ENVIRONMENTAL ASSESSMENT

Orwick Diversion Fish Screen Improvement Project
Battle Creek, Tehama County, California

Prepared for:
Red Bluff Fish and Wildlife Office
U.S. Fish and Wildlife Service

Prepared by:
North State Resources, Inc.
50776

Draft Date: August 2006
Revision Date: September 27, 2006

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ACRONYMS

AFRP..... Anadromous Fish Restoration Program
ASTM ..... American Society for Testing and Materials
BA..... Biological Assessment
BLM..... Bureau of Land Management
BMP ..... Best Management Practice
CARB..... California Air Resources Board
CDFG..... California Department of Fish and Game
CESA ..... California Endangered Species Act
cfs..... Cubic feet per second
CHART ..... Critical Habitat Analytical Review Teams
CNFH..... Coleman National Fish Hatchery
CO ..... Carbon monoxide
CVPIA..... Central Valley Project Improvement Act
DPS ..... Distinct Population Segment
EA ..... Environmental Assessment
EFH..... Essential Fish Habitat
EIS/EIR..... Environmental Impact Statement/Environmental Impact Report
EPA..... Environmental Protection Agency
ESA..... Endangered Species Act
ESU..... Evolutionarily Significant Unit
HDPE ..... High-density polyethylene
HSA..... Hydrologic Sub-area
LOC..... Letter of Concurrence
MSFCMA ..... Magnuson-Stevens Fishery Conservation and Management Act
MSL ..... Mean sea level
NAGPRA ..... Native American Graves Protection and Repatriation Act
NEPA ..... National Environmental Policy Act
NHPA..... National Historic Preservation Act
NMFS..... National Marine Fisheries Service
NO_X..... Nitrous oxides
NRCS ..... Natural Resources Conservation Service
NRHP..... National Register of Historic Places
NSVAB..... Northern Sacramento Valley Air Basin
O_3 ..... Ozone
O&M..... Operations and Management
OHSA..... Occupational Health and Safety Administration
PCE ..... Primary Constituent Elements
PEIS ..... Preliminary Environmental Impact Statement

PG&E ..... Pacific Gas and Electric
PM10 ..... Particulate matter 10-micron
PM2.5 ..... Particulate matter 2.5-micron
Proposed Action ..... Orwick Diversion Fish Screen Improvement Project
Reclamation ..... U.S. Bureau of Reclamation
Restoration Project ..... Battle Creek Salmon and Steelhead Restoration Project
ROD ..... Record of Decision
RPM ..... Resource Protection Measure
Service ..... U.S. Fish and Wildlife Service
SO_X ..... Sulfur oxides
SRA ..... Shaded Riverine Aquatic
TT ..... Technical team
VELB ..... Valley elderberry longhorn beetle
VOC ..... Volatile organic compound

ORWICK DIVERSION FISH SCREEN IMPROVEMENT PROJECT ENVIRONMENTAL ASSESSMENT

1. INTRODUCTION

This environmental assessment (EA) was prepared by the U.S. Fish and Wildlife Service (Service), as the federal lead agency, in compliance with the National Environmental Policy Act (NEPA), to assist with the planning and decision-making for the Orwick Diversion Fish Screen Improvement Project (proposed action). A draft EA was circulated for public review beginning on August 3, 2006 and subsequent revisions to the EA were made on September 27, 2006. The revisions are minor in nature and changes are shown as strikeouts (deletions) and underlines (additions) of text in this document. Installation of an effective fish screen and bypass at the Orwick Diversion, a private, small irrigation water diversion, on Battle Creek was identified as a priority action as part of the Final Anadromous Fish Restoration Plan (U.S. Fish and Wildlife Service 2001b), in accordance with the Central Valley Project Improvement Act (CVPIA) (Title 34 of Public Law 102-575, Section 3406(b)(1)), which authorizes the development and implementation of programs intended to, at a minimum, double the natural production of anadromous fish in California's Central Valley rivers and streams. The proposed action emerged from an ongoing collaboration between the Service, California Department of Fish and Game (CDFG), National Marine Fisheries Service (NMFS), and Bureau of Land Management (BLM) to design, install, and operate an effective fish protection solution at the Orwick Diversion canal. The proposed action is needed to further implementation of effective fish protection at the Orwick Diversion and resolve performance deficiencies that have developed with the existing fish screen and bypass, which was originally installed in 1998.

The proposed action consists of two components: (1) a re-engineered bypass pipeline and outfall to the creek, and (2) a new headgate water control structure. The existing fish screen at the Orwick Diversion is owned and operated by CDFG. Under the proposed action, the re-engineered fish bypass pipe, an integral feature of the fish screen facility, will be owned and maintained by the CDFG. The fish bypass pipeline will be funded by the Service and constructed on land managed by BLM. A new, upgraded headgate flow control structure on the diversion is needed to prevent entrainment of fish, and "take" of fish species listed under the Endangered Species Act of 1973, as amended (ESA), during high flow events that overtop the screen. However, federal funding from the Service for upgrade and replacement of the headgate structure cannot be made available until an operation and maintenance (O&M) agreement is in place between CDFG and the private water rights holder, who is the owner of the diversion. Currently, an O&M agreement for the proposed upgraded headgate structure is being negotiated between CDFG and the owner of the diversion; however, an agreement has not been reached (M. Berry, CDFG-Redding, pers comm. 2006). Federal permits and approvals, as well as NEPA documentation, are required for both components of the project. This EA addresses the direct, indirect, and cumulative effects of the proposed action and provides information for the lead agency to determine whether the proposed action would have a significant effect on the human environment.

2. PROJECT LOCATION

The approximately 5.035-acre project area includes a portion of the Orwick Diversion canal, which flows south-southwest from Battle Creek (stream mile 7.3) and adjacent uplands located to the north between the canal and Battle Creek, Township 29 North, Range 2 West, Section 6 of the Balls Ferry, California

U.S. Geological Survey (USGS) 7.5-minute quadrangle, Mount Diablo Base and Meridian. Battle Creek forms the border between the counties of Shasta and Tehama, State of California (Figure 1). The project area is located approximately 1.5 miles northeast of the Service's Coleman National Fish Hatchery (CNFH) and approximately 0.25 mile southwest of Pacific Gas and Electric Company's (PG&E) Coleman Powerhouse (Figure 2).

3. PROGRAMMATIC PURVIEW

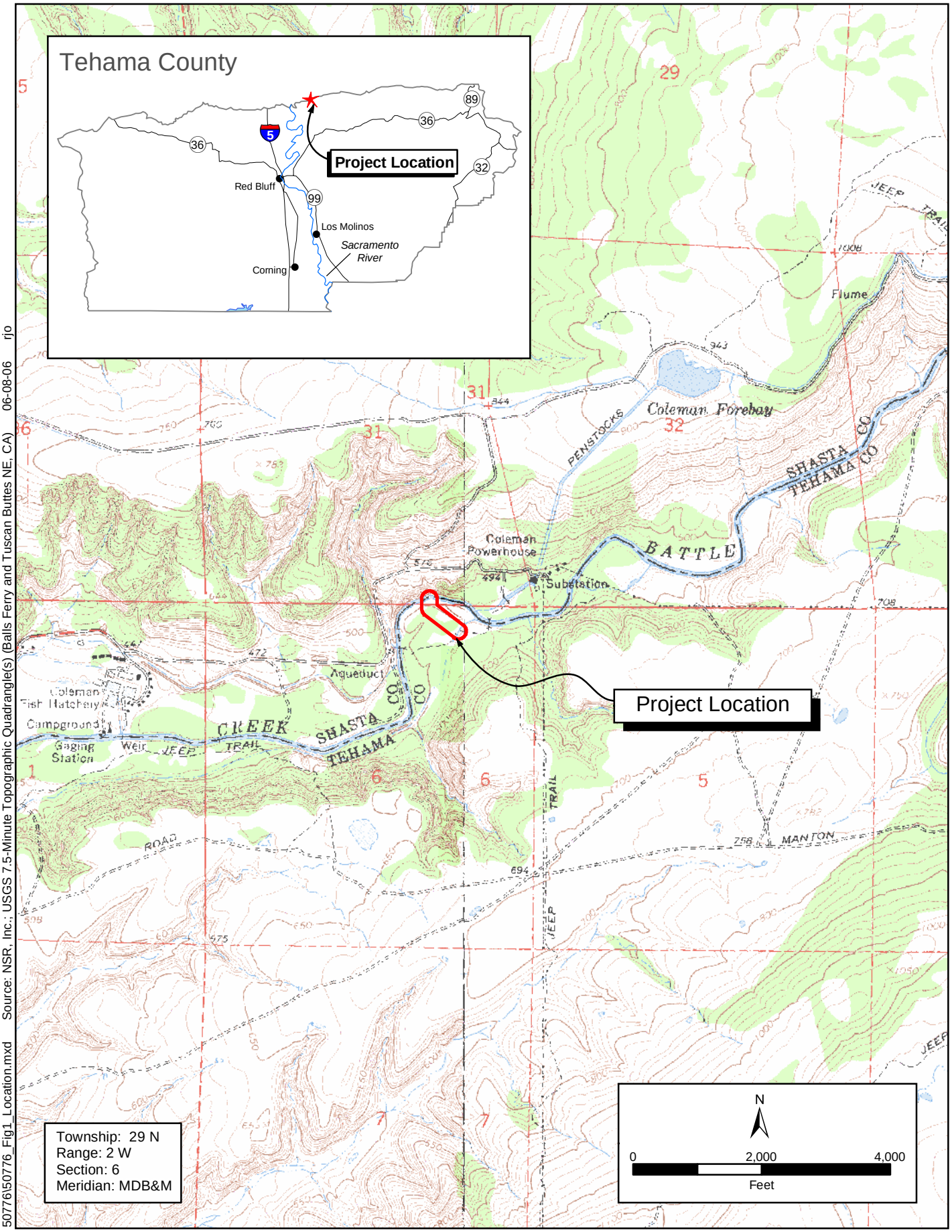
The Anadromous Fish Restoration Program (AFRP) was authorized by the CVPIA (Title 34 of Public Law 102-575, Section 3406(b)(1)), which directed the Secretary of the Interior, in consultation with other State and Federal agencies, Indian tribes, and affected interests, to develop and implement a program that makes all reasonable efforts to at least double natural production of anadromous fish in California's Central Valley rivers and streams. The CVPIA responsible agencies, U.S. Bureau of Reclamation (Reclamation) and the Service, evaluated the environmental effects of a range of programmatic alternatives that included the AFRP and prepared a programmatic environmental impact statement (PEIS) (Department of Interior 1999) and a Record of Decision (ROD) (Department of Interior 2001) in accordance with NEPA.

Because the PEIS conducted only general analyses and was not intended to disclose the site-specific impacts of implementing the CVPIA, specific AFRP-related actions tier from the CVPIA PEIS and have been implemented in a manner consistent with the CVPIA ROD. A tiered analysis focuses on the specific proposed action and relies on the broader programmatic review for analyses of pertinent program-level impacts and mitigation measures. These programmatic-level impacts and mitigation measures are described in the CVPIA PEIS.

This EA is tiered from the CVPIA PEIS and ROD and addresses detailed, site-specific information on impacts and mitigation for the proposed action. The EA is consistent with the environmental provisions of the CVPIA PEIS and ROD.

4. PURPOSE AND NEED FOR ACTION

The Orwick Diversion Fish Screen Improvement Project is being proposed to further implementation of effective fish protection facilities for water diversions on Battle Creek identified by the Service, NMFS, and CDFG (California Department of Fish and Game 1993; U.S. Fish and Wildlife Service 1995, 2001b). Salmon and steelhead restoration in Battle Creek has been given a high priority among State and Federal anadromous fish recovery and restoration efforts, including the AFRP (California Department of Fish and Game1993; CalFed 2000; U.S. Fish and Wildlife Service 2001b; Good et al. 2005). Effective screening of the Orwick Diversion was identified as a specific action (Action 4) of the Final AFRP Plan issued in 2001 (U.S. Fish and Wildlife Service 2001b). The proposed action addresses improvements required to alleviate performance deficiencies that have developed with the existing fish bypass pipeline (installed in 1998) and the diversion's headgate control structure (part of the original diversion structure) associated with the Orwick Diversion. Two adverse conditions can occur for juvenile salmon and steelhead at the Orwick Diversion under the existing structural configuration: (1) fish can be entrained past the fish screen during periods when stream flows and the headgate setting are mismatched and flows overtop the screen; and, (2) fish can encounter a "dead end" at the screen, because there is no effective downstream access back to Battle Creek.



Source: NSR, Inc.; USGS 7.5-Minute Topographic Quadrangle(s) (Balls Ferry and Tuscan Buttes NE, CA) 06-08-06 rjo

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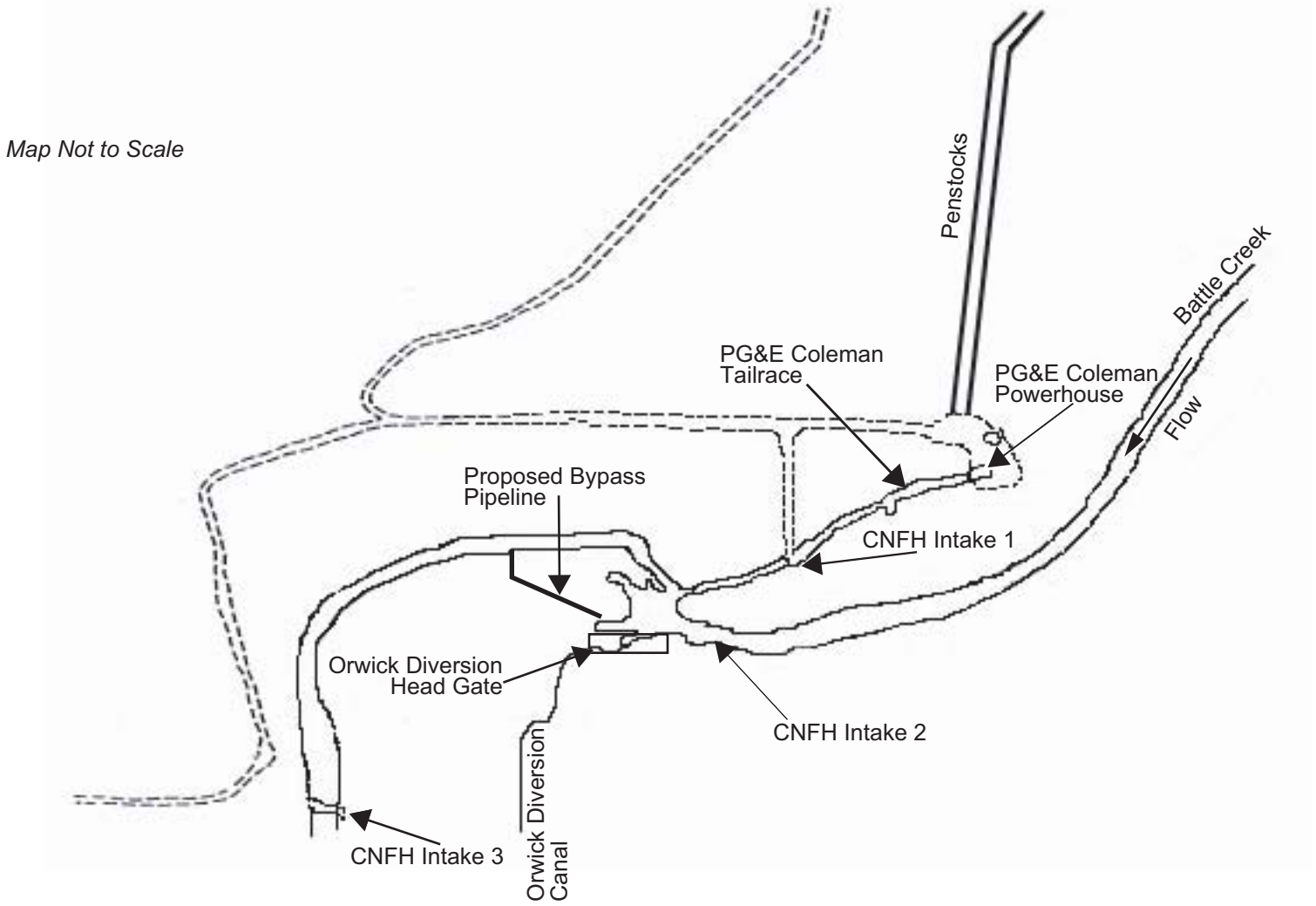
North State Resources, Inc.

Orwick Diversion Fish Screen Improvement Project

Figure 1
Project Location



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Adapted from: Coleman Powerhouse Tailrace Channel Fish Barrier EA. USFWS 2004.

Figure 2
Orwick Diversion Site and Adjacent Features Along Battle Creek

Currently, diversions into the canal must be manually regulated using the existing headgate control structure, which requires adjustment of the headgate, when stream flow and creek water surface levels change, for proper operation of the fish screen and to maintain diversion levels. The private water diverter holds a water right for up to 50 cubic feet per second (cfs) to meet irrigation needs. Without an efficient method to regulate diversion flows into the canal, the fish screen can overtop during times of high and rapidly changing stream flows, and high water velocities and debris can damage the fish screen, both of which can result in fish entrainment into the diversion canal.

Summer irrigation diversions to the Orwick Diversion canal (up to 50 cfs) can equal nearly 20 percent of the typical summer baseflow in lower Battle Creek, which averages about 250 cfs (T. Parker, USFWS, pers. comm. 2006). The existing bypass pipe, which was intended to return fish encountering the Orwick Diversion fish screen back to the main creek channel, has proven ineffective for several reasons, including a rough interior surface, intermittent seasonal connectivity of the side channel leading from the bypass outfall to the main creek channel, and a suboptimal pipeline gradient to conduct water and fish efficiently to the creek. Under the existing condition, fish entering the bypass pipe during the summer and fall months may encounter a nearly dry side-channel at the bypass outfall, impairing return to the main creek channel. During winter and spring high creek flows, the suboptimal pipeline gradient results in a reverse flow of water (and fish) from the high-flow side channel at the bypass outfall back towards the fish screen, also impairing fish return to the main creek channel.

The CDFG has operated and maintained the fish screen at the Orwick Diversion since the fish screen's construction in 1998, and has committed to continue to maintain the screen and bypass into the future (i.e., by clearing debris up to three times per week and repairing fish screen panels) (M. Berry and K. Gale, CDFG, pers. comm. 2006).

Concerns about the continued loss of juvenile salmonids by periodic overtopping of the fish screen and poor function of the fish bypass prompted NMFS to form a working team of knowledgeable agencies and other stakeholders. NMFS, CDFG, the Service, Natural Resource Conservation Service (NRCS), and the water diverter have joined together to work on two overall objectives: (1) provide the diverter with continued access to the creek in order to exercise his pre-existing water right using the Orwick Diversion canal (*aka*., South Side Ditch for the Battle Creek Ranch), and (2) prevent take of listed fish species at the diversion by improving the functioning of the fish screen through replacement of the bypass pipe to return fish to the main channel of Battle Creek, and upgrade of the headgate for control of the water surface elevation at the fish screen.

Along with this larger team, a smaller technical team (TT) includes representatives from CDFG, the Service, BLM, and NMFS. The role of the TT is to work on the technical issues related to the bypass and headgate water control structure and to assist the larger team in resolving fish passage protection problems at the project site. The proposed action described in this EA has been developed through the collaboration of the TT members.

5. ALTERNATIVE ACTIONS CONSIDERED

The TT investigated and considered two approaches (project alternatives) for addressing the ongoing fish passage problem identified at the Orwick Diversion: (1) retrofit and extend the existing bypass pipeline

to the main creek channel to correct pipe gradient and to meet NMFS' fish passage and outfall criteria, and (2) construct a new bypass pipeline that meets NMFS' fish passage and outfall criteria. Both alternatives were considered superior, in terms of fish protection and passage, to the existing condition and taking no action at this site.

The first alternative was determined to have required considerable re-engineering and have a greater environmental impact. Therefore, it was rejected from further consideration, since considerable excavation within the active stream channel would be required to extend the pipeline from its existing outfall location to an outfall site on the creek in order to meet NMFS' criteria. The second alternative was considered the most feasible and efficient manner, from a bioengineering stand point, to improve the existing fish passage conditions at the diversion site and meet NMFS' fish bypass and outfall criteria. The second approach also would allow routing of the bypass pipeline to avoid and minimize environmental impacts within the project site to a greater degree than with the first approach. The second alternative was, therefore, selected as the proposed action to improve fish passage at the project site.

6. PROPOSED ACTION

The proposed action consists of two distinct construction activities that will be staged in the following sequence: (1) construction of a new fish bypass pipe and outfall to the main channel of Battle Creek, and (2) installation of a new headgate on an existing headwall to better control water flows passing the fish screen and entering the Orwick Diversion. Both actions are intended to improve fish protection and passage at the diversion by increasing fish screen effectiveness and by increasing bypass effectiveness for returning fish to the main creek channel with minimal delay under the full range of stream flows occurring at the site.

6.1 FISH BYPASS PIPELINE AND OUTFALL

The fish bypass pipeline portion of the proposed action involves the installation of a new bypass pipe mated to the existing fish screen structure. The proposed bypass pipeline has been designed to comply with current fish screening criteria and fish protection standards (National Marine Fisheries Service 1997). The new fish bypass pipeline has been designed to withstand and fully function in up to a 50-year recurrence flood flow in Battle Creek (830 cfs), and for diversion rates through the fish screen into the canal of up to 50 cfs (S. Thomas, NMFS-Santa Rosa, pers. comm. 2006). Design drawings and specifications were prepared by engineering staff with the NMFS-Southwest Region and are provided in Appendix A.

The new bypass pipe will be routed along the shortest distance from the fish screen in the diversion canal to an appropriate outfall location on the main channel of Battle Creek downstream of the diversion. The bypass pipeline route has been selected to, where possible, avoid and otherwise minimize impacts to vegetation, wildlife habitat, and cultural resources, and to return fish to the creek at a safe and geologically stable site.

High flow conditions in Battle Creek during the design phase of the project (spring 2006) precluded determining an exact location and elevation for the pipeline outfall. Exact siting of the outfall will be identified by the project engineer prior to beginning construction. However, the general bypass outfall location, determined by engineers and biologists from the Service and NMFS to meet NMFS' fish bypass

criteria is located at the most geomorphically stable channel constriction, with appropriate water velocities, in the immediate vicinity of the proposed project area. The bypass outfall will be located where its receiving water is no less than 3 feet deep and the outfall height will not exceed 1.5 feet above the water surface, even at low creek flows.

The NMFS fish bypass design specifications require installation of a 12 inch diameter double-walled, high-density, polyethylene (HDPE) pipe, or similar material, with water-tight joints between pipe sections. Pipe size selection and pipeline design slope (1.07 percent) were engineered to insure water velocities of 2-12 feet per second and water depths no less than 4 inches within the pipeline under all expected operating conditions. Pipe bends will be smooth and continuous, with internal walls mating with those of straight sections to minimize the potential for entrapment of debris and fish. Pipeline cleanout ports will be located about every 80 feet (after every four lengths of straight pipe) along the length of the pipeline, with one cleanout port located at the immediate upstream end of the any pipe bends. The bypass outfall will consist of ~~steel pipe with concrete anchors~~PVC pipe. ~~Schedule 40 (ASTM A53 Grade B) steel pipe~~ PVC pipe, Schedule 40 or similar material, with an internal diameter no less than that of the pipe to which it is being joined will be required for the pipeline outfall. Internal surfaces will be smooth to the touch and free of burrs and rough edges. One additional 20-foot section of PVC (SDR 30 or similar grade pipe) will be provided for use as a temporary seasonal extension. The extension will be installed if the active creek channel migrates away from the bypass outfall terminus due to exceptionally low stream flows or if the active channel changes shape.

Construction methods and requirements will involve some necessary vegetation removal along the bypass pipeline route up to 20 feet on either side of the centerline, including felling some trees up to 24 inches in diameter; however, no woody debris or soil will be ~~approximately 12 feet~~removed from the project site. The contractor will be required to line the trench with compacted bedding to a minimum depth of 6 inches to set pipe on a uniform slope of 1.07 percent. Compacted bedding material will be used to cover the pipeline to 1 foot above the top of the pipe. The trench will be backfilled with stockpiled native material removed during excavation. Backfill material will be graded to match existing topographic contours. Erosion control, mulching, and replanting of the backfilled trench route, with a BLM-approved native grass seed mix, will be implemented to prevent sediment runoff and restore ecological functions compatible with surrounding vegetation and wildlife communities, while allowing future access to the pipeline cleanouts for required maintenance.

Rip-rap consisting of sound, well-graded, unfractured, angular rock, 2 to 3 feet in diameter, will be required to protect and reinforce the buried pipeline where it passes through a portion of a high-flow channel and stream bank. A short portion of the existing side channel, near its confluence with the main creek channel, will also be revetted with rip-rap to prevent erosion and undercutting of the pipeline within the high-flow channel. The rip-rap will be placed along the left side of the side channel to raise the elevation of the swale through which the pipe will pass to match that of the present floodplain elevation (see Appendix A drawings). The largest pieces of rock would be placed individually in an interlocking fashion, with smaller pieces being used to fill spaces between larger rocks. Rip-rap will be keyed, at a minimum, 2 feet vertically and 5 feet horizontally into existing bed and bank contours. All rip-rap bed and bank reinforcement will be installed under dry conditions. No in-water work is anticipated. All rip-rap placed on stream banks will be interspersed with native soil and ~~inter~~planted with native willow cuttings to restore ecological function of the site. Additionally, 2 to 3 trees stockpiled during vegetation

clearing of the pipeline route will be placed along the high-flow channel and keyed or cabled into the flood terrace bank to restore habitat complexity (i.e., provide large woody debris (LWD)) where the pipeline enters this secondary channel.

All excavations shall be in accordance with applicable Occupational Health and Safety Administration (OHSA) Construction Industry Standards. The contractor shall be responsible for knowing applicable regulations and shall provide appropriate shoring, signs, barricades, etc. Although excavation side-slopes are shown on the project design drawings (Appendix A), these are for illustrative purposes only. Actual trench side-slopes shall be determined by the contractor and are the sole responsibility of the contractor.

The storage of construction materials and equipment, and repair and maintenance of equipment and vehicles will be restricted to a clearly defined staging area located south of the existing fish screen at the end of the BLM access road within the project study boundaries. Disposal of excess native soil materials would be allowed at the staging area.

While the Service will be responsible for funding actual construction of the proposed action, the bypass pipeline ownership and maintenance responsibilities would be transferred to CDFG upon completion of construction (T. Parker, USFWS-Red Bluff, pers. comm. 2006). A right-of-way for construction and subsequent maintenance of the bypass pipeline will be administratively established for the property at the site by BLM (K. Williams, BLM-Redding, pers. comm. 2006).

6.2 HEADGATE

The second element of the proposed action involves renovating the existing headgate structure for an automated flow control system. The renovation is needed because the existing structure does not allow for the sufficient regulation of diverted flows to prevent overtopping of the fish screen. New flow control gates would be installed on the existing head wall structure, which would be modified, as necessary, to accommodate new flow regulating equipment. The new headgate system would allow maintenance of diversion canal flows at set levels up to 50 cfs at a wide range of stream flows, throughout the year, without restricting water diversion rates during periods of low flows. In addition, the ability to control canal flow levels would help to prevent entrainment of juvenile fish in the canal and would protect the fish screen from damage that can occur when debris is carried beyond the headgate during periods of unregulated high flow. All renovations would occur within the footprint of the existing structure. Any in-water work necessary to install the new water control equipment would be performed within the intake channel to the diversion and accomplished using manual and power (pneumatic and electric) hand tools. No major excavation, ground disturbing activities, or vegetation disturbance is anticipated in implementing this project element.

6.3 RESOURCE PROTECTION MEASURES

The following Resource Protection Measures (RPM's) have been incorporated as part of the project design and construction specifications (as appropriate) to avoid or minimize adverse impacts associated with project implementation:

Valley Elderberry Longhorn Beetle Resource Protection Measures

1. Alignment of the bypass pipe has been routed to avoid elderberry shrubs.

2. The BLM will fence an avoidance area, providing a minimum setback of at least 20 feet from the dripline of each elderberry shrub.

3. The Service will brief contractors on the need to avoid damaging the elderberry shrubs and the possible penalties for not complying with these requirements.

4. The Service will erect signs every 50 feet along the edge of the avoidance area, which will state the following: "This area is habitat of the valley elderberry longhorn beetle, a threatened species, and must not be disturbed. This species is protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment." The mounted signs will be clearly readable from a distance of 20 feet and maintained for the duration of construction.

5. The contractor will restore any damage done to the buffer area (within 100 feet of elderberry plants) during construction. The contractor will provide erosion control and re-vegetate with appropriate native plants.

6. No insecticides, herbicides, fertilizers, or other chemicals that might harm the beetle or its host plant will be used in the buffer areas or within 100 feet of any elderberry shrub.

Cultural Resources Resource Protection Measures

1. Alignment of the bypass pipe has been routed to avoid known archaeological sites.

2. An individual knowledgeable in identifying cultural resources will be present during the trenching activities. In the event subsurface cultural remains over 45 years of age are encountered, the construction will cease immediately in the general area of the discovery, and the contractor will consult with a professional archaeologist on staff with the BLM or the Service. A field exam by the archaeologist will likely be necessary and a determination made of the need for further measures, including mitigation and contacting the Native American Indian community, if human remains are encountered.

3. If any prehistoric and/or historic resources or other indications of cultural resources are found once project construction is under way, all work in the immediate vicinity of the discovery will cease and the project archaeologist will be immediately notified. An archaeologist meeting the Secretary of the Interior's Professional Qualifications Standards in prehistoric or historical archaeology, as appropriate, will be retained to evaluate the find and recommend appropriate mitigation measures.

4. In the event that human remains are discovered during construction of the project, the directives of the Native American Graves Protection and Repatriation Act (NAGPRA) (43 CFR 10) shall be implemented, including immediate cessation of activities and telephone notification of the discovery, with written confirmation, to the responsible Federal agency official.

