be no impact to soils, minerals or geology due to the fact that the dams, the exposed siphon and associated infrastructure would not be retrofitted or replaced. The existing structure would all remain in place.

Proposed Action Alternative

Under this alternative, no known mineral resources of value or mineral resource recovery sites would be disturbed or lost. No permanent structures or facilities would be constructed that expose structures and / or people to geologic hazards. The Alquist-Priolo Earthquake Fault Zoning Act (1972) and the Seismic Hazards Mapping Act (1990) direct the State Geologist to delineate regulatory "Zones of Required Investigation" to reduce the threat to public health and safety posed by earthquake-triggered ground failures. Cities and counties affected by the zones must regulate certain projects within them.

A search of the Alquist-Priolo Earthquake Fault Zoning Map (<http://www.quake.ca.gov/gmaps/WH/regulatorymaps.htm>) shows there are no Earthquake Fault Zones or Landslide and Liquefaction Zones of regulatory interest within or surrounding the project area. The project does not include elements that would cause ground failure (including liquefaction) or landslides.

Construction-related ground disturbances would occur as a result of the excavation for the new siphon, the installation of the new fish screens and ladders on the Ward Dam and Upper Dam, and other work associated with water conveyance retrofittings and upgrades at the three sites. Substantial soil erosion could occur as a result of the ground disturbance which is considered a potentially significant impact.

This project is not located on expansive soil nor would implementation of the project result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan.

The following measures would be implemented to avoid and minimize impacts to geology and soil resources and to mitigate potentially significant impacts to less than significant levels:

SOIL / GEO-1: After ground-disturbing activities are complete, all disturbed areas (outside of the active stream channel and the ditch bottom) shall be seeded with native plant species and mulched as described in the revegetation plan.

SOIL / GEO-2: Construction of all project actions shall comply with Central Valley Water Board Basin Plan Objectives. Standard Best Management Practices (BMPs) will be incorporated into the project designs.

SOIL / GEO-3: If the total disturbance area is greater than one acre for any of the three project sites, a Notice of Intent will be submitted to the State Water Resources Control Board to obtain coverage under the National Pollution Discharge Elimination System General Permit for Discharges of Stormwater Associated with Construction Activity.

3.9 Hazards and Hazardous Wastes

3.9.1 Affected Environment

Hazardous materials management involves the prevention of illegal hazardous materials actions on public lands; the proper authorization, permitting, and regulation of the uses of hazardous materials; and the timely, efficient, and safe responses to hazardous materials incidences. Federal, state, and local agencies regulate hazardous materials and hazardous waste. Nonetheless, illegal storage and disposal and unintentional releases of hazardous materials or waste from leaks and accidents can occur when hazardous materials are used or hazardous waste is generated by a project.

Under the California Code of Regulations (CCR), Title 13, Section 1150-1194, and CFR Title 49, the California Highway Patrol (CHP) regulates the transport of hazardous materials. When a spill of hazardous material or waste occurs on a highway, such as State Route (SR) 99, the CHP is responsible for directing cleanup and enforcement (CCR Section 2450-2453b).

There are no public airports or private airstrips near the project site. The project site is located within an area that is designated as a Non-Very High Fire Hazard Severity Zone on the Tehama County Fire Hazard Severity Zone map (California Department of Forestry and Fire Protection [CAL FIRE] 2015). A governmental record search (California Department of Toxic Substances 2015) indicated that there are no known hazardous waste and substances sites located within five miles of any of the three project sites.

3.9.2 Environmental Consequences / Impacts and Mitigation Measures

Methodology

The analysis of impacts related to hazards and hazardous wastes was conducted through document review and site visits.

An impact related to hazards and hazardous materials would be significant if the project would:

- 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 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, the project would 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, the project would 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; or
- h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

No Action Alternative

Under this alternative, no construction activities would occur and thus there would be no risk of hazard to the public through the transport, use, or disposal of hazardous materials; nor would this alternative interfere with emergency response and evacuation plans. Since the project area is not located within an airport land use plan or in the vicinity of a private airstrip, this alternative would not result in an airport safety hazard. Similarly, there would be no impact on wildland fire potential or catastrophic fire behavior because the project would not be implemented.

Proposed Action Alternative

Under this alternative, activities associated with the proposed project would utilize potentially hazardous materials associated with the project construction and operation of vehicles and construction equipment during project implementation including oil, fuels and concrete. These materials are similar to those routinely used for other types of construction projects throughout Tehama County. The widespread use and associated transport of these materials along the highways and county roads that traverse Tehama County, combined with the low level of incidents (spills), suggest that impacts related to project activities would be similar to those found elsewhere in the county. Given the temporary nature of project construction, the risk of hazardous materials spills is relatively low, however the potential release of these hazardous materials is considered a potentially significant impact.

This project would not emit hazardous emissions or require handling of hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school. The project is not located on a site included on a list of hazardous materials sites that would create a significant hazard to the public or the environment, nor is it located within two miles of a public or private airport or airstrip.

Under the proposed project, construction traffic would include the trucks traveling to and from the site over the course of the construction period. Construction traffic would be limited to daily trips for personnel and routine service and supply vehicles. Accessing the project area would not impede emergency response and evacuation plans. The impacts created would be less than significant.

Construction activities are a potential source of wildfire ignition. The vegetation in the project area is composed of a fire-adapted vegetation community and is susceptible to wildfire, however the project is located in an area designated as a Non-Very High Fire Hazard Severity Zone. Under the proposed project, construction activities would occur within, or adjacent to the riparian corridor of Mill Creek. Potential fuels within the boundaries of the site are generally noncontiguous especially at the Upper Dam site and the creek serves as a substantial natural firebreak. The types and amounts of fuels and their continuity may be decreased temporarily by implementation of this alternative, 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. The proposed project would have a less than significant impact on wildland fire potential and behavior.

The following measures would be implemented to avoid and minimize impacts related to hazards and hazardous wastes and to mitigate potentially significant impacts related to hazards and hazardous wastes to less than significant levels:

HAZ-1: A designated concrete washout area will be located at least 100 feet from any high water mark within adjacent waterways and will be developed and used following the U.S. EPA Stormwater BMP for a Concrete Washout.

