Final
Mitigated Negative Declaration
and Draft Environmental Assessment/Initial Study
for the
Sutter Mutual Water Company Tisdale Pumping Plant
Positive Barrier Fish Screen Project

Prepared for

Reclamation District No. 1500
15094 Cranmore Road
Robbins, CA 95676

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NEGATIVE DECLARATION
FOR THE PROPOSED

SUTTER MUTUAL WATER COMPANY
TISDALE POSITIVE BARRIER FISH SCREEN

Reclamation District No.1500
15094 Cranmore Road
Robbins, CA 95676

Juvenile winter-run Chinook salmon, spring-run Chinook salmon, other salmon races, steelhead, and a variety of other resident and migratory fish species are adversely impacted by entrainment at the unscreened Tisdale Sutter Mutual Tisdale Pumping Plants. The Sutter Mutual Tisdale diversion is located on the Sacramento River in an area designated as critical habitat for winter-run Chinook salmon and essential fish habitat (EFH) for Pacific salmon. Sutter Mutual Water Company proposes to construct and operate a positive barrier fish screen at the Tisdale Pumping Plants to eliminate entrainment mortality on juvenile and adult fish inhabiting the Sacramento River. The diversion is operated to provide water supplies for agricultural irrigation and rice straw decomposition. The proposed project will require approvals from Reclamation District 1500 for construction and operation of the fish screen and therefore, Reclamation District 1500 is serving as the state lead agency for compliance with CEQA.

The proposed fish screen will meet design criteria established by the California Department of Fish and Game (CDFandG) and National Marine Fisheries Service (NOAA Fisheries). The design of the proposed fish screen has been developed in consultation with representatives of the Anadromous Fish Screen Program (AFSP), including CDFandG, NOAA Fisheries, U.S. Bureau of Reclamation (USBR), California Department of Water Resources (DWR), Natural Resources and Conservation Service (USDA-NRCS), and U. S. Fish and Wildlife Service (USFWS). Engineering designs for the proposed fish screen have been reviewed by the AFSP participants. Installation of the fish screen will not increase water diversions from the Sacramento River.

The Finding: Although the proposed fish screen project may have the potential to cause minor construction-related localized short-term impacts on soil, vegetation, wildlife, water quality, and aquatic resources, the measures to avoid significant impacts that will be incorporated into the project will lessen such impacts to less-than-significant levels (see Environmental Assessment/Initial Study).

Basis for the Finding: Based on the Environmental Assessment/Initial Study it was determined that there would not be significant adverse environmental effects resulting from construction or long-term operations and maintenance of the proposed fish screen. The project is expected to achieve a net environmental benefit by reducing mortality resulting from entrainment losses for winter-run Chinook salmon, spring-run Chinook salmon, other salmon races, steelhead, and other resident and migratory fish species. The long-term environmental benefit resulting from reduced entrainment mortality of fish inhabiting the Sacramento River will mitigate and compensate for short-term impacts to aquatic resources resulting from construction activity.

Therefore, Reclamation District 1500 finds that implementing the proposed project will have no significant environmental impact. This Negative Declaration is filed pursuant to the California Environmental Quality Act guidelines.

Determination: On the basis of this initial evaluation:

I find that the proposed project *could not* have a significant effect on the environment and a NEGATIVE DECLARATION will be prepared. _____

I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because the *mitigation* measures described in the Environmental Assessment/Initial Study have been added to the project. Therefore, a NEGATIVE DECLARA TION will be prepared. __X__

I find the proposed project *may* have a significant effect on the environment, and an ENVIRONMENTAL IMP ACT REPORT is required. _____

_____ _____

•Date

President, Board of Trustees
Reclamation District No.1500

Environmental Assessment/Initial Study

1.0 INTRODUCTION, PURPOSE OF ACTION, AND ENVIRONMENTAL COMPLIANCE

Sutter Mutual Water Company (Sutter Mutual or Company) proposes to construct and operate a positive barrier fish screen at the Tisdale Pumping Plant, located on the east bank of the Sacramento River near river mile 118 in Sutter County (Figure 1). The site is located approximately 4.5 miles southeast of the town of Grimes shown on the Tisdale Weir U.S. Geological Survey 7.5-minute topographic quadrangle (Township 14 N, Range 1E, Section 35; Latitude 39 01'17" Longitude 121 49'13"). Tisdale Pumping Plant No. 1 was installed in 1919 and Pumping Plant No. 2 was installed in 1940. Combined, Pumping Plants No. 1 and 2 have a diversion capacity of 960 cfs. Pumping Plants No.1 and 2 are located in close proximity (Figure 2) and both diversions would be screened with one positive barrier fish screen as part of the proposed project.

The purpose of the proposed fish screening project is to continue to provide the Sutter Mutual Water Company with a reliable water supply for agricultural irrigation and rice straw decomposition, while providing protection for juvenile winter-run Chinook salmon which have been listed for protection as an endangered species under both the State and federal Endangered Species Acts, spring-run Chinook salmon (State and federal threatened species), and Central Valley steelhead (federal threatened species). The positive barrier fish screen will also provide protection for fall-run and late fall-run Chinook salmon, green and white sturgeon, Sacramento splittail, and other resident and migratory fish species which are susceptible to entrainment at the currently unscreened diversion. Specific objectives of the positive barrier fish screening program include:

- Provide a screened diversion that will eliminate significant adverse impacts to winter-run and spring-run Chinook salmon, Central Valley steelhead, and other resident and migratory fish species;

- Provide a positive barrier fish screen meeting the National Marine Fisheries Service (NOAA Fisheries) and California Department of Fish and Game (CDFandG) design criteria for fish screen facilities; and

- Provide a reliable water supply to the Sutter Mutual Water Company and the local landowners.

The proposed project would not result in a change in water use by the Sutter Mutual Water Company. Water use by the Sutter Mutual Water Company is regulated by both State Water Resources Control Board water right permits and federal Bureau of Reclamation water contract deliveries. The construction and operation of the proposed positive barrier fish screen would not result in an increase in water use for municipal or industrial purposes or

result in the sale and transfer of water that would not have occurred under the no project alternative operations.

The Tisdale Pumping Plant diversion is located within an area of the Sacramento River designated as critical habitat for winter-run Chinook salmon. The area is also being reviewed by NOAA Fisheries for potential designation as critical habitat for spring-run Chinook salmon and steelhead. The Sacramento River in the vicinity of the proposed positive barrier fish screen also serves as essential fish habitat (EFH) for Pacific salmon.

Results of fishery monitoring conducted at the Reclamation District 108 (RD 108) Wilkins Slough diversion, located approximately 0.5 miles downstream from the Tisdale diversion, have documented that juvenile winter-run Chinook salmon, and other fish species, are entrained as a result of diversion operations (Hanson 1996, Hanson and Bemis 1997). The Wilkins Slough Pumping Plant has been equipped with a positive barrier fish screen similar to that being proposed for construction and operation at the Tisdale Pumping Plant (CH2M HILL 1997). The Tisdale Pumping Plant, with a diversion capacity of 960 cfs, is unscreened and therefore entrainment at the site represents a source of additional mortality for fish inhabiting the Sacramento River. Installation of a positive barrier fish screen at the site would reduce or avoid entrainment mortality and contribute to improved conditions for a variety of fish within the area.

Development of the proposed design for the Tisdale Pumping Plant positive barrier fish screen has been based on results of a feasibility study conducted by CH2M HILL (2001) and a positive barrier fish screen design development report (CH2M HILL 2003). The feasibility study examined the existing diversion facilities, site-specific conditions (e.g., hydraulic and bathymetry) within the Sacramento River, environmental conditions at the site, land use, and other factors. Alternative fish screen designs, locations, and configurations were also evaluated in developing the proposed project design. Participants in the Central Valley Project Improvement Act (CVPIA) Anadromous Fish Screen Program Technical Team (AFSPTT), including representatives of NOAA Fisheries, California Department of Fish and Game (CDFandG), U.S. Fish and Wildlife Service (USFWS), Department of Water Resources (DWR), Natural Resources Conservation Service (USDA-NRCS), and U.S. Bureau of Reclamation (USBR), critically reviewed results of the feasibility evaluation and screen design development documents. Participants in the AFSPTT were involved in the evaluation and selection of the preferred screen design and continue to provide review and comment on the engineering design for the proposed positive barrier fish screen.

State and federal funding will support the Sutter Mutual Tisdale Pumping Plant positive barrier fish screen in addition to that provided by Sutter Mutual Water Company. The total estimated cost of the fish screen for the capital components of the fish screen structure is $13,900,000. The CVPIA Anadromous Fish Screen Program (AFSP) is anticipated to contribute 50% toward the fish screen project and the remaining 50% is expected to be funded from state and local sources. These contributions are not guaranteed; however, this project is considered a high priority activity by State and federal agencies and will likely receive the needed funding support for completion. As a consequence of both State and federal participation in the project, environmental documentation will need to comply with

both the National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA). This document represents a joint Environmental Assessment/Initial Study to comply with requirements of both NEPA and CEQA. Reclamation District 1500 is serving as lead agency for CEQA compliance. The U. S. Bureau of Reclamation is serving as the lead agency for NEPA compliance, since a portion of funding for the fish screen will be from the CVPIA AFSP. In addition, Sutter Mutual Water Company is a Central Valley Project (CVP) water contractor. The proposed Sutter Mutual Tisdale Pumping Plant Positive Barrier Fish Screen will need to receive the following permits and approvals:

- Section 404/Section 10 Permit from the Army Corps of Engineers;
- Section 401 Water Quality Certification (or waiver of certification) of compliance with state water quality standards from the Central Valley Regional Water Quality Control Board;
- Section 1603 Streambed Alteration Agreement from the California Department of Fish and Game;
- Reclamation Board permit;
- California Department of Fish and Game 2081 permit with respect to winter-run and spring-run Chinook salmon incidental take;
- National Marine Fisheries Service biological opinion with respect to winter-run and spring-run Chinook salmon and Central Valley steelhead incidental take; and

In support of the required permits and consultations, available data has been compiled and analyzed from fishery studies performed at the RD 108 Wilkins Slough diversion facility (Demko *et al*. 1994; Hanson 1996; Hanson and Bemis 1997) and by CDFandG at a downstream sampling location at Knights Landing (Snider and Titus 1998, 2001). Results of these fishery studies provide representative information regarding the seasonal occurrence of various fish species in the Sacramento River in the area of the Tisdale Pumping Plant. Site-specific biological surveys were also conducted at the Tisdale Pumping Plant site by Miriam Green and Associates to assess potential impacts of intake construction on plant and wildlife species in the area. Using data from these biological surveys, a Biological Assessment has been prepared for the proposed fish screening project (Hanson and Green 2003) which will be provided to the U. S. Fish and Wildlife Service and National Marine Fisheries Service and California Department of Fish and Game in support of consultation with respect to potential impacts to species protected under the California and federal Endangered Species Act or identified as species of special concern. The biological assessment also considers the potential effects of the proposed project on essential fish habitat (EFH) for Pacific salmon. Results and findings of the Biological Assessment have been integrated into this joint Environmental Assessment/Initial Study.

On September 5, 2003, 15 copies of the drat Environmental Assessment/Initial Study were submitted to the State Clearing House and distributed to the following reviewing agencies:

Resources Agency; Department of Boating and Waterways; Department of Fish and Game, Region 2; Office of Historic Preservation; Department of Parks and Recreation; Reclamation Board; Department of Water Resources; Caltrans, District 3; State Water Resources Control Board; Division of Water Quality; Regional Water Quality Control Board, Region 5 (Sacramento); Native American Heritage Commission; and the State Lands Commission.

Public notices (Appendix C) were posted at the local store, post office, and local insurance company in Robbins, CA, on September 5, 2003. On September 8, 2003, Elise Holland of the Bay Institute was sent a fax of the public notice and John Merz, President of the Sacramento River Preservation Trust was contacted via phone. On September 19, 22-25, 2003, the public notice was published in the Appeal-Democrat, a newspaper of general circulation in Sutter County.

The review process started on September 8, 2003 and ended on October 7, 2003. Comments were submitted directly t the lead agency by the California Department of Fish and Game on October 7, 2003 via fax and email. Comments were submitted to the State Clearinghouse and then forwarded to the lead agency on October 8, 2003. The comments and responses to these comments have been included in Appendix C.

2.0 AFFECTED ENVIRONMENT

The proposed Tisdale Positive Barrier Fish Screen will be located immediately adjacent to the existing Tisdale Pumping Plants No.1 and 2 on the outboard side of the Sacramento River flood control levee (Figure 2). Access to the site is via Cranmore and Tisdale Roads and the gravel levee road. Construction activity and local access roads will be developed along the north and south sides of the existing Tisdale Pumping Plant diversion facilities (Figure 3). The area where positive barrier fish screen construction activity will occur is currently a highly disturbed site (Figures 2 and 4).

Figure 3 shows a plan view of the existing Tisdale Pumping Plant diversion site with an overlay depicting the positive barrier fish screen and site access roads. The area directly affected by construction and installation of the positive barrier screen is approximately 7.5 acres. Figure 4 shows photographs of existing habitat conditions at the site that would potentially be disturbed by construction activity. Construction of the positive barrier fish screen will not impact water levels or flow within the irrigation conveyance canals or significantly affect water levels in the Sacramento River or Tisdale Weir.

The existing Tisdale Pumping Plant diversion includes a forebay, six diversion pumps at Pumping Plant No.1, two diversion pumps at Pumping Plant No. 2, mechanically controlled flow regulating gates, and an irrigation distribution canal system. Existing facilities are shown in Figures 2 and 4. The intake forebay and adjacent area within the Sacramento River have been subject to dredging to remove deposited sediments as part of routine ongoing facility maintenance. Maintenance dredging inside the fish screen and forebay area will continue to be required to ensure effective operation of the positive barrier fish screen and to maintain design approach velocities to the screen and efficient operation of the diversion pumps. Levees on both the east and west sides of the Sacramento River in the area are protected by riprap (Figures 2 and 4).

Diversions at the Tisdale Pumping Plant typically occur between late March and December (diversion schedules vary between years) depending on water demands. Analysis of actual diversion rates between 1990 and 2000 showed that peak daily diversions have ranged from 616 cfs in 1991 to 900 cfs in 2000 (CH2M HILL 2001). Water demand is greatest during the spring and summer (May-August) to irrigate local orchards, row and field crops, and rice fields. Diversion operations late in the irrigation season (September - December) are typically less than 200 cfs, to provide water for late fall and winter irrigation and rice straw decomposition (CH2M HILL 2001).

Fishery investigations have been conducted in the Sacramento River in the general area of the Tisdale Pumping Plant as part of an evaluation of fish entrainment losses and the effectiveness of alternative fish protection at the RD 108 Wilkins Slough diversion (Demko *et al.* 1994, Hanson 1996, and Hanson and Bemis 1997) and as part of fish monitoring done at Knights Landing by CDFandG (Snider and Titus 1998, 2001). Results of these monitoring efforts have shown that a variety of fish species inhabit the Sacramento River and are vulnerable to entrainment at unscreened water diversions similar to the Tisdale Pumping

Plant diversion. The majority of fish collected in these studies have been young-of-the-year, although sub-adult and adult lifestages of some species have also been collected. Juvenile winter-run, spring-run, fall-run, and late fall-run Chinook salmon, steelhead, Sacramento splittail, sturgeon, and lamprey, are among the fish species that have been collected in the area. Fish inhabiting the Sacramento River are identified in Table 1.

Table 1. Partial list of fish species inhabiting the Sacramento River.