Erosion and Sediment Control Resource Protection Measures

1. Activities that increase the potential for erosion within the project footprint shall be restricted to the fullest extent possible to the relatively dry summer and early fall period to minimize the potential for rainfall events to mobilize and transport sediment to Battle Creek. If these activities must take place during the late fall, winter, or spring, temporary erosion and sediment control structures will be in place and functional at the end of each construction day and will be maintained until disturbed ground surfaces have been successfully stabilized.

2. Spoil sites shall be located such that they do not drain directly into a surface water feature. Prior to a forecasted storm event, temporary spoil sites shall be protected from the potential for erosion using Best Management Practices (BMPs) such as compaction, mulching, and/or sediment barriers.
3. Erosion control BMPs such as silt fence, straw bales, and seeding/mulching will be placed in disturbed areas and approach fills, embankment slopes, and excavation slopes.
4. Sediment control measures shall be in place prior to the onset of the rainy season and will be monitored and maintained in good working condition until the disturbed areas have been stabilized.
5. Excavated material will be stockpiled away from Battle Creek and the Orwick Diversion canal.
6. All construction debris will be removed from the site after construction is complete.
7. Disturbed areas will be graded to match the surrounding topography and will be seeded with native plant species at the earliest feasible time following backfilling of the pipeline trench.
8. The BLM will complete revegetation and stabilization of disturbed soils within the construction prism. Seeding and mulching of disturbed areas with native grasses will be conducted immediately following implementation of construction activities. Seeding or planting with Sacramento River riparian natives will occur on an ongoing basis until a sufficient number of plants have been established for a period of 3 years after project construction completion.
9. Install 2-3 pieces of LWD, stockpiled during vegetation removal, in areas adjacent to pipeline route and keyed into the high flow channel bank
10. Rip-rap installed on stream bank areas will be interplanted with native vegetation
11. In-stream work will be limited to the dry summer months (June 15 through October 30).

General Resource Protection Measures

1. Construction and maintenance equipment and materials shall be stored away from wetland and surface water features.
2. Vehicles and equipment used during construction and maintenance shall receive proper and timely maintenance to reduce the potential for mechanical breakdowns that could lead to a spill of hazardous materials (e.g., petroleum lubricants, fuels). Maintenance and fueling shall be conducted in a designated location at least 150 feet away from Battle Creek or any wetlands.
3. Construction equipment shall be fueled at a fixed fueling station to reduce the area exposed to fuel spills from overtopping fuel tanks. Truck mounted tanks will provide fuel for equipment.
4. Spill containment materials shall be kept on site at all times to contain any accidental spill. The contractor will be responsible for immediate containment and removal of any toxins released.
5. All measures contained in permits or associated with agency approvals shall be implemented.
6. Water all active construction areas and staging areas at least twice daily in dry season.
7. Cover all trucks hauling soil, sand, or other loose material, or require all trucks to maintain at least 2 feet of freeboard.

8. Vehicle speeds will be limited to 15 mph on unpaved roads.
9. Vehicle idling time will be minimized.
10. Construction workers will carpool when possible.
11. Construction activities will be limited to daytime hours (between 7:00 a.m. and 7:00 p.m.).
12. All equipment will comply with the manufacturer's muffler requirements.
13. Engines not in use will be shut down, where applicable.
14. Equipment use will be minimized.

7. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

The environmental issues and resources potentially affected by the proposed action were identified through (1) discussions with agency and other stakeholder representatives on the working team; (2) field reconnaissance; (3) technical input from BLM, CDFG, NMFS, and Service resource specialists; and (4) similarity of necessary construction equipment and activities required for the proposed action to those of another recent project in the vicinity of proposed action area, the Coleman Powerhouse Tailrace Channel Fish Barrier Project (U.S. Fish and Wildlife Service 2004).

Key indicators used to determine the potential for significant impacts of the proposed action on the human environment include the following:

- Significant impacts to populations or critical habitat of any listed plant and animal species, or impacts to other special status species, including injury or death of individuals, removal or adverse modification of required habitats
- Significant impacts to wetlands, or other waters of the United States, including discharges and fills
- Significant impacts to water quality, including discharges of sediment, increases of temperature, increases of turbidity, and discharges of pollutants and toxic materials
- Significant impacts to archeological and other cultural resources, including disturbance or unlawful removal of Native American sacred sites and artifacts and modification or destruction of registered historic sites
- Significant impacts on air quality, noise, or aesthetics, including exceedance of air quality standards, local noise ordinances, or impaired recreational use and enjoyment.

7.1 BIOLOGICAL RESOURCES

Information on biological resources within and near the proposed project area was provided by BLM, CDFG, NMFS, and Service fishery and wildlife resource specialists. A biological assessment (BA) for potentially occurring listed species was prepared by the BLM (Appendix B). This information, along with the Service's informal letter of concurrence (LOC) responding to the BA (Appendix B), and the judgment and analysis of North State Resources Inc.'s analysts were used to evaluate potential effects of the proposed action on biological resources.

7.1.1 Affected Environment

According to the Jepson Manual (Hickman 1993), the Battle Creek watershed is located in the Cascade Range region, which is characterized by recent volcanic geology in contrast to the largely metamorphic geology of the Sierra Nevada and northern Coast Ranges. Originating on the western slopes of Mount Lassen, Battle Creek is a high-gradient headwater stream experiencing an elevation change in excess of 5,000 feet over 50 miles. A perennial tributary to the Sacramento River, the Battle Creek confluence is approximately 28 miles below Keswick Dam and approximately 5 miles southeast of the Shasta County town of Cottonwood. Flow in Battle Creek is sustained by snowmelt, natural springs, and seasonal rainfall. Snowmelt and accretion from natural springs provide cold, year-round flow. The underlying volcanic geology of the Battle Creek watershed creates a hydrology that is unusual for the Central Valley, characterized by abundant cold, spring-fed flows and relatively high dry-season base flows (California Department of Fish and Game 1993; Jones & Stokes 2005). This characteristic makes Battle Creek especially suitable for species requiring year-round cool water stream habitats, such as spring- and winter-run salmon and steelhead (California Department of Fish and Game 1993; U.S. Fish and Wildlife Service 1995).

The Orwick Diversion Fish Screen Improvement Project will be located in the lower Battle Creek watershed about 7 miles upstream of its confluence with the Sacramento River. The Cascade Range Foothill sub-region (Hickman 1993), just above the northern end of the Sacramento Valley, is characterized by hot, dry summers and mild, wet winters. The project area encompasses portions of the active channels of Battle Creek and the Orwick Diversion canal, as well as valley-foothill riparian wetlands and blue oak woodland. A wetland delineation was conducted for the project area and is included as Appendix D.

Plant Communities

The valley-foothill riparian vegetation habitat is the dominant habitat in the project area, and is characterized by open to dense accumulations of herbaceous and woody riparian plant species (Figure 3). Near the Battle Creek stream channel, dominant tree and shrub species include Fremont cottonwood (*Populus fremontii*), white alder (*Alnus rhombifolia*), Oregon ash (*Fraxinus latifolia*), shining willow (*Salix lucida* ssp. *lasiandra*), sandbar willow (*Salix exigua*), black willow (*Salix gooddingii*), bricklebush (*Brickellia californica*), Scotch broom (*Cytisus scoparia*), and Himalayan blackberry (*Rubus discolor*). Forb species include mugwort (*Artemesia douglasiana*), Santa Barbara sedge (*Carex barbarae*), and rushes (*Juncus* spp.). At locations farther away from the stream channel, species such as gray pine (*Pinus sabiniana*), interior live oak (*Quercus wislizenii*), valley oak (*Quercus lobata*), and poison oak (*Toxicodendron diversilobum*) become more prevalent. Two blue elderberry shrubs (*Sambucus mexicana*) occur in the proposed action boundary, approximately 80 feet northeast of the pipe alignment and about 40 feet northwest of the headgate. Blue elderberry shrubs provide habitat for the federally listed as threatened valley elderberry longhorn beetle (VELB) (*Desmocerus californicus dimorphus*). (A BA that assesses potential impacts to VELB relative to the proposed project action, and an informal consultation letter issued by the Service, which concurs with the findings of the BA that while the project may affect VELB, it is not likely to have an adverse effect, is included as Appendix B. Lianas are common throughout and include California wild grape (*Vitis californica*) and pipevine (*Aristolochia californica*).

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North State Resources, Inc.

Orwick Diversion Fish Screen Improvement Project

Figure 3
Wildlife Habitat Relationship

Blue oak woodland habitat occupies the northern- and southern-most portions of the project area. This habitat is characterized by open to moderately dense stands of blue oak (*Quercus douglasii*) with a moderately dense to dense herbaceous layer. Dominant herbaceous species include medusa head (*Taeniatherum caput-meduseae*), ripgut brome (*Bromus diandrus*), torilis (*Torilis arvensis*), cheat grass (*Bromus tectorum*), and wild oat (*Avena sativa*).

The riverine habitat consists of the Battle Creek stream channel, including active secondary channels (Appendix D). In the project area, Battle Creek is characterized as a boulder- and cobble-dominated stream with pool, riffle, and run habitats. Riverine habitat also includes the open channel portion of the Orwick Diversion intake channel and canal downstream of the existing fish screen, a man-made irrigation ditch feature that diverts water from Battle Creek for agricultural uses (Appendix D).

Wildlife

Fish

Seventeen fish species are known to occur in the Battle Creek watershed, consisting of native and non-native species and both resident and anadromous salmonids. In the project area, special-status[1] fish species that could be affected by implementation of the proposed action include the Central Valley steelhead (*Oncorhynchus mykiss*) distinct population segment (DPS), listed as threatened under the federal Endangered Species Act (ESA); winter-run evolutionarily significant unit (ESU) Chinook salmon (*O. tshawytscha*), listed as federally endangered; Central Valley spring-run ESU Chinook salmon (*O. tshawytscha*), listed as federally threatened; and Central Valley fall/late-fall run ESU Chinook salmon (*O. tshawytscha*), a federal species of concern. The project area also contains designated critical habitat for the Central Valley steelhead DPS and the Central Valley spring-run ESU Chinook salmon.

Battle Creek also provides those elements defined as Essential Fish Habitat (EFH) for Chinook salmon pursuant to the Magnuson-Stevens Fishery Management and Conservation Act 1996, as amended. The waters and substrate of Battle Creek provide essential holding, spawning, and rearing habitat for Chinook salmon, and all life stages of Chinook salmon are present in the creek virtually throughout the year.

The actual timing of runs in the Sacramento River and its tributaries varies slightly from year to year as a function of weather, stream flow, and water temperature (Vogel and Marine 1991). A summary of the life history and habitat requirements of the special-status fish species occurring in the Battle Creek watershed is provided in Table 1.

[1] For the purposes of this EA, the term "special-status" refers to those species listed by the U.S. Fish and Wildlife Service or National Marine Fisheries Service as being threatened or endangered, or that are candidates for listing as threatened or endangered, or are recognized to be a species of concern or species of special concern.

Table 1
Special-Status Fish Species in the Battle Creek Watershed

Common Name *(Scientific Name)*	Federal/ State Status[a]	Migration	Spawning	General Habitat Description	Comments
Hardhead (*Mylopharodon conocephalus*)	--/SSC			Quiet deep pools of large, warm, clear streams over rocks or sand.	Common native, non-game species.
Central Valley steelhead DPS[b] (*Oncorhynchus mykiss irideus*)	T/--	Late summer–winter	December–April	Requires cold flowing water, clean spawning gravel, and diverse riverine habitat for rearing. Spawns and rears in the mainstem Sacramento River and its tributaries. Juveniles rear year round in the mainstem river and tributaries.	Battle Creek provides suitable spawning, rearing, and migration habitat; Portions of project area are designated critical habitat.
Central Valley spring-run ESU[c] Chinook salmon (*Oncorhynchus tshawytscha*)	T/T	Spring–summer	September–November	Requires cold flowing water, clean spawning gravel, and diverse riverine habitat for rearing. Spawns and rears in perennial tributaries and the mainstem of the Sacramento River. Rears for a time in the Delta estuary. Juveniles may be found year round in the Sacramento River.	Battle Creek provides suitable spawning, rearing, and migration habitat; Portions of project area are designated critical habitat.
Central Valley fall/late-fall run ESU Chinook salmon (*Oncorhynchus tshawytscha*)	SC/--	Fall	October–December	Requires cold flowing water, clean spawning gravel, and diverse riverine habitat for rearing. Spawns and rears in the mainstem of the upper Sacramento River. Juveniles rear from the winter of hatching through following fall.	Battle Creek provides suitable spawning, rearing, and migration habitat.
Sacramento River winter-run ESU Chinook salmon *(Oncorhynchus tshawytscha*)	E/E	Winter–spring	April–August	Requires cold flowing water, clean spawning gravel, and diverse riverine habitat for rearing. Spawns and rears in the mainstem of the upper Sacramento River. Rears for a time in the Delta estuary. Juveniles rear from the summer of hatching through following winter.	Winter run Chinook salmon spawn primarily in the mainstem Sacramento River; were historically known to spawn in Battle Creek (Yoshiyama, Fisher, and Moyle 1998)
Pacific lamprey *(Lampetra tridentata)*	NW/--			Spawn in freshwater rivers and streams with juveniles found in slow-moving current, silty bottom habitats. Spring-summer spawner; juveniles require 5-7 years for freshwater rearing.	Native fish species common to Sacramento River basin.

Common Name *(Scientific Name)*	Federal/ State Status[a]	Migration	Spawning	General Habitat Description	Comments
River lamprey *(Lampetra ayresii)*	NW/SSC			The biology of river lampreys has not been studied in California; general habitat and life history thought to be similar to Pacific lamprey.	Native fish species thought to be common. Actual distribution and abundance is unknown.
Western brook lamprey (Lampetra richardsoni)	NW/--			The biology of brook lampreys has not been studied in much California; preferred habitat is small coastal streams, including streams of the Sacramento-SanJoaquin basin.	Native species often overlooked and thought to be more common than records indicate. Not tolerant of severe pollution or habitat alteration.

Sources: Moyle 2002; Jones and Stokes 2005

[a]Status definitions: E = endangered; T = threatened; SC = Species of Concern; SSC = Species of Special Concern; C = Candidate species; NW = listing not warranted.

[b]DPS = distinct population segment

[c]ESU = evolutionarily significant unit

Numerous natural and anthropogenic fish passage barriers occur in the Battle Creek watershed and affect access and distribution of anadromous fish. Many of these barriers prevent fish migration to habitat required for activities essential to survival, growth, and reproduction. The first barrier to fish migration on Battle Creek occurs at the CNFH, approximately 5.8 miles upstream of the mouth of the creek and 1.5 miles downstream of the project action area, where the Service operates a barrier weir. This barrier functions as a fish management tool for collection of hatchery broodstock and to selectively allow upstream passage of spring-run Chinook salmon and steelhead. A fish ladder in the weir is operated seasonally to allow fish passage into upstream reaches of the creek. Fish passage at this ladder is monitored by the Service. From August 1 to March 1, the fish ladder is closed to allow broodstock collection at the hatchery and to confine spawning of fall-run Chinook salmon to lower Battle Creek. When the fish ladder is closed, the barrier weir prevents passage of adult Chinook salmon and steelhead upstream of CNFH. At flows in excess of approximately 225 cfs, some adult Chinook and steelhead can pass the barrier. This barrier is currently being upgraded to improve management of fish passage for naturally produced fish and collection of hatchery broodstock for stream flows up to 800 cfs.

Natural impediments and barriers to fish migration occur on both the north and south forks of Battle Creek. Impassible barriers to upstream fish migration occur at river miles 13.48 and 18.85 on the north and south forks of Battle Creek, respectively. The natural impassible barrier on the South Fork is known as Angel Falls, a 25-foot high waterfall. Smaller natural barriers to migration occur in the form of falls and cascades that may variously impede fish passage under different flow conditions (Jones and Stokes 2005).

Hydroelectric facilities on Battle Creek physically block or impede fish passage, but also control downstream flows that under certain conditions impede fish passage at natural channel features, such as rapids and cascades. The Wildcat Diversion, Eagle Canyon Diversion Dam, and North Battle Creek Feeder Diversion Dam on North Fork Battle Creek and the Coleman Diversion Dam, Inskip Diversion Dam, and South Diversion Dam on South Fork Battle Creek all impede fish passage to some degree.

Obsolete fish ladders at Eagle Canyon, Wildcat, and Coleman Diversion Dam are not functional under most flow conditions (California Department of Water Resources 1997, 1998). During average or wet years, fish ladders at North Battle Creek Feeder, Eagle Canyon, Wildcat, Inskip, and Coleman diversion dams can be ineffective for up to 8 months of the year because flow exceeds the maximum effective capacity of the ladders by a factor of 10 or more. Fish ladders at Eagle Canyon and the Coleman diversion dams were intentionally closed to fish passage under the 1998 Interim Agreement between Reclamation and PG&E, with concurrence by CDFG (California Department of Fish and Game 1995). Collectively, these hydropower diversion dams block approximately 48 miles of upstream habitat, including 42 miles of spawning and rearing habitat in Battle Creek (Jones & Stokes 2005).

Sacramento River Winter-Run ESU Chinook Salmon

The Sacramento River winter-run ESU Chinook salmon was listed as an endangered species under the ESA on January 4, 1994 (59 FR 440), and its endangered status was reaffirmed on June 28, 2005 (70 FR 37169). The winter-run Chinook salmon was designated as an endangered species under the California Endangered Species Act (CESA) on September 22, 1989. NMFS published proposed critical habitat for winter-run on August 14, 1992, and the final rule was published on June 16, 1993 (58 FR 33212). Battle Creek is not identified as part of critical habitat for winter-run Chinook salmon.

Historically, winter-run Chinook salmon spawned in the cold spring-fed headwaters of the upper Sacramento, the Pit, and the McCloud rivers (U.S. Fish and Wildlife Service 1995). Following construction of Shasta Dam, deep water releases during the summer months provided suitable cold water conditions for winter-run Chinook salmon spawning and rearing downstream of the dam. In response to these conditions, which increased total coldwater spawning habitat available to the winter run, the population increased. In 1969, winter-run size estimates exceeded 100,000 fish; since the early 1990s, run size estimates have decreased to runs of only 200 to 1,400 fish per year. However, the Sacramento River winter-run Chinook salmon population continues to exhibit a trend towards recovery. In recent years, spawning populations have been estimated at about 7,000 to 8,000 (California Department of Fish and Game 1998), but these levels remain well below draft recovery goals established for this run (National Marine Fisheries Service 2004).

Currently, winter-run Chinook salmon spawn and rear primarily in the mainstem Sacramento River. Historical reports of naturally produced winter-run Chinook salmon in Battle Creek include observations of juvenile outmigrants in the early 1900s (Rutter 1902, 1903), runs in the late 1940s and early 1950s (U.S. Fish and Wildlife Service 1987), and uncounted runs in the late 1950s and early 1960s (California Department of Fish and Game 1965). The current number of winter-run Chinook salmon returning to Battle Creek at the Coleman barrier dam, ~~if any, is unknown; if winter-run Chinook salmon do return to Battle Creek, they are scarce~~averages about one fish per year ~~(Jones & Stokes 2005)~~ (Matt Brown, USFWS, personal communication).

Central Valley Spring-Run ESU Chinook Salmon

Central Valley spring-run ESU Chinook salmon was listed as threatened under the ESA on September 16, 1999 (64 FR 50394). This designation was unchanged in a June 14, 2004, status review by NMFS (69 FR 33102). The Central Valley spring-run Chinook salmon was designated listed as threatened under the CESA on February 5, 1999. On September 2, 2005, NMFS issued the final rule designating critical

habitat for Central Valley spring-run ESU Chinook salmon, which became effective on January 2, 2006 (70 FR 52488).

Spring-run Chinook salmon migrate upstream during the spring beginning in March, hold over in deep pools of the mainstem Sacramento River and its large perennial tributaries where fish can access cold headwaters during the summer months, and spawn from mid-August through mid-October. Most of the spring-run in the Sacramento River basin spawn in the principal tributary streams (Mill, Deer, Clear, and Butte creeks, and the Feather River). Egg incubation occurs from mid-August through mid-January. Spring-run in the Sacramento River exhibit an ocean-type life history, emigrating as fry, sub-yearlings, and yearlings (Myers et al. 1998). Based on observations at the Red Bluff Diversion Dam, spring-run emigration from the upper Sacramento River typically occurs from November through April (Johnson, Weigand, and Fisher 1992; Vogel and Marine 1991). Although some spring-run salmon may spawn in the Sacramento River between Red Bluff and Keswick Dam, it is thought that most have hybridized with fall-run salmon due to overlapping spawning periods, lack of spatial separation, and redd superimposition (California Department of Fish and Game 1998).

Central Valley spring-run ESU Chinook salmon populations in the Sacramento River and tributaries such as Clear Creek and Battle Creek have remained relatively depressed; however, some modest increases have occurred in their principal spawning tributaries, including Deer, Mill, and Butte creeks (California Department of Fish and Game 2004). Currently, spring-run Chinook salmon are monitored at the CNFH barrier weir and allowed to migrate upstream via the fish ladder between March 1 and August 1. Only unmarked, naturally-produced Chinook salmon and steelhead are allowed to pass during the season prior to mean daily water temperatures reaching 60° Fahrenheit. After this period, all Chinook salmon and steelhead are passed and monitored using video monitoring technology until August 1, when the ladder is closed (N. Alston, USFWS, pers. comm. 2006).

Designated critical habitat for Central Valley spring-run Chinook salmon includes the San Francisco Bay-Delta estuary, the mainstem Sacramento River upstream to Keswick Dam, and most of the Sacramento Valley's perennial tributaries with established spring salmon runs, including Battle Creek, and the Feather River. The project area falls into CALWATER Hydrologic Sub-area (HSA) Unit 550712, which provides 40 miles of spawning/rearing, rearing/migration, and presence/migration Primary Constituent Elements (PCEs) for spring-run Chinook salmon. Central Valley spring-run Chinook salmon received a score of 16 out of a possible score of 18, which represents a "high" conservation value for the HSA (National Marine Fisheries Service 2004).

Central Valley Fall/Late-Fall Run ESU Chinook Salmon

On September 16, 1999, NMFS determined that listing of Central Valley fall/late fall-run ESU Chinook salmon was not warranted (64 FR 50394); however, this ESU was classified as a Species of Concern on April 15, 2004, due to specific risk factors (69 FR 11975). The ESU includes all naturally spawned populations of fall/late fall-run Chinook salmon in the Sacramento and San Joaquin River basins and their tributaries east of Carquinez Strait, California.

The Central Valley fall/late-fall run ESU Chinook salmon comprises the largest present-day populations of Chinook salmon in the Central Valley. Fall-run Chinook salmon begin to enter the Sacramento River in July, and the run builds through the late summer and fall months, peaking by late September and

October (Vogel and Marine 1991). Spawning occurs throughout the upper Sacramento River and in a majority of its tributaries from mid-October through December (Moyle 2002; Vogel and Marine 1991). Spawning densities of fall-run salmon are very high in the Sacramento River from about Red Bluff to Keswick Dam (D. Killam, CDFG, pers. comm. 2006). Juvenile fall-run Chinook salmon rear throughout the Sacramento River and its tributaries. Juvenile fall-run fry may emigrate to the estuary beginning shortly after they hatch through the spring and summer months following their birth.

The late-fall run component of this Chinook salmon ESU enters the Sacramento-San Joaquin estuary and ascends Central Valley streams after the fall-run, usually from late October through March (Vogel and Marine 1991). Spawning begins in January and is usually completed by late April.

Large numbers of the fall-run and late-fall run salmon are spawned and reared by state and federal fish hatcheries in California's Central Valley, including CNFH. The number of hatchery-produced fish may greatly exceed the number of naturally produced fall/late-fall run Chinook salmon in some Central Valley streams, which has led to concern over the viability of certain tributary populations. These runs support valuable and popular ocean and river commercial and sport fisheries.

Central Valley Steelhead DPS

The Central Valley DPS steelhead was federally listed as a threatened species on March 19, 1998 (63 FR 13347). Their threatened status was reaffirmed on January 5, 2006 and became effective on February 6, 2006 (71 FR 834). West coast steelhead populations were determined to comprise 10 distinct populations segments (DPS), and the former stock designation, ESU, was changed to DPS (Good, Waples, and Adams 2005). The Central Valley steelhead DPS includes all naturally spawned anadromous O. mykiss populations occurring below natural and manmade impassable barriers in the Sacramento and San Joaquin rivers and their tributaries, and also includes steelhead propagated at CNFH and at Feather River State Fish Hatchery (71 FR 834).

Steelhead possess one of the most complex life history patterns of the Pacific salmonid species. Steelhead typically refers to the anadromous form of rainbow trout. Similar to other Pacific salmon, steelhead adults spawn in freshwater and spend a part of their life history at sea. However, unlike Chinook salmon, steelhead exhibit a variety of life history strategies during their freshwater rearing period and as adults may spawn more than once during their life. The typical life history pattern for steelhead is to rear in freshwater streams for 2 years, followed by up to 2 or 3 years of residency in the marine environment. However, some juvenile steelhead may deviate from this pattern, rearing in freshwater from 1 to 4 years (Busby et al. 1997; Moyle 2002).

Steelhead populations inhabiting the upper Sacramento River basin belong to the Central Valley ESU, as defined by Busby et al. 1997. These steelhead populations generally exhibit a life history pattern typical of fall/winter run salmonids. This species historically has provided a popular sport fishery throughout the Sacramento River and its tributaries; at present, however, naturally produced steelhead remain at relatively low levels throughout their range in the Central Valley (Hallock 1989; McEwan 2001).

Steelhead adults may enter the Sacramento River and its tributaries from August through March, but peak migration generally occurs from October through February. Spawning begins in late December and can extend into early April. Steelhead spawn in gravel and small cobble substrates usually associated with

riffle and run habitat types. The upper mainstem Sacramento River is known to provide suitable spawning and juvenile rearing habitat for steelhead. The Sacramento River in the vicinity of the project area may be used by steelhead during all life stages, including spawning and egg incubation.

Critical habitat designations for listed anadromous salmonids published in September 2005 (70 FR 52488) were finalized as part of the recent status reviews and are restricted to the species' anadromous range, which is coextensive with the steelhead-only DPS delineations described in that notice (71 FR 834). Designated critical habitat for Central Valley ESU steelhead includes all river reaches accessible to steelhead in the Sacramento and San Joaquin rivers and their tributaries, which includes the Sacramento River downstream of the project area. The project area falls into CALWATER HSA Unit 550712, which provides 82 miles of spawning/rearing, rearing/migration and presence/migration habitat for Central Valley steelhead. Central Valley steelhead received a score of 17 out of a possible score of 18, which represents a "high" conservation value for the HSA (National Marine Fisheries Service 2004).

Essential Fish Habitat

The Sacramento River and its tributaries are designated by NMFS as EFH for Chinook salmon, as defined by the Magnuson-Stevens Fisheries Conservation and Management Act of 1994, as amended. EFH refers to those waters and substrates necessary for spawning, breeding, feeding, or growth to maturity. Freshwater EFH for salmon consists of four major components: spawning and incubation habitat; juvenile rearing habitat; juvenile migration corridors; and adult migration corridors and adult holding habitat (Pacific Fishery Management Council 2000). Important components of EFH for spawning, rearing, and migration include adequate substrate composition; water quality (e.g., dissolved oxygen, nutrients, temperature); water quantity, depth, and velocity; channel gradient and stability; food; cover and habitat complexity (e.g., large woody debris, pools, channel complexity, aquatic vegetation); space; access and passage; and floodplain and habitat connectivity (Pacific Fishery Management Council 2000).

Battle Creek provides all four major components of freshwater EFH for salmon. Adult Chinook salmon migrate to and are known to spawn within all suitable habitats in the vicinity of the project site. Fry and juveniles are expected to, and are known to, occur in suitable rearing habitats nearly year round. Medium to large cobbles and boulders dominate the river bottom in these habitats, providing suitable cover and refuge for rearing salmonids. Additionally, woody debris and terrestrial vegetative cover are present along stream margins immediately upstream and downstream of the project area.

Other Potentially Affected Special-Status Species

California Red-Legged Frog

Although the project area includes riverine and riparian habitat, potentially suitable habitat for the California red-legged frog (*Rana draytonii*), which is federally listed as threatened, does not occur. Flow rates in and adjacent to the project area are too high for this species, and there is a lack of slow, backwater habitat. Furthermore, there are no known or historic populations of the species in the project vicinity. California red-legged frog will therefore be given no further consideration in this document.

Bald Eagle

Bald eagles (*Haliaeetus leucocephalus*), which are federally listed as threatened, are known to occur in the area, but no active or inactive nest sites have been identified in or adjacent to the project area. Nesting habitat for this species does not occur within the project area, but eagles are likely to nest in the vicinity

of the project area. Although foraging habitat is present within the project area, the availability of similar foraging habitat in the vicinity would offset potential adverse effects to eagles resulting from project implementation. Therefore, bald eagles will be given no further consideration in this document.

Valley Elderberry Longhorn Beetle

The valley elderberry longhorn beetle (VELB) is completely dependent on its host plant, elderberry shrub, which is a common component of the remaining riparian forests and adjacent upland habitats of the California Central Valley. It appears that in order to serve as habitat, the shrub must have stems that are 1 inch or greater in diameter at ground level. Two elderberry shrubs with stem diameters as large as 5 inches in diameter are located immediately adjacent to one another in a transition zone of riparian and upland vegetation about 80 feet from the proposed bypass pipeline alignment.

Declining habitat has resulted in the patchy distribution of VELB populations in the Central Valley. Population clusters in the region containing the project area appear to be locally common. In fact, VELB have been detected by Service biologists (H. Crowell and T. Parker) several hundred feet north of the project area, on the north side of Battle Creek.

A BA was prepared by BLM (May 2006) that assessed in detail potential impacts to VELB associated with the proposed action On June 1, 2006, the Service issued an informal consultation letter in which it concurred with the findings of the BA in that the proposed action may affect, but is not likely to adversely affect VELB. The BA and the Service's informal LOC are provided in Appendix B. Resource protection measures designed to prevent adverse effects to VELB and its habitat are also included in Appendix B and in Section 6.3 of this EA.