3.10 Hydrology and Water Quality

3.10.1 Affected Environment

The project site is located within Mill Creek, a perennial stream originating from the southern slopes of Lassen Peak, and eventually flowing into the Sacramento River. The Mill Creek watershed includes a total area of 134 square miles. There are some ephemeral streams present within the Upper Dam haul road. There are also a number of perennial, intermittent and ephemeral streams in the general project area.

Water Quality

Mill Creek water quality typically has a high silt load and turbidity during the spring and early summer snowmelt period originating from naturally occurring volcanic ash and glacial till in LVNP. Additional sediment load potentially comes from land management activities in the watershed, including timber harvesting, roads and cattle grazing, however the contribution of these sources to the overall condition of water quality is unknown.

Water temperature in Mill Creek is an important parameter for species such as spring- and fall-run Chinook salmon, trout and steelhead. Concerns with temperature apply mainly in the lower reach of Mill Creek and are closely related to instream flow conditions. See Section 3.4.4, Fisheries for more information on water temperatures within Mill Creek.

Mercury is a water quality concern in watersheds with significant mining histories. Mercury is typically attached to particulate matter and has the ability to adsorb (hold as a thin film on the outside surface of a material) to fine sediments with high organic matter. Mining was not an important activity historically or in recent times within the Mill Creek watershed; however, there are natural discharges of mercury from hydro thermal activity in the headwaters of Mill Creek (G. Chetelat pers. comm.). Historic sources mention inconsequential placer mining taking place on homesteads located adjacent to Mill Creek, however, no significant mining ventures or mineral deposits have been noted in the Mill Creek watershed, as highlighted by the total lack of mineral locations on a 1946 "*Tehama County Mineral Location Map*" (Armentrout et al. 1998).

Groundwater Quality

The project site is located within the Sacramento Valley Groundwater Basin (SVGB) in the Dye Creek and Los Molinos sub basins. Mill Creek is the southern and northern boundary of each subbasin respectively. Groundwater in the SVGB is typically sufficient for municipal, industrial and agricultural uses, averaging less than 280 milligrams (mg) / Liter (L) TDS. This range is below both the California and Environmental Protection Agency (EPA) secondary drinking-water standard of 500 mg/L TDS and the agricultural water quality limit of 450 mg/L TDS.

Hydrologic Analysis

Mill Creek receives its stream flow from spring / summer snowmelt and winter storm rainfall and runoff. In lower Mill Creek, Ward Dam and Upper Dam greatly influence the hydrology (USFWS 2000). Mill Creek flows remain relatively high during winter and spring, even in dry years. Stream flow peaks both during winter rains in December, January, and February, and during spring snowmelt in April and May (USFWS 2000). However, reduced snowmelt and water diversions greatly diminish the instream flows during the summer (Armentrout et al. 1998). The typical flows at the Mill Creek gage (USGS #11381500), upstream of the Upper Dam, from August to October are approximately 100 to 120 cfs. The diversion capacity between the gage and the Exposed Siphon is approximately 140 cfs. Typically, some flows remain in Mill Creek downstream of Ward Dam, but they are often less than five cfs.

Water diversions usually begin in late spring and take place through early fall (approximately April through October). In some years, diversions may exceed Mill Creek’s natural flows, especially during the summer and early fall. In drier years, the entire instream flow is diverted or reduced enough to inhibit salmonid migration; however, recent water exchange agreements between CDFG, DWR, and LMMWC are helping to improve these conditions (USFWS 2000). Between 1929 and 1994, the average annual flow is 297 cfs with a median of 175 cfs (USFWS 2000). In the driest years, flows have ranged between 60 and 120 cfs (USFWS 2000). Figure 17 below presents hydrologic data from the DWR California Data Exchange Center for Gage “MCH (Mill Creek below HWY 99)” from 1998 to 2005.

Figure 17. Mean Daily Flow from the DWR California Data Exchange Center for Gage “MCH (Mill Creek below HWY 99).” (Source: NHC 2015)