Common Name	**Scientific Name**
Chinook salmon	*Oncorhynchus tshawytscha*
winter-run	
spring-run	
fall-run	
late fall-run	
Steelhead trout	*Oncorhynchus mykiss*
Striped bass	*Morone saxatilus*
American shad	*Alosa sapidissima*
White sturgeon	*Acipenser transmontanus*
Green sturgeon	*Acipenser medirostris*
Channel catifsh	*Ictalurus punctatus*
White catfish	*Ictalurus catus*
Yellow bullhead	*Ictalurus natalis*
Brown bullhead	*Ictalurus nebulosus*
Black crappie	*Pomoxis nigromaculatus*
White crappie	*Pomoxis annularis*
Green sunfish	*Lepomis cyanellus*
Bluegill	*Lepomis macrochirus*
Redear sunfish	*Lepomis microlophus*
Largemouth bass	*Micropterus salmoides*
Smallmouth bass	*Micropterus dolmieui*
Pacific lamprey	*Lampetra tridentata*
River lamprey	*Lampetra ayresi*
Sacramento blackfish	*Orthodon microlepidotus*
Hardhead	*Mylopharodon conocephalus*
Hitch	*Lavinia exilicauda*
Sacramento squawfish	*Ptychocheilus grandis*
California roach	*Hesperoleucus symmetricus*
Speckled dace	*Rhinichthys osculus*
Sacramento sucker	*Catostomus accidentalis*
Tule perch	*Hysterocarpus traski* ssp.
Prickly sculpin	*Cottus asper*
Threadfin shad	*Dorosoma petenense*
Carp	*Cyprinus carpio*
Goldfish	*Carassius auratus*
Splittail	*Poganichthys macrolepidotus*
Longfin smelt	*Spirinchus thalcichythys*
Delta smelt	*Hypomesus transpacificus*
Golden shiner	*Notemigonus crysaleucas*
Red shiner	*Notropis lutrensis*
Fathead minnow	*Pimephales promelas*
Mosquitofish	*Gambusia affinis*
Inland silversides	*Menidia audens*
Threespine stickleback	*Gasterosius aculeatus*
Bigscale logperch	*Percina macrolepida*

3.0 PREFERRED PROJECT DESCRIPTION DETAIL

The Tisdale Pumping Plant positive barrier fish screen structure would be a major screening structure and construction project. The overall structure would be approximately 279 feet in length (Figure 3). The screen would be comprised of 16 screen panels each providing 181.8 ft^2 of screened area. Total effective screen area is 2,909 ft^2. The screen design would afford 960 cfs design pumping capacity while satisfying the 0.33 ft/sec approach velocity criteria (CH2M HILL 2003). The intake screen has been designed to meet CDFandG and NOAA Fisheries fish screening criteria. Design criteria and parameters for the fish screen are summarized in Table 2. Additional detailed information regarding the design of the Tisdale Pumping Plant positive barrier fish screen has been documented by CH2M HILL (2003).

Table 2. Design parameters for Tisdale Pumping Plant positive barrier fish screen project.

Design flow	960 cfs
Approach velocity	0.33 ft/sec
Required effective screen area	2,909 ft^2
Design minimum water surface elevation	27.1 feet
Effective screen invert elevation	17.8 feet
Effective screen width	14.9 feet
Effective screen height	12.2 feet
Effective screen panel area	181.8 ft^2
Number of screen panels	16
Screen slot opening size	1.75 mm
Total screen length	260.9 feet
Total intake length	279.0 feet
Minimum sweeping velocity	1.7 ft/sec
Sweeping to approach velocity ratio (Vs/Vn)	5.2
Exposure time	153 sec
Screen deck elevation	54 feet (100 year flood level)

Screen cleaning frequency with a mechanical brush system will be at least once every 5 minutes.

Screen panels will be stainless steel, vertical wedge wire with 1.75 mm continuous slot size.

(Source: CH2M HILL 2003)

Site preparation and construction activities include (1) site preparation and civil work; (2) construction of the concrete fish screen structure, foundations, and retaining walls; (3) fish screen and brush cleaner; and (4) associated project features. Information on each of these project elements has been compiled and summarized from CH2M HILL (2003) and unpublished data, and briefly discussed below.

3.1 Site Preparation and Civil Work

Site preparation consists of dredging within the Sacramento River, dredging and excavation within the existing Tisdale Pumping Plant forebay, grading of approach roads to the concrete fish screen structure, and construction of gravel access roads along both the north and south sides of the existing Tisdale facility (Figure 3). Dredging within the Sacramento River and intake forebay is required to insure a proper foundation for the fish screen structure and adequate channel capacity and hydraulic control within the forebay for velocity regulation. Dredging within the Sacramento River would be performed from a shore-mounted crane. The majority of dredging will occur within the confines of a cofferdam in the dry. Dredging within the intake forebay has historically been performed using a shore-mounted crane and clamshell bucket, drag line, or suction dredge.

Approach roads to the fish screen construction area would consist of lean concrete and select earth backfill contained within the sheet pile retaining walls. Access roads would be constructed on both the north and south sides of the existing intake forebay (Figure 3) and would include a crushed gravel/asphalt road surface to allow equipment access to the fish screen structure during construction and for routine operations and maintenance.

Excavation of the existing Tisdale intake forebay would be performed to enhance the uniformity of velocities across the fish screen structure and to reduce erosion of bank material into the intake forebay during flood events. Excavation and dredging within the forebay would occur as part of site preparation, with the additional installation of sheet pile retaining walls on both the north and south sides of the forebay to further facilitate intake maintenance and hydraulic control. The dredging of the forebay will most likely occur behind a cofferdam in the dry.

Site surveys were performed to compile information on bathymetric conditions within the Sacramento River and intake forebay, and topographic contours adjacent to the existing facilities (CH2M HILL 2001). Based on these preliminary bathymetric and topographic measurements, it is estimated that the volume of sediment to be dredged from the Sacramento River is approximately 300 cubic yards. Approximately 4,700cubic yards of sediment would be dredged and excavated from the intake forebay and cofferdam area. Dredge material may be used on-site depending on its quality, in part, as fill material in preparing the north and south access roads to the fish screen structure, or used to repair existing levees within the service area. The total estimated volume of fill for the north and south access areas is estimated to be 8,000 cubic yards. Select backfill, crushed rock and asphalt to be used for access roads will be imported from off-site.

Sufficient quantities of fill exist within the immediate vicinity of the site to meet project needs. Sutter Mutual Water Company has stockpiled spoils from maintenance dredging within the intake forebay. As a result of the highly disturbed nature of the dredge spoil stockpile (Figure 4), and the ongoing routine deposition and excavation at the stockpile, no adverse impacts to sensitive plant or wildlife species are expected to occur as a consequence of the excavation of fill material for the positive barrier fish screen construction. Sensitive

vegetation areas adjacent to the stockpile location, gravel access road, and equipment storage and laydown staging area are routinely protected from disturbance by the Company and would not be adversely impacted by the proposed construction of the Tisdale Positive Barrier Fish Screen.

Soil erosion is not considered a major issue during or after construction. However, a soil erosion control plan will be prepared by the contractor prior to grading and excavation activities to minimize potential impacts of silt entering the river and increasing river turbidity (Section 3.7).

3.2 Concrete Fish Screen Structure

The fish screen structure would be constructed using reinforced concrete. Sheet pile would be used to create a cofferdam to allow for construction of the fish screen structure under dry conditions. Sheet piling would be installed from a barge and/or on-shore crane after completion of dredging and site civil work. The cofferdam would then be dewatered to allow access for construction activity.

Construction of the concrete fish screen within the cofferdam offers the opportunity for better alignment and construction of fish screen components than could be accomplished using divers for intake assembly. Construction of the fish screen, under dry conditions using the cofferdam, would contribute to faster installation of the positive barrier fish screen and reduce the overall time period of construction activity. This would benefit fishery populations through a reduction in entrainment losses once the fish screen is installed and operational. In addition, use of the cofferdam would minimize potential adverse impacts of construction activity on the Sacramento River. Increases in turbidity and suspended solids are expected to occur during installation of the sheet pile cofferdam, however these impacts would be localized, of relatively short duration, and limited to the period of dredging, installation and removal of the cofferdam.

Construction of the concrete fish screen structure would require a period of approximately two years to complete, with a total construction period of 21 months (Figure 5). During the period of construction and installation of the positive barrier screen, Sutter Mutual Water Company would require water diversions from the Tisdale Pumping Plant to meet water demand. During the construction period, the contractor would be required to provide for the diversion of water at the Tisdale Pumping Plant at sufficient flow rates to meet service area demand.

To provide the greatest degree of flexibility for competitive ideas and construction pricing, no plans or specifications have been developed for how the contractor is to accomplish the irrigation flow delivery requirements. Since the cross-sectional area of the intake forebay would be reduced during the construction period, approach velocities would be increased with an associated increase in the potential susceptibility of fish to entrainment losses during the construction period. There is no cost effective practical method for providing fish protection during construction of the Tisdale positive barrier fish screen while also meeting water demands for irrigation flows (P. Rude, personal communication).

Two alternative strategies have been developed for diversion of water during construction of the positive barrier screen. Both strategies would allow for continued water delivery operations. The first alternative includes installation of a cofferdam across a portion of the Tisdale intake forebay (e.g., approximately 60% of the distance across the forebay mouth) where fish screen construction could occur, while allowing the Company to meet water demands through diversions from the unobstructed portion of the intake forebay. After the first 60% of the fish screen structure is complete, the cofferdam would be removed and the remaining 40% can be coffer dammed. A second strategy involves the installation of a single cofferdam across the entire Tisdale Pumping Plant forebay, which would be equipped with large-diameter pipes, allowing water to flow through the cofferdam to meet the water demands while construction of the fish screen is underway. The schedule for both of these construction alternatives is discussed in Section 3.5.

3.3 Fish Screen and Brush Cleaner

A total of 16 screen panels, each with an effective width of 14.9 feet and an effective height of 12.2 (effective screen area is 181.8 ft^2 per panel), would be installed within the concrete fish screen structure. Fish screen panels would consist of stainless steel vertical wedge wire with 1.75 mm slot openings. Additional information on the fish screen design is summarized in Table 2, Figure 3, and by CH2M HILL (2001, 2003).

The fish screen would be mechanically cleaned using a horizontally traveling brush capable of cycling once every five minutes (CH2M HILL 2003). The mechanical cleaning system is designed to remove accumulated debris from the screen surface and help insure that the fish screen operates in accordance with the approach velocity design criteria.

Each screen panel would be removable to allow for annual pressure washing, cleaning and maintenance, as well as inspection of screen integrity. The fish screen structure would be constructed to permit vehicle access for screen panel removal and maintenance.

3.4 Associated Project Features

Intake maintenance would be facilitated by a boom truck or mobile crane, which can be used to remove individual screen panels for cleaning, maintenance, and repair as needed. A portable high-pressure wash water system would be provided to facilitate screen panel cleaning. It is anticipated that prior to each irrigation season, screen panels would be removed for inspection, repair, and high-pressure washing. Block-off and/or replacement screen panels will be stored on site and used to replace screen panels removed for routine maintenance or repair. Screen panels will be blocked off only during those time periods that water diversions are occurring at the Tisdale pumping plants. Water diversions will be reduced, to the extent possible give existing facilities and constraints, during periods when screen panels have been removed from service in an effort to achieve approach velocity criteria. Spare screen panels will be maintained on site, or at other suitable storage locations, that can be used to replace screen panels removed for repair or maintenance. A sediment jetting system would also be included in the fish screen forebay design to reduce sediment

deposition and accumulation within the fish screen. A long arm excavator will be used to remove sediment deposited in the forebay.

The existing Tisdale Pumping Plant diversion structure includes mechanically operated cast iron slide gates. The control gates at Pumping Plant No. 1 are over 80 years old, while those at Pumping Plant No. 2 are over 60 years old, and are not adaptable to modern automated motor control operation. The gates would be replaced with motor-controlled gates and a computer-controlled head differential monitoring system to improve the operational performance and insure safety of the positive barrier fish screen structure.

As part of pre-construction design for the positive barrier fish screen, the existing levee tube and gate structures for both Pumping Plant No. 1 and Pumping Plant No. 2 are being inspected. In the event that these inspections identify significant structural problems with the levee tube and gate structures, the existing facilities may need to be either repaired or replaced as part of positive barrier fish screen construction. Repair or replacement of the existing levee tubes and gates, if required, would be done under dry conditions but may require additional excavation within the levee between the pumping plant intake and discharge into the main canal. The area that would be disturbed is currently utilized as an access road. Disturbance associated with levee tube and gate repair or replacement would be limited to the area immediately adjacent to the existing gravel access road, pumping plants, and levee. Given the uncertainty in the condition of the existing facilities and the need for repair or replacement of these structures, it has been assumed for purposes of this biological assessment that excavation and replacement of the structures will be required and is included as part of the project description for the positive barrier intake screen project.

A floating log boom has been used in association with the RD 108 Wilkins Slough positive barrier fish screen. The log boom has proven to be effective in protecting the fish screen and the traveling brush cleaner from floating debris. A similar floating log boom would be incorporated as part of the Tisdale Pumping Plant positive barrier fish screen for use in deflecting floating debris from being impinged on the screen, damaging screen panels, or damaging the traveling brush cleaner.

3.5 Construction Schedule

Two alternative construction plans have been developed for installation of the positive barrier fish screen, while continuing to provide water to Sutter Mutual Water Company to meet operational demands.

In one plan, a cofferdam would be constructed obstructing approximately 60% of the open area of the Tisdale intake forebay. After the initial phase when 60% of the fish screen structure is completed, the cofferdam would be removed and a new cofferdam would be constructed to allow construction of the remaining 40% of the fish screen structure. This two-step process requires that construction activity extend over a period of approximately 21 months (Figure 5).

An alternative construction plan would involve the installation of a single cofferdam across

the Tisdale forebay. Large diameter pipes would pass through the cofferdam to provide water to meet operational demands during construction of the positive barrier screen. Constructing the cofferdam and concrete fish screen structure at a single time offers a number of logistic advantages and cost efficiencies. Constructing the fish screen structure using a single cofferdam would require a period of approximately 21 months. Construction of the fish screen structure using the single cofferdam approach is the alternative preferred by Sutter Mutual Water Company.

The estimated time required for completing fish screen construction from initial contractor mobilization to start-up is approximately 21 months (Figure 5). The schedule for construction is contingent upon both successful funding of the positive barrier fish screen in accordance with the schedule identified and completion of environmental documentation and permitting. Delays in either project funding or permitting would result in delayed selection of a contractor and initiation of construction activity. As a result of high winter flows, site preparation and installation of the cofferdam would not occur during winter months. In the event of delays in permitting or funding that preclude initiation of site preparation and installation of the cofferdam during the late winter/early spring of 2004, construction activity would be delayed until the spring of 2005. In the event that initiation of site preparation is delayed, the schedule would be modified to reflect a later date of completion.

Seasonal time periods have been identified for dredging and construction activity within the Sacramento River in an effort to protect winter-run Chinook salmon and other sensitive fish species. Dredging and installation of the cofferdam may occur outside of the designated seasonal period for construction activity. The construction schedule for the Tisdale Positive Barrier Fish Screen assumes that a variance would be granted by both State and federal resource agencies to allow for dredging, site preparation work, and installation of the cofferdams, during any period of the year when river levels are suitable for construction. In the event that dredging and installation of the cofferdam is restricted to the designated construction period for winter-run Chinook salmon (June 1 and September 1), the entire project schedule would be extended and additional 12 months to 24 months. The accelerated schedule identified in Figure 5 for installation of the positive barrier fish screen is designed to provide protection for juvenile winter-run Chinook salmon and other fish species from entrainment at the currently unscreened Tisdale Pumping Plant at the earliest possible date.

Although Sutter Mutual Water Company has identified a preferred strategy for installation of the positive barrier fish screen involving the use of a single cofferdam, construction under either approach requires approximately the same duration. Construction under the two alternative construction strategies would involve the same basic activities. As a result, environmental permits for the project should encompass construction under either of the strategies identified to allow the contractor the greatest flexibility in developing a cost-effective bid for construction of the positive barrier fish screen in accordance with the design criteria and schedules developed for this project.

3.6 Fish Screen Operations and Maintenance

The positive barrier fish screen would be operated and maintained to reduce debris and

sediment accumulation that would adversely affect the magnitude and uniformity of approach velocities. The fish screen would be equipped with a screen cleaning brush that would be operational throughout the period of diversion operations. In addition to the screen cleaning brush, individual screen panels would be removed periodically for inspection and removal of debris as part of routine maintenance.