7.1.2 Environmental Consequences

Plant Communities

Special-status plant species (i.e., species that are federally listed as threatened or endangered or candidates for listing as threatened or endangered) have not been detected within the project area. Although the pipeline alignment has been selected to minimize impacts to vegetation, approximately 30 trees of various size and age classes would need to be removed to accommodate the project. Vegetation within the construction corridor, which would be approximately 40 feet wide and 734 feet long, would be temporarily affected by construction activities. The affected plant communities would be valley-foothill riparian forest, blue-oak woodland, and riverine. Disturbed areas will be reseeded with a seed mix as prescribed by BLM (K. Williams, BLM pers. comm. 2006).

Wildlife

Effects on wildlife associated with implementation of the proposed action are expected to be minor. Measures will be implemented to ensure that effects on wildlife are avoided or minimized to the extent possible. Potentially suitable habitat for special-status fish and VELB occurs within or immediately adjacent to the project area. Following is a discussion of potential impacts to these species that could result from implementation of the proposed action.

Special-Status Fish

Implementation of the proposed action is expected to benefit fishery resources, including listed salmon and steelhead, through improvements to juvenile fish protection and passage at the Orwick Diversion.

Resource Protection Measures, to be implemented in conjunction with project construction activities, are an integral part of the proposed action and were developed to minimize, to the extent possible, any temporary and transient impacts to fish and fish habitat during project construction.

Implementation of the proposed action will not significantly impact designated critical habitat for listed species or EFH for Chinook salmon. No in-water work within the creek channel is planned as part of the project, and most construction activities will occur outside of the ordinary high water mark. Localized and transient turbidity and suspended sediment levels could increase in Battle Creek as a result of stream bank excavation to install a new fish bypass pipeline; however, use of Best Management Practices (BMP's) during and after construction for erosion control and sediment runoff prevention (as described in Section 6.3, "Resource Protection Measures") will reduce the proposed action's potential impacts to fish to less than significant.

Shaded Riverine Aquatic (SRA) habitat is a component of EFH for Chinook salmon. The degree of impact to SRA habitat as a result of the proposed action would be negligible, because the new bypass pipeline has been routed to minimize impacts to vegetation, disturbed areas will be interplanted with native willow cuttings or reseeded with native grasses, and improved juvenile fish screen protection and passage at the Orwick Diversion will increase fish survival over the long-term. Although some vegetation removal would be necessary, including felling some trees up to 24 inches in diameter, native grass seeding and large wood placement along the secondary high-flow channel where the new pipeline enters will restore the ecological function of this vegetation to the stream after construction. Removal of vegetation and soil could accelerate erosion processes within the project boundaries and increase the potential for sediment to enter the Battle Creek. However, the topography of the project site is relatively flat, which would not cause accelerated storm runoff and erosion, and RPM's included as part of the proposed action will install BMP's that minimize the potential for erosion.

Construction activities typically include the refueling and occasional equipment repair and maintenance on location. As a result, minor fuel and oil spills could occur, and there would be a risk of larger releases. These materials could be toxic, depending on the location of the spill in proximity to surface water features, including Battle Creek. Oils, fuels, and other contaminants could have deleterious effects on all salmonid life stages within close proximity to construction activities. The potential for such an impact to fishery resources, including listed species, will be minimized by (1) restricting all equipment fueling, maintenance, and repairs to the construction staging site, on the south side of the diversion, at least 150 feet away from Battle Creek; (2) equipment and vehicles used during construction shall receive proper and timely maintenance to reduce potential for mechanical breakdowns leading to spills of hazardous materials; (3) spill containment booms shall be maintained onsite at all times during construction operations and staging or fueling of equipment; and (4) contractor will develop and implement site-specific BMP's, a water pollution control plan, and emergency spill controls, and will be responsible for containment and removal of any toxins released.

The long-term benefit of the proposed action will be a properly functioning bypass system at the CDFG fish screen that will meet the NMFS's fish protection and passage criteria. Implementation of the proposed action would serve to enhance salmonid populations in the Battle Creek watershed by providing long-term benefits for fish migration passage in Battle Creek, while preserving the private diverter's access to the creek to exercise his water right.

Valley Elderberry Longhorn Beetle

The pipe alignment route has been selected to minimize impacts to vegetation and wildlife habitat, including the two elderberry shrubs located immediately adjacent to one another approximately 80 feet from the proposed route for the bypass pipe, and approximately 40 feet from the headgate control structure. Both shrubs support stems that are large enough (> 1-inch diameter) to provide suitable habitat for VELB. Although occurrence of VELB within the project action area has not been determined, its presence has been documented in shrubs several hundred feet away, on the north side of Battle Creek (see BA in Appendix B).

Adverse effects to shrubs in the project action area will be avoided by using RPM's as described in Section 6.3 (above) and in Appendix B.

7.2 CULTURAL RESOURCES

In accordance with the Cultural Resources Compliance Process (36 CFR Part 800 of Section 106 of the National Historic Preservation Act [NHPA]), a review of undertakings that could affect properties included or eligible for inclusion in the National Register of Historic Places (NRHP) has been completed for the proposed action. A cultural resources survey of the project action area and vicinity was conducted by Eric Ritter, BLM Archaeologist, on February 2 and 13, 2006. An archaeological inventory and site evaluation report has been prepared for this project and is included as Appendix C. Consultation with two federally recognized Native American Indian tribes (the Pit River Tribe and Redding Rancheria) has not identified any potential conflicts.

7.2.1 Affected Environment

Only one cultural resource property is known to occur in the proposed action area: the Orwick Dam (aka the headgate structure) (State of California Resources Agency #CA-030-1701) (Ritter 2006). It is presumed that the ditch was constructed about 1913 and the headgate in 1929 (as evidenced by the date "1929" incised on its top), along with the initials "WEB" (derivation unknown), a boot print, and a handprint in the concrete. Although the origin of these initials is unknown, they may be attributable to relatives of either T. Bassett, a local homesteader, or L. J. Blodgett, the water rights holder at that time (Ritter 2006).

Appendix C provides a comprehensive description of the history of the area.

7.2.2 Environmental Consequences

In considering potential listing of the structure on the NRHP under Criterion A (36 CFR 60), the headgate and canal are related to the agricultural development of Tehama County as a whole. However, their importance has been only to one ranch operation that does not particularly stand out in its size, type of operation (sheep and cattle, which are common throughout the county), infrastructure (reservoirs, pastures, roads, buildings, etc.), age, or in the amount of water granted in its water right. It is not among the early canals of Tehama County.

Under Criterion B (36 CFR 60), the headgate is not relevant, since the structure cannot be tied to any significant early inhabitants of the area.

Under Criterion C (36 CFR 60), this structure is not considered to be significant since it does not appear to contain any innovative or exceptional characteristics even though it has few known counterparts in the region.

Criterion D (36 CFR 800.4) does not appear to apply to this structure since there are no additional archaeological data not already gleaned from the site documentation and photography prepared for the site during recordation. The proposed action will involve only a minor modification of the structure and would not significantly alter its integrity.

7.3 WATER QUALITY

7.3.1 Affected Environment

Battle Creek, a perennial spring-fed, cold-water stream, drains the western flank of Mount Lassen and enters the Sacramento River from the east approximately 7 miles east of the town of Cottonwood, California (U.S. Fish and Wildlife Service 2004). Battle Creek is the largest spring-fed tributary to the Sacramento River between Keswick Dam and the Feather River, with a median September flow of 250 cfs and an average annual flow of 500 cfs. Flows typically remain higher throughout the winter and spring and decrease by about one-half in the summer and fall (Pacific Gas and Electric Company 2004). Spring flows enter Battle Creek, adding significant inflow at a fairly constant rate, with a relatively cool temperature, compared to other local streams.

The Final Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the Battle Creek Salmon and Steelhead Restoration Project (Jones and Stokes 2005) extensively discussed water quality in Battle Creek, citing data reported from 1955 to 1989, which described surface water quality in Battle Creek as excellent.

7.3.2 Environmental Consequences

Since all excavation and installation of the bypass pipeline will be done during the dry season in relatively flat upland areas and dry secondary channels, installation of the fish passage pipeline, including placement of concrete outfall anchors, would not result in significant increases of turbidity or sedimentation in Battle Creek. Additionally, erosion control and sediment runoff prevention BMP's, along with revegetation of excavated and rip-rapped areas will restore ecological functions at the project site. No large shading trees will be removed along the stream bank of the main stream channel, thus avoiding impacts to temperature moderating effects of vegetation at the project site.

7.4 AIR QUALITY

7.4.1 Affected Environment

The project area is in the Northern Sacramento Valley Air Basin (NSVAB), which includes the following counties: Butte, Colusa, Glenn, Shasta, Sutter, Tehama, and Yuba. The NSVAB is bounded on the north and west by the Coast Ranges and on the east by the southern portion of the Cascade Range and the northern portion of the Sierra Nevada. These mountain ranges, which reach heights in excess of 10,000 feet mean sea level (msl), provide a substantial physical barrier to locally created pollution as well as that transported northward by prevailing winds from the Sacramento metropolitan area.

Although much of the area that composes the NSVAB is above 1,000 feet msl, the vast majority of its populace lives and works below that elevation. The valley is often subjected to inversion layers that, coupled with geographic barriers and high summer temperatures, create a high potential for air pollution problems (Northern Sacramento Valley Air Basin Districts 2003). The period of heaviest pollution potential occurs in the fall, when temperature inversions and winter radiation inversions can occur simultaneously.

The California Air Resources Board (CARB) has determined State ambient air quality standards that Air Districts must attain and retain for pollutants such as particulate matter 2.5 microns and 10 microns in aerodynamic diameter (PM2.5 and PM10), ozone (O_3), carbon monoxide (CO), sulfur oxides (SO_X), and nitrogen oxides (NO_X). All NSVAB Districts have been designated as "non-attainment" areas for PM10. Both Tehama and Shasta counties (Battle Creek forms a portion of the boundary between these two counties) also fall within the designated non-attainment area for O_3. Combustion sources, primarily the internal combustion engine, which is the catalyst for the photochemical reaction of nitrogen oxides and reactive organic gases that produces ozone, are the greatest contributor to ozone violations.

7.4.2 Environmental Consequences

Standards of significance for assessing impacts to air quality were derived from Appendix G of the revised CEQA Guidelines (Association of Environmental Professionals 2006) and in accordance with Federal Clean Air Act General Conformity Requirements. Impacts to air quality were considered significant if they would

- conflict with or obstruct implementation of any applicable air quality plan;
- violate any Federal or State air quality standard or contribute substantially to an existing or projected air quality violation;
- result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under applicable Federal or State ambient air quality standards (including releasing emissions which exceed quantitative thresholds for ozone precursors);
- expose sensitive receptors, including schools, hospitals, residential areas, to substantial pollutant concentrations;
- create objectionable odors affecting a substantial number of people;
- alter air movement, moisture, or temperature, or lead to a change in climate, either locally or regionally; or
- result in the generation of more than 100 tons per year of NO_2, volatile organic compounds (VOC), CO, or PM10.

Construction Impacts

Project construction would primarily be achieved through the use of a backhoe; however, some use of other equipment such pick-ups and dump trucks (for the transport of rip-rap) are anticipated. Exhaust emissions and PM10 would be the primary air pollutants emitted during construction activities. Even when assuming "worst case" conditions (i.e., simultaneous operation of all project equipment), project-related contributions would be less than 1 percent for all pollutant categories. The effects of construction-related emissions on air quality would therefore be less than significant.

Operational Impacts

Operation of the fish passage and the headgate structure would have no effect on air quality because it would be manually operated.

7.5 NOISE

7.5.1 Affected Environment

The project site is located in a relatively remote area of Tehama County. There are no sensitive noise receptors in the area (e.g., homes, designated recreation areas, known raptor nests).

7.5.2 Environmental Consequences

Standards of significance were derived from Appendix G of the revised CEQA Guidelines (Association of Environmental Professionals 2006). Accordingly, impacts to the ambient noise environment were considered to be significant if they would

- expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- expose persons to or generate excessive ground borne vibration or ground borne noise levels;
- result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project; or
- result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

Construction Impacts

Construction activities would occur in a remote area of Tehama County. The project site is not adjacent to any residential areas or other known sensitive noise receptors. Because noise emissions would be temporary (occurring only during the construction period) and there are no known sensitive receptors in the area, construction-related emissions would have no significant adverse effect on ambient noise levels currently encountered at the project site.

Operational Impacts

Project operation would include the operation and maintenance of the fish passage pipeline and the headgate control structure. Following completion of construction, operation of the fish passage or the headgate structure would have no significant adverse effect on ambient noise levels currently encountered at the project site.

7.6 SOCIO-ECONOMIC CONDITIONS AND LAND USE

7.6.1 Affected Environment

The project is located in an undeveloped region of Tehama County immediately adjacent to Battle Creek. Several industries depend on Battle Creek and its watershed, including hydroelectric power generation, fish rearing, irrigated agriculture, ocean commercial fishing, and ocean/in-river recreational fishing.

Much of the land in the lower Battle Creek watershed is privately owned; however, the BLM manages the land on which the proposed action is located. The Orwick Diversion canal conveys water for agricultural

use from Battle Creek to a single ranch, approximately 3 miles from the project area. The most widespread use of both private and public lands in the project vicinity is for livestock grazing. Other common uses of these lands include hydroelectric power production and both land- and water-based recreational activities.

7.6.2 Environmental Consequences

Although the proposed action is a federal action (a joint action involving the Service and BLM), actual project construction would be put out to bid for consideration by private contractors. Construction is anticipated to take about one month. The relatively small size of the project, coupled with its short construction duration, would have little effect on the region's economic growth. Thus, only minor social effects are expected to occur in Shasta and Tehama as a result of the proposed action. The effect of the proposed action on land use and regional economics would be less than significant.

Water diverted into the Orwick Diversion canal is used for agricultural purposes at a local ranch, which holds the rights to this water. Flows in the diversion ditch would not be affected by project implementation; therefore, socio-economic or land use impacts associated with the ranch's water use would not occur.

7.7 AESTHETICS

7.7.1 Affected Environment

The majority of the project area sits in a secluded patch of riparian forest on the south side of Battle Creek. Although much of this area is well above the ordinary high water mark of Battle Creek, a portion of the project area is composed of a series of threaded channels that convey water during periods of higher than normal flooding events. The surrounding topography and dense vegetation obscure most of the area from the nearby administrative access road, as well as from the banks of Battle Creek. The headgate structure is more apparent, since it is located within the Orwick Diversion intake channel, but it is also somewhat hidden from the access road by the site's topography. The area does not show indications of long-duration use (e.g., camping). The site access road and turn-around are located uphill and adjacent to the Orwick Diversion (in an area closed to public vehicular access), and power lines extend from the south to the fish screen. Visitation to the area is primarily by CDFG fish screen maintenance crews, and occasional anglers and other recreationists.

7.7.2 Environmental Consequences

The perceptions of viewers are influenced by their location, specific activities in which they engage, personal degree of awareness, and individual values and goals. It is likely that anglers would be the primary viewers of the outfall structure, since they are the most likely viewer group passing through the Battle Creek corridor. Anglers are likely to understand that the purpose of the fish passage pipeline is to prevent entrainment of fish in the Orwick Diversion.

Construction activities, especially vegetation clearing and grading, would cause short-term changes to the visual setting of the project pipeline alignment. The impact of these changes will be minimized by revegetation following construction. There would be little indication of disturbance following project completion, with the exception of the concrete collars and pipe outfall, which could be visible from Battle

Creek during periods of low flow. The aesthetic effects of the proposed action would therefore be less than significant.

8. CUMULATIVE EFFECTS

The proposed action described in this EA has been designed primarily to improve fish protection and downstream passage by preventing fish entrainment and expediting return of juvenile salmon and steelhead to the main creek channel at the Orwick Diversion. The proposed action is integral to other restoration activities in the Battle Creek watershed and would serve to enhance the benefit of these other actions to salmonid populations by eliminating the risk of entrainment and loss of fish at the Orwick Diversion, including special-status species. Cumulative adverse effects of the proposed action, and past, present, and reasonably foreseeable future projects would not be expected to occur in the Battle Creek watershed, since none of these projects would contribute to cumulative declines of fish species or degradation of habitat in Battle Creek. A similar conclusion regarding the cumulative effects of ongoing and planned restoration actions recommended by the Battle Creek Salmon and Steelhead Restoration Project and other projects in the watershed was described in the Final EIS/EIR for the restoration project (Jones & Stokes 2005).

The AFRP Final Restoration Plan states that the proposed action considered in this EA (identified as Action 4 in the Final Restoration Plan), coupled with other identified actions, some of which have been completed and others that are planned for the foreseeable future, would increase anadromous fish runs in Battle Creek by an estimated 4,500 fall-run, 4,500 late-fall run, 2,500 winter-run, and 2,500 spring-run Chinook salmon and 5,700 steelhead trout. Other aquatic habitat improvements in the Sacramento River that have occurred or are planned by the CALFED Bay-Delta Program and CVPIA-related programs include water acquisition, gravel replenishment, installation of fish screens, and restoration of riparian habitat. The cumulative effects of these actions are described in the PEIS for the CVPIA (Department of Interior 1999) and the Programmatic EIS/EIR for the CALFED Bay-Delta Program (CALFED 2000). Collective AFRP actions, whether implemented through CVPIA or CALFED Bay-Delta–related programs, are designed to at least double anadromous fish population levels in Central Valley rivers and streams above the average annual escapements from 1967 to 1991 (U.S. Fish and Wildlife Service 2004).

Table 2 provides a summary of restoration actions identified for Battle Creek in the AFRP Final Restoration Plan.

Table 2. Restoration Actions Identified for Battle Creek in the Final Anadromous Fish Restoration Plan (2001)

Restoration Action	Status	Comments
1. Continue to allow spring-run Chinook salmon and steelhead passage above the CNFH weir. After a disease-safe water supply becomes available to CNFH, allow passage of fall- and late-fall run Chinook salmon and steelhead above the weir. In the interim, prevent anadromous fish from entering the main hatchery water supply by blocking fish	Completed and ongoing State of the art ozone water treatment facility at CNFH fully operational in 2000. Upstream fish passage monitoring at the upstream ladder is underway.	Natural origin late-fall run and spring-run Chinook and steelhead access habitat above the barrier weir. The spring run passes during the time period when the upstream ladder is open (March 1 – Aug 1); natural origin steelhead and natural origin late-fall encountered during CNFH spawning activities are also passed above the weir

Restoration Action	Status	Comments
ladders at Wildcat Canyon, Eagle Canyon, and Coleman diversions.		
2. Acquire water from willing sellers consistent with applicable guidelines or negotiate agreements to increase flows past PG&E's hydropower diversions in two phases to provide adequate holding, spawning, and rearing habitat for anadromous salmonids.	The EIS/EIR for the Restoration Plan was completed in July 2005.	Component of the Battle Creek Salmon and Steelhead Restoration Plan
3. Construct barrier racks at the Gover Diversion dam and waste gates from the Gover Canal to prevent adult Chinook salmon from entering Gover Diversion.	Barrier racks are seasonally installed by CDFG to prevent adult Chinook salmon from entering the Gover Diversion	Initiated by CDFG, ongoing
4. Screen Orwick Diversion to prevent entrainment of juvenile salmonids and straying of adult Chinook salmon.	In planning, design, and permitting phases	Expected to be completed fall 2006.
5. Screen tailrace to Coleman powerhouse to eliminate attraction of adult Chinook salmon and steelhead into an area with little spawning habitat reduce the potential for contamination of the CNFH water supply.	Completed Fall 2004	
6. Construct fish screens on all PG&E diversions, as appropriate, after both phases of upstream flow actions (Action 1) are completed and fish ladders on Coleman and Eagle Canyon diversion dams are opened.	The EIS/EIR for the Restoration Plan was completed in July 2005.	Component of the Battle Creek Salmon and Steelhead Restoration Plan
7. Improve fish passage in Eagle Canyon by modifying a bedrock ledge and boulders that are potential barriers to adult salmonids, and rebuild fish ladders on Wildcat and Eagle Canyon diversion dams.	The EIS/EIR for the Restoration Plan was completed in July 2005.	Component of the Battle creek Salmon and Steelhead Restoration Plan
8. Screen CNFH intakes 2 and 3 to prevent entrainment of juvenile Chinook salmon and steelhead.	USFWS/BOR preparing environmental compliance and permitting.	Upgrade and Modifications Planned

Source: (U.S. Fish and Wildlife Service 2001)

Changes in broodstock selection practices at CNFH to improve compatibility of natural salmon and steelhead production upstream of the hatchery with hatchery operations have been made in recent years. An interim instream flow agreement with PG&E has improved habitat conditions in the North Fork of Battle Creek to provide for natural production of salmonids passed above the CNFH barrier weir. Additionally, actions identified in the restoration plan will increase fish access and improve habitat conditions above and below hydroelectric facilities on the north and south forks of Battle Creek. The

proposed action will insure that maximum benefits will be derived from the projected improved fish production resulting from these other fish restoration actions in the Battle Creek watershed.

Various land uses occur in the Battle Creek watershed, including hydroelectric facilities, timber harvest, and agriculture. Private actions, such as timber harvest could have adverse impacts, thereby, reducing the success of restoration efforts downstream. However, California's timber harvest planning procedures require environmental review, and include provisions to protect aquatic resources (California Forest Practices Rules). For lands within the Lassen National Forest in the upper Battle Creek watershed, protection of aquatic resources is provided for through implementation of the Aquatic Conservation Strategy, identified in the Northwest Forest Plan of 1996.

Over the past 15 years, land has been acquired, or its use converted, for the purpose of protecting the natural ecological function of lands adjacent to streams in the Battle Creek watershed. The Nature Conservancy (TNC) has purchased conservation easements on the 36,000 acre Denny Ranch, partnered with private land owners to protect 83,000 acres in TNC's Lassen Foothills Project, and partnered with the Service to acquire conservation easements on Digger Creek and on 1,800 acres with springs that feed Baldwin Creek. BLM acquired conservation easements on two properties in lower Battle Creek, including land along the mouth of the stream, on the Gover Ranch, to conduct riparian restoration activities and maintain the agricultural nature of the properties. The CDFG currently manages the Battle Creek Wildlife Area, which contains over 480 acres of riparian, freshwater marsh, and oak woodland wildlife habitats acquired by the Wildlife Conservation Board. The Battle Creek Wildlife Area was developed to conserve property with outstanding riparian and wetland habitat within the watershed.

Considerable funding and effort have been invested, and continue to be invested, in conservation measures that serve to protect and restore the Battle Creek watershed. The proposed action is an integral part of past, ongoing, and reasonably foreseeable projects in the Battle Creek watershed and would serve to enhance salmonid populations. Protection and restoration of aquatic habitat and production of salmon and steelhead in Battle Creek will contribute to the overall conservation and recovery goals for fisheries, including special-status fish species, in the Central Valley of California (USFWS 1995; DOI 1999; CALFED 2000).

9. CONSULTATION AND COORDINATION

Coordination and consultation in preparing the EA included the following:

- Tricia Parker, Fishery Biologist, U.S. Fish & Wildlife Service, Red Bluff, CA
- Brenda Olson, Fishery Biologist, U.S. Fish & Wildlife Service, Red Bluff, CA
- Mike Berry, Fisheries Biologist, California Department of Fish and Game, Redding, CA
- Kevin Gale, Fisheries Habitat Supervisor, California Department of Fish and Game, Red Bluff, CA
- Steve Thomas, Fisheries Engineer, National Oceanic and Atmospheric Administration - National Marine Fisheries Service, Santa Rosa, CA
- Charlie Wright, Real Estate Specialist, Bureau of Land Management Redding, CA

- Gary Diridoni, Wildlife Biologist, , Bureau of Land Management Redding, CA
- Eric Ritter, Archaeologist, Bureau of Land Management, Redding, CA
- Mike Tucker, Biologist, National Oceanic and Atmospheric Administration - National Marine Fisheries Service, Sacramento, CA
- Janiel Killeen, Special Agent, National Oceanic and Atmospheric Administration - National Marine Fisheries Service, Sacramento, CA
- Kelly Williams, Natural Resource Specialist, , Bureau of Land Management Redding, CA
- Keith Marine, Senior Fisheries Scientist, North State Resources, Inc., Redding, CA
- Connie MacGregor Carpenter, Regulatory Specialist, North State Resources, Inc., Redding, CA

Persons consulted concerning Native American cultural resources include:

Organization/Individual	Date of Letter	Date of Response	Result of Response
Native American Heritage Commission			
Redding Rancheria Barbara Murphy, Chairperson	February 23, 2006	None	Not Applicable
Pit River Tribe of California Jessica Jim, Chairperson)	February 23, 2006	None	Not Applicable

10. ENVIRONMENTAL COMPLIANCE

The following Executive Orders and Legislative Acts have been reviewed as they apply to the proposed action.

National Environmental Policy Act

This EA has been prepared pursuant to regulations implementing NEPA (42 USC 4321 et seq.). NEPA provides a commitment that Federal agencies will consider environmental effects of their proposed action actions and adhere to regulations, policies, and programs, to the fullest extent possible, in accordance with NEPA's policies of environmental protection. This EA assesses potential environmental impacts associated with implementation of the Orwick Diversion Fish Passage Improvement Project. If it is determined that the project would have no significant environmental effects, a "finding of no significant impact" will be filed with the Environmental Protection Agency (EPA).

Endangered Species Act

The ESA (16 USC 1531 et seq.) establishes a national program for the conservation of threatened and endangered species of fish, wildlife, and plants and the preservation of the ecosystems upon which they depend. Section 7(a) of the ESA requires Federal agencies to consult with the Service and NMFS on any activities that may affect any species under their jurisdiction that is listed as threatened or endangered, is proposed for listing, or for which designated critical habitat occurs.

A LOC prepared by the Service (Appendix B) in response to a request for informal consultation related to VELB, concurred with the determination made in the BA that implementation of the proposed action may affect, but is not likely to adversely affect any VELB.

A request for informal consultation, seeking concurrence that the project may affect, but is not likely to adversely affect spring-run chinook salmon or its Critical Habitat, and that the project may affect, but is not likely to adversely affect Central Valley steelhead or its Critical Habitat, was been submitted by the Service to NMFS on June 21, 2006. A response is pending.

Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (16, USC 661 et seq.) provides a basic procedural framework for the orderly consideration of fish and wildlife conservation measures in Federal and federally permitted or licensed water development projects. Whenever any water body is proposed to be controlled or modified "for any purpose whatever" by a Federal agency or by any "public or private agency" under Federal permit or license, that agency is required first to consult with the wildlife agency with a view to the conservation of fish and wildlife resources in connection with the project. Additionally, a report is authorized to be prepared and submitted to the action agency or applicant for Federal license or permit. The report must be made available to the authorizing agent when decisions are made to authorize (or not to authorize, or authorize with modifications) the project. A report meeting these requirements is pending (T. Parker, USFWS, pers. comm. 2006).

National Historic Preservation Act

The National Historic Preservation Act (NHPA) (16 USC 470 et seq.) requires federal agencies to evaluate the effects of federal actions, including the issuance of permits, on historical, archaeological, and cultural resources that are listed, or that are eligible for listing, on the National Register for Historic Places. Pursuant to Section 800.13 of the regulations (36 CFR 800.13) implementing Section 106 of the NHPA the Service, the Advisory Council on Historic Preservation, and the State Historic Preservation Officer, have entered into a programmatic agreement to streamline the cultural resource compliance process for low impact projects. A request for cultural resource compliance was submitted to the Service's Regional Archeologist, Region 1, Portland, Oregon. The response is pending (T. Parker, USFWS, pers. comm. 2006).

Clean Water Act and Rivers and Harbors Act

Section 404 of the Clean Water Act (33 USC 1344) requires that a Department of the Army permit be obtained from the U.S. Army Corps of Engineers (Corps) for the discharge of dredged or fill material into the "waters of the United States," including wetlands. Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403) prohibits the unauthorized obstruction or alteration of any navigable waters of the United States without a permit from the Corps. This EA has described the potential effects of proposed activities on wetlands and other waters.

In discussion with the Corps pertaining to the permitting needs of the proposed action, the Corps District Engineer (Mr. Matt Kelley) has determined that the proposed work falls within the exemptions within 33 CFR 323.4(a)(3) for normal farming, silviculture, and ranching activities (Matt Kelley, Corps, pers. comm.. 2006). That exemption covers discharges associated with siphons, pumps, headgates, wingwalls, weirs, diversion structures, and such other facilities as are appurtenant and functionally related to irrigation ditches. Since this project does not appear to trigger the recapture clause in 323.4(c) the fish bypass pipe is a discharge that does not require a permit.

Floodplain Management--Executive Order 11988

Executive Order 11988 requires that all Federal agencies take action to reduce the risk of flood loss, to restore and preserve the natural and beneficial values served by floodplains, and to minimize the impact of floods on human safety, health, and welfare. The project area is within the 100-year floodplain and supports the preservation and enhancement of the natural and beneficial values of floodplains; therefore, the proposed action is in compliance with Executive Order 11988.

Protection of Wetlands--Executive Order 11990

Executive Order 11990 requires Federal agencies to follow avoidance, mitigation, and preservation procedures with public input before proposing new construction in wetlands. This EA has shown that the proposed action would not result in the net loss of any wetlands; therefore, the proposed action is in compliance with Executive Order 11990.

Environmental Justice in Minority and Low-Income Populations--Executive Order 12898

Executive Order 12898 requires Federal agencies to identify and address disproportionately high and adverse human health and environmental effects of Federal programs, policies, and activities on minority and low-income populations. The proposed action has considered the environmental, social, and economic impacts on minority and low-income populations and is in compliance with Executive Order 12898.

Indian Trust Assets, Indian Sacred Sites on Federal Land–Executive Order 13007, and American Indian Religious Freedom Act of 1978

These laws are designed to protect Indian Trust Assets, accommodate access and ceremonial use of Indian sacred sites by Indian religious practitioners and avoid adversely affecting the physical integrity of such sacred sites, and protect and preserve the observance of traditional Native American religions, respectively. The proposed action and associated mitigation measures would not violate these protections.

Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) is designed to take immediate action to conserve and manage the fishery resources found off the coasts of the United States, and the anadromous species and continental shelf fishery resources of the United States. The Service has a statutory requirement under Section 305(b)(4)(B) of the MSFCMA to consult with NMFS with respect to any action authorized, funded, or undertaken; or proposed to be authorized, funded, or undertaken; that may adversely affect any EFH identified by MSFCMA. The Service has identified and incorporated measures in the proposed action for avoiding, mitigating, or offsetting potential impacts on EFH from project activities.

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APPENDIX A

Project Design Schematics

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED

12 IN HDPE DOUBLE WALL PIPE WITH WATER TIGHT FITINGS INSTALLED WITH BELLS FACING UPSTREAM

CLEANOUT PORTS (8) CONSIST OF 45 DEGREE WYE AND PIPE EXTENDING TO ONE (1) FOOT ABOVE FINISHED GROUND, EVERY 80 FT.

ONE (1) 10 FT RADIUS PVC BEND WITH BELL/BELL CONNECTORS AND WATER TIGHT JOINTS.

PIPE TRANSITION TO 14 IN XH STEEL FOR FINAL 20 FT SECTION. JOIN TO HDPE PIPE WITH WATER TIGHT SEAL.

ORWICK SCREEN BYPASS

BYPASS PIPELINE LAYOUT

DRAWN BY: S. THOMAS	SIZE	FSCM NO.	DWG NO.	REV
DATE: MAY 2006	SCALE		SHEET	

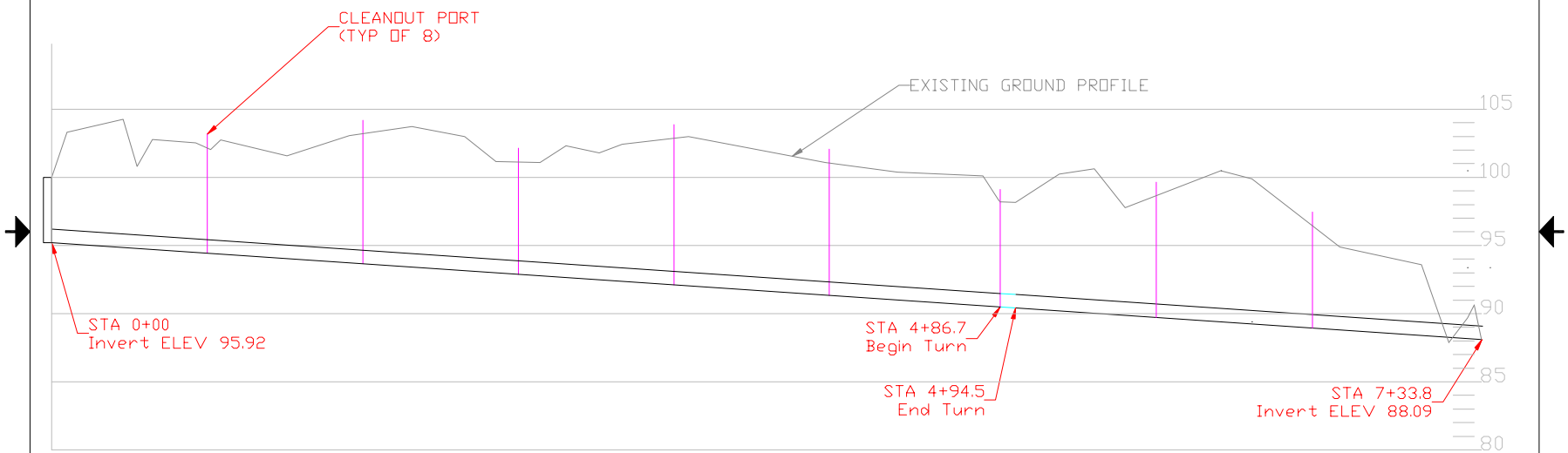
FNAME

REVDATE

USER

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED

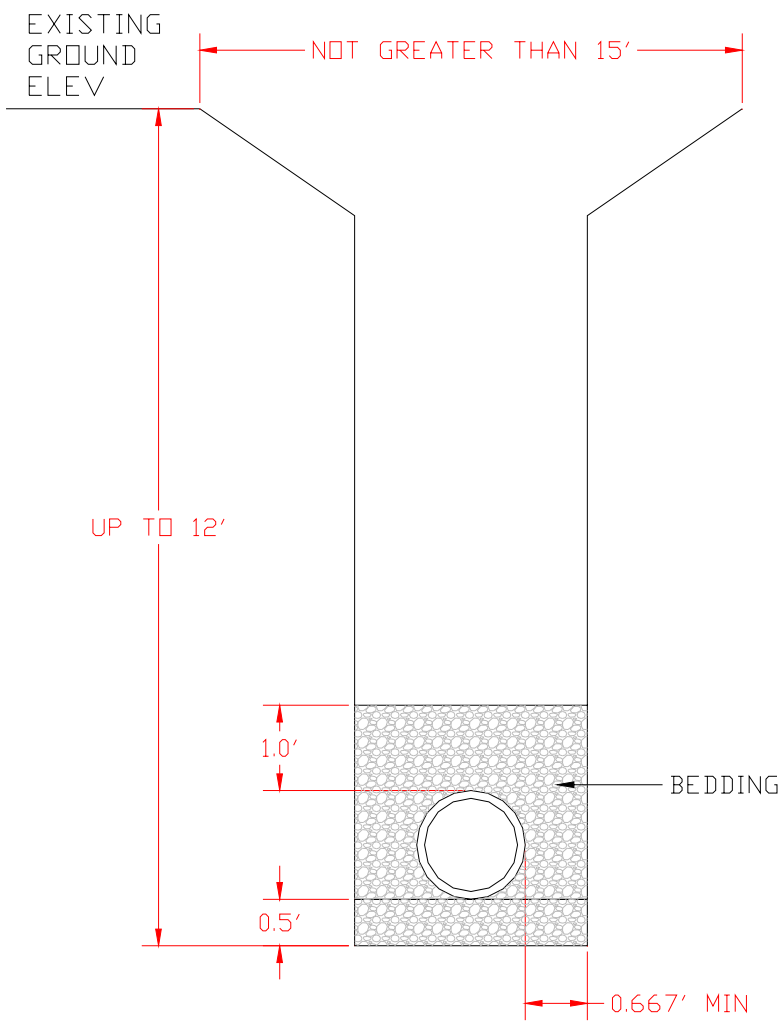
1. UNIFORM PIPELINE SLOPE = 0.0107 FT/FT



ORWICK SCREEN BYPASS

PIPELINE PROFILE AND EXISTING GROUND SURFACE ELEVATIONS

DRAWN BY	SIZE	FSCM NO.	DWG NO.	REV
S. THOMAS				
DATE	SCALE		SHEET	
MAY 2006				



REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED

TRENCHING WILL REQUIRE EXCAVATION OF UP TO 12 FEET.

PIPELINE SHALL BE SUPPORTED ON COMPACTED BEDDING GRADED TO THE PROPER ELEVATION TO WITHIN 0.05 FOOT.
PIPELINE SHALL BE COVERED WITH BEDDING TO A MINIMUM DEPTH OF 1 FOOT.
SEE SPECIFICATIONS FOR BEDDING MATERIAL

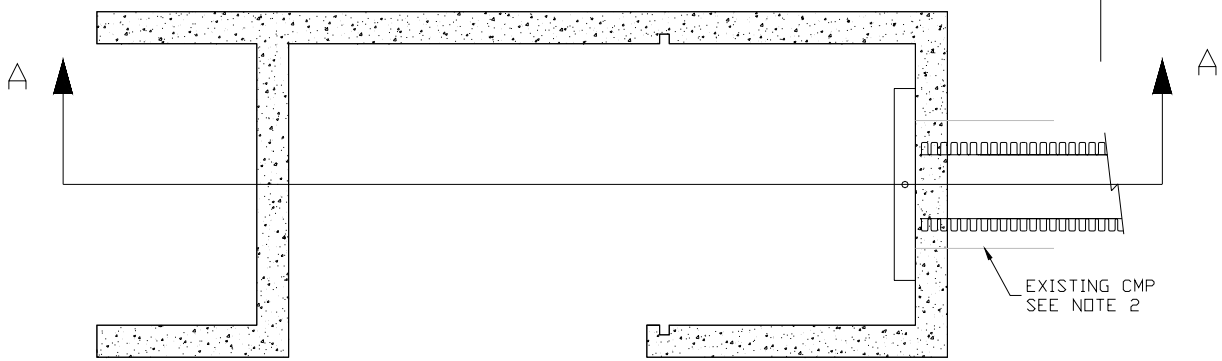
SHORING NOT SHOWN
CONTRACTOR IS RESPONSIBLE FOR KNOWING AND COMPLYING WITH ALL OSHA REGULATIONS

ORWICK SCREEN BYPASS

TRENCHING DETAILS

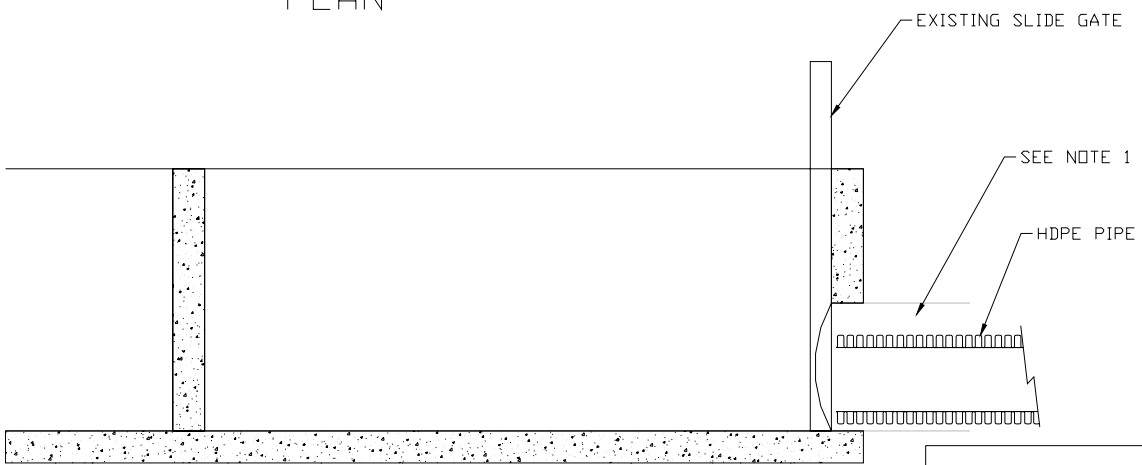
DRAWN BY	SIZE	FSCM NO.	DWG NO.	REV
S. THOMAS				
DATE	SCALE		SHEET	
MAY 2006				

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED



PLAN

1. GROUT ANNULAR SPACE WITH NON SHRINK GROUT.
2. LEAVE CMP STUB 2' MIN.



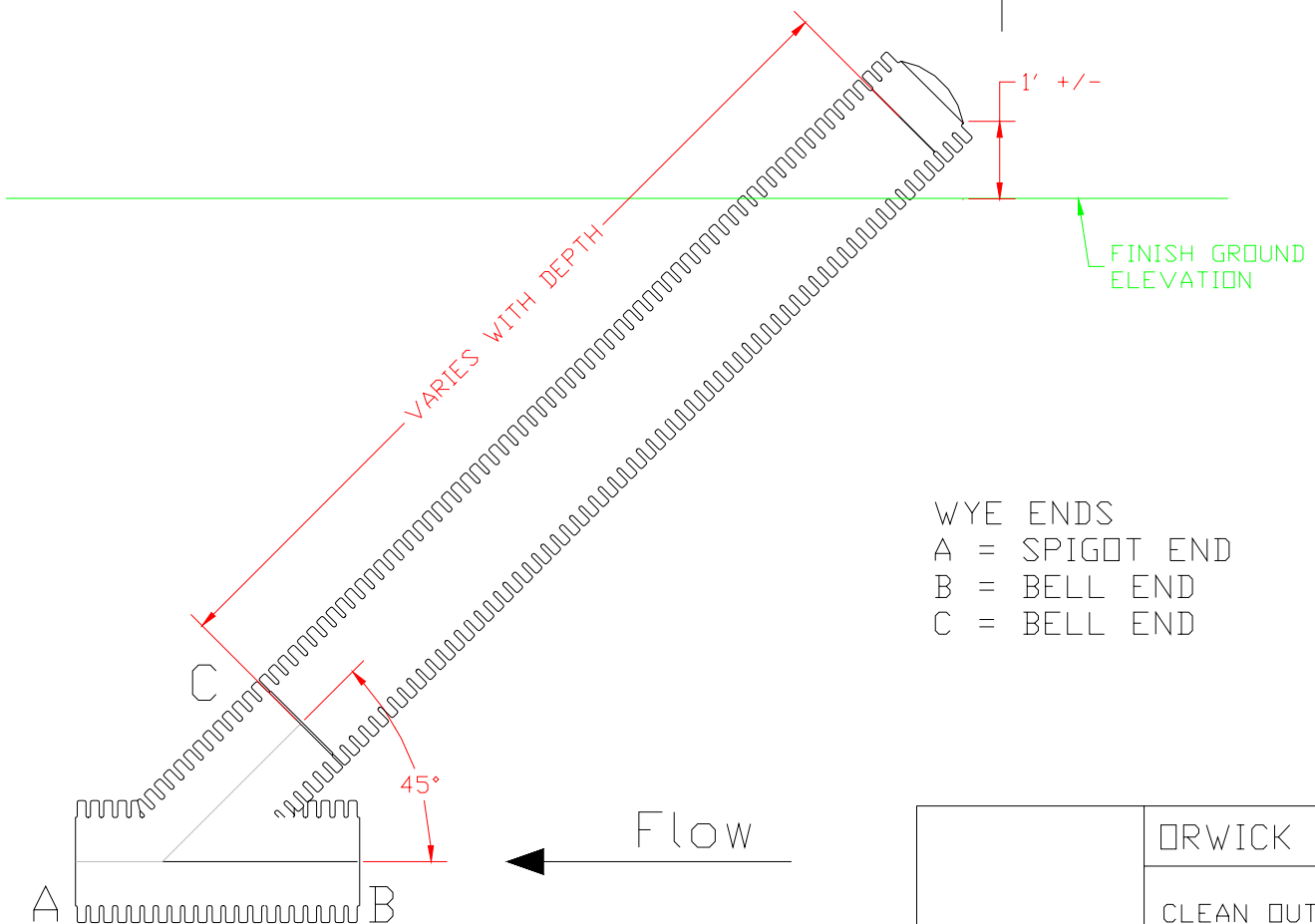
Section A-A

ORWICK SCREEN BYPASS

EXISTING BYPASS CIVIL WORKS AND JUNCTION WITH NEW PE PIPE

DRAWN BY S. THOMAS	SIZE	FSCM NO.	DWG NO.	REV
DATE MAY 2006	SCALE		SHEET	

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED

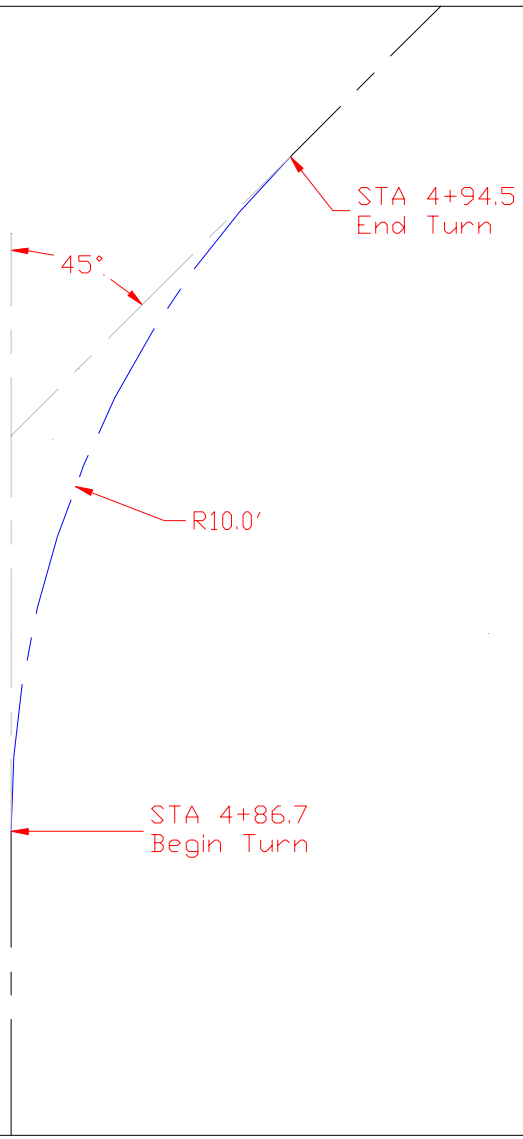


WYE ENDS
A = SPIGOT END
B = BELL END
C = BELL END

ORWICK SCREEN BYPASS

CLEAN OUT PORTS

DRAWN BY	SIZE	FSCM NO.	DWG NO.	REV
S. THOMAS				
DATE	SCALE		SHEET	
MAY 2006				

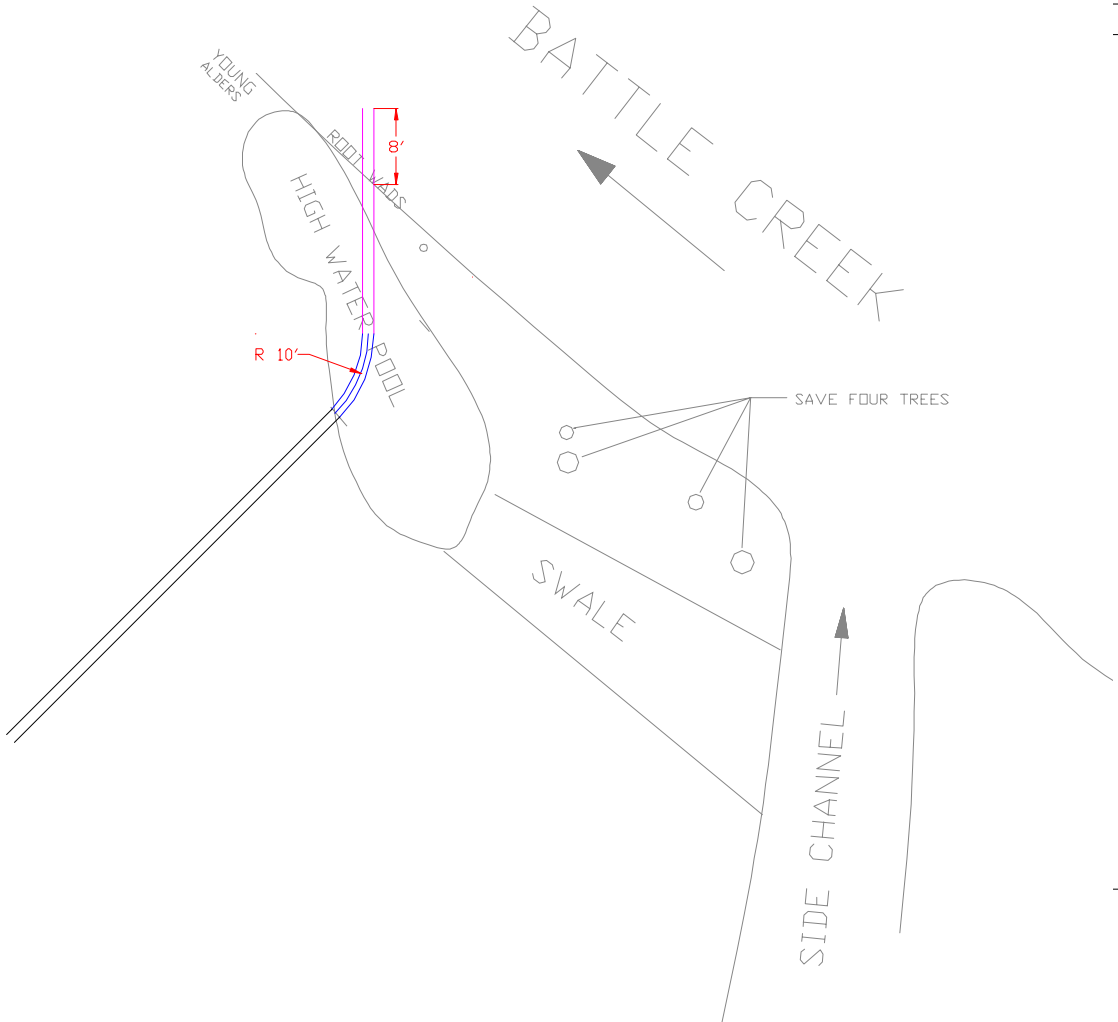


REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED

Bend Specifications

Material: 12 in. nominal PVC
Connectors: WT Bell/Bell
Radius: 10 ft.
Arc length: 7.85 ft

	ORWICK SCREEN BYPASS			
	PIPELINE BEND DETAILS			
DRAWN BY S. THOMAS	SIZE	FSCM NO.	DWG NO.	REV
DATE MAY 2006	SCALE		SHEET	



REVISIONS		
DESCRIPTION	DATE	APPROVED

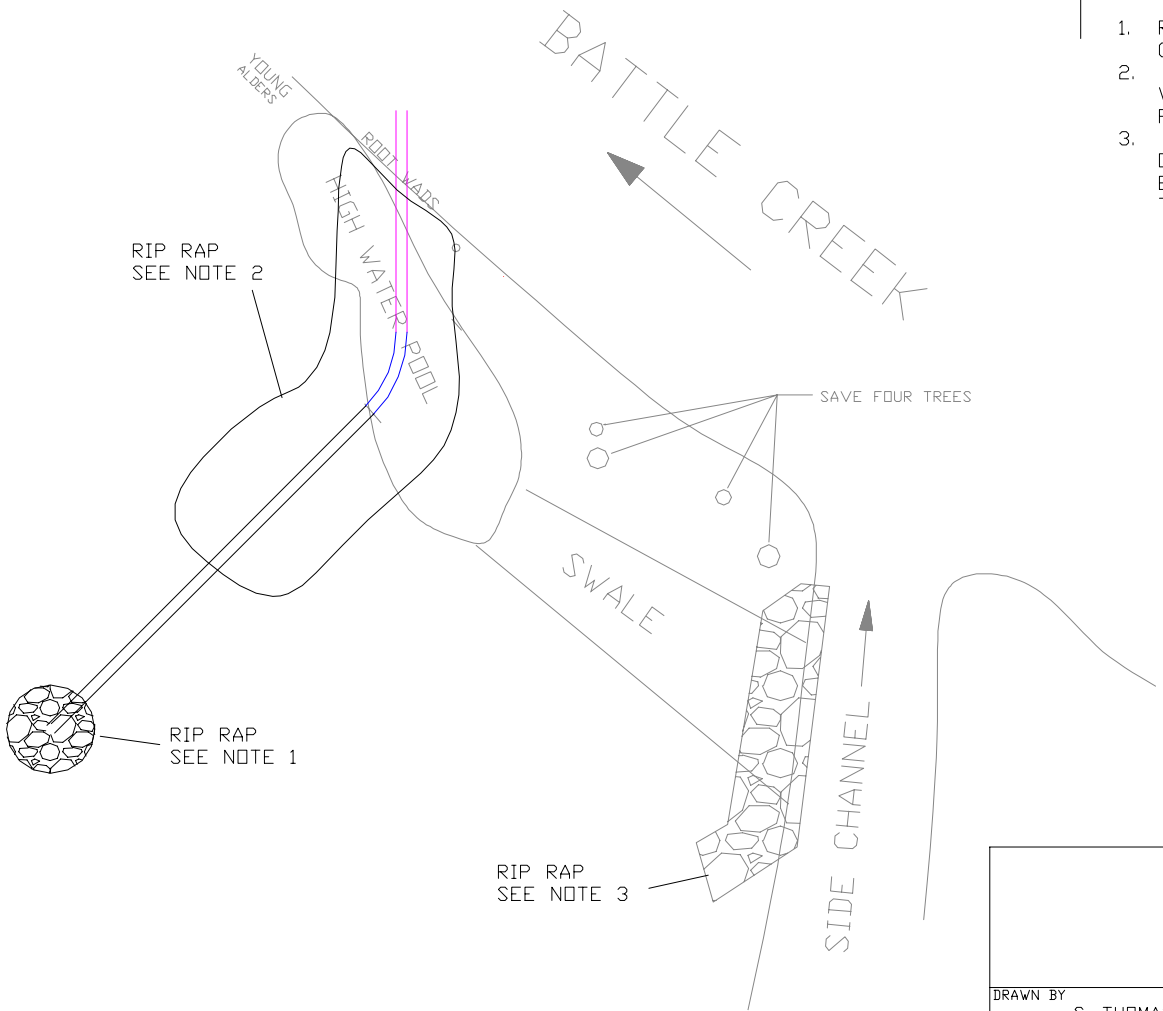
ORWICK SCREEN BYPASS

PIPELINE OUTFALL

DRAWN BY: S. THOMAS	SIZE	FSCM NO.	DWG NO.	REV
DATE: MAY 2006	SCALE		SHEET	

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED

1. RIP RAP FOUR (4) FT RADIUS AROUND TOP OF CLEAN OUT PROT RISER ON FLOOD PLANE
2. LAY RIP RAP BOTH SIDES OF PIPELINE TO WATER'S EDGE. KEY INTO SUBSTREATE TWO (2) FT MIN., AND INTO CREEK BANK SIX (6) FT MIN.
3. REINFORCE SIDE CHANNEL AT SWALE TO ELEV. OF SURROUNDING FLOOD PLANE. TIE INTO EXISTING GROUND SURFACE WITHOUT DAMAGE TO TREE ROOTS.

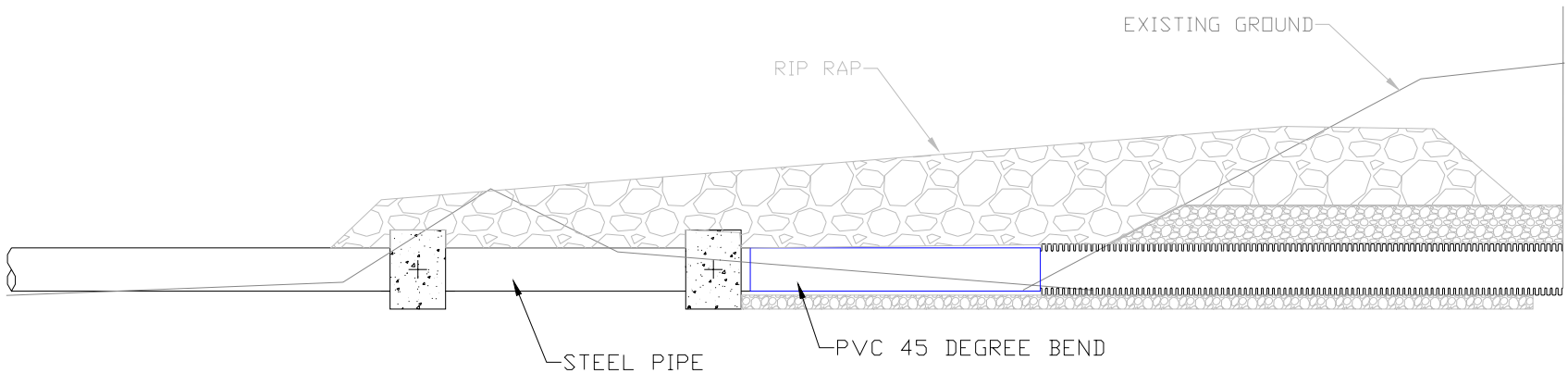


ORWICK SCREEN BYPASS

PIPELINE OUTFALL RIP RAP PROTECTION

DRAWN BY	SIZE	FSCM NO.	DWG NO.	REV
S. THOMAS				
DATE: MAY 2006	SCALE		SHEET	

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED

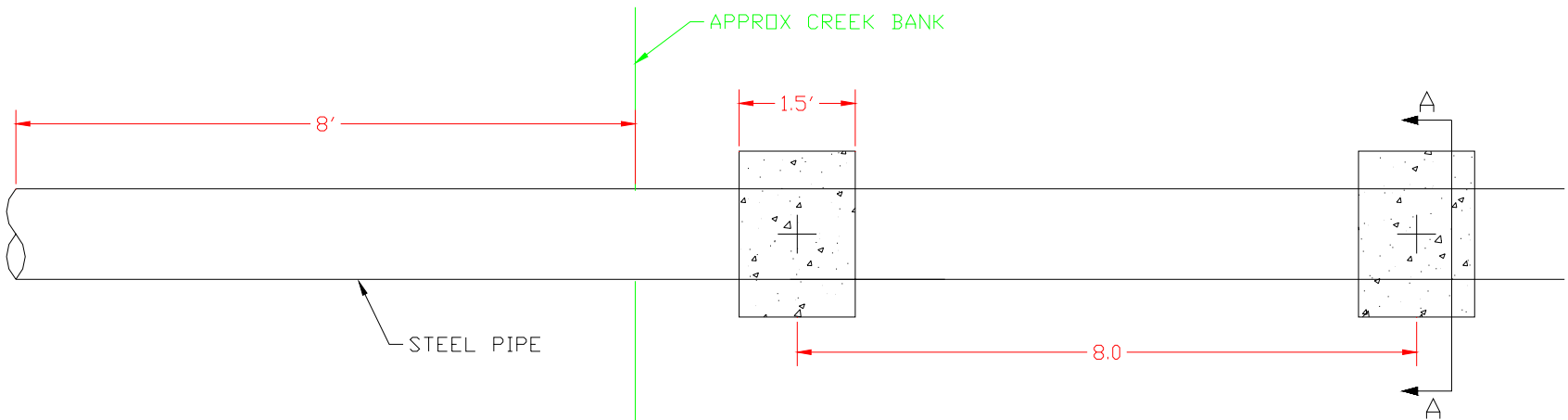


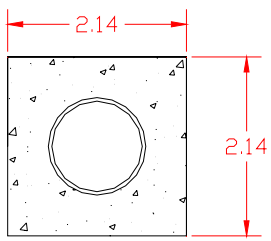
ORWICK SCREEN BYPASS

OUTFALL LONGITUDINAL SECTION

DRAWN BY S. THOMAS	SIZE	FSCM NO.	DWG NO.	REV
DATE MAY 2006	SCALE		SHEET	

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED





Section A-A

ORWICK SCREEN BYPASS

BYPASS OUTFALL ANCHORAGE

DRAWN BY	SIZE	FSCM NO.	DWG NO.	REV
S. THOMAS				
DATE	SCALE		SHEET	
MAY 2006				

APPENDIX B

Biological Assessment and Letter of Concurrence

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Redding Field Office
355 Hemsted Drive
Redding, CA 96002
Phone (530) 224-2100, Fax (530) 224-2172
www.ca.blm.gov/redding

In Reply Refer To:
Cooperative Agreement # 81330-6-J969

JUN - 1 2006

May 31, 2006

Mr. Jim Smith
U.S. Fish and Wildlife Service
10950 Tyler Road
Red Bluff, CA 96080

Subject: Orwick Diversion Fish Passage Improvement Project (bypass pipe and automatic flow control)

Dear Mr. Smith:

The purpose of this letter is to initiate Section 7 consultation and request that U.S. Fish and Wildlife Service concur with our determination that the construction activities of the Orwick Diversion Fish Passage Improvement Project (bypass pipe and automatic flow control) may affect, but is not likely to adversely affect Federally listed as Threatened valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*).