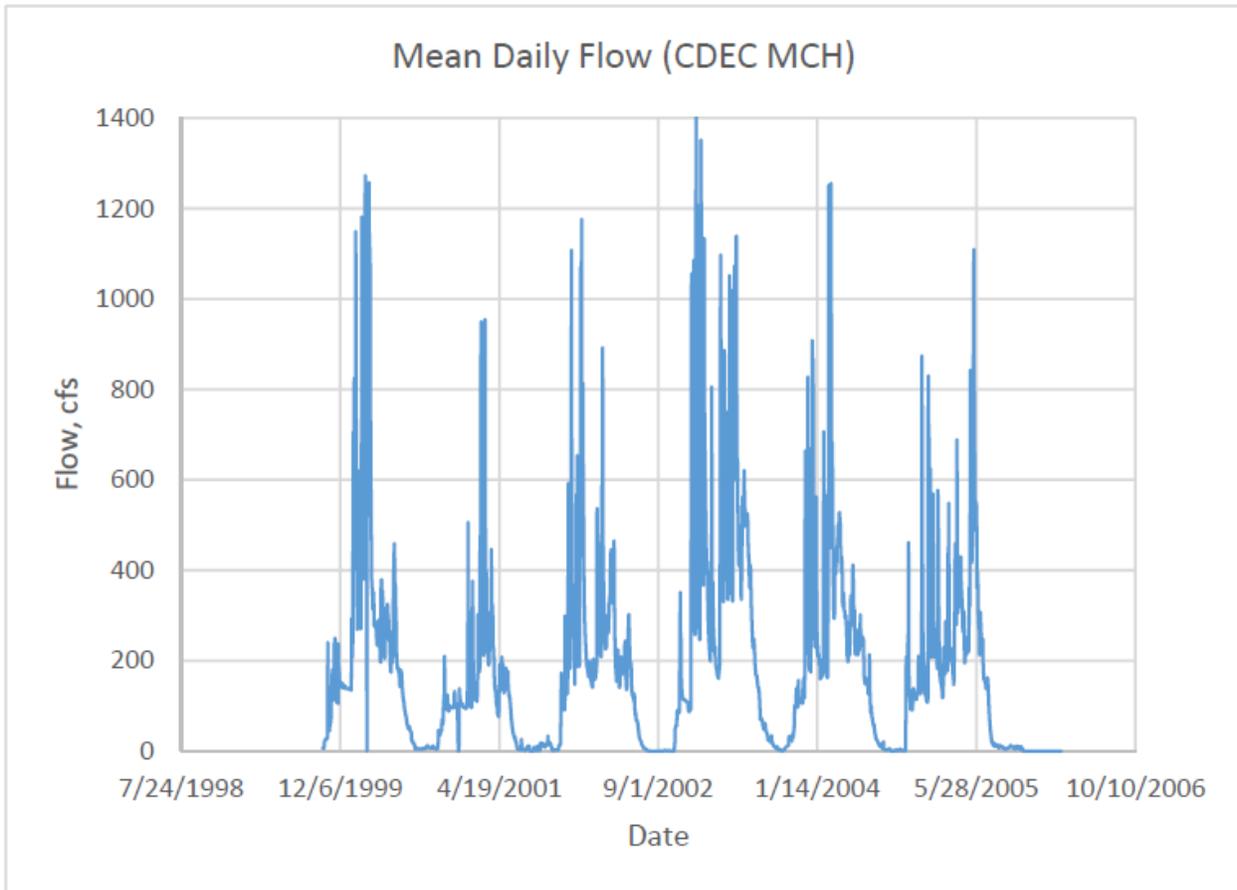


Figure 18 below shows average cross-section velocities for the existing and project condition models at the Exposed Siphon site. The figure shows that the project lowers 100-year average velocities through much of the project site.

Figure 18. Existing Condition and Project Condition

Existing Condition and Project Condition Average Channel Velocities for 100-year Peak Flow at the Exposed Siphon Site. (Source: NHC 2015)

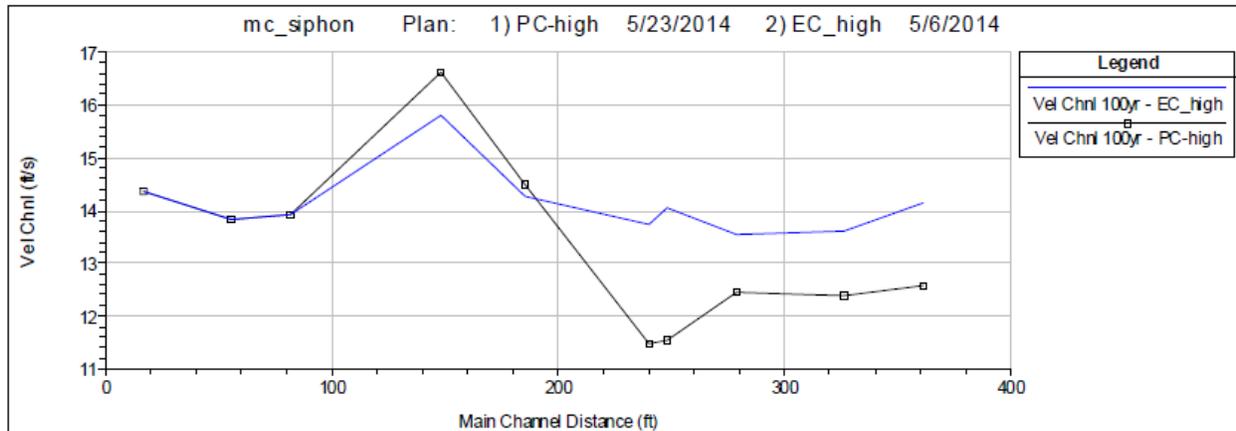
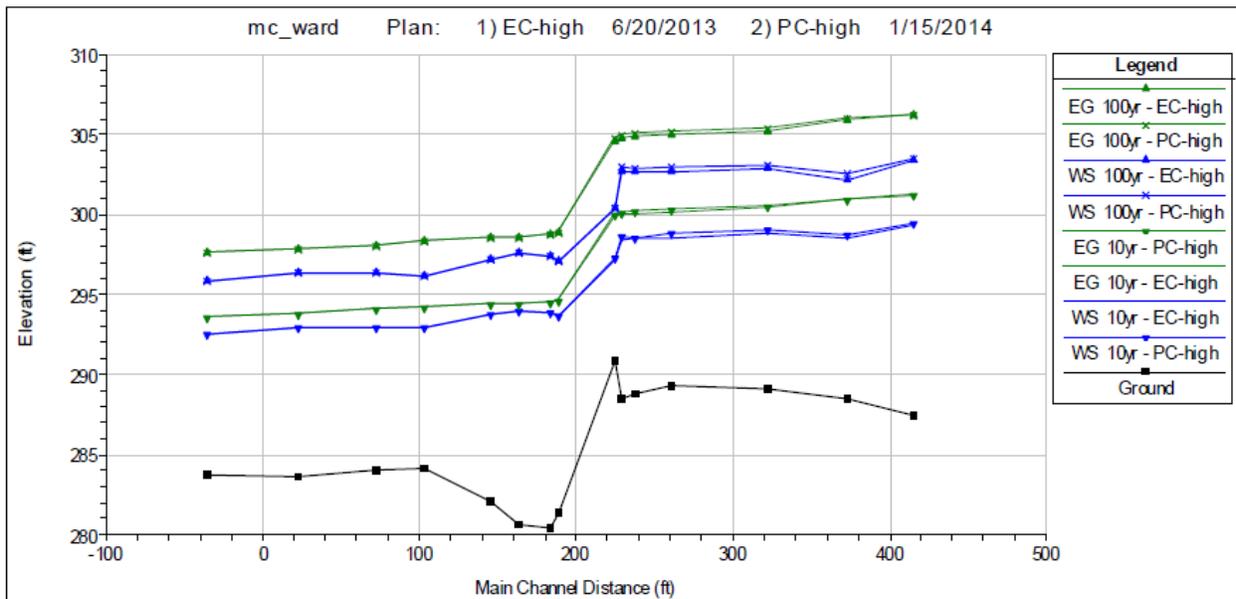


Figure 19 below shows the pre- and post-project condition water surface profiles for the 100-year and 10-year peak flows at the Ward Dam site. The increase in the 100-year water surface elevation from the new fish ladder is relatively minor and the pre- and post-project water surface profiles converge about 200 feet upstream of the dam. Raised 100-year water levels will remain within the stream banks and will not aggravate flooding of adjacent properties or have a significant impact on the performance of the project or on local infrastructure (NHC 2015c).