Sediment accumulation has historically occurred within the Tisdale intake forebay and in the Sacramento River in the area where the positive barrier fish screen would be installed. Sediment accumulation in these areas would adversely affect hydraulic performance of the fish screen and the uniformity of approach velocities across the screen surface. Periodic maintenance dredging would be performed as part of this project to remove accumulated sediments. Dredging will occur within the intake forebay and should not occur within the Sacramento River along the base of the fish screen foundation. Should maintenance dredging be required within the Sacramento River outside of the positive barrier fish screen structure, applications will be submitted for separate maintenance dredging permits to the appropriate State and federal agencies. Based on sediment deposition with a similar type fish screen at RD 108 Wilkins Slough (0.5 miles downstream from Tisdale), it is expected that the forebay will need to be dredged once or twice per year as part of the positive barrier fish screening maintenance program. Maintenance dredging associated with operation of the positive barrier fish screen, within the intake forebay, should be incorporated into all State and federal permits for construction, operations, and long-term maintenance of the positive barrier fish screen. It is recommended that project permits include authorization for long-term maintenance dredging to maintain hydraulic performance of the fish screen and avoid the need to apply and obtain additional permits for maintenance dredging. The permits should also authorize routine maintenance dredging within the Tisdale Pumping Plant forebay during the interim period until the screen can be constructed to help maintain efficient and reliable operation of the existing facilities.

3.7 Integration of Avoidance and Mitigation Measures into Project Design Specifications

During the preliminary environmental analysis, several mitigation measures were incorporated into the project design or would be required in the design specifications for the engineering contractor. They include the following measures:

Prepare a Dust Suppression Plan

The construction contractor selected for the project must prepare and implement a dust suppression plan. The project contractor would submit the suppression plan to Sutter County for review before initiating construction activities. The plan would include, but would not be limited to, the following measures:

- All exposed earth surfaces, including the existing unpaved levee road, would be watered periodically during construction activities. This practice would be conducted twice during the morning and twice during the afternoon;

- Visible mud and dust carried onto Tisdale or Cranmore Road by construction equipment would be removed on a daily basis. The highest concentrations of mud and dust are created generally within several hundred feet from the project access road. This mitigation measure will be required to minimize and avoid adverse air quality resulting from dust and potential vehicle safety on Tisdale and Cranmore Roads and the levee road; and

- Haul trucks would be covered with tarpaulins or watered sufficiently to eliminate dust emissions.

Prepare a Hazardous Materials Control and Spill Prevention and Response Plan

The construction contractor will be required to prepare and implement a hazardous materials control and spill prevention and response plan. Measures would include, but would not be limited to, the following:

- Prevent raw cement, concrete or concrete washings, asphalt, paint, or other coating material, oil or other petroleum products, or any other substances that could be hazardous to aquatic life from contaminating the soil or entering watercourses;

- Establish a spill prevention and countermeasure plan before project construction that includes strict on-site handling rules to keep construction and maintenance materials out of drainage and waterways;

- Clean up all spills immediately according to the spill prevention and countermeasure plan, and notify CDFandG and the Central Valley Regional Water Quality Control Board immediately of spills and cleanup procedures; and

- Provide staging and storage areas for equipment, materials, fuels, lubricants, solvents, and other possible contaminants away from watercourses and their watersheds.

The plan would be prepared by the construction contractor for the proposed project and should be implemented before the construction phase begins. U. S. Fish and Wildlife Service, California Department of Fish and Game, NOAA Fisheries, and Regional Water Quality Control Board staff would review the plan to verify that hazardous material control and spill response measures have been incorporated to control the use of hazardous materials and reduce the chance of spills to the maximum extent practicable. USFWS, CDFandG, NOAA Fisheries, and the Sutter Mutual engineer would inspect construction activities to ensure compliance with this measure.

Prepare Erosion Control Plan and Stormwater Pollution Prevention Plan

The project specifications require that the construction contractor prepare an erosion control plan and a stormwater pollution prevention plan. The plan will include, but would not be

limited to, the following measures to minimize erosion and sedimentation:

- Use of sedimentation basins and straw bales or other measures to trap sediment and prevent sediment and silt loads to the Sacramento River during construction;

- Cover graded areas adjacent to the levee with protective material, such as mulch, and re-seeded with adapted native plant species after construction is complete;

- Incorporate retaining walls into the project design on both the north and south sides of the intake forebay to minimize erosion of soils into the Sacramento River;

- Minimize surface disturbance of soil and vegetation;

- Place any stockpiled soil where it would not be subject to accelerated erosion; and

- Commence re-vegetation and placement of erosion control devices, such as crushed rock, as soon as a graded area has attained finish grade.

The construction contractor for the proposed project, using the services of a certified erosion control specialist or California-registered civil engineer, would prepare the plan. The plan would be prepared and implemented before the construction phase begins. CDFandG, Regional Water Quality Control Board staff, and the Sutter Mutual Water Company engineer would review the plan to verify that physical best management practices (BMPs) have been incorporated to reduce erosion and sedimentation to the maximum extent possible and ensure compliance with this measure. Erosion and sedimentation would be reduced to the maximum extent possible according to the BMPs being used.

Markings and Notification of Navigation Hazards

During the period of construction, barges and other workboats may be on-site in the Sacramento River. These in-river activities pose a potential risk to recreational boaters using the area. Prior to initiating construction, the selected contractor would be required to:

- Notify the Commander, 11th Coast Guard District in writing at least two weeks prior to commencing construction activities with information regarding the name and telephone number of the project manager, size and placement of any floating construction equipment, radio-telephone frequencies and call signs, and the anticipated start and end date of in-river construction;

- Prior to construction, 5-mile-per-hour marker buoys would be located both upstream and downstream of the project area in the mainstem Sacramento River to reduce boater speed through the project area, and to reduce boater wakes; and

- Floating construction equipment will be equipped with appropriate nighttime lights and daytime markers.

Additional Avoidance and Mitigation Measures

As part of preparation of the Environmental Assessment/Initial Study, additional mitigation measures have been identified. These mitigation measures include, monitoring for Swainson's hawk nesting, operation of the Tisdale Pumping Plant, to the extent possible, during periods of dredging and construction activity to reduce turbidity within the mainstem Sacramento River, establish exclusion zones around mature trees and Elderberry shrubs in the area to avoid damage and compaction of soil, conducting a fish rescue and relocation effort within the area of the intake forebay being dewatered by the cofferdam, conducting giant garter snake and Swainson's hawk surveys prior to construction, and halting construction within 100 feet of an archaeological find. These mitigation measures are discussed in more detail within the appropriate sections of this Environmental Assessment/Initial Study. Appendix B presents a summary of environmental commitments and agency responsibility with respect to the implementation of mitigation measures. These mitigation measures are consistent with the protective measures identified in the Biological Assessment for the proposed project.

4.0 DESCRIPTION AND ANALYSIS OF ALTERNATIVES

Several alternative methods for providing fish protection at the Tisdale Pumping Plant diversion were evaluated as part of the feasibility assessment (CH2M HILL 2001). These alternatives included the use of a flat panel screen, application of a V panel configuration, and consolidation of one or more Sutter Mutual Water Company diversions into a single screened facility, and alternative intake locations and designs for the Tisdale Pumping Plant site.

Additional consideration of alternative fish protection technologies has been given to water intakes located on the Sacramento River including the use of underwater sound (acoustic barriers), electric barriers, and a combination flow distribution system - electric barrier. RD 108, for example, initiated an extensive field investigation of alternative fish protection technologies for the Wilkins Slough site beginning in 1993 and continuing through 1996. Given the close proximity and similarities in diversion operations, results of the RD 108 Wilkins Slough diversion evaluation of alternative technologies are directly applicable to the Tisdale Pumping Plant site.

The 1993 and 1994 studies conducted by RD 108 examined the effectiveness of an underwater sound barrier generating an acoustic signal of 300 - 400 Hz (EESCO). The acoustic barrier was comprised of a series of underwater transducers located within the Sacramento River upstream of the RD 108 Wilkins Slough diversion. The acoustic signal was developed by EESCO specifically to elicit a behavioral response by juvenile Chinook salmon. Testing during 1993 and 1994 also included evaluation of an electric barrier designed by Smith-Root. The electrical array included a series of vertically oriented anodes and cathodes suspended from a floating dock within the entrance to the RD 108 intake forebay. Results of the 1993 and 1994 testing proved to be inconclusive, but did show promise of the potential application of behavioral barrier technologies at the Wilkins Slough site. Results of the testing have been documented by Demko *et al.* 1994.

As a continuation of the initial behavioral barrier testing, field investigations were designed and conducted in 1995 to evaluate the effectiveness of a combined flow distribution system - electric barrier in reducing entrainment losses of juvenile Chinook salmon, and other fish species, at the Wilkins Slough site. Smith - Root designed the flow distribution system - electric barrier tested in 1995. Results of the 1995 testing showed that the flow distribution system was not effective in providing uniform velocities across the Wilkins Slough intake forebay. However, guidance efficiency for the combined flow distribution system - electric barrier was promising (guidance efficiency index overall was 0.52). Results of individual tests, however, showed relatively high variation in juvenile Chinook salmon guidance efficiency among tests. Results were also promising for all fish species combined in which the average density of fish entrained was reduced from approximately 291 fish per 1000 AF when the electric barrier was off, to 123 fish per 1000 AF when the electric barrier was on representing an overall reduction in fish losses of over 50 %. Results of the 1995 testing were documented by Hanson (1996).

Based on the promising results of the flow distribution system - electric barrier testing and a recognition that the flow distribution system tested in 1995 did not provide hydraulic uniformity across the intake forebay, a series of physical modeling studies were conducted by the U. S. Bureau of Reclamation to identify specific design configurations for a flow distribution system at Wilkins Slough that provided uniform velocities. Results of the U. S. Bureau of Reclamation hydraulic modeling studies (USBR 1996) were subsequently used, in part, in the design of a flow distribution system - electric barrier that was installed and tested at the site in 1996. The 1996 flow distribution system - electric barrier was evaluated in terms of its guidance efficiency for juvenile Chinook salmon, and for other species. Results of the 1996 testing showed that guidance efficiency was highly variable among tests. Statistical estimates were made, based on the relationship between the density of juvenile Chinook salmon collected in screw traps within the Sacramento River and in the fyke nets within the RD 108 diversion during periods when the electric barrier was energized (on) and when it was off. Statistical estimates were also derived, based upon results from the 1993 sampling, for use in estimating the relative numbers of juvenile salmon that would be entrained at the RD 108 diversion in the absence of the flow distribution system - electric barrier. Results of these statistical analyses indicated that overall guidance efficiency of the flow distribution system was 92%, with the addition of the electric barrier increasing overall guidance efficiency to 93%. Variability in the estimates among tests, however, remained high. Results of the 1996 RD 108 guidance efficiency analyses have been documented in Hanson and Bemis (1997).

Results of the 1996 flow distribution system - electric barrier testing program, and results of earlier evaluations of alternative fish protection technologies, were provided to the RD 108 Technical Advisory Committee (TAC) comprised of representatives of the National Marine Fisheries Service, U. S. Fish and Wildlife Service, California Department of Fish and Game, and U. S. Bureau of Reclamation. Based upon review of the available data the Technical Advisory Committee determined that the acoustic barrier, electric barrier, and combination of a flow distribution system - electric barrier did not provide a sufficient level of guidance efficiency for protecting juvenile winter-run Chinook salmon. Managers within State and federal resource agencies recommended that RD 108 discontinue further field testing of alternative fish protection technologies and actively pursue the design and installation of a positive barrier fish screen at the Wilkins Slough Pumping Plant. As a result of the analyses of alternative technologies using behavioral barriers and guidance devises, no further consideration was given to the application of these alternative technologies for providing fish protection at the Tisdale Pumping Plant as part of this project.

Based on results of the testing of alternative technologies, a positive barrier fish screen design was subsequently developed and constructed at the RD 108 Wilkins Slough diversion. The intake screen design is similar to that being proposed for the Tisdale Pumping Plant.

The No-Project Alternative would continue the operation of the Tisdale Pumping Plant as an unscreened diversion. The no-project alternative would avoid short-term impacts resulting from construction of a fish screen, but would continue long-term entrainment of winter-run and spring-run Chinook salmon, steelhead, and other fish species. Continued operation of the unscreened diversion under the no-project alternative would result in increased levels of

mortality as a direct consequence of fish entrainment. The no-project alternative would not meet the basic objectives of providing fish protection and substantially reduced entrainment mortality.

5.0 CEQA ENVIRONMENTAL CHECKLIST AND NEPA ENVIRONMENTAL CONSEQUENCES

This section presents information on the environmental setting, impacts, and mitigation for the proposed Tisdale Pumping Plant positive barrier fish screen project. The section has been formatted to be consistent with the CEQA environmental checklist, developed by the Governor's Office of Planning and Research. The section has also been formatted to include information on the affected environment and environmental consequences of the proposed project to be consistent with provisions of NEPA. The topics and issues discussed in this section include:

- Land Use and Planning;
- Population, Employment, and Housing;
- Geology, Soils, and Seismicity;
- Hydrology and Water Quality;
- Biological Resources;
- Cultural and Historical Resources;
- Traffic and Transportation;
- Visual Quality and Esthetics;
- Air Quality;
- Noise and Vibration;
- Utilities and Infrastructure;
- Public Services;
- Energy;
- Hazardous Materials;
- Recreation;
- Socioeconomic effects; and
- Mandatory Findings of Significance.

This section has been organized to present the findings of the environmental checklist, followed by a discussion of the affected environment, criteria for determining impact significance, a discussion of the environmental consequences, and the responses for each element of the environmental checklist as it relates to the proposed project. Mitigation measures are identified where appropriate. The section includes a discussion of the no-project alternative. The discussion of biological resources has been expanded to include information developed and presented in a separate Biological Assessment. These biological analyses evaluated impacts of construction and operation of the proposed Tisdale Pumping Plant positive barrier fish screen on plant, wildlife, and fish species, which have been listed under the State and/or federal Endangered Species Acts, on critical habitat for winter-run Chinook salmon, and on essential fish habitat for Pacific salmon.

Land Use and Planning

	No Impact	Less than Significant Impact	Significant Impact unless Mitigated	No Mitigation Identified EIR
Land Use and Planning				
a. Does the project conflict with adopted land use plans or policies that are applicable to the project site or to the project vicinity? [Note that on a project-specific basis, such applicable land use plans and policies may include those imposed by local agencies, by local or regional agencies, and by statewide land use agencies.]	X			
b. Would the project conflict with open space, low-income housing, or other adopted land use goals that are applicable to the project location?	X			
c. Would the project conflict with established recreational, educational, religious, or scientific uses at the project location?	X			
d. Would the project require cancellation of Williamson Act agricultural contracts, or convert agricultural land to a non-agricultural use within an area designated as Important Farmland by the Department of Conservation, or an area designated as Prime Farmland by the U.S. Natural Resources Conservation Service of the federal Department of Agriculture?	X			
e. Would the project cause a nuisance to existing or planned land uses? Would existing or planned land uses cause a nuisance to the residents or users of the project?	X			

Affected Environment. Land use in the project area is predominantly agriculture and is

within the jurisdiction of land use plans adopted by Sutter County. Orchards, row crops, and rice fields dominate the landscape. Four houses are located within a distance of approximately 0.25 miles of the proposed project site. Three of the homes are owned by the Sutter Mutual Water Company and are occupied by Company employees. One home is a private residence. These residences are located on the landward side of the flood control levee.

With the exception of the Colusa-Sacramento River State Recreation area located approximately 18 miles away in Colusa, there are no other recreational lands in the vicinity of the project site. The Sacramento River is used for fishing and boating from summer through the start of the winter rainy season. A boat launching ramp is proposed to be constructed at the Tisdale Weir, located upstream of the Tisdale Pumping Plant, that would provide improved access to the river for fishing and boating. Boaters would pass in front of the construction area.