The *Central Valley Project Improvement Act (CVPIA; Title 34 of Public law 102-575, Section 3406(b)(1),* authorizes and directs the Secretary of the Department of the Interior (DOI), in consultation with other State and Federal agencies, Indian tribes, and affected interests, to develop and implement a program which makes all reasonable effort to at least double natural production of anadromous fish in California's Central Valley rivers and streams. Further, the CVPIA requires that this program give first priority to measures which protect and restore natural channel and riparian habitat values through habitat restoration actions, modifications to Central Valley Project operations, and implementation of the supporting measures mandated by the CVPIA. The DOI is implementing these directives through the USFWS Anadromous Fish Restoration Program (AFRP). The species and runs of anadromous fish addressed by the AFRP include fall-run, late-fall run, winter-run, and spring-run Chinook salmon (*Oncorhynchus tshawytscha*) and steelhead (*O. mykiss*). The project is located on public lands administered by the Redding Field Office of the Bureau of Land Management (BLM).

BLM requests that U.S. Fish and Wildlife Services concur with the determination that the Orwick Diversion Fish Passage Improvement Project (bypass pipe and automatic flow control) may affect but is not likely to adversely affect the valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)..

In order to assist the AFRP in obtaining these aforementioned objectives, two construction activities will occur: (1) a new fish bypass pipe at the Orwick Diversion on Battle Ck and (2) an automatic flow control (water surface elevation and flow) for water entering the headgate at the Orwick Diversion on Battle Creek. Both actions will protect and restore the natural riparian habitat values by maintaining populations of juvenile salmon and steelhead in the stream channel and protecting them from being diverted into a major agricultural diversion.

Task 1: Orwick screen bypass pipe: Juvenile salmon and steelhead that encounter the fish screen on this diversion currently "dead end" at the screen as no passage is in place for them to get back into the creek. The current bypass pipe is ineffective for several reasons (e.g. it is not smooth, it does not connect the fish back to a flowing stream at all times and is not correctly sloped). A new bypass pipe is required to return fish to the main creek channel.

Preliminary survey work shows the new pipe will need to be approximately 700 feet long on a uniform slope of approximately 1.5%. The pipe will need to mate to the existing fish screen structure and will require sufficient ballast to prevent floating during high flow events. Smooth plastic pipe with smooth joints is preferred according to design criteria (see the Design Plans for specifics). The route for the bypass pipe will be excavated primarily on dry ground with only a minimal disturbance to the stream at the pipe exit.

A route has been selected to minimize impacts to vegetation, wildlife habitat and cultural resources. Approximately 30 trees of various size and age class will need to be removed along the pipe route to accommodate construction. Cut vegetation materials will be scattered throughout the area to provide for wildlife habitat components. Although vegetation removal will occur along the new route, the route is expected to disturb an approximate 30 foot wide by approximately 700 foot corridor. Vegetation that will be disturbed in the construction route includes multiple associated Sacramento River riparian forest associates. Two single stem elderberry (*Sambucus spp*) plants, with stem diameters of 5", located immediately adjacent to one another in a transition zone of riparian and upland vegetation, occur approximately 80 feet from proposed route for the bypass pipe. The plants are approximately 40 feet from the proposed headgate control structure (no ground disturbance for this task). All construction materials and heavy equipment needed for the bypass pipe project will be brought to the site on existing county and BLM roads.

Task 2: Orwick headgate control structure: The diverter currently does not regulate flows into the canal during the irrigation season. To control diversion rates and to prevent overtopping of the fish screen, an automated gate system is required.

This effort involves the construction of an automated system to control flow rates into the diversion canal, and prevent overtopping. The gate system will control flows to 50 cfs down the canal at a wide range of stream flows throughout the year, without restricting water diversion rates during periods of low flows in addition to providing the bypass with sufficient flows to safely transport juvenile salmonids back to the main migratory route of the river. Flow control gates will be installed on the existing head wall structure; and the head wall structure may be modified as necessary to accomplish the goals of this task. No vegetation disturbance is anticipated in this task.

The following conservation measures are designed to prevent adverse effects to Valley elderberry longhorn beetle from the project.

A. The following conservation measures ensure adverse effects to elderberry plants remain discountable and will not adversely affect VELB:

- The BLM will fence an avoidance area, providing a minimum setback of at least 20 feet from the dripline, each elderberry plant.
- The USFWS will brief contractors on the need to avoid damaging the elderberry plants and the possible penalties for not complying with these requirements.
- The USFWS will erect signs every 50 feet along the edge of the avoidance area with the following information: "This area is habitat of the valley elderberry longhorn beetle, a

threatened species, and must not be disturbed. This species is protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment." The mounted signs will be clearly readable from a distance of 20 feet, and maintained for the duration of construction.

- The USFWS will instruct work crews about the status of the beetle and the need to protect its elderberry host plant.

B. The following conservation measures ensure potential impacts to habitat quality remain insignificant related to the construction of the project, and will not adversely affect VELB:

- The BLM will complete revegetation and stabilization of disturbed soils and within the construction prism. Seeding and mulching of disturbed areas with native grasses will be conducted immediately following implementation of construction activities. Seeding or planting with Sacramento River riparian natives will occur on an ongoing basis until a sufficient number of plants have been established for a period of 3 years after project construction completion.
- The contractor will restore any damage done to the buffer area (area within 100 feet of elderberry plants) during construction. Provide erosion control and re-vegetate with appropriate native plants.
- No insecticides, herbicides, fertilizers, or other chemicals that might harm the beetle or its host plant will be used in the buffer areas, or within 100 feet of any elderberry plant.
- Best management practices for control of erosion will be implemented as part of the project specifications. These measures shall include, but not be limited to, avoidance of sensitive areas, use of straw to cover disturbed areas, implementation of seeding and revegetation plans, and use of sediment berms and/or curtains to reduce storm water erosion.

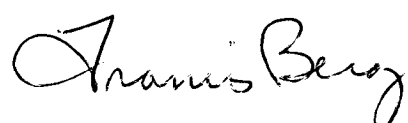
C. The following stipulations ensure the potential for take to occur remains discountable:

- Construction activities will occur after the adult's have completed their reproductive life cycle (emergence, breeding and egg deposition), July to March.

Our determination that this project may affect, but is not likely to adversely affect the valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) results from discussions with USFWS staff. The project implementation window of July to March represents a time when impacts to the reproductive stage can be avoided. Avoidance and post construction restoration activities will ensure the area will recover quickly, no impacts will occur to the elderberry occurring within the 100 foot buffer, and the habitat quality within the project footprint will not degrade.

If you have any questions, please contact Gary Diridoni at 530-224-2184.

Sincerely,



for Steven W. Anderson
Field Manager, Acting

BIOLOGICAL ASSESSMENT
for
ORWICK DIVERSION FISH PASSAGE IMPROVEMENT PROJECT
(BYPASS PIPE AND AUTOMATIC FLOW CONTROL)
Redding Field Office
Bureau of Land Management

May 2006

Prepared by: _____ Date: 6/1/06
Gary Diridoni
Wildlife Biologist, Redding

Reviewed by: Francis Berg Date: 6/1/06
for Glen Miller
Environmental Coordinator

Approved by: Francis Berg Date: 6/1/06
for Steve Anderson
Redding Field Manager, Acting

6840(P)

I. INTRODUCTION

The Orwick Diversion Fish Passage Improvement Project is being proposed by the USFWS and its partners (Bureau of Land Management, California Department of Fish and Game, National Marine Fisheries Service, and the water rights holder) as a means of restoring and protecting natural riparian habitat values by maintaining populations of juvenile salmon and steelhead in the stream channel. Currently, juvenile salmon and steelhead that encounter the existing fish screen associated with the Orwick irrigation diversion find a "dead end" at the screen as there is no passage back to the creek. Fish passage is further inhibited by inadequate sloping of the existing bypass pipe. This project, to improve fish passage at this irrigation diversion, directly addresses Action 4 in the Anadromous Fish Restoration Program Plan (USFWS 2001) as called for by the Central Valley Project Improvement Act.

The *Central Valley Project Improvement Act (CVPIA; Title 34 of Public law 102-575, Section 3406(b)(1),* authorizes and directs the Secretary of the Department of the Interior (DOI), in consultation with other State and Federal agencies, Indian tribes, and affected interests, to develop and implement a program which makes all reasonable effort to at least double natural production of anadromous fish in California's Central Valley rivers and streams. Further, the CVPIA requires that the Anadromous Fish Restoration Program give first priority to measures which protect and restore natural channel and riparian habitat values through habitat restoration actions, modifications to Central Valley Project operations, and implementation of the supporting measures mandated by the CVPIA. The DOI is implementing these directives through the USFWS Anadromous Fish Restoration Program (AFRP). The species and runs of anadromous fish addressed by the AFRP include fall-run, late-fall run, winter-run, and spring-run Chinook salmon (*Oncorhynchus tshawytscha*) and steelhead (*O. mykiss*).

The project is located on public lands administered by the Redding Field Office of the Bureau of Land Management (BLM). This irrigation diversion is for a water right held by Charles Orwick, Red Bluff. The diversion, sometimes referred to as South Side Ditch, delivers water to the Battle Creek Ranch .

The objective of this biological assessment (BA) is to review the construction activities related to the two proposed tasks at the Orwick Diversion on Battle Creek as it relates to the Federally Threatened valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*).

Within the project area, habitat components that support California red-legged frogs (*Rana draytonii*) do not occur. Flow rates are too high and the lack of slow, backwater habitat precludes their occurrence from Battle Creek. No populations occur or are known to have occurred (historic) in the area to support metapopulations of the frog. As such it has been determined that no effects will occur to the California red-legged frog and the species will not be considered further in the document.

Bald eagles *(Haliaeetus leucocephalus)* are known to occur in the area but no active or inactive nest sites have been identified. Bald eagles likely nest outside the project area, but near enough that it

would lie within the daily range of foraging eagles. Additionally, alternative foraging opportunities are available to bald eagles within this vicinity. As such, it has been determined that no effects will occur to the bald eagle and the species will not be considered further in the document.

This assessment is intended to be sufficiently detailed to determine if this action may affect valley elderberry longhorn beetle (VELB). This BA is prepared pursuant to Section 7 of the Endangered Species Act, as amended, and follows the general guidance provided by BLM Manual 6840 and California State Office Memorandum CA-94-0149.

II. CONSULTATIONS TO DATE

Consultation and conferencing on this proposed action has followed interagency streamlining guidance utilizing the Level 1 Team comprised of Gary Diridoni (BLM), Tricia Parker (USFWS), Ron Clementsen (USFWS) and Doug Powers (USFWS). This consisted of a site visit on February 8, 2006 and a phone conversation and site visit on May 19, 2006. USFWS has also had an opportunity to review this Biological Assessment in draft form; comments from Doug Powers were incorporated on May 31, 2006.

III. CURRENT MANAGEMENT DIRECTION

General management guidance for resource programs comes from laws, Executive Orders, regulations, Department of the Interior manuals, BLM manuals and BLM instruction memoranda.

IV. DESCRIPTION OF THE PROPOSED ACTION

In order to assist the AFRP in obtaining these aforementioned objectives, two construction activities will occur: (1) a new fish bypass pipe at the Orwick Diversion on Battle Ck and (2) an automatic flow control (water surface elevation and flow) for water entering the headgate at the Orwick Diversion on Battle Creek. Both actions will protect and restore the natural riparian habitat values by maintaining populations of juvenile salmon and steelhead in the stream channel and protecting them from being diverted into a major agricultural diversion. At present, only the first task is being implemented. The second task may be implemented later this year.

Task 1: Orwick screen bypass pipe: Juvenile salmon and steelhead that encounter the fish screen on this diversion currently "dead end" at the screen as no passage is in place for them to get back into the creek. The current bypass pipe is ineffective for several reasons (e.g. it is not smooth, it does not connect the fish back to a flowing stream at all times and is not correctly sloped). A new bypass pipe is required to return fish to the main creek channel.

Preliminary survey work shows the new pipe will need to be approximately 700 feet long on a uniform slope of approximately 1.5%. The pipe will need to mate to the existing fish screen structure and will require sufficient ballast to prevent floating during high flow events. Smooth plastic pipe with smooth joints is preferred according to design criteria (see the Design Plans for

specifics). The route for the bypass pipe will be excavated primarily on dry ground with only a minimal disturbance to the stream at the pipe exit.

A route has been selected to minimize impacts to vegetation, wildlife habitat and cultural resources. Approximately 30 trees of various size and age class will need to be removed along the pipe route to accommodate construction. Cut vegetation materials will be scattered throughout the area to provide for wildlife habitat components. Although vegetation removal will occur along the new route, the route is expected to disturb an approximate 30 foot wide by approximately 700 foot corridor. Vegetation that will be disturbed in the construction route includes multiple associated Sacramento River riparian forest associates. Two single stem elderberry (*Sambucus spp*) plants, with stem diameters of 5", located immediately adjacent to one another in a transition zone of riparian and upland vegetation, occur approximately 80 feet from proposed route for the bypass pipe. The plants are approximately 40 feet from the proposed headgate control structure (no ground disturbance for this task). All construction materials and heavy equipment needed for the bypass pipe project will be brought to the site on existing county and BLM roads.

Task 2: Orwick headgate control structure: The diverter currently does not regulate flows into the canal during the irrigation season. To control diversion rates and to prevent overtopping of the fish screen, an automated gate system is required.

This effort involves the construction of an automated system to control flow rates into the diversion canal, and prevent overtopping. The gate system will control flows to 50 cfs down the canal at a wide range of stream flows throughout the year, without restricting water diversion rates during periods of low flows in addition to providing the bypass with sufficient flows to safely transport juvenile salmonids back to the main migratory route of the river. Flow control gates will be installed on the existing head wall structure; and the head wall structure may be modified as necessary to accomplish the goals of this task. No vegetation disturbance is anticipated in this task.

The following conservation measures are designed to prevent adverse effects to Valley elderberry longhorn beetle from the project.

A. The following conservation measures ensure adverse effects to elderberry plants remain discountable and will not adversely affect VELB:

- The BLM will fence an avoidance area, providing a minimum setback of at least 20 feet from the dripline, each elderberry plant.
- The USFWS will brief contractors on the need to avoid damaging the elderberry plants and the possible penalties for not complying with these requirements.
- The USFWS will erect signs every 50 feet along the edge of the avoidance area with the following information: "This area is habitat of the valley elderberry longhorn beetle, a threatened species, and must not be disturbed. This species is protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment." The mounted signs will be clearly readable from a distance of 20 feet, and maintained for the duration of construction.

- ▶ The USFWS will instruct work crews about the status of the beetle and the need to protect its elderberry host plant.

B. The following conservation measures ensure potential impacts to habitat quality remain insignificant related to the construction of the project, and will not adversely affect VELB:

- ▶ The BLM will complete revegetation and stabilization of disturbed soils and within the construction prism. Seeding and mulching of disturbed areas with native grasses will be conducted immediately following implementation of construction activities. Seeding or planting with Sacramento River riparian natives will occur on an ongoing basis until a sufficient number of plants have been established for a period of 3 years after project construction completion.
- ▶ The contractor will restore any damage done to the buffer area (area within 100 feet of elderberry plants) during construction. Provide erosion control and re-vegetate with appropriate native plants.
- ▶ No insecticides, herbicides, fertilizers, or other chemicals that might harm the beetle or its host plant will be used in the buffer areas, or within 100 feet of any elderberry plant.
- ▶ Best management practices for control of erosion will be implemented as part of the project specifications. These measures shall include, but not be limited to, avoidance of sensitive areas, use of straw to cover disturbed areas, implementation of seeding and revegetation plans, and use of sediment berms and/or curtains to reduce storm water erosion.

C. The following stipulations ensure the potential for take to occur remains discountable:

- ▶ Construction activities will occur after the adult's have completed their reproductive life cycle (emergence, breeding and egg deposition), July to March.

V. EXISTING ENVIRONMENT

Battle Creek is a unique watershed possessing extraordinary resources. Compared to other watersheds draining to the Sacramento-San Joaquin system, the watershed is in good condition in terms of both hydrologic connectivity and habitat for anadromous fishes and other aquatic species one of the few streams left in California that supports a population of spring-run Chinook salmon (*Oncorhynchus tshawytscha*, federal and state listing as Threatened). Central Valley steelhead (*Oncorhynchus mykiss*, federally listed as Threatened), late fall Chinook (*O. tshawytscha*) and fall-run chinook salmon (*O. tshawytscha*) also utilize in the watershed. The watershed is 360 square miles in size. Prior to hydropower development, roughly 53 miles of stream was historically available to anadromous fish; currently approximately 24 miles are available for naturally producing spring Chinook and steelhead.

The Sacramento River riparian vegetation community along Battle Creek has a diverse, overstory of cottonwood and willows, pines and oaks as well as sycamores, California buckeye, ash and alder. Understory vegetation includes buttonbrush , blackberry, elderberry and poison oak which are often covered by an assortment of vines (clematis, wild grape, and pipevine) which extend up into the overstory trees. Perennial and annual grasses, forbs and sedges form dense pockets in the understory.

VI. SPECIES ACCOUNTS

Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)
ESA Status: Federal Threatened Species, (August 8, 1980)
Suitable habitat:
The valley elderberry longhorn beetle (beetle) is completely dependent on its host plant, elderberry (*Sambucus spp*), which is a common component of the remaining riparian forests and adjacent upland habitats of California's Central Valley. Use of the elderberry by the beetle, a wood borer, is rarely apparent. Frequently, the only exterior evidence of the elderberry's use by the beetle is an exit hole created by the larva just prior to the pupal stage. The life cycle takes one or two years to complete. The animal spends most of its life in the larval stage, living within the stems of an elderberry plant. Adult emergence is from late March through June, about the same time the elderberry produces flowers. The adult stage is short-lived. Further information on the life history, ecology, behavior, and distribution of the beetle can be found in a report by Barr (1991) and the recovery plan for the beetle (USFWS 1984).

Natural history:
Longhorn beetles (family Cerambidae) are characterized by somewhat elongate, cylindrical bodies with long antennae, often more than 2/3 of the body length. Valley elderberry longhorn beetles (*Desmocerus californicus dimorphus*) are stout-bodied. Males range in length from about 1/2 to nearly 1 inch (measured from the front of the head to the end of the abdomen) with antennae about as long as their bodies. Females are slightly more robust than males, measuring about 3/4 to 1 inch, with somewhat shorter antennae. Adult males have red-orange elytra (wing covers) with four elongate spots. The red-orange fades to yellow on some museum specimens. Adult females have dark colored elytra.

There are four stages in the animal's life: egg, larva, pupa and adult. The species is nearly always found on or close to its host plant, elderberry (*Sambucus* species). Females lay their eggs on the bark. Larvae hatch and burrow into the stems. The larval stage may last 2 years, after which the larvae enter the pupal stage and transform into adults. Adults are active from March to June, feeding and mating.

It appears that in order to serve as habitat, the shrubs must have stems that are 1.0 inch or greater in diameter at ground level. Use of the plants by the animal is rarely apparent. Frequently, the only exterior evidence of the shrub's use by the beetle is an exit hole created by the larva just before the pupal stage. Field work along the Cosumnes River and in the Folsom Lake area suggests that larval galleries can be found in elderberry stems with no evidence of exit holes. The larvae either succumb before constructing an exit hole or are not far enough along in the developmental process to construct an exit hole.

Local Populations:
The beetle's current distribution is patchy throughout the remaining riparian forests of the Central Valley from Redding to Bakersfield. The beetle appears to be only locally common, i.e., found in population clusters that are not evenly distributed across the Central Valley. One nearby

documented occurrence was in 2004. Two USFWS biologists (H. Crowell and T. Parker) found exit holes in elderberry bushes several hundred feet away on the North side of Battle Creek.

VII. EFFECTS OF THE PROPOSED ACTION

A. Direct

The proposed actions may affect but are not likely to adversely affect VELB potentially occurring in the project area. Construction activities shall be limited to the period from July 1 to March 1 of each year, therefore avoiding the flight and reproductive period (i.e., generally late March thru June) of the VELB. Limiting activities to this period will reduce potential adverse impacts to reproductive individuals. Avoidance and post construction restoration activities will ensure the area will recover quickly, no impacts will occur to the elderberry occurring within the 100 foot buffer, and the habitat quality within the project footprint will not degrade.

B. Indirect

Indirect effects are those that are caused by the action and are later in time, but are still reasonably certain to occur. There are no indirect actions associated with implementing the Orwick Diversion Fish Passage Improvement Project.

C. Interdependent and Interrelated Effects

Interrelated actions are those that are part of the proposed action and depend upon the proposed action for their justification. Independent actions are those that have no independent utility apart from the action under consultation. There are no known interrelated and interdependent effects.

D. Cumulative effects

A cumulative impact is identified as an impact on the environment which results from the incremental impact of the action when added to other past, present, or reasonably foreseeable impacts as a result of future actions. The project evaluated individually and cumulatively will have no negative impact on the surroundings or other resources in the watershed.

VIII. DETERMINATION

It is determined that the project may affect, but is not likely to adversely affect VELB due to discountable or insignificant effects .

X. REFERENCES

Barr, C. 1991. The Distribution, Habitat, and Status of the Valley Elderberry Longhorn Beetle *Desmocerus californicus dimorphus*. Sacramento, CA.

Eng, L. L., 1984. Rare, threatened and endangered invertebrates in California riparian systems. In: California riparian systems Ecology, conservation, and productive management, ed. R. E. Warner and K. M. Hendrix. Berkeley: University of California Press.

Thelander, C. ed. 1994. Life on the edge: a guide to California's endangered natural resources. BioSystem Books. Santa Cruz, CA. p 414-415.

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U.S. Fish & Wildlife Service. 1980. Listing the Valley elderberry longhorn beetle as a threatened species with critical habitat. (pdf) Washington, DC.

U.S. Fish & Wildlife Service. 1984. Valley elderberry longhorn beetle recovery plan. Portland, Oregon.

U.S. Fish and Wildlife Service. 1996. Valley elderberry longhorn beetle consultation with the U.S. Army Corps of Engineers. Sacramento, California. Appendix: Conservation Guidelines for the Valley Elderberry Longhorn Beetle, Updated July 9, 1999.

U.S. Fish and Wildlife Service. 2001. Final Restoration Plan for the Anadromous Fish Restoration Program: A plan to increase natural production of anadromous fish in the Central Valley of California. Adopted as Final on January 9, 2001.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Red Bluff Fish & Wildlife Office
10950 Tyler Road, Red Bluff, California 96080
(530) 527-3043, FAX (530) 529-0292

In Reply Refer To: 1-12-2006-I-11 JUN - 1 2005

Steven W. Anderson
Field Manager
Bureau of Land Management
Redding Field Office
355 Hemsted Drive
Redding, CA 96002

Subject: Informal Endangered Species Consultation on the Orwick Diversion Fish Passage Improvement Project (Project)

Dear Mr. Anderson:

This correspondence is in reply to yours of May 31st, 2006, received by this office on June 1st, 2006, requesting our concurrence with your determination that the proposed action, the Orwick Diversion Fish Passage Improvement Project, is not likely to adversely affect federally listed, proposed or candidate species or their critical habitat. We have reviewed the Biological Assessment (BA) transmitted with your request, and concur with your determinations that the proposed action *may affect, but is not likely to adversely affect* the federally threatened valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*). The Bureau of Land Management (BLM) is using a species list issued by the U.S. Fish and Wildlife Service (Service) on May 31st, 2006. The BLM has implemented the Streamlined Consultation Process and the Service has provided technical expertise where appropriate.

Consultation History

Consultation on this proposed action has followed interagency streamlining guidance utilizing a Level 1 Team comprised of Gary Diridoni (BLM), Tricia Parker (USFWS), Ron Clementsen (USFWS) and Doug Powers (USFWS). This consisted of a site visit on February 8, 2006 and a phone conversation and site visit on May 19, 2006. A draft copy of the BA was received on May 29, 2006. Following several minor corrections requested by the Service, the final BA was received on June 1st, 2006.

Discussion of Project Effects

The *Central Valley Project Improvement Act (CVPIA; Title 34 of Public law 102-575, Section 3406(b)(1),* authorizes and directs the Secretary of the Department of the Interior (DOI), in consultation with other State and Federal agencies, Indian tribes, and affected interests, to develop and implement a program which makes all reasonable effort to at least double natural production of anadromous fish in California's Central Valley rivers and streams. Further, the CVPIA requires that this program give first priority to measures which protect and restore natural channel and riparian habitat values through habitat restoration actions,

modifications to Central Valley Project operations, and implementation of the supporting measures mandated by the CVPIA. The DOI is implementing these directives through the USFWS Anadromous Fish Restoration Program (AFRP). The project is located on public lands administered by the Redding Field Office of the Bureau of Land Management (BLM).

In order to assist the AFRP in obtaining these aforementioned objectives, two construction activities will occur: (1) a new fish bypass pipe at the Orwick Diversion on Battle Ck and (2) an automatic flow control (water surface elevation and flow) for water entering the headgate at the Orwick Diversion on Battle Creek. Both actions will protect and restore the natural riparian habitat values by maintaining populations of juvenile salmon and steelhead in the stream channel and protecting them from being diverted into a major agricultural diversion.

Task 1: Orwick screen bypass pipe: Juvenile salmon and steelhead that encounter the fish screen on this diversion currently "dead end" at the screen as no passage is in place for them to get back into the creek. The current bypass pipe is ineffective for several reasons (e.g. it is not smooth, it does not connect the fish back to a flowing stream at all times and is not correctly sloped). A new bypass pipe is required to return fish to the main creek channel.

Preliminary survey work shows the new pipe will need to be approximately 700 feet long on a uniform slope of approximately 1.5%. The pipe will need to mate to the existing fish screen structure and will require sufficient ballast to prevent floating during high flow events. Smooth plastic pipe with smooth joints is preferred according to design criteria (see the Design Plans for specifics). The route for the bypass pipe will be excavated primarily on dry ground with only a minimal disturbance to the stream at the pipe exit.

A route has been selected to minimize impacts to vegetation, wildlife habitat and cultural resources. Approximately 30 trees of various size and age class will need to be removed along the pipe route to accommodate construction. Cut vegetation materials will be scattered throughout the area to provide for wildlife habitat components. Although vegetation removal will occur along the new route, the route is expected to disturb an approximate 30 foot wide by approximately 700 foot corridor. Vegetation that will be disturbed in the construction route includes multiple associated Sacramento River riparian forest associates. Two single stem elderberry (*Sambucus spp*) plants, with stem diameters of 5", located immediately adjacent to one another in a transition zone of riparian and upland vegetation, occur approximately 80 feet from proposed route for the bypass pipe. The plants are approximately 40 feet from the proposed headgate control structure (no ground disturbance for this task). All construction materials and heavy equipment needed for the bypass pipe project will be brought to the site on existing county and BLM roads.

Task 2: Orwick headgate control structure: The diverter currently does not regulate flows into the canal during the irrigation season. To control diversion rates and to prevent overtopping of the fish screen, an automated gate system is required.

This effort involves the construction of an automated system to control flow rates into the diversion canal, and prevent overtopping. The gate system will control flows to 50 cfs down the canal at a wide range of stream flows throughout the year, without restricting water diversion rates during periods of low flows in addition to providing the bypass with sufficient flows to safely transport juvenile salmonids back to the main migratory route of the river. Flow control gates will be installed on the existing head wall structure; and the head wall structure may be modified as necessary to accomplish the goals of this task. No vegetation disturbance is anticipated in this task.

The following conservation measures are designed to prevent adverse effects to Valley elderberry longhorn beetle from the project.

A. The following conservation measures ensure adverse effects to elderberry plants remain discountable and

will not adversely affect VELB:

- The BLM will fence an avoidance area, providing a minimum setback of at least 20 feet from the dripline, each elderberry plant.
- The USFWS will brief contractors on the need to avoid damaging the elderberry plants and the possible penalties for not complying with these requirements.
- The USFWS will erect signs every 50 feet along the edge of the avoidance area with the following information: "This area is habitat of the valley elderberry longhorn beetle, a threatened species, and must not be disturbed. This species is protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment." The mounted signs will be clearly readable from a distance of 20 feet, and maintained for the duration of construction.
- The USFWS will instruct work crews about the status of the beetle and the need to protect its elderberry host plant.

B. The following conservation measures ensure potential impacts to habitat quality remain insignificant related to the construction of the project, and will not adversely affect VELB:

- The BLM will complete revegetation and stabilization of disturbed soils and within the construction prism. Seeding and mulching of disturbed areas with native grasses will be conducted immediately following implementation of construction activities. Seeding or planting with Sacramento River riparian natives will occur on an ongoing basis until a sufficient number of plants have been established for a period of 3 years after project construction completion.
- The contractor will restore any damage done to the buffer area (area within 100 feet of elderberry plants) during construction. Provide erosion control and re-vegetate with appropriate native plants.
- No insecticides, herbicides, fertilizers, or other chemicals that might harm the beetle or its host plant will be used in the buffer areas, or within 100 feet of any elderberry plant.
- Best management practices for control of erosion will be implemented as part of the project specifications. These measures shall include, but not be limited to, avoidance of sensitive areas, use of straw to cover disturbed areas, implementation of seeding and revegetation plans, and use of sediment berms and/or curtains to reduce storm water erosion.