Figure 19. Water Surface Profiles

Water Surface Profiles Ward Dam 10- and 100-year Water Surface Profiles for Existing Condition and Project Condition. (Source: NHC 2015)



According to NHC (2015d), a steady-state one-dimensional HEC-RAS model of the project reach was developed for the Upper Dam site, using the topographic survey data. The low passage flows, high

passage flows, and flood events of various return intervals were used to assess water levels through the project site. The HEC-RAS model extended from about 1,200 feet downstream of Upper Dam to about 150 feet upstream of the dam with 28 cross-sections. The model was calibrated to a low flow condition of 140 cfs, and the December 2014 high flow event of 9,200 cfs.

Water Rights

California fully-adjudicated water rights on Mill Creek in the 1920s. Flow records indicate that authorized diversions in lower Mill Creek (203 cfs) have the potential to divert all of the natural stream flow during the summer irrigation season. Accordingly, there are cooperative agreements between resource agencies and the water diverters to provide adequate flows (when possible) for salmon during the peak migration / spawning periods as discussed in the Water Exchange Agreements section below. The LMMWC is the Water Master and provides irrigation water to its shareholders and other water right holders (Armentrout et al. 1998).

Water Exchange Agreements

According to the *Mill Creek Watershed Management Strategy Report* (CH2MHILL 1997), adequate transportation flows are essential to the restoration of the spring-run salmon population in Mill Creek. In dry years, during the two critical salmon migration periods of May through June (for spring-run) and October (for fall-run), water right holders on the valley floor may divert the entire flow of Mill Creek as authorized through water rights. As a result, upstream migration of adult spring-run salmon and downstream migration of juvenile salmon and steelhead can be impeded or entirely blocked. In 2007, a Memorandum of Understanding was entered into between LMMWC, DWR, CDFG and the Mill Creek Conservancy (MCC), forming a Managing Committee to develop a long-term cooperative management plan to address instream Mill Creek spring and fall flows for fall-run and spring-run Chinook salmon, while maintaining and not adversely affecting irrigation water use pursuant to the water rights of the water users (Memorandum of Understanding 2007). Mill Creek Water Exchange Agreements exchange pumped groundwater to support irrigation purposes in exchange for instream water to augment transport flows for anadromous fish within Mill Creek. Supplemental flows provided through these unique water exchanges help to restore anadromous fish populations by allowing migrating adults to reach their holding and spawning habitats, and by providing transportation flows for juveniles emigrating to the Sacramento River.

3.10.2 Environmental Consequences / Impacts and Mitigation Measures

Methodology

Impacts on water quality and hydrology were evaluated by analyzing regional and site-specific reports. The analysis was conducted through document review and site visits.

Significant impacts would occur to the water quality and hydrology if the project would:

- 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 onsite or offsite;

- 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 onsite or offsite;
- e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;
- 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) 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; or
- j) Inundation by seiche, tsunami, or mudflow.

No Action Alternative

Under this alternative, no changes would occur to the existing Exposed Siphon, Ward Dam, Upper Dam or associated diversion infrastructure or diversion practices. Stream flows would continue to be diverted at the current rate between spring and late fall / early winter. No changes in water quality would occur.

Proposed Action Alternative

Under this alternative, water quality impacts such as short-term minor increases in turbidity and suspended sediment concentrations would likely occur due to project activities following instream construction during the rewatering process and potentially during the initial winter following construction due to erosion from the project construction areas. This is considered a potentially significant impact.

Under this alternative, water quality impacts such as causing a significant increase in alkalinity of the water in Mill Creek could occur as a result of the piping of the ditch at Upper Dam, if work were to occur when the ditch was flowing and water return flows with wet concrete were to re-enter the creek. This is considered a potentially significant impact. Water quality impacts to Mill Creek could occur if fuel, oil, other petroleum products or wet concrete were accidentally spilled as a result of construction activities and entered surface waters. This is considered a potentially significant impact.

Under this alternative, there would be no expected impacts to the potential flooding of adjacent properties, nor the performance of the project or the local infrastructure. An analysis of the existing and projected conditions at the Exposed Siphon site found that the 100-year water levels from expected project conditions would remain within the stream banks and would not aggravate the flooding of adjacent properties (NHC 2014a). It was also determined that at the Ward Dam, raised 100-year water levels would remain within the streambanks and would not aggravate flooding of adjacent properties or have a significant impact on the performance of the project or on local infrastructure (NHC 2015c). At the Upper Dam site, the model showed that the 100-year flow event, post-project construction would be completely contained within the canyon. The proposed project footprint would not increase the total diversion facility footprint at the site and would not be expected to negatively affect flood levels upstream of the site. The diversion infrastructure is located in areas which are already ineffective under existing conditions. The addition of the bypass weir and sediment sluice would slightly reduce some of the flow over the dam. The removal of the concrete wall and planting of the stream bank would increase the high flow conveyance area without significantly impacting the overall channel roughness.

Under this alternative, there would be no expected impacts to water quality due to the redistribution of mercury from suspended sediments. The redistribution of sediments would likely cause a minor temporary increase in turbidity in Mill Creek and potential distribution of mercury. However, because Mill Creek does not have a significant mining history, erosion control features would be put in place

before and during construction activities, dewatering would occur slowly to avoid increasing turbidity, the amount of sediment redistributed would be minor, and turbidity would be minimal, there are no expected impacts. BMPs for turbidity control in the work areas address any potential discharge of mercury bearing sediment from natural discharges.

This alternative would not violate any water quality standards or waste discharge requirements, impact groundwater supplies, increase onsite or offsite flooding, contribute additional runoff water, place housing within flood hazard areas, place structures that would impede or redirect flood flows, expose people of structures to flooding impacts, or cause inundation by seiche, tsunami or mudflows.

The following measures would be implemented to avoid and minimize impacts to water resources and water quality and to mitigate potentially significant impacts to water resources and water quality to less than significant levels:

WATER-1: All construction shall be conducted in the summer / early fall during the low flow period. Any work within the channel and banks, outside of this instream work window must be isolated from flowing water and dewatering will be required.

WATER-2: BMP's will be developed and implemented to ensure that wet concrete does not enter Mill Creek during construction.