Criteria for Determining Impact Significance. Land use impacts were considered significant if the proposed project would conflict or be inconsistent with Sutter County General Plan or other local policies.

Discussion of Environmental Consequences. The item numbers in this section correspond to the item numbers of the checklist above.

Proposed Project

a. Implementation of the project would not conflict with adopted Sutter County land-use plans or policies.

b. Implementation of the proposed project would not conflict with open space, low-income housing, or other land use goals that are applicable to the project area.

c. Implementation of the proposed project would not conflict with recreational or other uses at the project location.

d. The project would not require cancellation of Williamson Act contracts.

e. The proposed project would not create a nuisance to existing or planned land uses due to the location of the project site, the lack of nearby housing and the levee separating the site from the nearest houses.

Mitigation. No mitigation measures are required.

No-Project Alternative. Implementation of the No-Project Alternative would have the same effects on land use and planning as the proposed project. The No-Project Alternative would not, however, achieve the project goals and objectives of reducing entrainment mortality at the diversion.

Population, Employment, and Housing

	No Impact	Less-than Significant Impact	Significant Impact unless Mitigated	No Mitigation Identified EIR
Population, Employment, and Housing				
a. Does the project conflict with population, employment, or housing policies or projections established by government agencies with jurisdiction over the project?	X			
b. Will the project directly or indirectly cause substantial growth or concentration in the population beyond current levels?	X			
c. Will the project directly or indirectly cause a net loss in the number of jobs in the community or cause substantial job or income losses by changing the employment opportunities in a community?	X			
d. Does the project displace existing residences or otherwise create or exacerbate a housing shortage?	X			

Affected Environment. The project site is located at approximately river mile (RM) 118 on the Sacramento River, approximately 4.5 miles southeast of Grimes, California in an agricultural area (Figure 1). The project involves constructing a positive barrier fish screen on the Sacramento River at the Tisdale Pumping Plant. The fish screen has been designed to prevent the loss of juvenile winter-run and spring-run Chinook salmon, steelhead, fall-run Chinook salmon, sturgeon, splittail, and other fish species as a result of entrainment into the Tisdale Pumping Plant. Except during the construction phase of the project, there would be no new jobs created or existing jobs lost.

Criteria for Determining Impact Significance. The following criteria, based on State CEQA Guidelines and professional judgment, were used to determine the level of significance of population, employment, and housing impacts. The project would result in a significant impact if it would:

- Conflict with adopted environmental plans and community goals;

- Induce substantial growth or concentration of population;
- Cause a net loss in the number of jobs in the community; or
- Displace a large number of people.

Discussion of Environmental Consequences. The item numbers in this section correspond to the item numbers of the checklist above.

Proposed Project

a. This project would not entail a significant change in population, employment, or housing because it is a small project that consists of constructing a positive fish screen barrier on the riverside of the levee.

b. The construction phase of the proposed project might require short-term recruitment of a small number of workers. Upon completion of the project routine operations and maintenance would require the same number of employees as currently employed by the Sutter Mutual Water Company. Neither the construction phase nor routine operation of the proposed project would cause substantial direct or indirect growth or concentration in the population beyond current levels.

c. Construction and routine operation of the proposed fish screen would not cause any job or income loss.

d. The proposed project would be located in a rural area. There are four existing residences (occupied by Company employees and one private residence) within a distance of approximately 0.25 miles of the proposed project site. These residences are located on the landward side of the flood control levee adjacent to the Sutter Mutual Water Company Main Canal. After construction, the positive barrier fish screen would not be visible from the local residences. Construction and routine operations of the fish screen would not cause or exacerbate a housing shortage.

Mitigation. No mitigation measures are required.

No-Project Alternative. Implementation of the No-Project Alternative would have the same effects on population, employment, and housing when compared to the proposed project. The short-term employment opportunities generated by the proposed project would not be available with the No-Project Alternative.

Geology, Soils, and Seismicity

		No Impact	Less-than Significant Impact	Significant Impact unless Mitigated	No Mitigation Identified EIR
Geology, Soils, and Seismicity					
a.	Would the project conflict with applicable legal requirements regarding geohazards and soil conservation?	**X**			
b.	Is the project likely to expose people or structures to significant geohazards? In particular, is the project located within an Alquist-Priolo Special Studies Zone, within a known active fault zone, in an area characterized by surface rupture that might be related to a fault, or in an area designated as geologic hazard area or subject to geohazard safety measures in a local plan or ordinance?	**X**			
c.	Does the substrate at the project site consist of material that is subject to liquefaction or other secondary seismic hazards in the event of ground shaking?		**X**		
d.	Is there any evidence of static hazards, such as landsliding or slopes in excess of 15%, that could result in slope failure?		**X**		
e.	Is the project located on or in the vicinity of soil that is likely to collapse or subside, as might be the case with fill, old mining properties, or areas of subsidence caused by groundwater drawdown?	**X**			
f.	Are soils characterized by shrink/ swell potential that might result in deformation of foundations or damage to structures?	**X**			

g.	Would the project result in substantial soil erosion or loss of topsoil?		X		
h.	Would the project result in loss of (or lost access to) mineral resources, including rock/sand/ gravel resources, or other known resources such as those identified in a Mineral Resource Zone identified by the California Department of Mines and Geology?	X			
i.	Would the project result in loss of a unique geographical feature of statewide or national significance?	X			

Affected Environment

Seismicity. There are no known active faults or any Alquist-Priolo Special Studies Zones within Sutter County in the area of the proposed project, however this does not rule out the possibility of a major earthquake occurring on a fault within the County. Although four minor quakes on an unknown fault in the foothills occurred in May 1985, the best geologic evidence currently indicates that Sutter County would be expected to experience only low-intensity earthquake shaking from a fault outside the County. The maximum credible earthquake on the nearest fault would generate ground shaking intensity of VI to VII on the Modified Mercalli (MM) scale, resulting in damage to non-reinforced masonry structures and chimneys.

Geology and Soils. Soils in the immediate project vicinity and where construction would occur are identified as recent alluvial fan and flood plain soils. This soil is found primarily along a relatively thin strip on each side of the Sacramento River and in large areas east of the foothills and south of the Town of Williams. Such soils are considered to be the best in the area, supporting prune, almond and walnut orchards, as well as rice and row crops.

Soil in the project vicinity has been preliminarily identified as Vina loam, a class one, well-drained soil with moderate permeability, low shrink/swell potential and slow surface runoff (A. Forkey, personal communication).

Nine soil borings were performed for the SMWC fish screen project. The soils encountered consisted of firm to very stiff silt and clay with occasional sand layers and lenses. Groundwater was encountered in all borings and estimated to be at the approximate river level.

The general topography of the proposed project area has been modified by agricultural activity and construction of the flood control levee immediately adjacent to the project site.

The ground is now nearly level except at the edge of the Sacramento River where the earthen levee separates the river from the agricultural land.

Criteria for Determining Impact Significance. The following criteria were used to determine the level of significance of geology, soils, and seismicity impacts. The criteria are based on the State CEQA Guidelines and professional judgment. A project will normally have a significant geologic or soil impact if it will:

- Expose people, structures, or property to major geologic hazards such as earthquakes, landslides, mudslides, or ground failure;
- Result in unstable earth conditions or changes in geologic substructure;
- Result in substantial disruptions, displacements, compaction, or over-covering of the soil;
- Result in a substantial change in topography or ground-surface relief features;
- Result in a substantial increase in wind or water erosion of soils, either on or off the site; or
- Be located on soils displaying evidence of static hazards, such as landslides or excessively steep slopes that could result in slope failure.

Discussion of Environmental Consequences. The item numbers in this section correspond to the item numbers of the checklist above.

Proposed Project

a. The proposed project would not conflict with legal requirements regarding geological hazards and soil conservation. The project would require in-river dredging, forebay dredging and excavation of approach ramps to the concrete structure and gravel access roads as illustrated in Figure 3. In-river dredging and forebay dredging will be conducted prior to constructing the concrete structure. It is anticipated that dredging will be done from a dredge mounted on a barge and/or land-based crane. All dredge spoils will be utilized on site or within the Sutter Mutual service area. The approach ramps will consist of earth backfill contained within sheet pile and concrete retaining walls as shown in Figure 3. Access to the concrete structure from the north and south will be *via* gravel/asphalt-topped access roads.

   Based on results of preliminary bathymetric and topographic measurements, it is estimated that the volume of sediment to be dredged from the Sacramento River is approximately 300 cubic yards. Approximately 4,700 cubic yards of sediment will be dredged and excavated from the intake forebay. The dredge material will be stockpiled and may be reused on-site, depending on its quality,

when construction begins. Dredge spoils may be used on-site, in part, as fill material , depending on its quality, in preparing the north and south access roads to the fish screen structure, used to repair existing levees within the service area, and/or for other uses. The total estimated volume of fill for the north and south access areas is estimated to be 8,000 cubic yards.

Additional fill material is available from a stockpile of dredge spoils and material to be excavated during site preparation within the Tisdale intake forebay. The fill material stockpile is located immediately adjacent to the project site in a highly disturbed area (Figure 4).

b. The proposed project is not likely to expose people or structures to significant geological hazards. The proposed project is not located within an Alquist-Priolo Special Studies Zone, with a known active-fault zone, or in an area characterized by surface rupture that might be related to a fault. The area has not been designated a geologic hazard area, and it is not subject to geologic-hazard safety measures in any local plans or ordinances.

c. The preliminary soils map prepared by the USDA NRCS does not indicate that the area is subject to liquefaction. As stated above, the project site is not located within an Alquist-Priolo Special Studies Zone or within a known active-fault zone, or in an area characterized by surface rupture that might be related to a fault. Therefore, based on the existing information, liquefaction is not a significant issue for the project site and is considered a less than significant impact.

d. The site is located in a relatively flat area next to the river. No evidence of landslides is present at the proposed project site. Access areas on the north and south sides of the Tisdale forebay are currently stabilized by riprap (Figure 2). As part of the construction of the positive barrier fish screen, sheet pile walls on both the north and south sides of the forebay will be extended to a higher elevation and back-filled using dredge material available from dredging as part of site preparation or other suitable fill material. The sheet pile walls on both sides of the intake forebay have been specifically designed to reduce sediment erosion from the surrounding areas into the Tisdale Pumping Plant forebay and Sacramento River. The sheet pile walls will serve to both stabilize the north and south banks of the intake forebay, reduce the possibility of potential landslides and erosion, increase ease of access to the positive barrier fish screen and forebay, and reduce requirements for maintenance dredging from the forebay. Therefore, the risk of landslides is considered less than significant.

e. The proposed fish screen would be located on soil that is not likely to collapse or subside because its texture is coarse enough not to be affected by groundwater drawdown. In addition, the fish screen will be submerged within the Sacramento River and not subject to groundwater drawdown. Subsidence is not a major design criterion for the fish screen and associated facilities.

Therefore, subsidence is not considered an issue.

f. Soils in the project vicinity have been preliminary mapped by the Natural Resource Conservation Service as having low shrink-swell potential. CH2M HILL performed soil borings as part of the design project at the site that generally concur with the soil survey findings of low to moderate expansion-contraction potential. The proposed project foundation and other important structures will be designed to accommodate any shrink-swell potential that may occur at the site. This issue is an engineering design consideration for the foundation and is not an impact of the project on the environment.

g. Minimal erosion could occur during project construction, but because of the small size of the excavated or graded area (approximately 7.5 acres), this impact is considered less than significant. All excavated soil will be stockpiled and reused as backfill for the approach ramps or for other purposes. Any remaining stockpiled soil will be utilized for repairing irrigation levees throughout the Sutter Mutual Water Company service area. In addition, the contractor will be required to prepare and implement a soil erosion control plan prior to initiating construction. Temporary facilities, such as sediment catchment basins and the

h. use of hay bales, will help control and minimize soil erosion during construction. The project site will be re-vegetated, and access roads will be surfaced with crushed gravel to further control and minimize long-term soil erosion. Incorporation of the retaining walls along both the north and south sides of the Tisdale forebay is also intended to reduce soil erosion into the forebay. As a result of these mitigation measures (Section 3.7), impacts resulting from soil erosion are considered less than significant.

i. The proposed project site would not result in the loss of, or lost access to, mineral resources because of the small size of the project when compared to the length of the Sacramento River. Furthermore, observations during previous dredging in the Tisdale Pumping Plant forebay and test borings conducted by CH2M HILL (1997) as part of the RD 108 fish screen project did not show evidence of gravel sediments in the river bottom in the area. Also, gravel in the Sacramento River is no longer extensively mined because of environmental constraints and the difficulty of working in an area with a high water table. This impact is not considered significant.

j. The proposed project would not result in the loss of a unique geographical feature of statewide or national significance. The site is continually disturbed by maintenance practices and contains no unique geographical features.

Mitigation. The contractor will be required to develop and implement an erosion control plan during the period of site preparation and construction (Section 3.7).

No-Project Alternative. Implementation of the No-Project Alternative would avoid

potential soil erosion and excavation impacts from project construction activities, but would not achieve the goals and objectives of the project.

Hydrology and Water Quality

	No Impact	Less-than-Significant Impact	Significant Impact unless Mitigated	No Mitigation Identified EIR
1. Hydrology and Water Quality				
a. Would the project conflict with applicable legal requirements relating to hydrology and water quality?		X		
b. Would the project cause direct or indirect wastewater discharges that would result in acute or eventual exposures to levels of hazardous materials that would adversely affect human health, wildlife, or plant species? Would the project otherwise substantially degrade surface water quality?		X		
c. Would the project substantially degrade groundwater quality, interfere substantially with groundwater recharge, or deplete groundwater resources in a manner that would cause water-related hazards such as subsidence?		X		
d. Would the project alter the existing drainage pattern of the site or arena in a manner that results in flooding, erosion, or siltation, on-or off-site?		X		
e. Is the project located in a flood-prone area, based on either historical flood records or potential risks relating to existing or planned changes to flood control measures?		X		

Affected Environment

Surface Water Hydrology. The proposed Tisdale Pumping Plant Positive Barrier Fish Screen will be located on the Sacramento River (Figure 1). The Sacramento River is the largest river in California, originating in the Cascade and Siskiyou Mountains of northern California and terminating in the Sacramento-San Joaquin Delta (Delta). Several major tributaries, including the upper Sacramento, McCloud, Pit, Feather, Yuba, and American rivers, contribute to flow in the Sacramento River. Flow is also contributed to the Sacramento River by a large number of smaller tributaries, including Cottonwood, Battle, Butte, Mill, Deer, and Thomes creeks.

Base flow levels in the Sacramento River are primarily controlled by releases from Shasta, Oroville, and Folsom Dams. These releases are adjusted to meet downstream requirements for water supply; Delta water quality, fish and wildlife habitat maintenance; flood control; and other beneficial uses in accordance with numerous legal and regulatory requirements. The California Department of Water Resources (DWR) and the U.S. Geological Survey (USGS) measure flows in the Sacramento River at several locations, including the Wilkins Slough gauge station, which is located approximately 0.75 miles downstream of the proposed project site. Hydrologic data are also available from the Tisdale Weir gaging station.

Hydrologic data from the USGS Wilkins Slough gauging station (gauge #11390500) was analyzed statistically as part of the positive barrier fish screen feasibility assessment. Sacramento River hydrology was examined for the period from 1944 through 2000 to assess the probability of both high flow flood events and low flows within the Sacramento River that would influence the design and operation of the fish screen. Results of this analysis (CH2M HILL 2003) show that the 100-year flood occurs at a Sacramento River flow of 33,800 cfs and water surface elevation at Tisdale of 54.00 feet. The 25-year flood event was estimated to occur at a Sacramento River flow of 32,000 cfs and a water surface elevation of 52.5 feet. Based on results of these analyses, the top deck elevation of the Tisdale Pumping Plant Positive Barrier Fish Screen was established at 54 feet (Table 2). This elevation allows for weir flow over the screen blanks to aid in equalizing pressure should sections of the screens become clogged. Above the 25-year flood elevation, the floodwaters would pass over the screens with associated silt and small debris. Large debris would continue to be restrained up to the 100-year flood event by the structure and sheet pile transition walls.