C. The following stipulations ensure the potential for take to occur remains discountable:
Construction activities will occur after the adult's have completed their reproductive life cycle (emergence, breeding and egg deposition), July to March.

Therefore, ***unless new information reveals effects of the proposed action that may affect listed or proposed species in a manner or to an extent not considered,*** or a new species or critical habitat is designated that may be affected by the proposed action, no further action pursuant to the Endangered Species Act of 1973, as amended, is necessary.

Please contact Doug Powers of my staff at (530) 527-3043, if you have questions regarding this response.

Sincerely,

Tom T. Kisanuki

(for) James G. Smith,
Project Leader

APPENDIX C

Archaeology Report

AN ARCHAEOLOGICAL INVENTORY AND SITE EVALUATION FOR THE PROPOSED ORWICK DIVERSION FISH PASSAGE IMPROVEMENT PROJECT, TEHAMA COUNTY, CALIFORNIA

By

Eric W. Ritter, Ph.D.
USDI-Bureau of Land Management
Redding, California

March, 2006

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INTRODUCTION

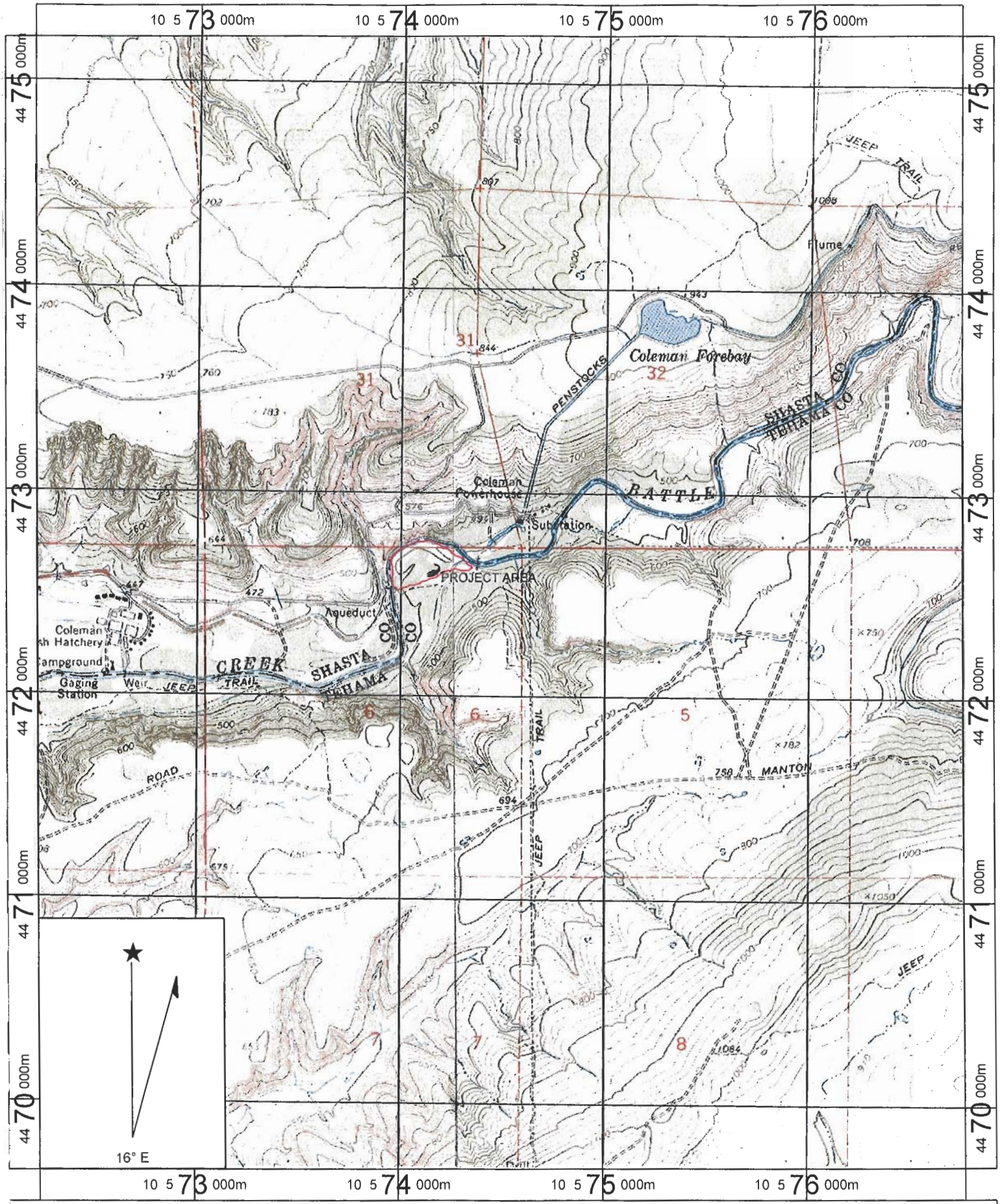
The U.S. Fish and Wildlife Service has proposed (1) the construction of a new fish bypass pipe at the Orwick Diversion on Battle Creek in Tehama County and (2) the construction of an automatic flow control device for the headgate at the diversion, both in T. 29 N,., R. 2 W., in Section 6 MDB&M (see proposed project map). Both actions are measures to complete a previously implemented screening project at this site and to protect and restore the natural riparian habitat values by maintaining populations of juvenile salmon and steelhead in the stream channel and protecting them from being sidetracked into a major agricultural diversion. These actions are consistent with the Central Valley Project Improvement Act as implemented through the USFWS's Anadromous Fish Restoration Program specifically oriented to fall-run, late-fall run, winter-run, and spring-run Chinook salmon (*Oncorhynchus tshawwytscha)* and steelhead *(O. mykiss)*. The USFWS plan includes the screening of the Orwick Diversion (Battle Creek Ranch Ditch) to prevent entrainment of juvenile salmonids and straying of adult Chinook salmon. The screening portion of the project and a pipeline to carry juvenile salmonids back to an intermittent side channel of Battle Creek were completed by the California Department of Fish and Game without full BLM consultation and without prior environmental clearance (including cultural resource work) as far as can be ascertained. Furthermore, this buried bypass pipe has been found to be inadequate and is need of replacement in a differing alignment.

PROPOSED WORK DETAILS

The major task for this project is the bypass pipeline replacement. Juvenile salmon and steelhead that encounter the Orwick screen bypass pipe diversion currently "dead end" at the screen as no passage is in place for them to get back to the creek. The current bypass pipe is ineffective due to the fact it is not smooth, is incorrectly sloped and empties into a seasonal side channel of Battle Creek. The new bypass pipe will return fish to the main channel. It will need to be approximately 500-600 feet long depending on environmental constrains such as cultural resources and elderberry bushes, with a uniform slope of approximately 1.5%. The pipe will need to mate to the existing fish screen structure and will require sufficient ballast to prevent floating during high flow events. Smooth plastic pipe with smooth joints is preferred.

Some nearby vegetation will be disturbed by the excavation, a narrow trench only a few feet wide. All equipment will be brought to site on an existing dirt road and deployed from an area already disturbed. The specific rout for the pipeline will be determined after completion of all environmental work. Construction is stated to begin in Spring, 2006 with a work window of about six weeks.

The Orwick headgate control structure will be constructed on the dam/headgate to prevent overtopping of the fish screen, utilizing an automated gate system. The gate system will need also to provide the bypass with sufficient flows to safely transport juvenile salmonids to the main migratory rout of the river. Flow control gates will be



Name: TUSCAN BUTTES NE
Date: 2/22/2006
Scale: 1 inch equals 2000 feet

Location: 10 0574479 E 4472456 N
Caption: AREA OF PROJECT

installed on the existing head wall structure which may be modified as necessary to accomplish the goals of this task. System set points must be adjustable by the diverter. System controls must be contained within a vandal-resistant enclosure above the 100 year flood level. Construction work will be outsourced by USFWS.

LOCAL ENVIRONMENT

The project area is situated on the south side of Battle Creek, a major tributary of the Sacramento River and a major anadromous fish stream. It is primarily within a riparian woodlands dominated by live oak, gray pine, elderberry, ash, blackberry, poison oak, Spanish broom, California grape, willow, sedge, grasses and forbs. The landform is an ancient point bar at a broad meander of the creek. As such there are low terraces and intermittent to ephemeral channels of the creek that flows westerly and southerly along the edge of the study area. The outer limits of the point bar are still active during flood cycles. A higher terrace with blue oak woodland vegetation is above the present ditch and diversion structure and will form the lay down area and access point. Previous construction activities have disturbed this location.

ETHNOGRAPHY

At the time of historic contact the study area was inhabited by the Hokan-speaking Yana Indians (cf. Gifford and Klimet 1939; Johnson 1978; Sapir and Spier 1943). These Cascade foothill hunters and foragers inhabited an area stretching from the Pit River drainage in the north to Rock Creek in the south. The divisions into Northern, Central, Southern and Yahi are based on dialectical differences. The Southern Yana occupied the study location. The name Battle Creek and nearby Bloody Island are derived from a Yana-white conflict in 1844 (Dotta 1982). Wintun intrusion was pushing the Yana easterly from the Sacramento River at the time of contact, although a few villages and seasonal fish camps were still used such as at Bloody Island. By 1858-1859 the Yana had been removed from the area to the Nome Lackee Reservation near Paskenta.

The Yana lived in small bands that seasonally occupied villages and campsites along the perennial streams. Gathering of roots, tubers, nuts, seeds and the like; fishing, and broad-scaled hunting and fishing provided subsistence and an array of material goods. In one of the Yana myths, the Yana are reported as dwelling close to the east shore of the Sacramento River, south of Battle Creek, fishing for salmon with seine nets and contending with their enemies, the Wintun (Sapir and Spier 1943:240-241). During late spring and summer Yana family groups would travel to higher elevations such as the area of Mt. Lassen to collect bulbs, berries and nuts and to hunt deer and other animals.

PREHISTORY

A cultural chronology for the region has been developed by Elaine Sundahl (2004) and work by Dr. Gregory White is ongoing on a number of as yet unpublished excavations where there is over 6000 years of regional use identified. Sundahl (2004:2) identifies four phases for the greater Bend area.

Phase I, from 1500 to 3000+ years B.P. (approximate ages) is characterized by projectile points of a large corner-notched or leaf-shaped configuration. Encampments were sporadic along the east bank of the Sacramento River by groups who utilized the atlatl for hunting to pursue large game. There is little evidence of aquatic resource use. Acorns were apparently baked whole after clay encapsulation.

During Phase II from about 1500 to 700 years B.P. the larger Gunther-like stemmed points and small notched points became prevalent along with manos, millingstones, mortars and pestles, notched pebble net weights and conical bone tools. There may have been a growing dependence on fishing and use of petroglyphs. Acorn leaching may have become more prevalent. Seasonal use of the river seems similar to that of later Phase III.

Phase III, from A.D. 700 to about 170 years ago is characterized by Gunther-barbed and small corner-notched projectile points, hopper mortars and pestles, manos and millingstones, notched pebble net weights, large numbers of cores, cobble tools, and edge-modified flakes of basalt and metavolcanic materials. There are also considerable quantities of mussel shell refuse suggesting Fall occupation at main sites. This is a time when housepit villages along the river were well-established and rockshelter use continued as in all periods. There was an emphasis on the acquisition of fish, turtle and other river resources with rabbit and deer among animals procured.

Phase IV lasts form A.D. 170 into the historic period. Use of glass for projectile points and glass trade beads are among the new items of technology employed and changes in demography and land base are evident as intruding groups impinged more and more on the Yana ancestral groups.

HISTORY OF THE PROJECT LOCATION AREA

This general region has been the subject of a historical overview wherein pertinent details regarding much of the local history is contained (Kraft and Woodrum 2005). The immediate history of the region is dominated by homesteading, water use for irrigation, hydroelectric production, and fisheries improvements.

It is likely that Hudson Bay and American trappers utilized the area in the 1830s-40s but no such evidence was found. Kraft and Woodrum (2005:159) note that the Battle Creek area was among the earliest to be settled in Tehama County with families here before 1855. Pierson B. Reading's Mexican land grant rancho from 1844 is just across the Sacramento River. Some of the early ranchers had Indian help. Kraft and Woodrum (2005:159) relate that "Of the numerous people living and farming in the Battle Creek area, the majority of them did not become landowners there."

A possible unrecorded homestead from the late 19th century was noted within a half mile of the project area with likely agricultural and stockraising occurring in the project location or immediately adjacent. The 1887 Tehama County map of Shackelford depicts local ownership to the south of Battle Creek by T. Basset and J. Arnold on separate parcels. Kraft and Woodrum (2005) also note that Section 6 was homesteaded by Frank

C. Nunes in 1903 after the Shackelford map was printed. However, the 1903 county map by Luning shows Nunes' property to be on the north side of Battle Creek beyond the immediate area of interest. Nunes was apparently farming on Battle Creek in 1896.

Thomas Bassett established a homestead patent in 1892 for 121 acres in Section 6 but as is evident from the Shackleford map, he and his family had interests or were living here earlier. Thomas Bassett was a Battle Creek farmer in 1896.The 1903 county map illustrates Bassett's property in Section 6 including the project area.

James Arnold located a homestead in Section 6 with a cash payment in 1881. He was here until at least 1887 as shown on the Shackleford map. His property was downstream of the project area.

The 1926 county map by Lunig shows the study area owned by D.L. Gover. Gover went into partnership with William Sample Wilcox, ranch foreman for P.B. Reading and later owner of ranch property on Bloody Island near the mouth of Battle Creek. This followed his marriage to Wilcox's daughter. The southern part of Bloody Island became the Gover Ranch and Gover's stockman and farming interests led to the purchase of other land along Battle Creek., including the project area. The Gover Ranch continues on Bloody Island to this day. The project area passed into other private hands until acquired by the Bureau of Land Management in 2000.

An integral part of this project is a headgate/dam and ditch. This headgate is dated 1929 on the concrete with the initials WEB of unknown origin, but perhaps a relative of T. Bassett, a local homesteader, or of water rights holder L.J. Blodgett as mentioned below. This ditch is known as the Orwick Ditch after the individual with the current water rights. These water rights were appropriated in 1913 to J.W. Long, Jerry Buckley and L.J. Blodgett (see attached). This ditch, in examining the Bend 7.5' quadrangle of 1965 fed reservoirs and agriculture land on the Battle Creek Ranch. This was formerly the Gordon Ranch as illustrated on the 1887 Tehama County Map. The 1926 map of the county shows the Battle Creek Ranch property as belonging to Joseph A. Long who arrived in California in 1852 and settled in Tehama County after a stint at mining. He was a sheep rancher who acquired the regional Inks Creek Ranch in 1875 and vastly expanded his landholdings after that including a purchase of the Gordon Ranch. This ranch was run by his son James Long who also acquired the water rights and presumably built the ditch about 1913 and the headgate later in 1929.

The Battle Creek Fish Cultural Station was built at the mouth of Battle Creek in 1896 by the State Fish Commission and later it was transferred to the federal government. This facility was closed in 1944 when the Coleman Fish hatchery was built just downstream from the project area in 1942-1943. However, an intake from Battle Creek just a few hundred yards upstream of the project area transports water across the project area in an underground pipe to the hatchery downstream. Little evidence of this construction is currently evident and this will be avoided by the current project. This intake is across the stream from the Coleman Powerhouse and penstock, components of greater Battle Creek

Water Notice of)
) Dated May 7, 1913.
J. W. LOng Et Als)

oooooooooooooooooooooooooooooo

NOTICE OF APPROXPRIATION OF WATER.

NOTICE IS HEREBY GIVEN, THat we, J.W.Long, Jerry Buckley and L.J. Boldgett claim the water flowing in Battle Creek at the point where this notice is posted on the left or south bank of Battle Creek fifteen (15) chains west and three (3) chains south of the corner of sections five (5), six (6), thirty one (31) and thirty two (32) in Townships twenty nine (29) and thirty (30) north range two (2) west M.D.M. and opposite the point where the tailrace from the Coleman Power Plant discharges into said creek to the extent of 2000 miners inches, measured under a four inch pressure.

That the said water is to be diverted by means of a ditch of the following dimensions, to-wit:- four feet wide at the bottom and ten feet wide at the top and three feet deep.

That the purposes for which we claim said water is for irrigation, stockwater and domestic purposes; the same is to be taken from said intake in a general south westerly direction in the ditch above described and is to be used in sections 1,2,3,10,11,12,13,14 and 23 in Township 29 north range 3 west M.DM.

Dated this 7 day of May 1913.

J. W. LONG

JERRY BUCKLEY

L. J. BLODGETT

Copy of this notice posted on a Oak tree at point of intake on the left or south bank of Battle Creek at the point above described.

Recorded at request of H.P.Andrews May 9 1913 at 57 min. past 10 O'clock A.M.

H. G. KUHN County Recorder

By-- F E Seitzer Deputy.

Hydroelectric System on the Historic American Engineering Record, a system dating to the end of the 19th century and in use to this day.

PROJECT INVENTORY

The study area was identified to this writer by USFWS individuals as well as with a topographic and orthophoto-derived map of the Area of Potential Effect (APE) (see figure). Two previous buried pipeline corridors through the area were identified Portions of the area are clearly flooded periodically and little time was spent in examining those stretches. For the remainder sweeps about 30 m apart were made back and forth with a hoe used periodically to clear away duff to examine the subsurface soil. A number of intersecting cross-sweeps were also conducted. Well over 200 areas about 0.25 m x 0.25 m square were exposed in this effort. Furthermore, erosion cuts and rodent hole spoils were examined for artifacts, ecofacts and soil discoloring (e.g., midden deposits). A compass and recreation-grade Garmin GPS device were also used during the survey. The main survey occurred on February 2, 2006 with a follow-up day of survey and site recording on February 13, 2006.

The survey was impeded to some degree by moderate vegetation growth including patches of blackberries, dense sedge locations, brush and trees and grass/forb cover. However, with an eye on subtle topographic differences such as low rises and drainage interfluves, knowledge of historic events in the location, and use of the hoe and perceptibly exclusion of flooded/eroded areas, the APE is considered thoroughly checked for surface/near-surface remains. There obviously remains the possibility of buried cultural remains not discovered.

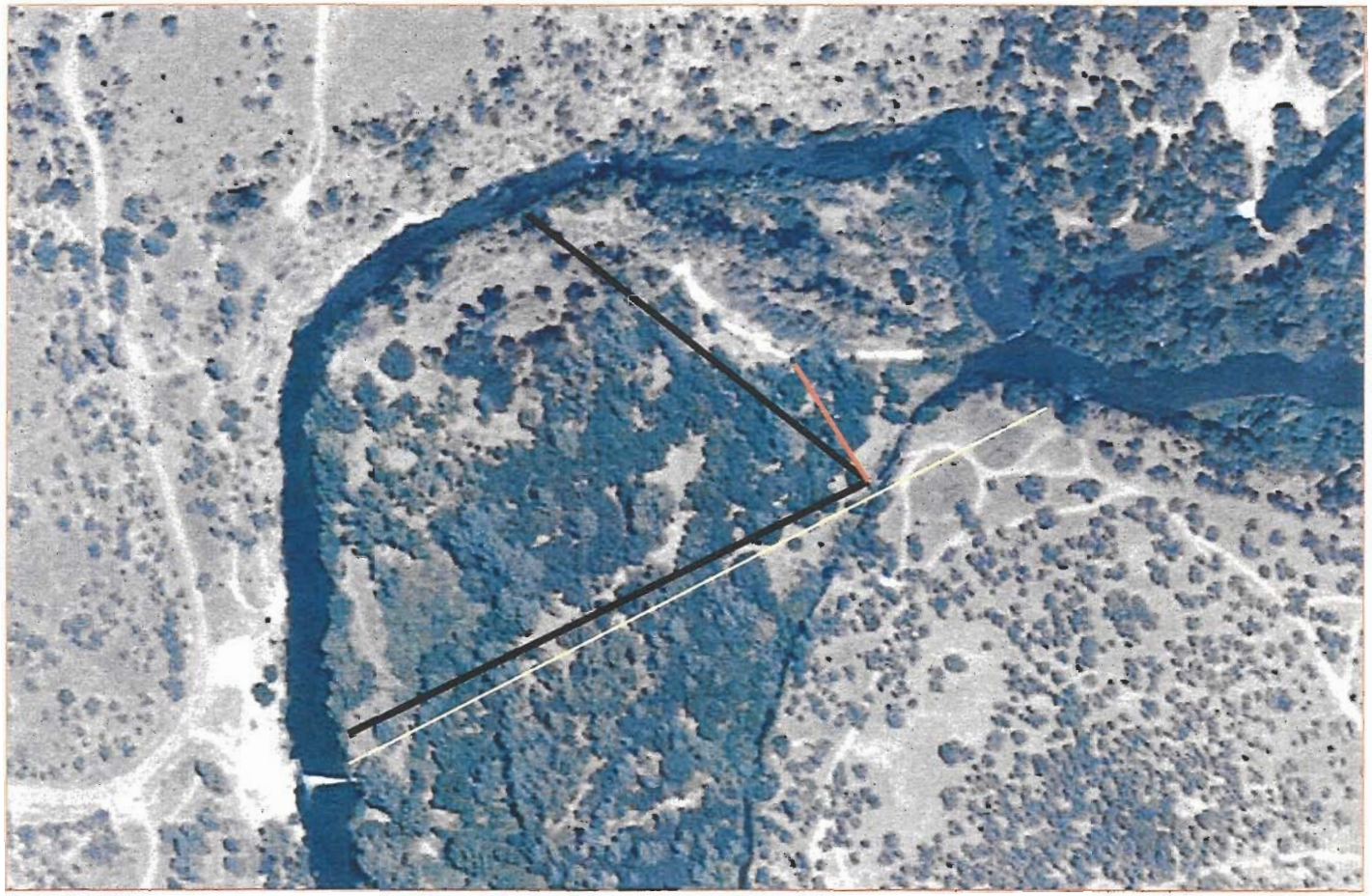
CULTURAL RESOURCE DISCOVERIES

There are three separate cultural resource properties that were discovered within the APE. There is also the 1942 buried pipe not considered further since it will not be impacted. Each of the resources is described below:

Coleman Tramway Tower

An abandoned and partially dismantled tramway tower (lacking cable and car) was discovered at UTM point [redacted] (NAD 83) with a matching tower notable on the opposite side of Battle Creek (see attached location map and photo). This tower is about 17' high with metal pipe legs six feet apart. The pipe is 4 ½" in diameter with bracing welded on. The bracing measures 7 ½" by 3/8'. On one side of the tower is a pipe ladder using 1" pipe. There are 14 steps, 14" between steps. Two eye loops are extending from the ground that formerly served as tie-down supports for cable bracing. It is likely this tower was constructed in the early 1940s or thereafter and is related to the construction of the Coleman Fish hatchery. This location will be avoided during the project.

Battle Creek, stream mile 6.5 – 7.5: Orwick Irrigation Diversion: Functional screen bypass needed



The current bypass pipe needs to be replaced with one that safely transports juvenile salmonids back to the stream and meets NOAA criteria. A large area is available in which to properly site the new bypass pipe.

General vicinity of possible sites for new bypass pipe; (upstream point avoid high flow channel, downstream point avoid the tramway frame.)

Replace: Non compliant bypass pipe

Avoid: CNFH Intake pipe (approx)

Coleman Tramway Tower facing west (note tower on opposite bank)

Coleman Bend Site (CA-030-1700)

This prehistoric midden site was discovered [redacted] A site record is attached (Smithsonian number pending). Soil augering suggests it is relatively shallow, perhaps 30-40 cm in depth. There are two loci that may be continuous if further exposure and testing were conducted. Locus 1 is about 50 m long and 15 m wide with Locus 2 some 25 m away and 12 m across. Together this is a dogleg strip about 90 m in length and about 15 m wide. Large flakes of basalt and fire-affected rock were found in a light scattering and there appears to be a distinct very dark brown midden (see image), although soil darkening from a thick duff over the area is common. Locus 2 includes a possible cairn or cluster of cobbles, although flooding nearby (within about 50 m) has deposited larger clasts in concentrations. Overall this is probably a small

residential location that was originally on a sandbar or low terrace immediately adjoining the creek before it migrated northward and westward.

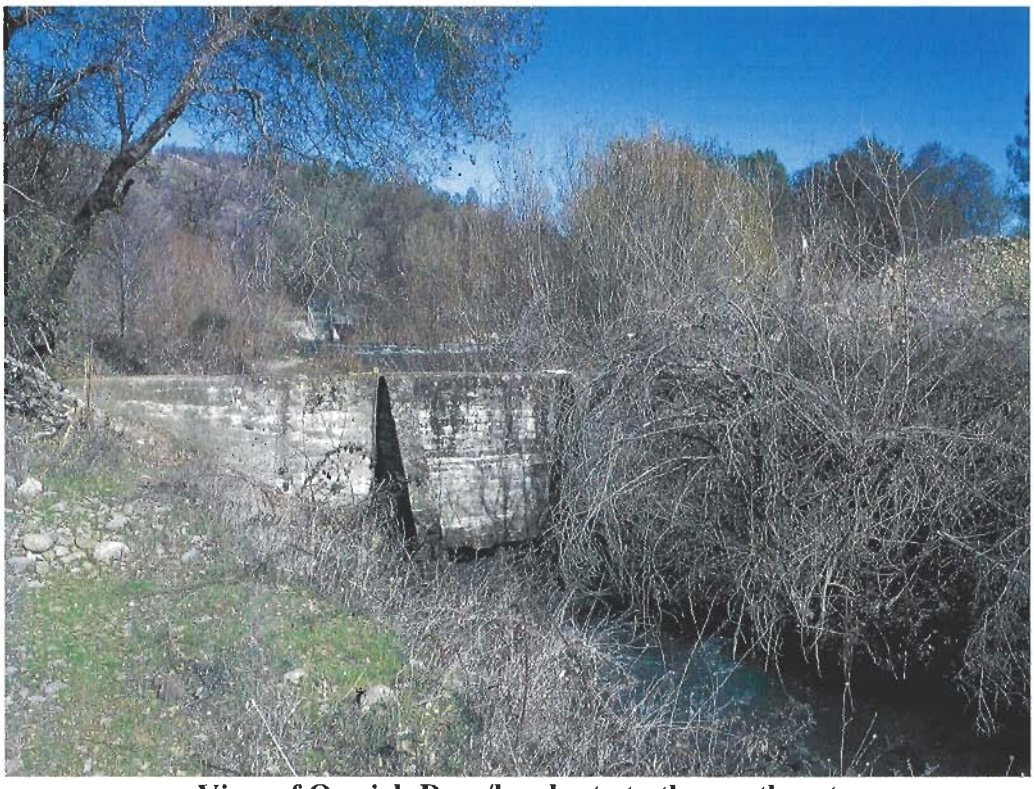
View of cleared spot in the Coleman Bend Site illustrating duff and midden

Orwick Dam (CA-030-1701)

The final site is the current Orwick Dam and a small section (less than 50 yards) of the Orwick or Battle Creek Ranch Ditch (see attached site record—Smithsonian number pending) on either side of the headgate (see images). This concrete dam or headgate is about 33 feet across and 10' high with two buttresses and an opening or semi-controlled gate between the buttresses at the base of the ditch. The concrete walls are 8" thick. This ditch is approximately 15 feet across with a maximum depth of 10 feet around the headgate but generally much lower, around 3-4 feet height, with the water no more than about one feet deep. The intake is wider to reach the headgate and then the ditch is tightly channelized beyond that point and current fish screen that adjoins the headgate.

The building of the headgate in 1929 is evident from the date placed on its top, along with the initial WEB (perhaps a worker, perhaps related to the local homesteader Bassett or one of the water rights holders Buckley), a boot print and a handprint in the concrete (see image). This headgate is still functioning on the historic ditch with water rights from 1913 still in effect. To a large degree the water right holder (Charles Orwick) has and can continue to maintain his ditch and the dam/headgate based on his existing rights acquired with his past purchase of the Battle Creek Ranch.

View of Orwick Dam/headgate to the south



View of Orwick Dam/headgate to the northeast

View of top of Orwick Dam/headgate showing hand and boot prints

EVALUATION OF SIGNIFICANCE

Both the Coleman Tramway Tower and the Coleman Bend Site are not evaluated for their National Register of Historic Places significance since they will be avoided by the project according to project lead Tricia Parker of the USFWS. If this proves not to be the case then their significance will have to be formally evaluated. In the case of the Coleman Bend Site this will likely involve test excavation units completed within the framework of a workable research design. The Coleman Tramway Tower will have to be evaluated within the framework of the Coleman Fish hatchery complex. However, the initial impression is that this tower/crossing of Battle Creek is not a significant component of that complex and suffers to some extent from a lack of integrity since it is no longer operable and portions are missing.

The Orwick Dam/headgate is historic and is associated with a working cattle ranch that has its roots in the agricultural history of Tehama County. It appears to retain its original integrity. In consideration criterion A in 36 CFR 60 for potential listing of the property to the National Register, this dam and ditch are related to the agricultural development of Tehama County as a whole, but only to one ranch operation that does not particularly stand out in its size, operation mode (sheep and cattle—common throughout the county), or infrastructure (reservoirs, pastures, roads, buildings, etc.) nor with the amount of water granted in its water right nor in its age (1913 to present). It is not one of the early ditches of the county as discussed in Kraft and Woodrum (2005).

The dam/headgate and ditch are peripherally associated with the Long family, a major historic sheep herding family and landowner in Tehama County as discussed by Kraft and Woodrum (2005). Joseph A. Long, the early settler, bought what is today the Battle Creek Ranch and considerable land nearby. One of the sons of Joseph Long, James, took over management of the ranch. Joseph, the father, died in 1915 before this headgate was built. James Long is not a man of notoriety in the County history in his own right following Kraft and Woodrum's 2005 listings of significant early figures in the region. In this regard the property does not appear to have significance relevant to criterion B per 36 CFR 60.