WATER-3: Monitoring of water turbidity and settleable materials shall be conducted in accordance with the Clean Water Act Section 401 Certification through consultation with the Central Valley Regional Water Quality Control Board.

WATER-4: All equipment and machinery that contains fuel, oil or other petroleum products used during construction related activities shall be checked for petroleum leaks immediately prior to being mobilized to the project site and again each day prior to use.

WATER-5: All equipment refueling and / or maintenance shall take place within a secondary containment structure and a minimum of 100 feet away from Mill Creek or other aquatic sites.

WATER-6: An emergency spill kit and absorbent oil booms will be onsite during construction activities.

WATER-7: All equipment operations within the channel and banks of Mill Creek will be required to use readily biodegradable hydraulic oil.

WATER-8: A dewatering permit will be obtained from the Central Valley Water Board for each project site, if deemed necessary, based on the dewatering methods used.

3.11 Land Use

3.11.1 Affected Environment

The Tehama County General Plan designation for the project site is Valley Floor Agriculture (VFA). The Tehama County zoning designations within the project site are zoned Agricultural / Upland District (AG-1) and Agricultural / Valley District (AG-2). The project site is within the Central I-5 Corridor Planning Unit in the Tehama County General Plan (Pacific Municipal Consultants 2009). This planning area is located in the central portion of the County and includes the communities of Los Molinos, Tehama, El Camino, Gerber, Proberta and Dairyville. This area supports large land areas held in public ownership, and lands utilized for agriculture and grazing. Road access within the Central I-5 Corridor Planning Unit is provided primarily by Interstate Highway 5 (I-5) and SR 99-East and SR 99-West, which runs north-south across the central portion of the County. The primary east-west running county roads in the Central I-5 Corridor Planning Unit are Flores Road, Gyle Road and Red Banks Road which runs generally north-east and south-

west. The primary north-south running county roads in the Central I-5 Corridor Planning Unit are Paskenta Road and Rawson Road.

3.11.2 Environmental Consequences / Impacts and Mitigation Measures

Methodology

The methodology used for the land use impact analysis involved an assessment of the compatibility of the proposed project with relevant plans and policies, and a review of the Tehama County General Plan, and zoning in relation to surrounding land uses and site features. The analysis was conducted through document review, site visits and discussions with Tehama County staff.

Impacts to land uses would be significant if they would:

- 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; or
- c) Conflict with any applicable habitat conservation plan or natural community conservation plan.

No Action Alternative

Under this alternative, no change of land use or activities would occur. Diverted flows from Mill Creek would continue to service the private agricultural uses of the site and customer base of LMMWC and continue to provide a water supply for irrigation and livestock water. There would be no impacts to the current land use.

3.11.2.3 Proposed Project Alternative

Under this alternative, no change in land use would occur. The project area is located within Tehama County's AG-1 and AG-2 land use zones, which limits land uses to further agriculture production and related activities. The proposed project fits within acceptable improvements in the land use zones and after discussion with Tehama County Planning Department staff, no further permitting through the county would be required (C. Nunez pers. comm.). The proposed project remains consistent with the goals, policies, and objectives of the Tehama County General Plan and Zoning Ordinance and there would be no physical division of an established community. Project implementation would not interfere with, preclude, or conflict with existing land uses adjacent to the project area. There would be no conflicts with any applicable habitat conservation plan or natural community conservation plan. Because there would be no impact to land use, no mitigation is required.

3.12 Noise

3.12.1 Affected Environment

Noise concerns are described in terms of sensitive receptors, or noise-sensitive land uses within hearing range of the activity. Aerial photography helped identify eight potential sensitive receptors (those within 600 feet of the project sites) near the Exposed Siphon site, two sensitive receptors near the Ward Dam site and no sensitive receptors near the Upper Dam. These potential receptors were located within the Mill Creek corridor to the north of Mill Creek. The closest potential sensitive noise receptors to each site were found to be approximately 231 feet from the Exposed Siphon site, 248 feet from Ward Dam site and approximately one mile from the Upper Dam site. Land uses at these locations appear to be residential in nature but could not be accurately identified from aerial photography.

The area surrounding the three project sites ranges from rural residential and ranch land at the Exposed Siphon and Ward Dam to remote rangeland at the Upper Dam site. There is paved public road access to the entrance of the Mill Creek Ranch, with private gravel road access from there to the Exposed Siphon Ward Dam project sites. In addition, there is paved public road access to a residence, which serves as the access to the north bank of the Exposed Siphon project site. There is paved public road access to the private entrance to the Dye Creek Preserve, with unimproved road access from there to the Upper Dam project site. There is limited daily traffic noise in the area of the Exposed Siphon and Ward Dam sites due to the rural residential and agricultural uses. There is also limited daily traffic noise at the Upper Dam site from routine vehicle access to the Upper Dam for livestock operations, stream flow gage maintenance, fish screen maintenance, water diversion maintenance and fisheries surveys. There is existing ambient and background noise associated with Mill Creek, the siphon, fish screens, dam spillways and varied wildlife activities. Varying ambient noise level at the Exposed Siphon, fish ladders and dams is dependent upon the volume of water flowing over the structures.

3.12.2 Environmental Consequences / Impacts and Mitigation Measures

Methodology

Construction noise related to the project site improvements are the focus of this analysis. Assumptions related to construction equipment and industry noise averages were used to evaluate construction-related noise impacts.

An impact related to noise would be significant if the project would cause:

- 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 ground borne vibration or ground borne 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, expose people residing or working in the project area to excessive noise levels;
- f) For a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels.

No Action Alternative

Under this alternative, the proposed project would not be implemented, therefore no change in permanent, temporary or periodic ambient noise levels would occur.

Proposed Action Alternative

Under this alternative, construction vehicles entering and leaving the Exposed Siphon project site would temporarily increase traffic levels and, thus, ambient noise levels along a total of 0.65 miles of paved public roads and 0.10 miles of unpaved private road from SR 99. Construction vehicles entering and leaving the Ward Dam project site would temporarily increase traffic levels and, thus, ambient noise levels along 0.65 miles of paved public roads and one mile of unpaved private road from SR 99. Construction vehicles entering and leaving the Upper Dam project site would temporarily increase traffic levels and, thus, ambient noise levels along 1.55 miles of paved public roads and 2.47 miles of unpaved private road from SR 99.