Results of the evaluation of low flow events on the Sacramento River show that the 20-year low-flow ranges from approximately 2,700 cfs in April to 4,000 cfs in July (CH2M HILL 1997). The predicted five-year low-flow events range from approximately 4,000 cfs in April to 5,000 cfs in July. The objective of this analysis was to determine the optimum positive barrier fish screen configuration which met the 0.33 ft/sec approach velocity criteria, satisfied the seasonal demand for water deliveries from the Tisdale Pumping Plant diversion, and minimized the overall length of the screen and hence exposure duration (transit time) for juvenile Chinook salmon and other fish species. Results of these calculations and analyses were presented to state and federal resource agencies as part of the feasibility assessment and design development for the positive barrier fish screen. The resulting fish screen design is shown in Figure 3. Fish screen design parameters are summarized in Table 2.

A series of hydrologic model calculations and simulations using the one-dimensional HEC-RAS mathematical model were performed to evaluate the effect of the proposed fish screen on potential changes in river stage and associated operation of the Tisdale Weir. Results of the flood flow impact analysis of the screen structure were calculated to increase river stage 0.09 feet. Results of these calculations were reviewed by State and federal resource and regulatory agencies participating in the design review of the proposed project. Results of these calculations indicated that the fish screen would contribute to a minor rise in flood flow stage that would not be expected to adversely affect river conditions although a potential increase in the risk of bank erosion was identified to be addressed in the final design of the screen structure.

Surface Water Quality. Water quality data for the Sacramento River are collected by several agencies, including DWR, USGS, and the Central Valley Regional Water Quality Control Board (CVRWQCB), as part of monitoring programs and special studies. In addition, water quality was monitored at the RD 108 Wilkins Slough diversion as part of the evaluation of alternative fish protection technologies and winter-run Chinook salmon incidental take monitoring (Demko *et al.* 1994, Hanson 1996; Hanson and Bemis 1997).

Dissolved oxygen concentrations at the Tisdale Pumping Plant project site typically range from approximately 6.5 to 7.5 mg/l. Electrical conductivity was approximately 200 μmhos.

Water temperature recorded in the Sacramento River in the area of the proposed project typically ranges from approximately 13 C (55 F) during the winter and early spring to over 20 C (68 F) during the summer. Water temperatures showed a general pattern of diel variations of approximately 1 - 2 C (2 - 4 F) within a day.

Turbidity within the Sacramento River has been highly variable, with secchi depths ranging from approximately 30-60 cm during periods of low storm water run-off and precipitation to less than 10 cm during high flow periods. Turbidity within the river varies substantially in response to storm activity and storm water run-off primarily during the fall, winter, and early spring.

Criteria for Determining Impact Significance. The following criteria, based on State CEQA Guidelines, the CVRWQCB Water Quality Control Plan for the Central Valley Region (Basin Plan), and professional judgment, were used to determine the level of significance of hydrology and water quality impacts. The project would result in a significant impact if it would:

- Substantially degrade the water supply;
- Contaminate a public water supply;
- Cause substantial flooding, erosion, or siltation;
- Substantially degrade or deplete groundwater resources;
- Substantially interfere with groundwater recharge; or
- Increase ambient turbidity by more than 20% in the mainstem Sacramento River.

Discussion of Environmental Consequences. The item numbers in this section correspond to the item numbers of the checklist above.

Proposed Project

a. The project proponents are required to comply with all applicable hydrology and water quality regulations. Several permits are required from State and federal agencies that will insure compliance with water quality regulations. The following necessary permits and approvals would be obtained as part of the proposed project:

- Section 404/Section 10 Permit from the Army Corps of Engineers;
- Section 401 Water Quality Certification (or waiver of certification) of compliance with state water quality standards from the Central Valley Regional Water Quality Control Board;
- Section 1603 Stream Bed Alteration Agreement from the California Department of Fish and Game;
- Reclamation Board permit;
- California Department of Fish and Game 2081 permit with respect to winter-run and spring-run Chinook salmon incidental take;
- National Marine Fisheries Service biological opinion with respect to winter-run and spring-run Chinook salmon and Central Valley steelhead incidental take; and

Sutter Mutual Water Company is required to obtain all permits and approvals from these agencies prior to construction and will use the Environmental Assessment/Initial Study to obtain permits. Therefore, this impact is considered less than significant.

b. The following sections describe potential effects related to releases of hazardous materials, turbidity, and Sacramento River flows.

Hazardous Materials Releases. Construction projects may involve the use of a wide variety of potentially hazardous materials, such as oils, greases, fuels, and other similar materials. As with any construction project, the construction phase of the proposed project includes a risk of accidental or inadvertent discharge of hazardous materials that, if released to a surface water body in sufficient volumes, may be toxic to aquatic life. This impact is considered less than significant because preparation and implementation of a hazardous spill prevention plan is being required to respond to any hazardous materials spills that could occur during construction activities (Section 3.7).

Turbidity. Project site preparation and excavation activities would expose soils and increase erosion potential. During installation of the intake structure and fish screens, a series of sheet piles and cofferdams would be installed in the Sacramento River along the levee to allow de-watering of the construction area. The sheet piles would extend about 40 feet offshore from the levee bank. Pile driving for the cofferdam sheet piles would disturb the bottom sediments and could cause some incremental increases in turbidity in the Sacramento River for several days. Substrate conditions where pile driving would be conducted include sand and fine materials. Turbidity would increase with their disturbance.

The turbidity generated from pile driving in a flowing channel or river tends to affect a very small area of the river. River flow carries disturbed sediments downstream forming a plume. The CVRWQCB Basin Plan states that river projects or discharges should not cause turbidity levels to exceed 20% of background levels where natural turbidity is between 5 and 50 NTUs. Elevated turbidity levels would probably be limited to the right bank, where dredging and pile driving would be conducted; the left bank of the river probably would not be affected. Observations at the RD 108 Wilkins Slough site during dredging and installation of the positive barrier fish screen indicated that the turbidity derived from dredging and pile-driving activities is short-term and intermittent on a daily basis and is not likely to have appreciable effects on beneficial uses downstream.

It is likely that pile-driving activities, although short-term and affecting only a small area of the river, may cause localized Sacramento River turbidity levels to temporarily increase above limits allowed by the Basin Plan. This is considered a less-than-significant impact because the affect would be localized to the immediate area within the forebay, would be temporary and intermittent, would be of short duration when dredging and installation of the sheet pile coffer dam is occurring, and an erosion control plan is being integrated into the engineering contractor's bid specifications to minimize and avoid long-term erosion and increased turbidity and suspended sediment concentrations within the river.

The erosion control plan will include provisions for reducing erosion of dredge-spoil materials back into the Sacramento River during the period of construction. Sediment catch basins, and the use of hay bales and other techniques will reduce sediment erosion and runoff into the Sacramento River. After completion of construction, the project site will be re-vegetated as part of the erosion control effort, and access roads will be surfaced using crushed gravel/asphalt. In addition, during the period of dredging within the Sacramento River and intake forebay, the Tisdale Pumping Plant will be in operation, to the extent possible, to entrain suspended sediments in water diverted from the river, thereby reducing turbidity and suspended sediment concentrations within the mainstem Sacramento River. These mitigation measures have been integrated as part of the proposed project (Section 3.7), and serve to reduce potential impacts to less-than-significant levels.

Effects on Flows

a. Dewatering within the cofferdam will be necessary to install the intake structure and screens. The affected area of the river will extend approximately 40 feet offshore and will extend along the river for a distance of approximately 335 feet. The dewatering

during screen construction would occur within the cofferdam. This is considered a less-than-significant impact.

There would be a potential to contaminate groundwater during the construction phase of the proposed project if any toxic materials used during construction were released. This is an important consideration because the groundwater in the area is very shallow and contaminants could rapidly reach and contaminate the aquifer. This impact was considered less than significant because a hazardous materials management plan is being required as part of the proposed project and will be included in the project bid specifications (Section 3.7).

b. The fish screens and intake structure would be submerged in the river. Because the structure would be only a fraction of the size of the riverbed, it should not have a limiting effect on the river's flood carrying capacity. During flood periods, water in the Sacramento River will simply pass over the top of the fish screen structure. The fish screen will extend approximately 40 feet offshore into the Sacramento River (Figure 3), but is not expected to create a significant obstruction to Sacramento River flow. As part of the feasibility study for the proposed project hydrologic modeling was used to evaluate the potential affect of the fish screen structure on river stage and operation of the Tisdale Weir and bypass. Results of these analyses showed that the fish screen would not result in a significant adverse effect of weir operations. The Sacramento River in the area of the Tisdale Pumping Plant site is approximately 300 feet across. The design of the fish screen (Figures 3) includes a transition sheet pile section on the northern portion of the barrier designed to improve hydraulic flow of water downstream within the Sacramento River past the intake structure. The proposed intake structure is expected to result in a less-than-significant impact on stormwater runoff, drainage patterns, and flooding. After the intake structure is built, the north and south access areas would be re-vegetated as part of the erosion control plan (Section 3.7). Access roads will have a crushed rock/asphalt surface. Retaining walls will also be installed on both the north and south sides of the intake forebay (Figure 3). These project features will protect the levee and intake from erosion and scour. Therefore, the project will not cause flooding, erosion, or siltation. This impact is less than significant.

c. The proposed Tisdale Positive Barrier Fish Screen is located in an area along the Sacramento River prone to flooding. The intake structure has been designed for a top elevation of the screening structure of 52.5 feet, which based upon results of a hydrologic and frequency analysis (CH2M HILL 2003), would provide protection from a 25-year flood event. The top of the road deck for the intake structure is designed at elevation 54 feet, which will provide protection from the 100-year flood event (Table 2). The intake structure has been designed recognizing the probability of flooding. During periods of flooding, water will flow over the top of the structure, resulting in minimal damage to the facilities. As a result of these design features, and flood control measures incorporated as part of the project plan, these impacts are considered less than significant.

Mitigation. Mitigation measures incorporated as part of the project design (Section 3.7) to address hydrology and water quality concerns would include:

- Preparation of an acceptable erosion control plan;
- Preparation of a hazardous materials spill prevention plan;
- Preparation of a dust suppression plan;
- Operation of the Tisdale Pumping Plant, to the extent possible, during intake forebay excavation and dredging to reduce turbidity and suspended sediments within the Sacramento River; and
- The positive barrier fish screen structure was designed to accommodate flood conditions within the Sacramento River based, in part, on results of hydrologic analyses of historic river flow and water surface elevations.

No-Project Alternative. Implementation of the No-Project Alternative would avoid the short-term temporary increases in turbidity in the Sacramento River and the risks associated with release of hazardous materials during in-river construction activities and other hydrology and water quality effects associated with the project, but would not achieve the project goals and objectives.

Biological Resources

	No Impact	Less-than-Significant Impact	Significant Impact unless Mitigated	No Mitigation Identified EIR
Biological Resources				
Wildlife and Plants				
a. Would the project violate any environmental law or regulation designed to protect wildlife, fisheries, plant species, or habitat areas?	**X**			
b. Would the project directly harm a sensitive species or cause a net loss to the habitat of the species?		**X**		
c. Would the project interfere substantially with the movement of any resident or migratory fish or wildlife species, or with established resident or migratory corridors?	**X**			
d. Would the project cause any fish or wildlife population to drop below self-sustaining levels?	**X**			
e. Would the project cause a net loss of any riparian lands, wetlands, marshes, or other environmentally sensitive habitat areas?		X		
f. Would the project result in the loss of any "specimen tree" or tree with historic value?	**X**			
Fish				
g. Would the project cause a temporary decline in growth rates, survival or reproductive success of special-status species (e.g., winter-run and spring-run Chinook salmon) within the Sacramento River?		**X**		

h. Would the project cause a long-term decline in Chinook salmon and steelhead trout growth rates, survival or reproductive success in the Sacramento River?	X			
i. Would the project remove spawning and rearing grounds for warmwater species on the Sacramento River?		X		

Affected Environment. The affected environment in the area of the proposed fish screen project provides habitat for various plant, wildlife, and fish species. The following sections briefly describe biological resources in the area.

Vegetation and Wildlife

Miriam Green Associates conducted biological surveys in 2001 and 2002 in the vicinity of the Tisdale Pumping Plant as part of this Environmental Assessment/Initial Study. The surveys included areas on both the river and land side of the levee (Figure 6). While general vegetation conditions were noted and wildlife present was recorded, special emphasis was placed on locating special-status animal and plant species that are known from the general area and assessing the suitability of existing habitat to support those species.

Methodology

Prior to conducting field surveys in 2001, a computer search of the California Department of Fish and Game's Natural Diversity Data Base (NDDB) was conducted to determine which special-status plant and animal species had been recorded in the general project area. This search was updated prior to conducting surveys in 2002. Table 3 provides legal status, habitat information, and location information on species that could occur in the area. The Knight's Landing, El Dorado Bend, Kirkville, Sutter Causeway, and Tisdale Weir USGS 7½-minute topographic quadrangles were checked for occurrences of special-status species.

Two biologists, Miriam Green and Tina Costella, conducted the first field survey on June 6, 2001. Miriam Green and Waldo Holt conducted the second survey on May 7, 2002. Previous surveys for nesting Swainson's hawks (*Buteo swainsoni*) that included the project area were conducted on April 30 and May 6, 2002 as part of another project. The area in the vicinity of the proposed fish screen and adjacent areas that may be disturbed by construction equipment and activity were walked (Figure 6) and any sightings of special-status species were recorded and mapped on aerial photographs.

Table 3. Special status species potentially occurring within the Sutter Mutual Water Company Tisdale positive barrier fish screen feasibility study area.