Under criterion C this dam has few counterparts known regionally, although it does not appear to contain any innovative or exceptional characteristics. A smaller dam is listed in Kraft and Woodrum (2005:181) on Paynes Creek from 1897. This dam pales in comparison with those larger dams built as part of the Battle Creek hydroelectric system around 1901-1911 (Reynolds and Scott 1980; West and Welch 2000). While some of these dams have been modified to some extent from their original condition and are not considered eligible, West and Welch (2000) found some of these larger dams eligible (also see HAER documentation by Reynolds and Scott 1980) . Overall this dam seems ineligible based on this criteria.

Criteria D does not appear to apply since there is no archaeological data not already gleaned from the site documentation and photography as seen in images attached and associated with the site record. All in all, this site does not appear eligible for listing. Furthermore, the proposed action is at best a minor modification of the structure, a modification that would not significantly alter the feature's integrity.

NATIVE AMERICAN COORDINATION

Letters were sent to two Federally recognized Native American Indian tribes, the Pit River Tribe and Redding Rancheria regarding their knowledge or concerns about the project area. Both tribes include members of Yana descent. These letters were received by the tribes toward the end of February. Any comments, if received, will be considered in the process and any TCPs will be avoided unless they encompass an area of such scale as to be unavoidable. If this proves the case then further project consideration and consultation will be undertaken with all parties (USFWS, BLM, contractor, tribes, OHP).

FINAL RECOMMENDATIONS

It is highly recommended that an individual knowledgeable in identifying cultural resources be present during the trenching activities. In the event subsurface cultural remains over 45 years of age are encountered, the project should cease work at the general area of discovery and the contractor consult with a professional archaeologist on staff with BLM or USFWS. A field exam by the professional will likely be necessary and further steps considered in the evaluation, including mitigation and contacting the

Native American Indian community if human remains are encountered (following NAGPRA procedures).

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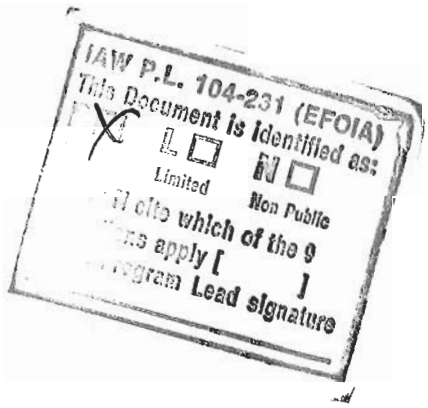
United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Redding Field Office
355 Hemsted Drive
Redding, CA 96002
www.ca.blm.gov/redding

CERTIFIED MAIL
Return Receipt Requested

FEB 23 2006



CA-360
8100(P)

Barbara Murphy
Chairperson
Redding Rancheria
2000 Rancheria Road
Redding, CA 96001

Dear Chairperson Murphy:

The Bureau of Land Management in cooperation with the U.S. Fish and Wildlife Service and the State Department of Fish and Game is proposing the construction of a relatively small bypass pipe to safely transport juvenile salmonids from an irrigation diversion structure along Battle Creek back to the stream. This project is in Tehama County near the Coleman Fish Hatchery (Twn 29N, Rng 2 W, Section 6—see attached map). The new entrenched pipe will replace a non-functioning one and will be approximately 1/4 mile in length. This proposed action is consistent with the Redding Resource Area's Resource Management Plan which was completed in July of 1993.

The BLM and other agencies involved are obligated to ensure proper consideration of cultural resources and social values that might be affected by this action. We have completed an extensive Native American literature review and consultation program, but we recognize that not all Traditional Cultural Properties have been made known to us. We therefore request from the Tribe any information you might have on sacred or sensitive locations within or near the project area. You can provide this information in writing or by phone within 30 days of receipt of this request. This information will be considered confidential. Please feel free to call Dr. Eric Ritter at (530) 224-2131 if you have any questions or would like to arrange a meeting with me to discuss the project and potential impacts. Thank you.

Sincerely,

S. W. Anderson

Steven W. Anderson,
Field Office Manager

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United States Department of the Interior

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Redding Field Office
355 Hemsted Drive
Redding, CA 96002
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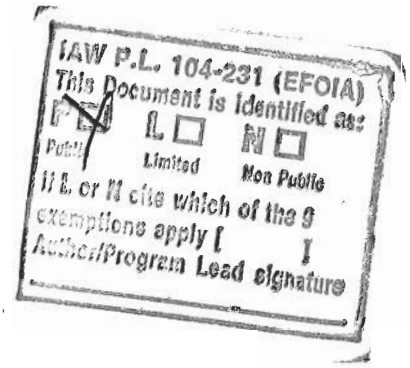

CERTIFIED MAIL
Return Receipt Requested

FEB 23 2006

CA-360
8100(P)

Jessica Jim
Chairperson
Pit River Tribe of California
37014 Main Street
Burney, CA 96013

Dear Chairperson Jim:

The Bureau of Land Management in cooperation with the U.S. Fish and Wildlife Service and the State Department of Fish and Game is proposing the construction of a relatively small bypass pipe to safely transport juvenile salmonids from an irrigation diversion structure along Battle Creek back to the stream. This project is in Tehama County near the Coleman Fish Hatchery (Twn 29N, Rng 2 W, Section 6—see attached map). The new entrenched pipe will replace a non-functioning one and will be approximately 1/4 mile in length. This proposed action is consistent with the Redding Resource Area's Resource Management Plan which was completed in July of 1993.

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Sincerely,

S. W. Anderson

Steven W. Anderson,
Field Office Manager

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APPENDIX D

Wetland Delineation Report

ORWICK DITCH FISH SCREEN IMPROVEMENT PROJECT

Delineation of Waters of the United States, Including Wetlands

August 2006

Prepared for:
United States Fish and Wildlife Service

Prepared by:
North State Resources, Inc.

NSR 50776

ORWICK DITCH FISH Screen IMPROVEMENT PROJECT

Delineation of Waters of the United States, Including Wetlands

August 2006

Prepared for:
Red Bluff Fish and Wildlife Office
U.S. Fish and Wildlife Service
Attn.: Ms. Tricia Parker, Project Manager
10950 Tyler Road
Red Bluff, California 96080
(530) 527-3043

Prepared by:
North State Resources, Inc.
5000 Bechelli Lane, Suite 203
Redding, CA 96002
(530) 222-5347
(530) 222-4958 *fax*

50776

North State Resources, Inc.

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ORWICK DITCH FISH SCREEN IMPROVEMENT PROJECT

Delineation of Waters of the United States, Including Wetlands

Project: Orwick Ditch Fish Screen Improvement Project
Applicant: U.S. Fish and Wildlife Service
Prepared by: North State Resources, Inc.
Date: August 2006

1. SUMMARY

On behalf of the U.S. Fish and Wildlife Service, North State Resources, Inc. (NSR) has conducted a delineation of waters of the United States, including wetlands, occurring within the approximately five acre Orwick Ditch Fish Screen Improvement Project area (study area). The field work was conducted by NSR on 5 June 2006.

A total of 1.579 acres of waters of the United States, were mapped in the study area. Waters of the United States occurring in the study area include wetlands and other waters. Wetlands occur as riparian wetlands, while other waters include two riverine features, a perennial stream, and a man-made irrigation ditch. Approximately 0.764 acres of riparian wetlands and 0.815 acres of other waters occur in the study area.

This delineation of waters of the United States, including wetlands, is subject to verification by the United States Army Corps of Engineers (ACOE). NSR advises all parties to treat the information contained herein as preliminary until the ACOE provides written verification of the boundaries of their jurisdiction.

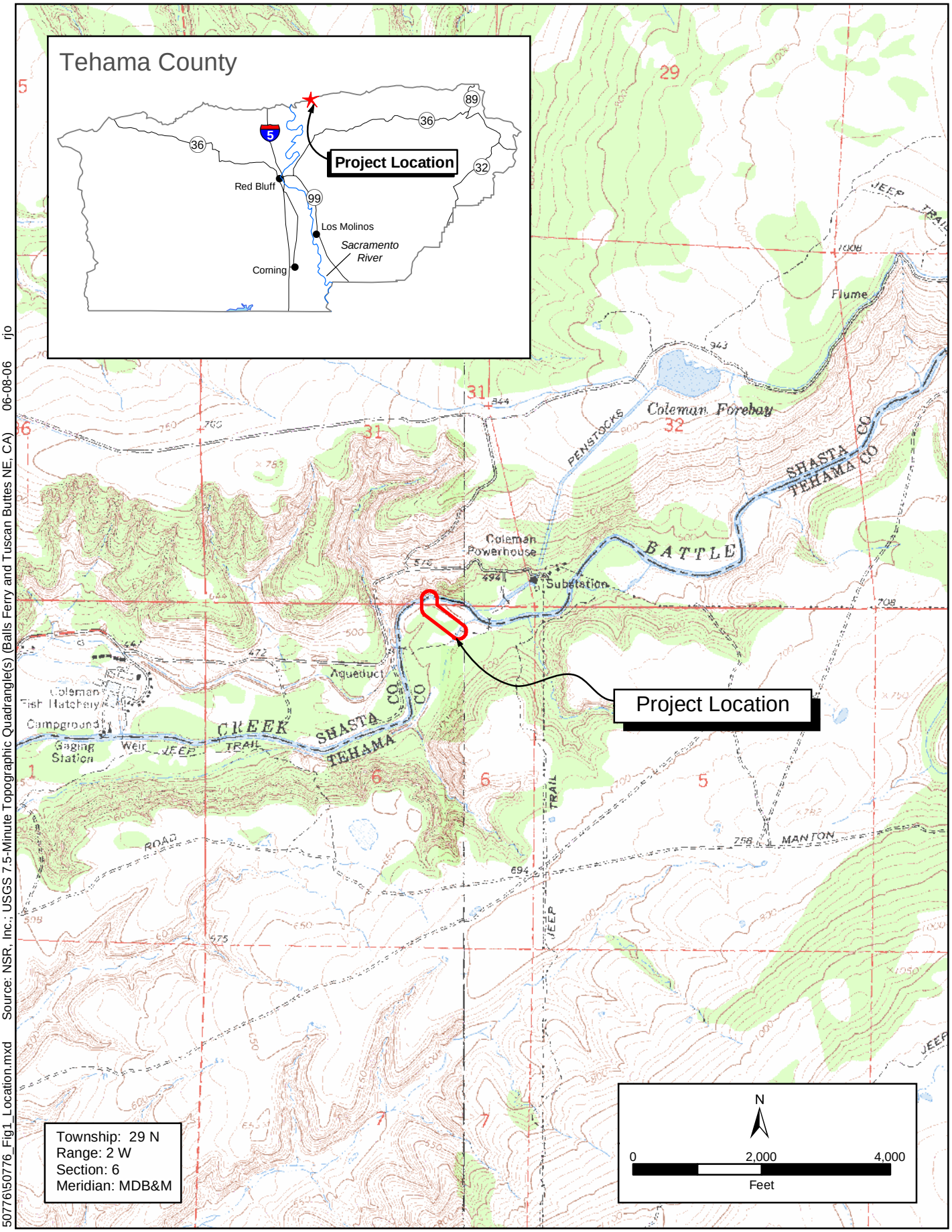
2. STUDY AREA LOCATION

a) **Study Area Location:** The study area is located adjacent to Battle Creek, approximately two miles east of the Coleman National Fish Hatchery and directly south of the PG&E Coleman Powerhouse, Tehama County, California. The study area is located in Township 30 North, Range 2 West, Section 31; and Township 29 North, Range 2 West, Section 6 of the *Balls Ferry* and *Tuscan Buttes NE, California* U.S. Geological Survey 7.5-minute quadrangles. A map of the study area location is presented in **Figure 1**.

b) **Acreage of Delineation Study Area:** The study area encompasses approximately five acres.

c) **Proximity to Major Highways and Streets**: The study area is located on a portion of the south bank and the adjacent floodplain of Battle Creek. Access to the study area is from Spring Branch Road.

d) **USGS Hydrologic Unit:** The study area is located within the "Lower Cottonwood" USGS Hydrologic Map Unit (Map Unit Number 18020102).



Source: NSR, Inc.; USGS 7.5-Minute Topographic Quadrangle(s) (Balls Ferry and Tuscan Buttes NE, CA) 06-08-06 rjo

5077\50776_Fig1_Location.mxd

North State Resources, Inc.

Orwick Diversion Fish Screen Improvement Project

Figure 1
Project Location

3. ENVIRONMENTAL SETTING

a) **Existing Land Uses:** The study area is includes the existing Orwick Ditch diversion, and undeveloped floodplain and woodland landscape features.

b) Elevation/Topography: The study area is located on a portion of the Battle Creek floodplain, with the general topography gently sloping north towards the Battle Creek stream channel. Elevations range from approximately 400 to 425 feet above mean sea level.

c) Climate:

Type: Mediterranean with cool, wet winters and hot, dry summers.

Precipitation: Average precipitation is approximately 25 inches per year and occurs almost exclusively as rain (U.S. Department of Agriculture 1967).

Air temperature: The average annual air temperature is approximately 63 degrees F. The average January high temperature is 50º F and average maximum July high temperature is 100º F (U.S. Department of Agriculture 1967).

Growing season: Thermic; assume February 1 to October 31.

d) **Hydrology:** Hydrology in the study area is provided primarily by flows from Battle Creek. All waters flow westerly, and eventually to the Sacramento River.

e) **Soils:** A map illustrating the distribution of soil map units in the study area is presented as **Figure 2**. The *Soil Survey of Tehama County, California* (U.S. Department of Agriculture 1967) identifies four soil map units in the study area. Determination of hydric soils was developed using the *Red Bluff Field Office, California Hydric Soils List* (U.S. Department of Agriculture 1992). The soil map unit occurring in the study area includes;

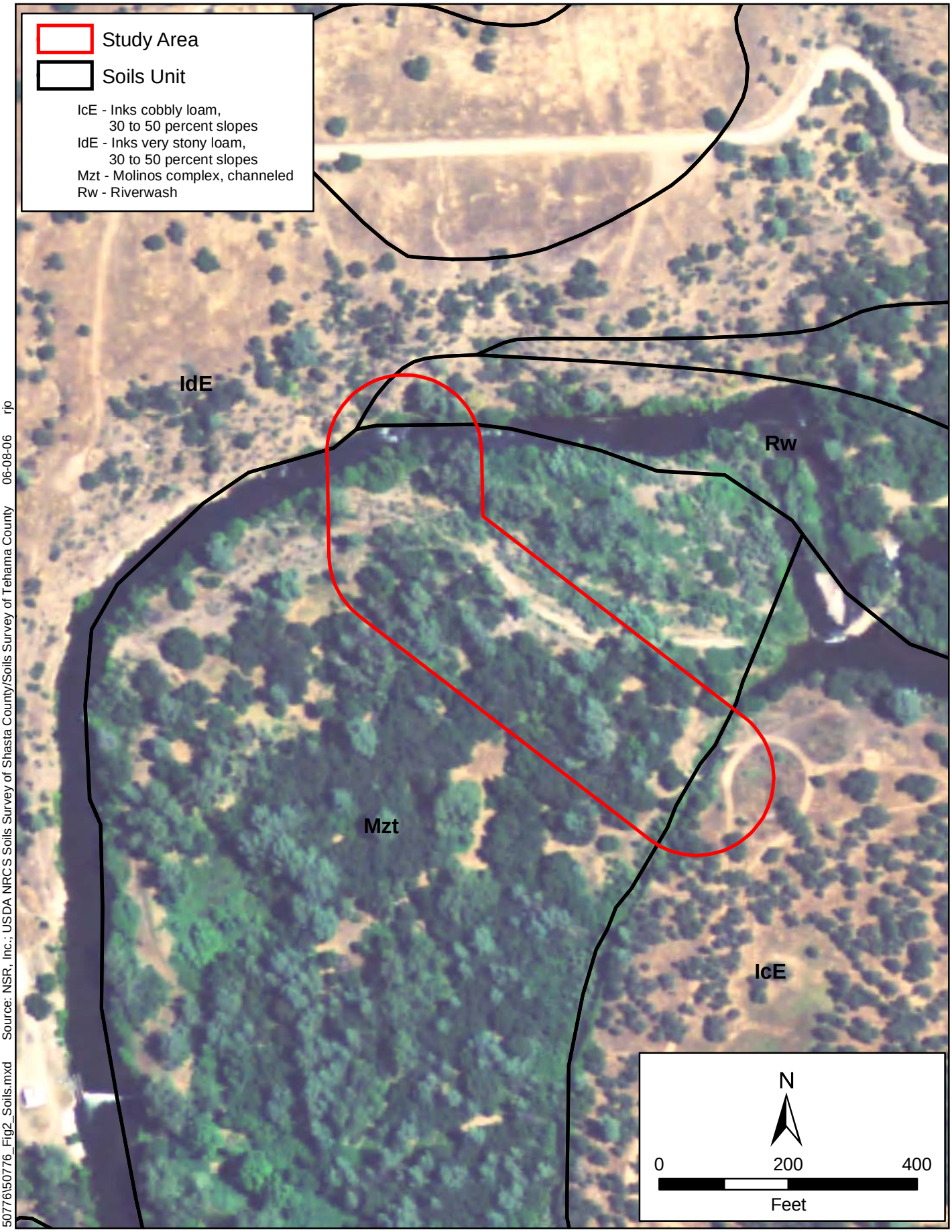
Inks cobbly loam, 30 to 50 percent slopes (IcE); Inks very stony loam, 30 to 50 percent slopes (Ide): Both of these soil map units consist of well-drained soils found on rounded hills and terrace breaks that are the dissected remnants of old terraces. Neither of these soil units is considered a hydric soil, nor have hydric inclusions.

Molinos Complex, Channeled (MzT): This soil unit occurs along active streams and is subject to flooding. This soil map unit is considered a hydric soil, has both a hydric component and hydric inclusions.

Riverwash (RW): Riverwash occurs in and along stream channels, floodplains, and other drainages. This soil map unit is considered a hydric soil, and is subject to frequent flooding.

f) **Vegetation Communities:** *A Guide to Wildlife Habitats of California* (Mayer and Laudenslayer 1988) was used to generally characterize the habitat types occurring in the study area. The vegetation habitats occurring in the study area include valley-foothill riparian, blue oak woodland, and riverine. A vegetation habitat map is included as **Figure 3**.

The valley-foothill riparian vegetation habitat is the dominant habitat in the study area, and is characterized by open to dense cover of herbaceous and woody riparian plant species. Near the Battle Creek stream channel, dominant tree and shrub species include Fremont cottonwood (*Populus fremontii*), white alder (*Alnus rhombifolia*), Oregon ash (*Fraxinus latifolia*), shinning willow (*Salix lucida* ssp. *lasiandra*), sandbar willow (*Salix exigua*), black



5077\50776_Fig2_Soils.mxd Source: NSR, Inc.; USDA NRCS Soils Survey of Shasta County/Soils Survey of Tehama County 06-08-06 rjo

North State Resources, Inc.

Orwick Diversion Fish Screen Improvement Project

Figure 2
Soils Map

5077\50776_Fig3_WHR.mxd Source: NSR, Inc.; 06-08-06 rjo

North State Resources, Inc.

Orwick Diversion Fish Screen Improvement Project

Figure 3
Wildlife Habitat Relationship

willow (*Salix gooddingii*), bricklebush (*Brickellia californica*), Scotch broom (*Cytisus scoparia*), and Himalayan blackberry (*Rubus discolor*). Forb species include mugwort (*Artemesia douglasiana*), Santa Barbra sedge (*Carex barbarae*), and rushes (*Juncus* spp.). At locations farther away from the stream channel species such as gray pine (*Pinus sabiniana*), interior live oak (*Quercus wislizenii)*, valley oak (*Quercus lobata*), and poison oak (*Toxicodendron diversilobum*) become more prevalent. Lianas are common throughout and include California wild grape (*Vitis californica*), and pipevine (*Aristolochia californica*).

Blue oak woodland habitat occupies the northern- and southern-most portions of the study area. This habitat is characterized by open to moderate stands of blue oak (*Quercus douglasii*) with a moderate to dense herbaceous layer. Dominant herbaceous species include medusa head (*Taeniathrum caput-meduseae*), ripgut brome (*Bromus diandrus*), torilis (*Torilis arvensis*), cheat (*Bromus carinatus*), and wild oat (*Avena sativa*).

The riverine habitat consists of the Battle Creek stream cannel, including active secondary channels. In the study area, Battle Creek is characterized as a boulder and cobble dominated stream with pool, riffle, and run habitats. Riverine habitat also includes the open channel portion of the Orwick Ditch, a man-made irrigation ditch feature that diverts water from Battle Creek for agricultural uses.

4. METHODOLOGY

a) **Technical Method:** This delineation was conducted according to the routine on-site method identified in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) (*Corps Manual*). Each on-site wetland determination was based on field observations of soil, vegetation, and hydrologic characteristics in accordance with the *Corps Manual*. Delineation of "other waters" was based upon presence of an ordinary high water mark (OHWM) and if the feature qualified as tributary to waters of the United States. Eight 3-parameter data points were characterized and documented in the study area. Wetland determination data forms for these data points are presented in **Appendix A**.

b) **Date of Field Observations:** The field work for this delineation was conducted by NSR biologist Mr. Len Lindstrand III on 5 June 2006.

c) **Wetland Vegetation Indicator Status Reference:** *National List of Plant Species That Occur in Wetlands, California Region 0* (Reed 1988).

d) **Hydric Soil Method of Determination:** Determination of hydric characteristics was made in accordance with the *Corps Manual*.

e) **Wetland Hydrology Method of Determination:** Indicators of depth and duration of soil saturation, ponding, drainage patterns, and the ordinary high water mark were observed in the field.

f) **Mapping Technique:** The wetland boundaries were evaluated in the field and mapped using large-scale rectified color aerial photography. Polygons were developed and mapped in the field. The field mapping was then digitized using ArcGIS for display and data query purposes.

5. RESULTS

a) **Features Delineated:** Figure 4 illustrates the boundaries of ACOE jurisdictional features identified within the study area. Non-ACOE jurisdictional features do not occur within the study area.

ACOE jurisdictional waters occur in the study area as wetlands and other waters. Wetlands occur as riparian wetlands. Other waters occur as two riverine features, a perennial stream (Battle Creek), and a man-made irrigation ditch (Orwick Ditch). A summary of the ACOE jurisdictional features delineated in the study area is presented in Table 1.

TABLE 1. SUMMARY OF ACOE JURISDICTIONAL WATERS OF THE UNITED STATES, ORWICK DITCH FISH SCREEN IMPROVEMENT PROJECT, TEHAMA COUNTY, CALIFORNIA.

ACOE Jurisdictional Waters	Total Acreage
WETLANDS	
Riparian Wetland	0.764
TOTAL	**0.764**
OTHER WATERS	
Riverine	0.815
TOTAL	**0.815**
TOTAL	**1.579**

b) **Characteristics of Delineated Features**:

ACOE jurisdictional waters occur in the study area as wetlands and other waters. Wetlands occur as riparian wetlands. Other waters occur as a perennial stream (Battle Creek) and a man-made irrigation ditch (Orwick Ditch). Data forms are presented in **Appendix A**. Representative photographs of each wetland feature are presented in **Appendix B**. Boundaries of waters of the United States, including wetlands, are shown in **Figure 4**.

Wetlands

Riparian Wetland: Riparian wetlands occur adjacent to the Battle Creek stream channel and the Orwick Ditch diversion. Typical species found within the riparian wetlands in the study area include Fremont cottonwood (FACW), white alder (OBL), Oregon ash (FACW), shinning willow (FACW), sandbar willow (FACW), black willow (OBL), Himalayan blackberry (FACW), mugwort (FACW), Santa Barbra sedge (FACW), and rushes (FACW). Wetland hydrology criteria are met through evidence of frequent flooding, including sediment deposits, watermarks, driftlines, and drainage patterns in wetlands. Hydric soil criteria are met by frequent flooding and by consisting of a landform considered a hydric soil map unit. This map unit consists entirely of hydric components and inclusions.

Other Waters

Riverine: Riverine wetlands consist of the Battle Creek stream cannel, including active secondary channels. Battle Creek is a tributary stream to the Sacramento River. In the study area, Battle Creek is characterized as a boulder and cobble dominated stream with pool, riffle, and run habitats. This is a bed and bank, and scour and deposition feature. Indicators of

Summary of Waters of the United States, Including Wetlands

Other Waters

Label	Type	Acres	Length (ft)	Width (ft)
R 1	Riverine	0.312	240	50-75
R 2	Riverine	0.419	550	10-60
R 3	Riverine	0.084	240	15
	Total	0.815	1,030	

Wetlands

Label	Type	Acres
RW 1	Riparian Wetland	0.060
RW 2	Riparian Wetland	0.565
RW 3	Riparian Wetland	0.086
RW 4	Riparian Wetland	0.053
	Total	0.764

Total Waters of the U.S.	1.579

Proposed Pipline Alignment

Study Area (5.035 Acres)

3 Parameter Data Point

Waters of the U.S., Including Wetlands

Other Waters

Riverine - R (0.815 Acre)

Wetlands

Riparian Wetland - RW (0.764 Acre)

RW 1
R 1
DP 1 (R)
DP 2 (RW)
RW 2
DP 3 (R)
DP 4 (UP)
R 2
DP 5 (UP)
RW 3
R 3
DP 6 (UP)
RW 4
DP 8 (R)
DP 7 (RW)

This delineation of waters of the U.S., including wetlands, is subject to verification by the ACOE. NSR advises all parties to treat the information contained herein as preliminary until the ACOE provides written verification of the boundaries of their jurisdiction.

Features Delineated by
Len Lindtrand III, on June 5th 2006

N

0 100 200

Feet

Figure 4
Waters of the U.S., Including Wetlands

hydrology and hydric soils were observed and include inundation, saturation in upper 12", watermarks, drift lines, sediment deposits, and drainage patterns in wetlands. The jurisdictional boundaries were established at the ordinary high water mark.

Riverine wetlands also include the open channel portion of the Orwick Ditch, a man-made irrigation ditch feature that diverts water from Battle Creek for various agricultural uses. Indicators of hydrology and hydric soils were observed and include inundation, saturation in upper 12", watermarks, drift lines, sediment deposits, and drainage patterns in wetlands. The jurisdictional boundaries were established at the ordinary high water mark. This feature is considered jurisdictional, as it occurs in the Battle Creek floodplain, and would convey and/or pond water even in the event that the head gate controlling the flow were turned-off. Additionally, this feature has a hydrologic connection from Battle Creek to a complex of agricultural drainages and ponds that eventually drain back into the Sacramento River. Similarly, the riparian wetlands occurring along the margins of the Orwick Ditch are considered jurisdictional for these same reasons.

6. DISCUSSION

A total of 1.579 acres of ACOE jurisdictional waters were delineated in the study area. These jurisdictional waters include riparian wetlands and riverine other waters. No non-jurisdictional features occur in the study area. One man-made wetland feature, the Orwick Ditch, occurs in the study area. The other waters and riparian wetland features associated with this feature are considered jurisdictional, as the feature occurs in the Battle Creek floodplain, and would convey and/or pond water even in the event that the head gate controlling the flow were turned-off. Additionally, this feature has a hydrologic connection from Battle Creek to a complex of agricultural drainages and ponds that eventually drain back into the Sacramento River.

This delineation of waters of the United States is subject to verification by the ACOE. NSR advises all parties to treat the information contained herein as preliminary until the ACOE provides written verification of the boundaries of their jurisdiction.

6. REFERENCES

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APPENDIX A

Routine Wetland Determination Forms

DATA FORM: ROUTINE WETLAND DETERMINATION | Comm. ID: Riverine | Plot ID: 1

Project/Site: Orwick Ditch | Date: 5 June 06
Applicant/Owner: USFWS | County: Tehama
Investigator(s): LL3 | State: California

Do normal circumstances exist on the site? (Y) or N Explain: _____
Is the site significantly disturbed (atypical situation)? Y or (N)
Is the area a potential problem area? Y or (N)

VEGETATION

Dominant Plant Species	Cover	Stratum	Indicator
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Percent of dominant species that are OBL, FACW or FAC _____

Remarks: N/A - Battle Creek channel

HYDROLOGY

- ☐ Recorded Data (Describe in Remarks)
- ☐ stream, lake, or tide gauge
- ☐ aerial photographs
- ☐ other _____
- ☐ No Recorded data available

Field Observation:
Depth of Surface Water: 1-4 ~~(in.)~~
Depth to Free Water in Pit: N/A (in.)
Depth to Saturated Soil: N/A (in.)

Wetland Hydrology Indicators

Primary Indicators	Secondary Indicators
☒ inundated	☐ oxidized root channels in upper 12"
☒ saturated in upper 12 "	☐ water-stained leaves
☒ water marks	☐ local soil survey data
☒ drift lines	☐ FAC-neutral test
☒ sediment deposits	☐ other (explain in remarks)
☒ drainage patterns in wetlands	

Remarks: Battle Creek - perennial stream

SOILS

Map Unit Name (Series and Phase): _____
Taxonomy (Subgroup): _____
Hydric Status on NRCS Field Office List: _____
Drainage Class: _____
Field Observations Confirm Mapped Type? Y N UNK

Depth	Horizon	Matrix Color	Mottle Colors	Mottle Abundance/contrast	Texture, Concretions, Structure, Etc.

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic odor
- ☐ Aquic moisture regime
- ☐ Reducing conditions
- ☐ Concretions
- ☐ Positive alpha-alpha dipyridyl test
- ☐ Gleyed or low-chroma colors
- ☐ High organic content in surface layer in sandy soil
- ☐ Organic streaking in sandy soils
- ☐ Listed on local hydric soils list
- ☐ Listed on national hydric soils list
- ☐ Other _____

Remarks: Battle Creek channel - other waters, "bed-and-bank feature

WETLAND DETERMINATION

Hydrophytic vegetation present? Y or (N) **Wetland Hydrology Present? (Y) or N** **Hydric Soils Present? (Y) or N**
Is this point within a wetland? Y or (N) **Is this point within an "Other waters of the U.S."? (Y) or N (if yes, complete bottom of form)**

Remarks: Battle Creek, perennial stream. Data point to document other waters feature. Riverine wetland.