During the construction phase of the project, noise from construction activities would temporarily impact the environment in the immediate area. The noise levels of typical construction equipment that could be used to implement the project are shown in Table 10.

Table 10. Typical Construction Equipment Noise	
Equipment Description	At 50 feet (Decibels- Acoustic, slow)
Auger Drill Rig	85
Backhoe	80
Boring Jack Power Unit	80
Compressor (air)	80
Concrete Mixer Truck	85
Concrete Pump Truck	82
Crane	85
Dozer	85
Dump Truck	84
Excavator	85
Flatbed Truck	84
Front-End Loader	80
Generator	82
Grader	85
Jackhammer	85
Pneumatic Tools	85
Pumps	77
Rock Drill	85

Source: Federal Highway Administration Roadway Construction Noise Model

There would be no permanent noise impacts resulting from implementation of the proposed project. However, adjacent landowners within the general vicinity of project construction at all three sites could encounter increased noise levels during construction activities; in excess of the Tehama County General Plan standards of 50 Energy-Equivalent Level (LEQ), depending on site-specific topography and vegetative screening. LEQ measures individual noises for a period of time (typically for one hour) and determines

the average noise level. Mobile equipment such as excavator, loaders, etc., may operate in a cyclic fashion in which a period of full power is followed by a period of reduced power and noise. Any impacts would be temporary and localized, however this is considered a potentially significant impact.

Recreational users in the general vicinity of the site could encounter increased noise levels during construction activities if they were near the project site during daytime hours on weekdays; however, the impact would be temporary and localized and recreational uses in the project areas are limited due to the fact that they are all located on private property with controlled access. Noise impacts to recreational uses are considered less than significant.

It is not anticipated that ground vibration created by project activities would be detectable at any sensitive receptor locations nor result in any structural damage. There are no noise related impacts relating to public airports or privately owned airstrips adjacent to or within the project area.

The following measures would be implemented to avoid and minimize impacts from noise and to mitigate potentially significant impacts from noise to less than significant levels:

NOISE-1: Construction work (including arrival and departure of trucks hauling materials) will generally be conducted from 7:00 am to 7:00 pm Monday through Friday. Weekend work will only be allowed, if necessary to complete the projects within the established environmental time frames.

3.13 Population and Socioeconomic Resources

3.13.1 Affected Environment

The project sites are located on several rural private parcels of varying acreage. In the vicinity of the Exposed Siphon, there are six residences and numerous outbuildings within the affected environment. In the vicinity of the Ward Dam, there are four residences and numerous outbuildings within the affected environment. In the vicinity of the Upper Dam, there are no residences or outbuildings within the affected environment.

3.13.2 Environmental Consequences / Impacts and Mitigation Measures

Methodology

Analysis of the potential population and socioeconomic impacts of the proposed project included qualitative assessments of potential impacts associated with housing, conflicts with county and local plans, population growth, displacement of persons and businesses, and community disruption.

The project would have a significant impact if it would:

- 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.

No Action Alternative

Under this alternative, there would be no impacts to the demographic or socioeconomic characteristics of the project, or surrounding area. The current land use and zoning, combined with the rural transportation infrastructure of the project area, limits substantial population growth and displacement.

Proposed Action Alternative

Under this alternative, project construction would not cause an economic or housing disruption through substantial population growth in an area, either directly or indirectly. The project improves fish passage conditions at all three sites, however it does not extend the infrastructure or increase production capacity. The project structures currently serve only those with water rights from Mill Creek and other LMMWC customers. Modifications associated with the project would continue to provide irrigation water to sustain the current agricultural and residential needs. No short-term or long-term residential housing displacement or displacement of people would occur as a result of the proposed project. No new transportation infrastructure or businesses would develop as a result of the project that would directly or indirectly influence local or regional population growth.

3.14 Public Services and Utilities / Energy

3.14.1 Affected Environment

The utility needs for the Exposed Siphon, Ward Dam and Upper Dam sites are self-contained and not dependent upon public infrastructure. Existing entitlements from the project area helps to service the agricultural and residential irrigation water needs of the LMMWC.

3.14.2 Environmental Consequences / Impacts and Mitigation Measures

Methodology

An impact related to Public Services and Utilities / Energy would be significant if the project would:

- a) 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:
 - a. Fire protection
 - b. Police protection
 - c. Schools
 - d. Parks
 - e. Other public facilities
- b) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board;
- c) 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;
- d) Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects;
- e) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed;
- f) 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;
- g) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs; or
- h) Comply with federal, state, and local statutes and regulations related to solid waste.

No Action Alternative

Under this alternative, no demand for public services would occur over the short-term or long-term. There are no utility needs within the project area.

Proposed Action Alternative

Under this alternative, no activities would occur to disrupt or require any new government facilities. Site irrigation needs would continue under existing entitlements. No public stormwater infrastructure, wastewater treatment or additional landfill service is needed.

Construction would result in the generation of solid waste associated with the project as well as other construction-related waste (e.g., garbage, containers, and oil). Disposal of potentially hazardous waste is evaluated in Section 3.9, Hazards and Hazardous Wastes. Construction would not have a significant effect on local or regional energy sources. Contractors would be responsible for their own utilities during construction activities. No impacts would result to public utilities and services in the project area as a result of the proposed project.

3.15 Recreation

3.15.1 Affected Environment

The parcels upon which the project sites are located, along with the surrounding parcels are all privately owned. To the south of Mill Creek at the Exposed Siphon, Ward Dam and Upper Dam project sites, the property is owned by the Mill Creek Ranch, a working organic cattle ranch. To the north of Mill Creek, at the Exposed Siphon and Ward Dam project sites, privately owned parcels include residential infrastructure and uses. These parcels include portions of Mill Creek where recreation use is unknown. At the Upper Dam site, to the north of Mill Creek, the 37,540-acre Dye Creek Preserve is managed by The Nature Conservancy and is mainly used for livestock grazing, recreation, research and outdoor education.