Species (Scientific Name)	**Legal Status* Federal/State/CNPS**	**Habitat Requirements**	**Presence in Study Area**
BIRDS			
Swainson's hawk (*Buteo swainsoni*)	-- / T [nesting]	nests in valley oaks, cottonwoods, and large willows usually in, or near, riparian habitats; forages in undisturbed grasslands, irrigated pastures, and agricultural fields of alfalfa, small grains, and some row crops	Active nests in 2002 along north side of Tisdale Bypass (RM 118.9L) and on west side of Sacramento River across from fish screen site no. 3 (RM 118.2R); historical nest sites located in Tisdale Bypass and 0.5 mile north of Tisdale Bypass along east bank of Sacramento River (NDDB 2001)
Bank swallow (*Riparia riparia*)	-- / T	nests colonially in vertical banks of creeks and rivers; requires fine-textured/sandy soils to excavate holes	Suitable habitat along portions of Sacramento River; however, no bank swallows observed during 2001 or 2002 surveys at alternative fish screen sites; closest historical records at RM 119.4R, 0.75 mile above Tisdale Weir and at RM 100.4L approximately 2 miles north of El Dorado Bend (1987)
REPTILES			
Giant garter snake (*Thamnophis gigas*)	T / T	associated with aquatic environments that contain sufficient water during the active summer season to supply food (fish and amphibians) and cover; vegetated banks for basking located immediately adjacent to water; emergent vegetation for cover during the active season; and high ground or uplands, that provide cover and refugia from floodwaters during the dormant winter season	Potential supporting habitat in Main and West canals; four individuals observed in Main Canal east of project area during 1999; historical occurrences from other locations in Sutter Basin

Species (Scientific Name)	Legal Status* Federal/State/CNPS	Habitat Requirements	Presence in Study Area
INVERTEBRATES			
Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)	T / --	inhabits riparian and oak savanna habitats with elderberry shrubs, its only known host plant	A few scattered elderberries in study area located along land side of levee and one along western portion of Main Canal; potential VELB habitat
FISH			
Winter-run Chinook salmon (*Oncorhynchus tshawytscha*)	FE/SE	Sacramento River; spawning in reaches upstream of project site. Riverene migration corridor and juvenile rearing	Juveniles and adults present in project area/potential short-term impacts associated with construction activity. Long-term reduction in entrainment losses
Winter-run Chinook salmon habitat	FE/--	Sacramento River from Keswick Dam to Golden Gate. Spawning and egg incubation upstream of project site. Project is in an area used by rearing juveniles and as a migration corridor	Project site is within designated critical habitat. Short-term increase in turbidity and suspended solids during dredging and construction. No long-term impacts to habitat
Spring-run Chinook salmon *(Oncorhynchus tshawytscha)*	FT/ST	Sacramento River and tributaries; spawning in reaches upstream of project site. Riverene migration corridor and juvenile raring	Juveniles and adults present in project area/potential short-term impacts associated with construction activity. Long-term reduction in entrainment losses
Fall-run Chinook salmon *(Oncorhynchus tshawytscha)*	EFH/--	Sacramento River and San Joaquin rivers and tributaries; spawning in upstream reaches of project site. Riverene migration corridor and juvenile rearing.	Juveniles and adults present in project area/potential short-term impacts associated with construction activity. Long-term reduction in entrainment losses
Late fall-run Chinook salmon *(Oncorhynchus tshawytscha)*	EFH/--	Sacramento River and tributaries; spawning in reaches upstream of project site. Riverene migration corridor and juvenile raring	Juveniles and adults present in project area/potential short-term impacts associated with construction activity. Long-term reduction in entrainment losses

Species (Scientific Name)	Legal Status* Federal/State/CNPS	Habitat Requirements	Presence in Study Area
Delta smelt *(Hypomesus transpacificus)*	FT/ST	Sacramento River downstream of Sacramento to Sacramento-San Joaquin Delta	No known occurrence in project area; therefore no impact on species by proposed project
Steelhead *(Oncorhynchus mykiss)*	FT/--	Sacramento and San Joaquin rivers and tributaries; spawning in reaches upstream of project site. Riverene migration corridor and juvenile raring	Juveniles and adults present in project area/potential short-term impacts associated with construction activity. Long-term reduction in entrainment losses
Splittail *(Pogonichthys macrolepidotus)*	FT/--	Riverene; Sacramento River downstream to the Sacramento-San Joaquin Delta	Juveniles and adults present in project area/potential short-term impacts associated with construction activity. Long-term reduction in entrainment losses

* Status Definitions

Federal

E = Endangered (Species that is in danger of extinction throughout all or a significant portion of its range)
T = Threatened (Species that is likely to become endangered within the foreseeable future)
CH = Designated critical habitat
-- = No designated species status

State

E = Endangered
T = Threatened
-- = no designation

The proposed project area was checked for the presence of suitable habitat that may support special-status plant species reported from the NDDB (2001, 2002). Both sides of the Sacramento River were checked for the presence of bank swallow (*Riparia riparia*) colonies. Binoculars and a spotting scope were used to check riparian vegetation for the presence of stick nests that may support Swainson's hawks or other raptors. Locations of elderberry (*Sambucus mexicana*) shrubs were recorded and mapped. The Main Canal was evaluated for the presence of emergent vegetation, water, and cover that could provide suitable habitat for the giant garter snake (*Thamnophis gigas*).

Results

Tisdale Pumping Plant and Bypass. The Tisdale Bypass supports mature riparian vegetation along both its north and south boundaries, including Fremont's cottonwood (*Populus fremontii*), box elder (*Acer negundo*), valley oak (*Quercus lobata*), willow (*Salix* spp.), Himalaya berry (*Rubus discolor*), and wild grape (*Vitis californica*). Small willow and cottonwood saplings are present within the bypass proper; however, these are most likely flushed out during wet winters when the bypass is flooded. The interior portion of the bypass also supports an annual grassland community.

The levee bank in the vicinity of the Tisdale Pumping Plant (Figure 4), on the east bank of the Sacramento River, supports a non-native annual grassland community dominated by slender wild oats (*Avena fatua*), curly dock (*Rumex crispus*), perennial rye-grass (*Lolium multiflorum*), rip-gut brome (*Bromus diandrus*), field mustard (*Brassica rapa*), and Mediterranean barley (*Hordeum murinum* spp. *gussoneanum*). This plant community continues downstream of the proposed fish screen site.

The levee bank on the west bank of the Sacramento River (Figure 4) supports a thin band of riparian vegetation dominated by Fremont's cottonwood, willow, and valley oak.

The Main Canal, between the West Canal and Pumping Plant No. 1, supports a narrow band of riparian scrub vegetation along its south bank consisting of dense Himalaya berry, valley oak saplings, wild grape, and a clump of elderberry. The elderberry is located along the top of the bank near the entrance road to the private residence. This elderberry is a multi-stemmed shrub approximately 15 feet tall and completely surrounded by dense Himalaya berry.

Special-Status Plants

No special-status plants occur in the area that would be impacted by the proposed fish screen project. Two plant species, Heckard's pepper-grass (*Lepidium latipes* var. *heckardii*) and rose-mallow (*Hibiscus lasiocarpus*), are reported in the NDDB (2001, 2002) on the topographic quadrangles searched for this project; however, no suitable habitat for either species is present in the area proposed for construction. Heckard's pepper-grass is included on the California Native Plant Society's (CNPS) List 1B: Plants rare, threatened, and endangered in California and elsewhere. It is an annual herb that occurs in alkaline soils on alkaline substrates; it almost always occurs in wetlands in valley grassland communities.

Rose-mallow in included on CNPS List 2: Plants rare, threatened, and endangered in California, but more common elsewhere. Rose-mallow occurs in fresh water marsh habitats in riverine backwaters, irrigation canal banks, and slow-moving streams. Potential habitat for rose-mallow occurs along portions of the Main and West canals; however, no individuals were observed during surveys of the project area. Neither plant has any state or federal legal status.

Special-Status Wildlife

Swainson's Hawk

Background - The Swainson's hawk (*Buteo swainsoni*) is state-listed as threatened; it has no federal status. Swainson's hawks historically inhabited open grasslands throughout most of lowland California. A variety of habitat changes, including the conversion of native grasslands to agricultural, urban, and industrial development have caused the Swainson's hawk population to decline by more than 90 percent from levels at the time of European settlement.

Swainson's hawks begin to arrive in the Central Valley from South America in March to breed and raise their young. They typically nest in large, mature trees such as valley oak, cottonwood, and black walnut and forage in open grasslands, agricultural fields, and pastures. Alfalfa, row crops, grainfields, and irrigated pastures are the Swainson's hawk's preferred foraging habitats, where they take advantage of the opportunities that harvesting and irrigating practices provide for the easy capture of small rodents. They do not forage in vineyards, orchards, or flooded rice fields. Agricultural lands adjacent to the study area (grasslands and row crops) provide suitable foraging habitat for this species, as well as other raptors.

Two active Swainson's hawk nests were found in the vicinity of the Tisdale Pumping Plant in 2002. The nest locations are as follows:

1. Approximately 200 yards east of Sacramento River (RM 118.9L) along the north side of the Tisdale Bypass in a riparian corridor; nest located approximately 85 feet high in a 100-foot-tall cottonwood tree; female observed in an incubating position on 04/30, 05/06, and 05/07; T14N, R1E, SE quarter Section 26; and

2. Sacramento River Mile 118.2R; nest approximately 80 feet high in a 90-foot-tall cottonwood tree in a riparian corridor; female observed in an incubating position on 04/30, 05/06, and 05/07; T14N, R1E, SE quarter Section 35.

Historical nest sites (NDDB 2001, 2002) located within 2 miles of the study area are as follows:

3. Along the east bank of the Sacramento River at the Tisdale Bypass (1984);

4. 0.5 mile north of the Tisdale Bypass on the east bank of the Sacramento River; and

5. 1.4 miles east of the Sacramento River, on the north side of the Tisdale Bypass, next to the levee road (1982).

Potential Impacts - The Swainson's hawk nest along the north side of the Tisdale Bypass is a sufficient distance from proposed fish screen that construction of the fish screen would not have any impacts on this nest.

The Swainson's hawk nest along the west side of the Sacramento River is across and downstream of the proposed fish screen site. Because this nest is across the river and within the riparian corridor, there is somewhat of a visual and distance buffer between the nest and impact area.

Avoidance and Mitigation Measures - If construction is undertaken during the nesting season (April 15 - August 15), a qualified wildlife biologist should monitor the nest to ensure that construction activities in the river do not adversely impact nesting Swainson's hawks.

Northern Harrier

The northern harrier (*Circus cyaneus*) is designated as a California Species of Special Concern; it has no federal status. Northern harriers frequent meadows, grasslands, and open rangelands; they typically nest on the ground in shrubby vegetation. One northern harrier was observed flying over the adjacent field during the 2002 field survey and nearby agricultural fields provide suitable foraging habitat. There is no suitable nesting habitat in the study area.

Giant Garter Snake

Background - The giant garter snake (*Thamnophis gigas*) is both federally- and state-listed as threatened. Recent field studies have shown giant garter snakes to be associated with aquatic environments that contain: 1) sufficient water during the active (summer) season to supply food (fish and amphibians) and cover, 2) vegetated banks for basking located immediately adjacent to water, 3) emergent vegetation for cover during the active season, and 4) high ground or uplands, such as levees or railroad grades, that provide cover and refugia from floodwaters during the dormant (winter) season (Hansen 1988, Hansen and Brode 1993).

Giant garter snakes appear to be absent from most permanent waters that support predatory "gamefish". Introduced bass, sunfish, and catfish compete with giant garter snakes for prey and likely prey upon the snake as well (Hansen 1988). The widely introduced bullfrog (*Rana catesbeiana*) also has been shown to prey upon garter snakes (Treanor 1983); young snakes may be particularly vulnerable to bullfrog predation. This species also appears to be absent from natural or artificial waterways that undergo routine mechanical or chemical weed control or compaction of bank soils (Hansen 1988, Hansen and Brode 1993).

Suitable aquatic habitat for the giant garter snake is present in the Main and West canals; although adjacent upland cover is limited due to roadways and incompatible land uses (i.e., private residences, lawns, and row crops). A dense growth of Himalaya berry is present along the southern bank of the Main Canal between the private driveway near Pumping Plant No. 1. Habitat for the giant garter snake improves in the portion of the Main Canal east of the West Canal where a vegetated berm of annual grassland dominated by slender wild oats (*Avena*

fatua) exists between the canal and the Tisdale Bypass. Patches of emergent vegetation (*Juncus* sp.) are also present along this portion of the Main Canal, which would provide cover for giant garter snakes. During the May 7, 2002 visit, water was flowing at about 2 miles per hour and was approximately 7 feet deep.

Four giant garter snakes were observed in the Main Canal approximately 2 miles east of the Sacramento River during October, 1999 (E. Holland personal communication). The snakes were observed during the morning and afternoon hours over several days in an unvegetated portion of the canal, near the drop structure, just east of where Reclamation Road crosses the canal.

The system of agricultural canals and ditches in the project area provides connectivity with other suitable habitat in the Sutter Basin. George Hansen, herpetologist, recorded giant garter snakes in the following locations in Sutter County from 1986 to 1992 (NDDB 2002; G. Hansen unpublished data). All sightings were made during the summer, active season.

6. Sutter Basin, south of Robbins, approximately 0.12 miles southwest of intersection of Reclamation and Maddock roads (1986-87); slow-flowing water with silt substrate; individual observed basking in emergent vegetation;

7. Sutter Basin, west of Sutter Bypass, approximately 0.76 miles north of intersection between Knight's and Pelger roads (1986-87); slow-flowing water with silt substrate; individual observed basking in emergent vegetation;

8. Sutter Basin, along Seymour Road, about 1.76 miles west of Highway 113 (1986-87); slow-flowing water with silt substrate; individual basking in emergent vegetation (1986-87);

9. Near Highway 113, approximately 1.6 miles north of Subaco Road (1988-92);

10. O'Banion Road at toe drain on east side of Sutter Bypass (1988-92); and

11. In a canal approximately 1/2 mile north of Gilsizer Slough, one mile south of O'Banion Road, east of Sutter Bypass (1988-92).

Potential Impacts - Construction of the proposed fish screen would have no impact on giant garter snakes because construction of the fish screen would be confined to the Sacramento River. Since the proposed fish screen project would not result in a physical (e.g., relocation) or operational changes in water flows and canal operations when compared with the current baseline operations no impacts to giant garter snakes were identified for the proposed fish screen construction or operation. Dredging and placement of material within the stockpile location would potentially affect giant garter snakes or their habitat and therefore protective measures have been identified for inclusion into the proposed project. Placement of erosion control matting at the site also has the potential to adversely affect giant garter snakes.

Avoidance and Mitigation Measures - Standard measures to minimize death, injury, or

displacement of any giant garter snakes that may be present in the project area should be observed prior to placement of material in the stockpile locations. Measures to reduce potential impacts to giant garter snakes are summarized from USFWS (1997) and should include, but not be limited to, the following:

- All work within potential giant garter snake habitat, including activities within aquatic habitat and activities within 200 feet of supporting upland habitat, should occur between May 1 and October 1 of any year, which coincides with the active season of this snake, with exceptions made to extend this window during periods of warm or temperate conditions, subject to the discretion of regulatory agencies.

- Any dewatered habitat should remain dry for at least 15 consecutive days after April 15 and prior to excavating or filling of dewatered habitat.

- Construction and maintenance personnel will participate in a USFWS-approved worker environmental awareness training program. Under the guidelines of this program, workers shall be informed about the presence of giant garter snakes and habitat associated with the species and that unlawful take of the animal or destruction of its habitat is a violation of the Endangered Species Act. Prior to construction activities, a qualified biologist approved by the USFWS shall instruct construction personnel about: 1) the life history of the giant garter snake; 2) the importance of irrigation canals, marshes/wetlands, and seasonally flooded areas, such as rice fields, to the species; and 3) the terms and conditions of the biological opinion. Colored photographs of the giant garter snake will be handed out during the training session for posting on the job site. Proof of this instruction shall be submitted to the USFWS.

- Within 24 hours prior to the commencement of construction activities in giant garter snake habitat, a pre-construction survey shall be undertaken by a qualified biologist. The biologist will maintain a field report documenting the monitoring efforts and submit a copy to the USFWS.

- The monitoring biologist will be available thereafter on an on-call basis. If a snake is encountered during construction activities, the biologist will have the authority to halt work until appropriate corrective measures have been implemented or it is determined that the snake will not be harmed. Giant garter snakes encountered during construction activities will be allowed to move away from construction activities on their own. Capture and relocation of trapped or injured individuals can only be attempted by personnel or individuals with current USFWS recovery permits pursuant to Section 10(a)1(A) of the federal Endangered Species Act.

- Clearing of wetland vegetation will be confined to the minimal area necessary for fish screen construction and fill placement.

- Movement of heavy equipment to and from the project site shall be restricted to established roadways to minimize habitat disturbance.

- Any erosion control matting will not include monfilament or plastic. Rather, the matting will be comprised of jute, straw, coconut matting, or other natural fibers.

Valley Elderberry Longhorn Beetle

Background - The valley elderberry longhorn beetle [VELB] (*Desmocerus californicus dimorphus*) is designated as threatened by the USFWS. The species is associated with habitats that support elderberry, its exclusive host plant. Adult VELBs lay eggs upon the plants, after which, larvae bore in and excavate pupal cells. After pupation, new adults emerge leaving a characteristic emergence or "exit hole" and use elderberry for resting, foraging, and mating. The presence of exit holes in elderberry stems is the accepted measure of VELB presence and habitat use, although all elderberry shrubs within the known range of the VELB and having a stem diameter of one inch or greater at ground level are considered potential habitat and are protected under the federal Endangered Species Act.

Adult VELBs and/or exit holes have been reported from several locations along the Sacramento River as far north as Redding. The closest recorded occurrence of VELB to the project area is along the Sacramento River, between Knight's Landing and the Feather River (NDDB 2001). Two clumps of elderberry shrubs are located on the land side of the levee south of the State Ranch Bend Pumping Plant; only one is in the study area (Figure 6).