ACOE JURISDICTION

ACOE Jurisdiction:
☐ Adjacent to Waters ☐ Tributary to Waters ☐ Isolated (with Interstate Commerce) ☐ Isolated (non-jurisdictional)
Explain: _____

EVALUATION OF FEATURES DESIGNATED "OTHER WATERS OF THE UNITED STATES"

Indicators:
☒ Defined Bed and Bank ☒ Scour ☒ Ordinary High Water Mark Mapped

Feature Designation:
☒ Perennial ☐ Intermittent ☐ Ephemeral ☒ Blue-line on U.S.G.S. Topographic Map ☒ Navigable Water
☒ Natural Drainage ☐ Artificial Drainage

Remarks:
Battle Creek - perennial stream

DATA FORM: ROUTINE WETLAND DETERMINATION | Comm. ID: Riparian | Plot ID: 2

Project/Site: Orwicle Ditch | Date: 5 June 06
Applicant/Owner: USFWS | County: Tehama
Investigator(s): WS | State: California

Do normal circumstances exist on the site? (Y) or N Explain:
Is the site significantly disturbed (atypical situation)? Y or (N)
Is the area a potential problem area? Y or (N)

VEGETATION

Dominant Plant Species	Cover	Stratum	Indicator
1. Alnus rhombifolia	15	T	OBL
2. Salix goodingii	10	T	OBL
3. fraxinus latifolia	10	T	FACW
4. Salix lasiandra	10	S/T	FACW
5. Rubus discolor	15	S	FACW
6. Vitis californica	10	V	FACW
7. Populus fremontii	10	T	FACW
8. Salix exigua	10	S/T	FACW
9. Juncus sp.	5	F	FACW
10. Carex barbarae	5	F	FACW

Percent of dominant species that are OBL, FACW or FAC 100%.

Remarks: Mixture of typical herbaceous & woody riparian vegetation present along Battle Cr.

HYDROLOGY

- ☐ Recorded Data (Describe in Remarks)
- ☐ stream, lake, or tide gauge
- ☐ aerial photographs
- ☐ other
- ☐ No Recorded data available

Field Observation:
Depth of Surface Water: N/A (in.)
Depth to Free Water in Pit: N/A (in.)
Depth to Saturated Soil: N/A (in.)

Wetland Hydrology Indicators

Primary Indicators	Secondary Indicators
☐ inundated	☐ oxidized root channels in upper 12"
☒ saturated in upper 12 "	☒ water-stained leaves
☒ water marks	☐ local soil survey data
☒ drift lines	☐ FAC-neutral test
☒ sediment deposits	☐ other (explain in remarks)
☒ drainage patterns in wetlands	

Remarks: Frequently flooded

SOILS

Map Unit Name (Series and Phase):
Taxonomy (Subgroup):
Hydric Status on NRCS Field Office List:
Drainage Class:
Field Observations Confirm Mapped Type? Y N UNK

Depth	Horizon	Matrix Color	Mottle Colors	Mottle Abundance/contrast	Texture, Concretions, Structure, Etc.

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic odor
- ☐ Aquic moisture regime
- ☐ Reducing conditions
- ☐ Concretions
- ☐ Positive alpha-alpha dipyridyl test
- ☐ Gleyed or low-chroma colors
- ☐ High organic content in surface layer in sandy soil
- ☐ Organic streaking in sandy soils
- ☐ Listed on local hydric soils list
- ☐ Listed on national hydric soils list
- ☑ Other Frequently flooded - riverwash

Remarks: Frequently flooded riparian zone adj. to Battle Creek. Riverwash.

WETLAND DETERMINATION

Hydrophytic vegetation present? (Y) or N Wetland Hydrology Present? (Y) or N Hydric Soils Present? (Y) or N
Is this point within a wetland? (Y) or N Is this point within an "Other waters of the U.S."? Y or (N) (if yes, complete bottom of form)

Remarks: Riparian wetland adjacent to Battle Creek.

ACOE JURISDICTION

ACOE Jurisdiction:
☑ Adjacent to Waters ☐ Tributary to Waters ☐ Isolated (with Interstate Commerce) ☐ Isolated (non-jurisdictional)
Explain:

EVALUATION OF FEATURES DESIGNATED "OTHER WATERS OF THE UNITED STATES"

Indicators:
☐ Defined Bed and Bank ☐ Scour ☐ Ordinary High Water Mark Mapped

Feature Designation:
☐ Perennial ☐ Intermittent ☐ Ephemeral ☐ Blue-line on U.S.G.S. Topographic Map ☐ Navigable Water
☐ Natural Drainage ☐ Artificial Drainage

Remarks:

DATA FORM: ROUTINE WETLAND DETERMINATION | Comm. ID: Riverine | Plot ID: 3

Project/Site: Orwick Ditch | Date: 5th June 06
Applicant/Owner: USFWS | County: Tehama
Investigator(s): WB | State: California

Do normal circumstances exist on the site? (Y) or N Explain:
Is the site significantly disturbed (atypical situation)? Y or (N)
Is the area a potential problem area? Y or (N)

VEGETATION

Dominant Plant Species	Cover	Stratum	Indicator
1. Bromus tectorum	10	F	NI
2. Avena fatua	5	F	
3. Torilis arvensis	5	F	
4. Anthoxanthum odoratum	5	F	
5. Bromus diandrus	10	F	
6. Rubus discolor	5	S	FACW
7. Cytisus scoparius	25	S	NI
8. Brickellia californica	25	S	FACU
9. Trifolium hirtum	5	F	NI
10. Helianthus sp.	5	F	NI

Percent of dominant species that are OBL, FACW or FAC 10%.

Remarks: Rocky river channel dominated by upland vegetation

HYDROLOGY

- ☐ Recorded Data (Describe in Remarks)
- ☐ stream, lake, or tide gauge
- ☐ aerial photographs
- ☐ other
- ☐ No Recorded data available

Field Observation:

Depth of Surface Water: N/A (in.)
Depth to Free Water in Pit: N/A (in.)
Depth to Saturated Soil: N/A (in.)

Wetland Hydrology Indicators

Primary Indicators	Secondary Indicators
☐ inundated	☐ oxidized root channels in upper 12"
☐ saturated in upper 12 "	☒ water-stained leaves
☒ water marks	☐ local soil survey data
☒ drift lines	☐ FAC-neutral test
☒ sediment deposits	☐ other (explain in remarks)
☒ drainage patterns in wetlands	

Remarks: Frequently flooded

SOILS

Map Unit Name (Series and Phase): =
Taxonomy (Subgroup): =
Hydric Status on NRCS Field Office List: =

Drainage Class:
Field Observations Confirm Mapped Type? Y N UNK

Depth	Horizon	Matrix Color	Mottle Colors	Mottle Abundance/contrast	Texture, Concretions, Structure, Etc.

Remarks: Riverwash, secondary stream channel

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic odor
- ☐ Aquic moisture regime
- ☐ Reducing conditions
- ☐ Concretions
- ☐ Positive alpha-alpha dipyridyl test
- ☐ Gleyed or low-chroma colors
- ☐ High organic content in surface layer in sandy soil
- ☐ Organic streaking in sandy soils
- ☐ Listed on local hydric soils list
- ☐ Listed on national hydric soils list
- ☒ Other riverwash, frequently flooded

WETLAND DETERMINATION

Hydrophytic vegetation present? Y or (N) Wetland Hydrology Present? (Y) or N Hydric Soils Present? (Y) or N
Is this point within a wetland? Y or (N) Is this point within an "Other waters of the U.S."? (Y) or N (if yes, complete bottom of form)

Remarks: Riverine wetland (other waters), secondary channel of Battle Creek, frequently flooded

ACOE JURISDICTION

ACOE Jurisdiction:
☑ Adjacent to Waters ☐ Tributary to Waters ☐ Isolated (with Interstate Commerce) ☐ Isolated (non-jurisdictional)
Explain:

EVALUATION OF FEATURES DESIGNATED "OTHER WATERS OF THE UNITED STATES"

Indicators:
☑ Defined Bed and Bank ☑ Scour ☑ Ordinary High Water Mark Mapped

Feature Designation:
☑ Perennial ☐ Intermittent ☐ Ephemeral ☑ Blue-line on U.S.G.S. Topographic Map ☑ Navigable Water
☑ Natural Drainage ☐ Artificial Drainage

Remarks: Battle Creek (secondary channel)

DATA FORM: ROUTINE WETLAND DETERMINATION | Comm. ID: Upland | Plot ID: 4

Project/Site: Orwrtle Ditch | Date: 5 June 04
Applicant/Owner: USFWS | County: Tehama
Investigator(s): LW3 | State: California

Do normal circumstances exist on the site? (Y) or N Explain:
Is the site significantly disturbed (atypical situation)? Y or (N)
Is the area a potential problem area? Y or (N)

VEGETATION

Dominant Plant Species	Cover	Stratum	Indicator
1. Pinus sabiniana	25	T	NI
2. Quercus wislizenii	20	T	NI
3. Quercus lobata	15	T	FAC
4. Fraxinus latifolia	5	T	FACW
5. Cytisus scoparius	10	S	NI
6. Bromus diandrus	5	F	NI
7. Vitis californica	5	V	FACW
8. Trifolium hirtum	5	F	NI
9. Cynosurus echinatus	5	F	NI
10. Rhus trilobata	5	S	NI

Percent of dominant species that are OBL, FACW or FAC 30%.

Remarks: Dominated by upland vegetation.

HYDROLOGY

- ☐ Recorded Data (Describe in Remarks)
- ☐ stream, lake, or tide gauge
- ☐ aerial photographs
- ☐ other
- ☐ No Recorded data available

Field Observation:
Depth of Surface Water: ~~0~~ (in.)
Depth to Free Water in Pit: > 12 (in.)
Depth to Saturated Soil: > 12 (in.)

Wetland Hydrology Indicators

Primary Indicators	Secondary Indicators
☐ inundated	☐ oxidized root channels in upper 12"
☐ saturated in upper 12"	☐ water-stained leaves
☐ water marks	☐ local soil survey data
☒ drift lines	☐ FAC-neutral test
☒ sediment deposits	☐ other (explain in remarks)
☒ drainage patterns in wetlands	

Remarks: likely occasionally (rather than frequently flooded)

SOILS

Map Unit Name (Series and Phase): Molinos complex, channeled
Taxonomy (Subgroup): —
Hydric Status on NRCS Field Office List: Hydric component + inclusions

Drainage Class: —
Field Observations Confirm Mapped Type? (Y) N UNK

Depth	Horizon	Matrix Color	Mottle Colors	Mottle Abundance/contrast	Texture, Concretions, Structure, Etc.
12	—	10YR 3/2	—	—	Rocky, cobbly, sandy
/	/	/	/	/	/

Remarks: Hydric soil type, occasionally flooded

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic odor
- ☐ Aquic moisture regime
- ☐ Reducing conditions
- ☐ Concretions
- ☐ Positive alpha-alpha dipyridyl test
- ☐ Gleyed or low-chroma colors
- ☐ High organic content in surface layer in sandy soil
- ☐ Organic streaking in sandy soils
- ☑ Listed on local hydric soils list
- ☐ Listed on national hydric soils list
- ☐ Other

WETLAND DETERMINATION

Hydrophytic vegetation present? Y or (N) Wetland Hydrology Present? (Y) or N Hydric Soils Present? (Y) or N
Is this point within a wetland? Y or (N) Is this point within an "Other waters of the U.S."? Y or (N) (if yes, complete bottom of form)

Remarks: Upland pair point to plot #'s 1-3. Upland (upper floodplain) landscape position. Dominated by upland vegetation.

ACOE JURISDICTION

ACOE Jurisdiction:
☐ Adjacent to Waters ☐ Tributary to Waters ☐ Isolated (with Interstate Commerce) ☐ Isolated (non-jurisdictional)
Explain:

EVALUATION OF FEATURES DESIGNATED "OTHER WATERS OF THE UNITED STATES"

Indicators:
☐ Defined Bed and Bank ☐ Scour ☐ Ordinary High Water Mark Mapped

Feature Designation:
☐ Perennial ☐ Intermittent ☐ Ephemeral ☐ Blue-line on U.S.G.S. Topographic Map ☐ Navigable Water
☐ Natural Drainage ☐ Artificial Drainage

Remarks:

DATA FORM: ROUTINE WETLAND DETERMINATION | Comm. ID: Upland | Plot ID: 5

Project/Site: Orwick Ditch | Date: 5 June 06
Applicant/Owner: USFWS | County: Tehama
Investigator(s): WJ | State: California

Do normal circumstances exist on the site? (Y) or N Explain:
Is the site significantly disturbed (atypical situation)? Y or (N)
Is the area a potential problem area? Y or (N)

VEGETATION

Dominant Plant Species	Cover	Stratum	Indicator
1. Pinus sabiniana	20	T	NI
2. Quercus wislizenii	20	T	
3. Cytisus scoparius	5	S	
4. Rhus trilobata	10	S	
5. Trifolium hirtum	5	F	
6. Avena fatua	10	F	
7. Bromus diandrus	10	F	
8. Cynosurus echinatus	10	F	
9. Artemesia douglasiana	5	F	FACW
10. Vitis californica	5	V	FACW

Percent of dominant species that are OBL, FACW or FAC 20%.

Remarks: Dominated by upland vegetation

HYDROLOGY

- ☐ Recorded Data (Describe in Remarks)
- ☐ stream, lake, or tide gauge
- ☐ aerial photographs
- ☐ other
- ☐ No Recorded data available

Field Observation:
Depth of Surface Water: 0 (in.)
Depth to Free Water in Pit: >12 (in.)
Depth to Saturated Soil: >12 (in.)

Wetland Hydrology Indicators

Primary Indicators	Secondary Indicators
☐ inundated	☐ oxidized root channels in upper 12"
☐ saturated in upper 12"	☐ water-stained leaves
☐ water marks	☐ local soil survey data
☒ drift lines	☐ FAC-neutral test
☒ sediment deposits	☐ other (explain in remarks)
☒ drainage patterns in wetlands	

Remarks: Floodplain surface adj. to Battle Creek - occasional flooding

SOILS

Map Unit Name (Series and Phase): Molinos complex, channeled
Taxonomy (Subgroup):
Hydric Status on NRCS Field Office List: Hydric component + inclusions
Drainage Class: —
Field Observations Confirm Mapped Type? (Y) N UNK

Depth	Horizon	Matrix Color	Mottle Colors	Mottle Abundance/contrast	Texture, Concretions, Structure, Etc.
12	—	10YR 3/2	—	—	Sandy
/	/	/	/	/	

Remarks: floodplain soil type, rocky/cobbly

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic odor
- ☐ Aquic moisture regime
- ☐ Reducing conditions
- ☐ Concretions
- ☐ Positive alpha-alpha dipyridyl test
- ☐ Gleyed or low-chroma colors
- ☐ High organic content in surface layer in sandy soil
- ☐ Organic streaking in sandy soils
- ☑ Listed on local hydric soils list
- ☐ Listed on national hydric soils list
- ☐ Other

WETLAND DETERMINATION

Hydrophytic vegetation present? Y or (N) Wetland Hydrology Present? Y or (N) Hydric Soils Present? (Y) or N
Is this point within a wetland? Y or (N) Is this point within an "Other waters of the U.S."? Y or (N) (if yes, complete bottom of form)

Remarks: Upland data point, floodplain landscape above Battle Creek, evidence of flooding - but considered occasional rather than frequent. Regardless, feature does not support predominance of wetland vegetation. Hydric soil type.

ACOE JURISDICTION

ACOE Jurisdiction:
☐ Adjacent to Waters ☐ Tributary to Waters ☐ Isolated (with Interstate Commerce) ☐ Isolated (non-jurisdictional)
Explain:

EVALUATION OF FEATURES DESIGNATED "OTHER WATERS OF THE UNITED STATES"

Indicators:
☐ Defined Bed and Bank ☐ Scour ☐ Ordinary High Water Mark Mapped

Feature Designation:
☐ Perennial ☐ Intermittent ☐ Ephemeral ☐ Blue-line on U.S.G.S. Topographic Map ☐ Navigable Water
☐ Natural Drainage ☐ Artificial Drainage

Remarks:

DATA FORM: ROUTINE WETLAND DETERMINATION | Comm. ID: uplane | Plot ID: 10

Project/Site: Orwville Ditch | Date: 5 June 2006
Applicant/Owner: USFWS | County: Tehama
Investigator(s): KB | State: California

Do normal circumstances exist on the site? (Y) or N Explain:
Is the site significantly disturbed (atypical situation)? Y or (N)
Is the area a potential problem area? Y or (N)

VEGETATION

Dominant Plant Species	Cover	Stratum	Indicator
1. Pinus sabiniana	20	T	NI
2. Quercus wislizeni	20	T	↓
3. Cytisus scoparius	5	S	↓
4. Artesmesia douglasiana	5	F	FACW
5. Cynosuras echinatus	20	F	NI
6. Avena fatua	5	F	↓
7. Bromus diandrus	10	F	↓
8. Trifolium hirtum	5	F	↓
9. Torilis arvensis	5	F	↓
10. Aristolochia californica	5	V	↓

Percent of dominant species that are OBL, FACW or FAC 10 %

Remarks: Dominated by upland vegetation.

HYDROLOGY

- ☐ Recorded Data (Describe in Remarks)
- ☐ stream, lake, or tide gauge
- ☐ aerial photographs
- ☐ other
- ☐ No Recorded data available

Field Observation:
Depth of Surface Water: 0 (in.)
Depth to Free Water in Pit: >12 (in.)
Depth to Saturated Soil: >12 (in.)

Wetland Hydrology Indicators

Primary Indicators	Secondary Indicators
☐ inundated	☐ oxidized root channels in upper 12"
☐ saturated in upper 12 "	☐ water-stained leaves
☐ water marks	☐ local soil survey data
☒ drift lines	☐ FAC-neutral test
☒ sediment deposits	☐ other (explain in remarks)
☒ drainage patterns in wetlands	

Remarks: upper floodplain surface of Battle Creek - occasional flooding

SOILS

Map Unit Name (Series and Phase): Molinos complex, channeled
Taxonomy (Subgroup):
Hydric Status on NRCS Field Office List: Hydric component + inclusions

Drainage Class: —
Field Observations Confirm Mapped Type? (Y) N UNK

Depth	Horizon	Matrix Color	Mottle Colors	Mottle Abundance/contrast	Texture, Concretions, Structure, Etc.
12	—	10YR 3/2	—	—	Sandy

Remarks: rocky + cobbly, floodplain landscape feature

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic odor
- ☐ Aquic moisture regime
- ☐ Reducing conditions
- ☐ Concretions
- ☐ Positive alpha-alpha dipyridyl test
- ☐ Gleyed or low-chroma colors
- ☐ High organic content in surface layer in sandy soil
- ☐ Organic streaking in sandy soils
- ☑ Listed on local hydric soils list
- ☐ Listed on national hydric soils list
- ☐ Other

WETLAND DETERMINATION

Hydrophytic vegetation present? Y or (N) **Wetland Hydrology Present?** Y or (N) **Hydric Soils Present?** (Y) or N
Is this point within a wetland? Y or (N) **Is this point within an "Other waters of the U.S."?** Y or (N) (if yes, complete bottom of form)

Remarks: Uplands pair point to plots 7 + 8. Hydric soil, occasional flooding - but not frequent, lacks hydrophytic vegetation.

ACOE JURISDICTION

ACOE Jurisdiction:
☐ Adjacent to Waters ☐ Tributary to Waters ☐ Isolated (with Interstate Commerce) ☐ Isolated (non-jurisdictional)
Explain:

EVALUATION OF FEATURES DESIGNATED "OTHER WATERS OF THE UNITED STATES"

Indicators:
☐ Defined Bed and Bank ☐ Scour ☐ Ordinary High Water Mark Mapped

Feature Designation:
☐ Perennial ☐ Intermittent ☐ Ephemeral ☐ Blue-line on U.S.G.S. Topographic Map ☐ Navigable Water
☐ Natural Drainage ☐ Artificial Drainage

Remarks:

DATA FORM: ROUTINE WETLAND DETERMINATION | Comm. ID: Riparian | Plot ID: 7

Project/Site: Orwick Ditch | Date: 5 June 04
Applicant/Owner: USFWS | County: Tehama
Investigator(s): LG3 | State: California

Do normal circumstances exist on the site? (Y) or N Explain:
Is the site significantly disturbed (atypical situation)? Y or (N)
Is the area a potential problem area? Y or (N)

VEGETATION

Dominant Plant Species	Cover	Stratum	Indicator
1. Salix exigua	30	S/T	FACW
2. Rubus discolor	40	S	FACW
3. Vitis californica	10	V	FACW
4. Alnus rhombifolia	10	T	OBL
5. Carex barbarae	5	F	FACW
6. Artemesia douglasiana	5	F	FACW
7.			
8.			
9.			
10.			

Percent of dominant species that are OBL, FACW or FAC 100%

Remarks: Riparian vegetation along ditch

HYDROLOGY

- ☐ Recorded Data (Describe in Remarks)
- ☐ stream, lake, or tide gauge
- ☐ aerial photographs
- ☐ other
- ☐ No Recorded data available

Field Observation:
Depth of Surface Water: 8 (in.)
Depth to Free Water in Pit: 76 (in.)
Depth to Saturated Soil: 76 (in.)

Wetland Hydrology Indicators

Primary Indicators	Secondary Indicators
☐ inundated	☐ oxidized root channels in upper 12"
☒ saturated in upper 12 "	☐ water-stained leaves
☒ water marks	☐ local soil survey data
☒ drift lines	☐ FAC-neutral test
☒ sediment deposits	☐ other (explain in remarks)
☒ drainage patterns in wetlands	

Remarks: Orwick Ditch; frequently flooded areas along margins of feature

SOILS

Map Unit Name (Series and Phase): Molinos complex, channeled
Taxonomy (Subgroup):
Hydric Status on NRCS Field Office List: Hydric component + inclusions
Drainage Class:
Field Observations Confirm Mapped Type? (Y) N UNK

Depth	Horizon	Matrix Color	Mottle Colors	Mottle Abundance/contrast	Texture, Concretions, Structure, Etc.
6	—	10YR3/2	—	—	Rocky, cobbly
/	/	/	/	/	/

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic odor
- ☐ Aquic moisture regime
- ☐ Reducing conditions
- ☐ Concretions
- ☐ Positive alpha-alpha dipyridyl test
- ☐ Gleyed or low-chroma colors
- ☐ High organic content in surface layer in sandy soil
- ☐ Organic streaking in sandy soils
- ☑ Listed on local hydric soils list
- ☐ Listed on national hydric soils list
- ☒ Other frequent/long duration flooding

Remarks: Hydric soil, frequent (long-duration) flooding from ditch diversion

WETLAND DETERMINATION

Hydrophytic vegetation present? (Y) or N Wetland Hydrology Present? (Y) or N Hydric Soils Present? (Y) or N
Is this point within a wetland? (Y) or N Is this point within an "Other waters of the U.S."? Y or (N) (if yes, complete bottom of form)

Remarks: Riparian wetland feature along margins of Orwick Ditch. The ditch feature would likely continue to convey flood water even if diversion were "shut-off", therefore adjacent riparian wetlands would also likely remain at some level.

ACOE JURISDICTION

ACOE Jurisdiction:
☒ Adjacent to Waters ☐ Tributary to Waters ☐ Isolated (with Interstate Commerce) ☐ Isolated (non-jurisdictional)
Explain:

EVALUATION OF FEATURES DESIGNATED "OTHER WATERS OF THE UNITED STATES"

Indicators:
☐ Defined Bed and Bank ☐ Scour ☐ Ordinary High Water Mark Mapped

Feature Designation:
☐ Perennial ☐ Intermittent ☐ Ephemeral ☐ Blue-line on U.S.G.S. Topographic Map ☐ Navigable Water
☐ Natural Drainage ☐ Artificial Drainage

Remarks:

DATA FORM: ROUTINE WETLAND DETERMINATION | Comm. ID: Orwick Ditch | Plot ID: 8

Project/Site: Orwick Ditch
Applicant/Owner: USFWS
Investigator(s): LG3
Date: 5 JUNE 06
County: Tehama
State: California

Do normal circumstances exist on the site? Y or N Explain:
Is the site significantly disturbed (atypical situation)? Y or N
Is the area a potential problem area? Y or N

VEGETATION

Dominant Plant Species	Cover	Stratum	Indicator
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Percent of dominant species that are OBL, FACW or FAC _____

Remarks: N/A - Orwick Ditch channel

HYDROLOGY

- ☐ Recorded Data (Describe in Remarks)
- ☐ stream, lake, or tide gauge
- ☐ aerial photographs
- ☐ other _____
- ☐ No Recorded data available

Field Observation:
Depth of Surface Water: 1-4' ~~(in.)~~
Depth to Free Water in Pit: N/A (in.)
Depth to Saturated Soil: N/A (in.)

Wetland Hydrology Indicators

Primary Indicators	Secondary Indicators
☒ inundated	☐ oxidized root channels in upper 12"
☒ saturated in upper 12 "	☐ water-stained leaves
☒ water marks	☐ local soil survey data
☒ drift lines	☐ FAC-neutral test
☒ sediment deposits	☐ other (explain in remarks)
☒ drainage patterns in wetlands	

Remarks: Orwick Ditch Diversion - Irrigation canal

SOILS

Map Unit Name (Series and Phase):
Taxonomy (Subgroup):
Hydric Status on NRCS Field Office List:
Drainage Class:
Field Observations Confirm Mapped Type? Y N UNK

Depth	Horizon	Matrix Color	Mottle Colors	Mottle Abundance/contrast	Texture, Concretions, Structure, Etc.

Hydric Soil Indicators:

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic odor
- ☐ Aquic moisture regime
- ☐ Reducing conditions
- ☐ Concretions
- ☐ Positive alpha-alpha dipyridyl test
- ☐ Gleyed or low-chroma colors
- ☐ High organic content in surface layer in sandy soil
- ☐ Organic streaking in sandy soils
- ☐ Listed on local hydric soils list
- ☐ Listed on national hydric soils list
- ☒ Other man-made ditch feature

Remarks: other waters (bed + bank) feature. Orwick Ditch, frequently (long-duration) flooded

WETLAND DETERMINATION

Hydrophytic vegetation present? Y or N Wetland Hydrology Present? Y or N Hydric Soils Present? Y or N
Is this point within a wetland? Y or N Is this point within an "Other waters of the U.S."? Y or N (if yes, complete bottom of form)

Remarks: Orwick Ditch channel, other waters feature, hydrologic connection from Battle Creek to other wetland / waters features, would likely still convey and pond water even if the diversion were "shut-off".

ACOE JURISDICTION

ACOE Jurisdiction:
☑ Adjacent to Waters ☑ Tributary to Waters ☐ Isolated (with Interstate Commerce) ☐ Isolated (non-jurisdictional)
Explain: Hydrologic connection to wetlands + other waters

EVALUATION OF FEATURES DESIGNATED "OTHER WATERS OF THE UNITED STATES"

Indicators:
☑ Defined Bed and Bank ☑ Scour ☑ Ordinary High Water Mark Mapped

Feature Designation:
☑ Perennial ☑ Intermittent ☐ Ephemeral ☐ Blue-line on U.S.G.S. Topographic Map ☐ Navigable Water
☐ Natural Drainage ☒ Artificial Drainage

Remarks:

APPENDIX B

Representative Photographs

Photo 1
Battle Creek, a riverine wetland feature.
Photo taken at the location of data point #1.

Photo 2
Riparian wetland adjacent to Battle Creek.
Photo taken at the location of data point #2.

Photo 3
Secondary channel of Battle Creek, a riverine wetland feature.
Photo taken at the location of data point #3.

Photo 4
Upland floodplain area above Battle Creek.
Photo taken at the location of data point #4.

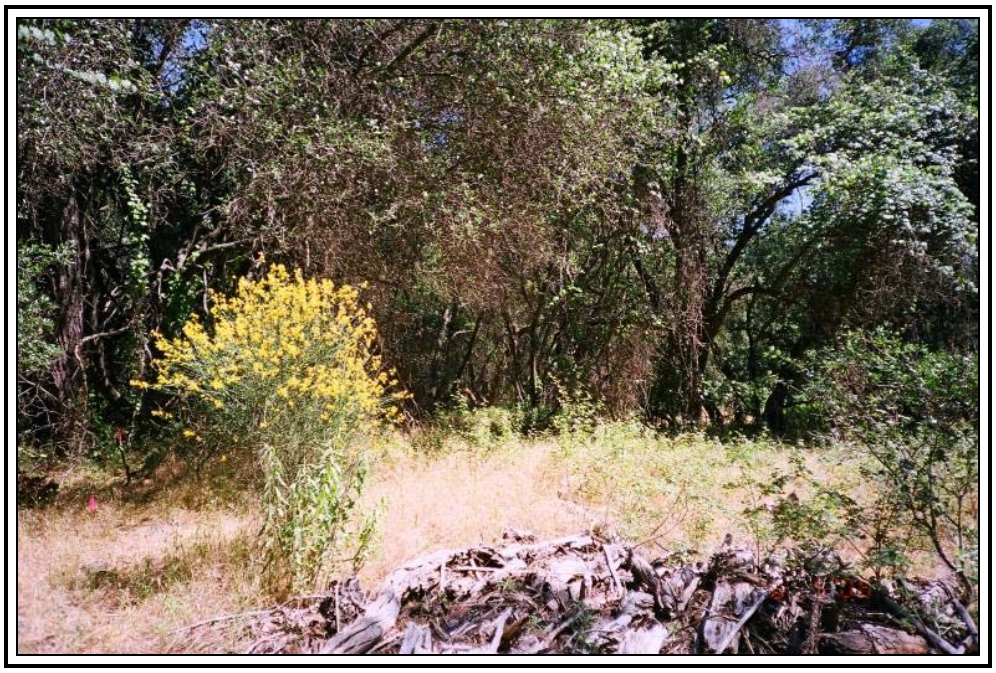

Photo 5
Upland floodplain area between Battle Creek and the Orwick Ditch diversion.
Photo taken at the location of data point #5.

Photo 6
Upland floodplain area between Battle Creek and the Orwick Ditch diversion.
Photo taken at the location of data point #6.

Photo 7
Riparian wetland adjacent to the Orwick Ditch channel.
Photo taken at the location of data point #7.

Photo 8
Orwick Ditch channel, a riverine wetland feature.
Photo taken upstream from the location of data point #8.