The Upper Dam project site and haul road are located within the Dye Creek Preserve. The Dye Creek Preserve provides controlled privately-managed recreational hunting opportunities including big game, waterfowl and upland game. This hunting program is managed through subleases held by individual parties and a commercial outfitter. The majority of the hunting occurs in the fall. In general, the big game hunting program includes approximately 60 hunters per season. Fall hunting is also allowed through a sublease for approximately four to six people each year on property owned by the LMMWC, south of Mill Creek, upstream of Upper Dam. There are also a handful of other property owners that own inholdings within the general area that occasionally hunt in the area.

Fishing opportunities also occur along Mill Creek, however access is limited due to the fact that the majority of the property in lower Mill Creek is held in private ownership. Dye Creek Preserve does not provide fishing as part of the recreational program. There are no developed regional or neighborhood parks or other recreational facilities within or directly adjacent to the project site.

3.15.2 Environmental Consequences / Impacts and Mitigation Measures

Methodology

The analysis of the potential effect on recreation resources as a result of the proposed project consists of identifying recreational resources near the project area and determining whether implementation of the action would impact these resources. In addition to evaluating the impacts on recreational resources, an evaluation was made of the project's consistency with Tehama County recreation objectives.

Impacts associated with recreational uses would be significant if the project would:

- a) 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) Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.

No Action Alternative

Under this alternative, no change in recreational uses would occur. The types of recreational activities within the project area, as well as upstream and downstream of the Exposed Siphon, Ward Dam and Upper Dam would remain unaffected. Potential recreational benefits, in the form of increased fish populations as a result of the proposed project, would not occur.

Proposed Action Alternative

Under this alternative, no new recreational facilities would be required nor would any existing facilities be negatively impacted or required to be expanded. Project construction activities will be coordinated with all project site landowners. During project construction activities, a limited duration of increased noise in the general area of the project site would occur that could potentially impact recreational uses for a short time, in particular hunting activities in the general area. However, because recreational use of the area appears to be light, and recreational uses are also available farther away from the project sites, coupled with the fact that the impact would be short in duration, this is considered a less than significant impact.

Under this alternative, beneficial impacts to recreation may result from increased fish populations, both locally and regionally. Mitigation measures that have been developed for potential noise and water quality impacts will be implemented to make sure that any materials released into the river, or noise generated from construction activities that could cause a nuisance or adversely affect recreation uses would not result in a significant impact. Refer to Section 3.12 for noise mitigation measures and Section 3.10 for water quality mitigation measures.

3.16 Transportation

3.16.1 Affected Environment

Exposed Siphon

SR 99 is the main highway near the project site. From SR 99, the Exposed Siphon project site would be accessed from Mill Race Road, Sherwood Avenue and Ward Road to access the south bank and from Mill Race Road, Sherwood Avenue, Shasta Boulevard and an approximate 0.1 mile section of unpaved private road to access the north bank. Aside from a portion of Ward Road, all routes are two-lane surfaced roads that access private parcels.

The project area is relatively rural and most of the roads are commonly used for large farm equipment and heavy-duty vehicles for agricultural operations. Vehicle and heavy machinery access to the project area would occur on existing roads and to the extent possible, existing parking areas on the private unpaved project access road would be employed for equipment staging. No new road construction (or maintenance to existing roads) is planned in conjunction with the project.

Project traffic would arrive on Mill Race Road, after traveling through the more highly used and urbanized SR 99 highway that provides regional access through the area. Delivery of heavy equipment and construction employee traffic would occur during up to four months of project activities. Trucks for transportation of water for dust control, construction workers and construction materials would also access the site daily.

During the construction period when the greatest number of workers and trucks would be required, approximate trips to the site and equipment needed at the Exposed Siphon site is as follows:

- 20 trips for concrete trucks (standard 9-yard concrete trucks)
- 5 trips for hauling rock onsite and offsite (10-wheel dump truck, pulling a 20-cubic-yard trailer)
- 12 trips of large flatbed trailers to bring equipment onsite and offsite

Equipment:

- 1 large excavator
- 1 large front-end loader
- 1 concrete pump truck

Ward Dam

From SR 99, the Ward Dam project site would be accessed from Mill Race Road, Sherwood Avenue and Ward Road. Aside from a portion of Ward Road, all routes are two-lane surfaced roads that access private parcels.

The project area is relatively rural and most of the roads are commonly used for large farm equipment and heavy-duty vehicles for agricultural operations. Vehicle and heavy machinery access to the project area would occur on existing roads and to the extent possible, existing parking areas on the private unpaved project access road would be employed for equipment staging. No new road construction (or maintenance to existing roads) is planned in conjunction with the project.

Project traffic would arrive on Mill Race Road, after traveling through the more highly used and urbanized SR 99 highway that provides regional access through the area. Delivery of heavy equipment and construction employee traffic would occur during up to four months of project activities. Trucks for transportation of water for dust control, construction workers and construction materials would also access the site daily.

During the construction period when the greatest number of workers and trucks would be required, approximate trips to the site and equipment needed at the Ward Dam site is as follows:

- 35 trips for concrete trucks (standard 9-yard concrete trucks)
- 38 trips for hauling rock onsite and offsite (10-wheel dump truck, pulling a 20-cubic-yard trailer)
- 25 trips of large flatbed trailers to bring equipment onsite and offsite

Equipment:

- 2 large excavators
- 1 large front-end loader
- 1 concrete pump truck

Upper Dam

From SR 99, the Upper Dam project site would be accessed from Third Avenue and then on a private dirt road past a locked gate. Third Avenue is a two-lane surfaced roads that accesses private parcels.

The project area is relatively rural and most of the roads are commonly used for large farm equipment and heavy-duty vehicles for agricultural operations. Vehicle and heavy machinery access to the project area would occur on existing roads and to the extent possible, existing parking areas on the private unpaved project access road would be employed for equipment staging. No new road construction (or maintenance to existing roads) is planned in conjunction with the project.

Project traffic would arrive on Third Avenue, after traveling through the more highly used and urbanized SR 99 highway that provides regional access through the area. Delivery of heavy equipment and construction employee traffic would occur during up to four months of project activities. Trucks for transportation of water for dust control, construction workers and construction materials would also access the site daily.