A mature elderberry shrub is located on the south side of the Main Canal along the entrance road to the residence (Figure 6). This elderberry is a multi-stemmed shrub, approximately 15 feet tall, and surrounded by a dense growth of Himalaya berry. It is located on the top of the levee and was in flower during the May 7, 2002 site visit. The stems were not checked for exit holes because of the dense berry encompassing it and the fact that it would not be impacted by any of the fish screen construction activities or facilities being considered. Although the elderberry is not located in an area expected to be disturbed there is a risk of inadvertant damage by moving equipment within the area.

Potential Impacts - Impacts to the elderberry could result from heavy equipment unless precautionary measures are taken.

Avoidance and Mitigation Measures - The elderberry shrub should be marked in the field prior to construction and encircled with protective fencing surrounding its dripline to ensure that it is not damaged by heavy equipment.

Other Species of Interest

Swallows - Cliff swallows (*Hirundo pyrrhonata*) are nesting within the project area under the Tisdale Weir bridge and under the bridge over the Main Canal connecting Tisdale and Cranmore Roads. Although cliff swallows are not considered a special-status species, their active nests and eggs are protected by the federal Migratory Bird Treaty Act and California Fish and Game Code. A nest is considered active if eggs are present. No impacts to cliff swallows are expected to occur. The structures where nesting has been observed will not be modified by project activities. Temporary disturbance resulting from heavy equipment

operations and movement in the area may result in short-term disturbance to cliff swallows in the area.

Fish

The Sacramento River in the vicinity of the Sutter Mutual Water Company Tisdale Pumping Plant provides habitat for a wide variety of resident and migratory fish species. Many of these species use the Sacramento River as a spawning and juvenile nursery area, in addition to providing habitat for juvenile, sub-adult, and adult lifestages. Species which have been collected as part of fisheries monitoring programs in the area by CDFandG, USFWS, and other investigators, are summarized in Table 1. Table 1 also provides both common and scientific names of fish used in this Environmental Assessment/Initial Study. As a result of the length of the Sacramento River and diversity of habitats, many of the species do not occur in the vicinity of the Tisdale Pumping Plant. For example, several of the species occur in the lower reaches of the Sacramento River downstream of the proposed site, which provides habitat for species such as Delta smelt and longfin smelt.

Fisheries studies conducted at the RD108 Wilkins Slough Pumping Plant have documented the occurrence and susceptibility to entrainment for species such as juvenile Chinook salmon (Demko *et al.* 1994; Hanson 1996; Hanson and Bemis 1997). Based on the similarities in design, location, and operation of the Wilkins Slough and Tisdale Pumping Plant diversions, results of these studies are expected to be representative of conditions occurring at the proposed project site. Four races of Chinook salmon inhabit the Sacramento River for spawning and juvenile rearing. Juvenile Chinook salmon have been collected at the RD108 Wilkins Slough diversion, with the greatest numbers occurring during the winter and spring. Juvenile steelhead were also collected in fishery sampling in the vicinity of the Wilkins Slough Pumping Plant. Spawning activity for both Chinook salmon and steelhead primarily occurs in areas of the Sacramento River upstream of the Tisdale Pumping Plant diversion, or within tributaries to the river. The Sacramento River in the project area serves as a migration corridor for upstream migrating adults and downstream migrating juvenile salmon and adult and juvenile steelhead.

Sacramento splittail were also collected in fishery studies at the Wilkins Slough Pumping Plant as both juvenile and adult lifestages. Splittail are expected to be susceptible to entrainment at the existing unscreened Tisdale Pumping Plant.

Sturgeon, including both green and white sturgeon, seasonally inhabit the upper Sacramento River. Adult sturgeon have been observed in recreational angler catches from the area adjacent to the Tisdale Pumping Plant. Juvenile sturgeon were infrequently collected as part of fishery studies in the area.

Lamprey, both adult and ammocete stages, were relatively common in fishery collections at the Wilkins Slough Pumping Plant and would be expected to be susceptible to entrainment at the currently unscreened Tisdale Pumping Plant.

Striped bass juveniles, sub-adults, and adults were collected during fishery studies, primarily

during the spring and early summer. Adult striped bass are harvested by recreational anglers from the Sacramento River throughout the area. Spawning by adult striped bass within the Sacramento River, in the general vicinity of the Tisdale Pumping Plant, has been observed in other studies.

Other fish species which typically utilize the area include, but are not limited to, American shad, channel and white catfish, yellow and brown bullhead, Sacramento squawfish, tule perch, and prickly sculpin. Additional information regarding the fish species inhabiting the Sacramento River in the proposed project area is summarized in Demko *et al.* (1994), Hanson (1996), Hanson and Bemis (1997), and Snider and Titus(1998, 2001).

Warmwater and game species inhabit the Sacramento River in the vicinity of the proposed project. These species include striped bass, threadfin and American shad, catfish and bullhead, crappie and bluegill, squawfish, largemouth bass, carp, tule perch, and other species. Warmwater and game species include both resident populations and migratory species. Results of fisheries monitoring (Demko *et al.* 1994; Hanson 1996; Hanson and Bemis 1997) have shown that many of these species are present in the area year-round. Many of these species are actively sought by recreational anglers (e.g., striped bass, American shad, catfish), while others are characterized as forage species (e.g., threadfin shad). These populations support an active recreational fishery, both within the Sacramento River in the vicinity of the proposed project, as well as further downstream within the Delta.

Special-Status Fish

Fish species that have been identified for protection under the State and/or federal Endangered Species Acts that inhabit the Sacramento River in the vicinity of the proposed project include winter-run and spring-run Chinook salmon and Central Valley steelhead. Consideration was also given to delta and longfin smelt, sturgeon, lamprey, hardhead, and California roach. Fall-run and late fall-run Chinook salmon are also considered as part of EFH. Based on information regarding their habitat distribution and known or presumed occurrence in the area of the Tisdale Pumping Plant Positive Barrier Fish Screen site, an assessment has been made of the potential impacts associated with construction, operation, and maintenance of the facility on each of the identified fish species. Results of the assessment are summarized below.

Chinook Salmon: Chinook salmon, including winter-run, spring-run, fall-run, and late fall-run races, inhabit the upper Sacramento River (Vogel and Marine 1991), and occur seasonally in the vicinity of the Tisdale Pumping Plant. In addition, NOAA Fisheries has identified and designated the Sacramento River as critical habitat for winter-run Chinook salmon. NOAA Fisheries is currently reviewing the status of both spring-run Chinook salmon and Central Valley steelhead and may designate areas of the Sacramento River as critical habitat for these species. The Sacramento River, including the area adjacent to the Tisdale Pumping Plant, has also been identified as Essential Fish Habitat (EFH) for Pacific salmon.

Adult Chinook salmon migrate from the Pacific Ocean upstream within the Sacramento

River to spawning areas. The river reach adjacent to the Tisdale Pumping Plant site serves as a migratory corridor for adult upstream migration. The timing of adult upstream migration for each of the four races typically occurs during the winter, spring, fall, and late-fall (the seasonal timing of adult upstream migration corresponds with the designation for each of the four races of Chinook salmon). The most abundant of the four races are fall-run Chinook salmon. The general seasonal timing of migration and spawning by each of the races is shown in Figure 7 based on observations of fish passage upstream at the Red Bluff Diversion Dam and other fishery monitoring within the Sacramento River (Vogel and Marine 1991). Spawning by adult Chinook salmon has not been observed or documented in the area of the proposed project. Adult salmon migrate upstream past the project site, with subsequent migration past the Tisdale Pumping Plant diversion by juvenile salmon during their emigration from the Sacramento River to the Pacific Ocean.

Results of fishery sampling at the RD 108 Wilkins Slough diversion over the period from 1993 through 1996 provides useful information on the seasonal distribution and length frequencies of juvenile Chinook salmon in the vicinity of the Tisdale Pumping Plant project site. Results of these surveys are consistent in showing that juvenile Chinook salmon are present in greatest abundance during the spring (April - June) and during the winter (November - January). Although not included in the RD108 monitoring period, juvenile Chinook salmon also migrate downstream in the Sacramento River during the late winter (February-March). Results of monitoring at the Wilkins Slough diversion show a seasonal distribution pattern for juvenile Chinook salmon which is consistent with that observed in the CDFandG monitoring at Knights Landing and USFWS monitoring at Sacramento.

Size criteria have been established for the Sacramento River in an effort to differentiate the four races of salmon inhabiting the river (i.e. winter-run, spring-run, fall-run, and late-fall-run Chinook salmon). Although the majority of juvenile salmon collected in the RD 108 Wilkins Slough fishery monitoring were classified as fall-run, juveniles of other salmon races were also collected. Winter-run sized salmon were predominantly collected during winter sampling (November - January). Juvenile fall-run Chinook salmon, and other races, were collected predominantly during the spring (April - mid-June).

Juvenile Chinook salmon emigrating downstream past the Tisdale Pumping Plant site typically range in length from approximately 27 to 150 mm. Length frequencies typically reflect three juvenile lifestages including fry (approximately 30 - 50 mm), smolts (approximately 60 - 90 mm), and yearlings (up to 150 mm). The largest numbers of juvenile salmon collected in the area have been in the smolt-size class which may reflect in part, an artifact of the seasonality in sampling effort. Fishery sampling was not conducted as part of the RD 108 Wilkins Slough studies (Demko *et al.* 1994; Hanson 1996; Hanson and Bemis 1997) during the late winter or early spring (e.g., mid-January - March) when salmon fry would be expected to by most abundant in the river.

Steelhead: Steelhead inhabit the upper Sacramento River and occur seasonally in the vicinity of the Tisdale Pumping Plant. Adult steelhead typically migrate upstream within the Sacramento River during the winter (November - March) to spawning areas upstream of the Tisdale Pumping Plant diversion. A portion of the adult steelhead survive spawning and

subsequently migrate back downstream. Spawning by adult steelhead has not been observed or documented in the area of the proposed project.

Juvenile steelhead typically rear in areas upstream within the Sacramento River and tributaries. Juvenile steelhead were not collected in large numbers as part of fishery monitoring conducted at the RD 108 Wilkins Slough diversion (Demko *et al.* 1994; Hanson 1996; Hanson and Bemis 1997). No juvenile steelhead were collected in sampling between April 17 and September 18, 1993 (Demko *et al.* 1994). No juvenile steelhead were collected during sampling at Wilkins Slough in 1995 (Hanson 1996). A total of five steelhead were collected in 1996 (Hanson and Bemis 1997). Steelhead were collected during the spring (May) as yearlings ranging in size from 192 to 269 mm. The low numbers of steelhead collected in Wilkins Slough fishery monitoring may reflect, in part, the absence of sampling during the late winter - early spring (mid-January - March) when many of the steelhead smolts migrate downstream.

Delta and Longfin Smelt: Delta and longfin smelt inhabit the lower reaches of the Sacramento River (typically downstream of the City of Sacramento). Neither Delta smelt nor longfin smelt were collected during the four years of fishery investigations at the Wilkins Slough Pumping Plant (Demko *et al.* 1994; Hanson 1996; Hanson and Bemis 1997). Based on the location of the proposed Tisdale Pumping Plant project with respect to the geographic distribution for both Delta and longfin smelt, construction of the proposed fish screen would not adversely impact these species or their habitat.

Sturgeon: Both adult and juvenile sturgeon inhabit the Sacramento River in the vicinity of the Tisdale Pumping Plant. Adult sturgeon have been harvested by recreational anglers in the project area. Sturgeon typically inhabit relatively high velocity riverene habitat which, under natural conditions, is characterized by seasonally high turbidity. Although juvenile sturgeon were infrequently collected in fishery samples from the area, they are expected to be vulnerable to entrainment at the existing unscreened Tisdale Pumping Plant diversion.

Sturgeon were collected infrequently in fishery sampling at the Wilkins Slough diversion facility. During sampling in 1993 and 1995 no juvenile sturgeon were observed in fishery collections (Demko *et al.* 1994; Hanson 1996). During 1996, a total of two juvenile sturgeon were collected in fyke net samples at the RD 108 Wilkins Slough diversion. The sturgeon were collected during May and ranged in length from 29 to 30 mm. No larger juveniles, sub-adult, or adult sturgeon were collected. No sturgeon were collected in sampling during the August - December 1996 period. The low number of juvenile sturgeon collected as part of fishery monitoring suggests that the Sacramento River in the vicinity of the Wilkins Slough and Tisdale Pumping Plants does not serve as a major juvenile sturgeon rearing area.

Lamprey: Lamprey are present in the upper Sacramento River in the vicinity of the Tisdale Pumping Plant. Lamprey, both adult and amniocite stages, were collected in fishery samples at the RD 108 Wilkins Slough diversion.

Lamprey were collected in fishery sampling at the RD 108 Wilkins Slough diversion throughout the year in 1995 and 1996 (Hanson 1996; Hanson and Bemis 1997). Lamprey

were also present throughout the spring and summer sampling period (April 17 - September 18) in 1993 (Demko *et al.* 1994). Amniocite stage lamprey (typically ranging in length from 40 to 120 mm) were most abundant in collections during the spring, while adult stages were collected throughout the year. Adult lamprey typically ranged in length from approximately 130 to 625 mm.

Lamprey, particularly the juvenile lifestages, were not quantitatively sampled by the fyke nets used in the RD 108 fishery monitoring program. Many of the juvenile lamprey were observed passing through the fyke net mesh and hence information regarding the seasonal distribution and length frequency of the lamprey at the site is considered qualitative.

Hardhead: Juvenile and adult hardhead are present in the Sacramento River in the vicinity of the Tisdale Pumping Plant diversion. Hardhead were collected in fishery samples at the RD 108 Wilkins Slough diversion, and hence are expected to be susceptible to entrainment at the unscreened Tisdale Pumping Plant diversion.

Hardhead were collected infrequently during the fishery monitoring in 1993, 1995 and 1996 (four in 1993, 15 in 1995, and one in 1996). An insufficient number of hardhead were collected to provide detailed information on either the seasonal distribution or length frequency of fish in the area. Hardhead were collected in low numbers during the spring and late fall and winter.

California Roach: Juvenile and adult California Roach are present in the Sacramento River in the vicinity of the Tisdale Pumping Plant. Roach were collected in fishery samples at RD 108 Wilkins Slough diversion, and hence are expected to be susceptible to entrainment at the unscreened Tisdale Pumping Plant diversion.

California roach were collected infrequently in fishery sampling at the RD 108 Wilkins Slough Diversion. A total of 97 roach were collected in 1993, four in 1995, and 12 in 1996. As a result of low numbers collected, information regarding the seasonal and length distribution of roach inhabiting the area is considered qualitative. Roach were collected sporadically throughout the spring - summer 1993 sampling period (Demko *et al.* 1994). Roach were collected during the spring and early winter at lengths ranging from 38 to 76 mm based on fishery collections during 1995 and 1996 (Hanson 1996; Hanson and Bemis 1997). The low numbers of roach collected indicated that the Sacramento River in the vicinity of the RD 108 Wilkins Slough and Tisdale Pumping Plant diversions is not a significant juvenile rearing area.

Criteria for Determining Impact Significance. Impacts on vegetation, wildlife, and fishery resources are considered significant if they would result in the following:

Vegetation and Wildlife

- Direct mortality or the permanent loss of existing or potential habitat for species which are Federally or State listed, or proposed for listing, as threatened or endangered;

- Loss or disturbance of substantial portions of local populations of candidate species or Species of Special Concern;

- Adverse effects on a substantial portion of a vegetation-type (including sensitive natural communities) in a local region;

- Temporary loss of habitat that may result in increased mortality or lower reproductive success of special-status wildlife species; or

- Avoidance by wildlife of biologically-important habitat for substantial periods with risk of increased mortality or lowered reproductive success.

Fish

- Directly or indirectly reduce the growth, survival, or reproductive success of individuals of species listed, or proposed for listing, as threatened or endangered under the State or federal Endangered Species Acts;

- Directly or indirectly reduce the growth, survival, or reproductive success of substantial portions of candidate species populations, or Species of Special Concern, or regionally important commercial or game species; or

- Substantially reduce the quality and quantity of important habitat for fish species or their prey.