During the construction period when the greatest number of workers and trucks would be required, approximate trips to each site and equipment needed at each site is as follows:

- 35 trips for concrete trucks (standard 9-yard concrete trucks)
- 20 trips for hauling rock onsite and offsite (10-wheel dump truck, pulling a 20-cubic-yard trailer)
- 20 trips of large flatbed trailers to bring equipment onsite and offsite

Equipment:

- 2 truck cranes
- 1 large front-end loader
- 2 large excavators
- 1 concrete pump truck

3.16.2 Environmental Consequences / Impacts and Mitigation Measures

Methodology

A qualitative assessment of traffic effects was performed, based on the construction procedures and equipment that would be used and site review of existing conditions.

An impact related to transportation would be significant if the project would:

- 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);
- e) Result in inadequate emergency access;
- f) Result in inadequate parking capacity; or
- g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks).

No Action Alternative

This alternative would not produce any potential direct transportation / traffic effects. The project area is rural in nature.

Proposed Action

Project construction activities would require truck and worker trips on SR 99 on Mill Race Road, Sherwood Avenue, Shasta Boulevard, Ward Road, Third Avenue, the privately owned, graveled portion of Ward Road and the privately owned dirt haul roads to access the Upper Dam project site. The proposed project would increase vehicle trips and type of equipment transported on these routes. At the Exposed Siphon site, construction vehicles would temporarily increase traffic levels on a total of 0.65 miles of

paved public roads and 0.10 miles of unpaved private roads from SR 99. At the Ward Dam site, construction vehicles would temporarily increase traffic levels on a total of 0.65 miles of paved public roads and one mile of unpaved private road from SR 99. At the Upper Dam site, construction vehicles would temporarily increase traffic levels on a total of 1.55 miles of paved public roads and 2.47 miles of unpaved private road from SR 99. Construction equipment i.e. large trucks and excavators, would be mobilized to the site prior to project activities and would be moved upon completion of these activities.

Throughout construction, the amount of daily construction equipment traffic would be limited by staging the construction vehicles and equipment within the project boundary for the duration of work. Post-construction activities i.e. revegetation, maintenance and monitoring would require intermittent access for approximately two to three years.

Existing traffic volumes along SR 99 are high and the potential increase in traffic generated from construction would be localized and minimal. There are consistent daily traffic volumes in the area of all three project sites due to the rural residential and agricultural uses. There is also consistent daily traffic volumes from routine vehicle access to the Upper Dam for livestock operations, stream flow gage maintenance, fish screen maintenance, water diversion maintenance and fisheries surveys. Additionally, these roads have been used previously for similar projects involving construction at these sites, and use of heavy equipment and similar materials and equipment at all three sites.

SR 99 is a designated truck route that was built to withstand occasional use by heavy equipment and was designed to accommodate a mix of vehicle types, including heavy trucks. The project is not expected to add significantly to roadway wear-and-tear on SR 99. Construction traffic would increase on the other local paved roads in conjunction with the various construction activities. The local roads over which project related trucks and heavy equipment must pass may have been constructed and / or maintained to support substantial volumes of truck traffic. The local roadways have previously provided and currently provide access for construction-related and maintenance activities on a regular continuous basis. Use of these roads by project related trucks and heavy equipment would likely not increase the wear-and-tear on the local roadways to a level which would result in adverse impacts on the road conditions due to roadway design and existing condition. Standard construction and transportation practices would also be implemented to reduce the potential adverse impacts on roadway conditions. Project related traffic would not increase traffic on the local roads to a level that is substantial in relation to the existing traffic load, or capacity of the road system. Project related impacts to traffic loads and capacity of the road systems are considered less than significant.

Under this alternative, project construction activities would be managed to ensure that the rural roads serving as access to the project site would remain open to through traffic. Temporary traffic control may be necessary during mobilization and demobilization of heavy equipment; however no road closures are planned. Construction activities would not reduce / close existing traffic lanes, therefore, congestion caused by construction vehicles accessing the work areas from local roads would be minimal and limited to the short term duration of the project work. The project would largely involve weekday activity when the roads in the general area would be lightly used. Project activities would not normally occur on weekends. Project related impacts to congestion would be less than significant.

Project activities would not result in a change in air traffic patterns, nor would they substantially result in safety risks or increase hazards due to design features, or incompatible uses. Emergency access and parking capacity would not change as a result of project activities. The project activities also do not conflict with any Tehama County transportation plans or any other alternative transportation plans. As a result of the proposed project, there would be less than significant impacts on transportation.

4.0 Consultation and Coordination

4.1 Tribes, Agencies, and Organizations Contacted or Consulted

Letters were sent to Native American Tribes in accordance with Section 106 of the National Historic Preservation Act. The California State Historic Preservation Officer is being consulted with, in accordance with Section 106 of the National Historic Preservation Act, regarding the project. NMFS and USFWS are being consulted with, in accordance with Section 7 of the ESA and CDFW is being consulted with, in accordance with the CESA, regarding the project.

4.2 Public Comments

An initial public scoping notice was published in the legal section of the Red Bluff Daily News on January 13, 2015 requesting comments by February 3, 2015. No comments were received. The Draft EA / IS and FONSI / MND will be released for public review from May 20, 2015 to June 19, 2015.

5.0 Compliance with Environmental Laws and Regulations

The following environmental laws and regulations will be complied with, as applicable, for the proposed project:

Environmental Law / Regulation	Agency
Bald and Golden Eagle Protection Act	U.S. Fish and Wildlife Service
California Endangered Species Act	California Department of Fish and Wildlife
California Environmental Quality Act	Central Valley Regional Water Quality Control Board
Clean Air Act	Tehama County Air Pollution Control District
Clean Water Act Section 401	Central Valley Regional Water Quality Control Board
Clean Water Act Section 402, National Pollution Discharge Elimination System – Construction Activities Storm Water General Permit	State Water Resources Control Board
Clean Water Act Section 404	U.S. Army Corps of Engineers
Endangered Species Act	National Marine Fisheries Service U.S. Fish and Wildlife Service
Magnuson-Stevens Fishery Conservation and Management Act	National Marine Fisheries Service
Migratory Bird Treaty Act	U.S. Fish and Wildlife Service
National Environmental Policy Act	U.S. Fish and Wildlife Service
National Historic Preservation Act Section 106	State Historic Preservation Officer
Executive Order 11990 Protection of Wetlands	U.S. Fish and Wildlife Service
Executive Order 11988 Floodplain Management	U.S. Fish and Wildlife Service

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