Discussion of Environmental Consequences. Potential impacts associated with construction and operation of the Tisdale Pumping Plant Positive Barrier Fish Screen on plants, wildlife, and fish have been evaluated. The evaluation was based on consideration of (1) construction activities and the area anticipated to be disturbed, (2) habitat conditions currently existing in the project area, and (3) known or presumed occurrence of plant, wildlife, and fish species in the area. In preparing the Environmental Assessment/Initial Study, background information on special-status species was obtained from a search of the California Department of Fish and Game's Natural Diversity Data Base (NDDB) in combination with the U.S. Fish and Wildlife Service and California Native Plant Society's Inventory. A list of State and federal protected species and special-status species known to occur in the Grimes/Colusa area was compiled and reviewed prior to conducting the field survey. Habitat requirements and the closest known locations of special-status plant and animal species were also reviewed prior to the site survey.

Information used in developing this Environmental Assessment/Initial Study includes basic habitat characteristics in the vicinity of the Tisdale Pumping Plant site which would be disturbed by construction activity associated with the installation of the positive barrier fish screen (Figure 3). Photographs of the site depicting current habitat conditions are shown in Figure 4. Additional information, complementing the database searches, was obtained during a site visits and field surveys conducted by Miriam Green for use in the Sutter Mutual Water Company fish screen feasibility study and this environmental analysis. This survey included

consideration of plant and wildlife species, and their potential occurrence based on habitat conditions in the area impacted by positive barrier fish screen construction activity. Fishery studies conducted at the RD108 Wilkins Slough Pumping Plant, located within 0.5 miles of the Tisdale Pumping Plant (Demko *et al.* 1994, Hanson 1996, Hanson and Bemis 1997) were also reviewed in addition to information collected from the Sacramento River by the U.S. Fish and Wildlife Service and California Department of Fish and Game. Results of these studies provide the necessary basis for evaluating adverse impacts of the proposed project on fishery resources.

Environmental Consequences - Plants and Wildlife

The proposed project would involve dredging, site preparation, and construction of a positive barrier fish screen (Section 3). In addition, a sheet pile wall would extend from both ends of the fish screen structure to join with the existing leveed bank (Figure 3). No trees would be removed to implement the project. Ruderal vegetation, mostly grasses, would be removed from the levee to facilitate construction. This loss is considered temporary and less-than-significant since vegetation along the river's edge in this location is of marginal quality (Figure 4), fast-growing, and expected to recolonize the disturbed areas following construction activities.

Construction activities could disturb nesting Swainson's hawks if such activities occur during the nesting season, typically late March through early August. If there is an active Swainson's hawk nest within the riparian corridor, human activities, especially early in the nesting cycle, could result in nest abandonment. No nesting trees would be removed by the proposed project. The project would not disturb or impact the existing riparian vegetation located along the main canal. The project site has historically, and is currently, subject to vehicular movement, heavy equipment, and crane operations. Potential impacts to Swainson’s hawk nesting would be addressed through implementation of project mitigation actions presented in Section 3.7.

Project construction may also result in temporary disturbance to cliff swallows, which nest under the pumps and other structures (e.g., bridges) in the area, or other birds which nest in the mature trees in the area. These are considered temporary and less-than-significant impacts.

Environmental Consequences - Fish

Based upon a review of habitat characteristics and results of fishery collections, it is concluded that a number of listed and special status fish species, in addition to warmwater and game species, occur seasonally or inhabit the Sacramento River in the vicinity of the Tisdale Pumping Plant Positive Barrier Fish Screen project site. Many of these species occur in the area, both as adult and juvenile lifestages. Species expected to occur in the area of the proposed project include the following:

- Chinook salmon - winter-run, spring-run, fall-run, and late fall-run;
- Steelhead;
- Sturgeon;
- Lamprey;
- Hardhead;
- California Roach

- Warmwater and game species

The potential environmental consequences of the proposed Tisdale Positive Barrier Fish Screen construction, operations, and maintenance are expected to be similar for each of these species, and hence they are discussed collectively below.

Construction and operation of the positive barrier fish screen at the Tisdale Pumping Plant would not result in a significant adverse impact to the long-term quality or availability of habitat for special status species. The fish screen would be constructed in the immediate vicinity of the existing Tisdale intake forebay (Figure 3). Although various fish species are present in the area, the habitat within the Sacramento River at the Tisdale Pumping Plant is not unique and is characterized by riprap-stabilized levees, a relatively deep, high velocity channel, and silt and sand substrate. The area is not used as spawning habitat by either Chinook salmon or steelhead.

Construction of the fish screen would exclude fish from the existing forebay and an area approximately 279 feet long along the Sacramento River levee (Figure 3). Exclusion of fish from the area is not considered to be a significant impact to spawning habitat. Although fish would be excluded by the positive barrier screen from the intake forebay area, this is considered a less than significant adverse impact to habitat availability.

Instream flows have been identified as a significant factor influencing the survival and habitat quality for Chinook salmon and other fish inhabiting the Sacramento River. The proposed Tisdale Pumping Plant Positive Barrier Fish Screen project would not result in an increase in water diversions from the Sacramento River, nor a reduction in instream flows compared to those that occurred prior to the project. The proposed fish screen project would not result in a change in the seasonal distribution of diversion operations. Installation of the positive barrier fish screen would increase the flexibility and reliability of operations by the Sutter Mutual Water Company. Operation of the positive barrier fish screen would not change instream flows within the Sacramento River, or adversely impact fishery habitat.

Construction activities including dredging and site preparation, and installation and removal of the cofferdams, would result in increased short-term, localized turbidity and suspended sediment concentrations within the Sacramento River. Construction activity would result in increased exposure of various lifestages and species of fish to temporary increases in turbidity. Observations during similar construction and dredging activities associated with the installation of cofferdams and construction of the RD 108 Wilkins Slough Pumping Plant fish screen suggest that increases in turbidity and suspended sediments would occur in a very small area. Increased turbidity and suspended sediment concentrations associated with construction activity have the potential to contribute to short-term, localized impacts to listed and species of special concern.

Although increases in turbidity associated with dredging, and installation and removal of the cofferdams has been identified as a potential impact to species of special concern, the magnitude of this impact is likely to be very small. Based on bathymetry measurements, it is estimated that approximately 300 cubic yards of sediment would need to be dredged from the

Sacramento River as part of site preparation. An additional 4,700 cubic yards of sediment would be dredged from the intake forebay. Dredging within the Sacramento River and forebay, is expected to be completed within a period of approximately 30 days. Installation of the sheet pile cofferdam is also anticipated to take approximately 60 days. Additional dredging and site preparation within the existing intake forebay would also occur, but would have negligible impact on turbidity or suspended sediment concentrations within the Sacramento River based upon observations of similar dredging activity performed in association with routine maintenance dredging activities. Based upon the relatively small volume of material to be removed from the Sacramento River by dredging, and the limited period of time when dredging within the Sacramento River is expected to occur, potential impacts on habitat and fishery populations inhabiting the river are expected to be of short-duration and limited to the localized area in the immediate vicinity of the positive barrier fish screen construction activity.

During the period when the positive barrier fish screen is being constructed, Sutter Mutual Water Company would be required to divert water at the Tisdale Pumping Plant to meet demands within the service area. As discussed in Section 3, two alternative strategies have been identified that would allow simultaneous construction of the fish screen and diversion operations. One strategy involves installation of a cofferdam across approximately 60% of the forebay area, which would allow diversion operations to continue through the 40% of the intake area that would remain unobstructed. The second strategy involves the installation of large-diameter pipes that would allow water to pass through a cofferdam that completely enclosed the forebay. Under either of these construction alternatives, the cross-sectional area through which water would be diverted at Tisdale would be reduced, resulting in a corresponding increase in water velocities entering the forebay. The increase in water velocities during the period of fish screen construction would be expected to increase the susceptibility of juvenile fish to entrainment losses. Juvenile Chinook salmon and other fish within the area of the project would be susceptible to increased entrainment losses. The magnitude of these losses, however, cannot be quantified given currently available data.

No engineering specifications have been developed for how the contractor would provide water to meet service area demands during the period of fish screen construction. During bidding for the construction contract, contractors would be asked to develop innovative methods for meeting seasonal irrigation demands during facility construction (Section 3). No cost-effective practical method has been identified during the feasibility study for fish protection as a result of increased vulnerability to entrainment losses during fish screen construction (P. Rude personal communication). The period of increased entrainment susceptibility as a result of reduced cross sectional area of the intake forebay during construction is anticipated to be approximately 21 months.

A number of fish species spawn in the Sacramento River in the area of the proposed project. For those species spawning in the area which have planktonic eggs and larvae (e.g., striped bass), these early lifestages are susceptible to entrainment at the Tisdale Pumping Plant. Because of the small size of these eggs and larvae, they would not be effectively excluded by the positive barrier screen. The impact of water diversion operations on entrainment of fish eggs and larvae would be the same or less for the proposed project, and no-project

alternative.

Installation and operation of the positive barrier fish screen would contribute to a direct reduction in the number of juvenile, sub-adult, and adult fish entrained at the Tisdale Pumping Plant diversion. The positive barrier fish screen would not completely exclude fish eggs and larvae, however entrainment losses for these early planktonic lifestages are expected to remain the same as current conditions at the unscreened diversion. The unscreened diversion has historically operated during the spring, summer, fall, and early winter coincident with the period when many of the fish species are present in the area and susceptible to entrainment losses. Eliminating diversion losses of juvenile and older lifestages would result in a significant positive environmental benefit.

Proposed Project

The item numbers in this section correspond to the item numbers in the environmental checklist above.

Vegetation and Wildlife

a. The proposed project would comply with environmental laws and State and federal permit requirements. The project area is currently a disturbed habitat (Figures 2 and 4), approximately 7.5 acres in size. The current habitat is not unique. No riparian vegetation or mature trees would be removed or disturbed as a result of the proposed project. A Biological Assessment has been prepared for the proposed project to evaluate potential impacts on plant, wildlife, and fishery populations, as a result of both short-term construction activities and long-term operation of the positive barrier fish screen. The Biological Assessment concluded that the proposed project would not result in significant adverse impacts to threatened, endangered, or candidate species of plants and wildlife, with the possible exception of Swainson's hawk nesting adjacent to the project area. The Biological Assessment concluded that short-term, localized increases in turbidity and suspended sediment concentrations within the Sacramento River would occur during dredging and site preparation, and installation of cofferdams and fish screen components. The Biological Assessment concluded that the overall biological benefits resulting from reductions in entrainment mortality for juvenile winter-run and spring-run Chinook salmon, steelhead, and other fish species, would mitigate for any short-term impacts attributable to construction activity. The U.S. Fish and Wildlife Service and NOAA Fisheries will be asked to concur with Reclamation that the proposed action is not likely to adversely affect the Federally-listed species identified in the project area and that short-term construction-related impacts to listed fish species would be more than offset by the long-term benefits to the fish. CDFandG will also be asked to review the proposed project for compliance with the California ESA. Permit conditions would be issued by both State and federal resource agencies, outlining the terms and conditions for construction activity. The contractor would be required to comply with all

permit conditions and applicable laws and regulations. As a result of the small area affected by construction, the disturbed characteristics of the existing habitat, and compliance with existing permits, laws, and regulations, the project would not have any significant long-term effects on vegetation or wildlife.

b. The proposed project would not directly harm sensitive species or cause a significant loss of available habitat. Results of field surveys, and an assessment of habitat conditions for selected plant and wildlife species, are discussed above.

c. The proposed project would not interfere with the movement of resident or migratory species. The proposed positive barrier fish screen would not disrupt a migratory corridor. Hence, the project would have no impact on fish or wildlife movement in the area.

d. The project would not cause any fish or wildlife population to drop below self-sustaining levels. The area affected by project construction is approximately 7.5 acres in size. The existing habitat is highly disturbed, and does not provide unique habitat in the area. The purpose of the project is, in part, to reduce entrainment mortality for juvenile winter-run and spring-run Chinook salmon, steelhead and other fish species which would result directly in a positive environmental benefit for these populations. As a result, it is concluded that the project would have no impact on the ability of any species to support self-sustaining populations.

e. The project would not result in a loss of riparian vegetation, wetlands, marshes, or other sensitive habitats. No mature trees or riparian vegetation would be removed as a result of the project. Existing vegetation in the area is primarily grasses (Figure 4). The area affected by project construction is not a sensitive habitat. At completion of project construction, the area would be re-vegetated as part of the erosion control plan, and existing mature trees would be protected from disturbance and damage. As a result, impacts to existing habitats are considered less than significant.

f. The proposed project would not result in the loss of any "specimen tree" or tree with historic value. Mature trees within the area would be protected from damage during construction. No mature trees would be removed as a result of the proposed project, and hence no impacts are expected.

Fish

a. A variety of resident and migratory fish species inhabit the Sacramento River in the vicinity of the proposed project (Table 1). These species would be susceptible to short-term, localized exposure to increased turbidity and suspended sediment concentrations resulting from dredging, site preparation, and installation of cofferdams. These species would also be subjected to short-

term increased risk of entrainment at the Tisdale Pumping Plant during the period of intake construction. These potential impacts were considered less-than-significant.

b. The proposed project would not result in a long-term decline in Chinook salmon orsteelhead growth rates, survival, or reproductive success. The project site is not used by Chinook salmon or steelhead for spawning. The purpose of the positive barrier fish screen is, in part, to reduce entrainment mortality on Chinook salmon, steelhead, and other resident and migratory fish. The project would have a long-term environmental benefit by improving juvenile survival and reducing the risk of entrainment losses. The long-term benefit of improved survival rates for a wide range of fish species would compensate and mitigate for any short-term impacts resulting from construction of the fish screen. The project would not result in long-term declines in Chinook salmon, steelhead, or other species, and therefore is considered to have no impact on these populations.

c. The project would exclude warmwater fish species from the Tisdale forebay and distribution canals. The intake forebay does not represent a unique habitat for warmwater fish spawning, but may potentially be used by some species. The forebay area is small, characterized as poor fish habitat, and therefore exclusion from this area is considered a less-than-significant impact.

Mitigation Measures

Vegetation and Wildlife

Avoidance and Mitigation Measure: If construction is scheduled during the Swainson's hawk nesting season a qualified biologist would survey the immediate area for adult hawks and potential or active nest sites prior to the onset of construction. If Swainson's hawk nests are found, the biologist would coordinate with CDFandG regarding appropriate construction activities.

Responsible Party: Sutter Mutual Water Company would insure that the site is surveyed for Swainson's hawk nests by a qualified wildlife biologist.

Timing: One raptor survey should be conducted between mid-April to mid-May.

Monitoring Program: Monitoring would be performed in accordance with guidelines in "Staff Report Regarding Impacts to Swainson's hawks *(Buteo swainsoni)* in the Central Valley of California".

Standards for Success: In the event that active Swainson's hawk nests are found within ¼ mile of the proposed project, the wildlife biologist would consult with CDFandG to determine if the potential for nest abandonment exists. If an adequate buffer is present between the nest and the proposed project, then no mitigation is

required. If the wildlife biologist and CDFandG determine that the potential for nest abandonment exists, short-term modifications to construction activities may be required by CDFandG until young are in the nest.

Avoidance and Mitigation Measure: To protect mature riparian trees and elderberries, temporary fencing would be erected around the outer edge of the driplines to ensure that this area remains off-limits to heavy equipment, supplies, and vehicles, and is not used as a stockpile area. This mitigation measure would prevent compaction of the soil around the trees or shrubs.

Responsible Party: The contractor would be responsible for marking exclusion areas around mature trees and elderberry shrubs. The contractor and Sutter Mutual Water Company would insure that these areas are off limits to heavy equipment.

Timing: Exclusion areas around mature trees and elderberry shrubs would be identified prior to initiation of construction and grading.

Monitoring Program: Sutter Mutual Water Company would periodically monitor the area to insure that exclusion areas are maintained.

Standards for Success: Mature trees and elderberry shrubs would not be disturbed during project construction activities.

Avoidance and Mitigation Measures: Standard measures to minimize death, injury, or displacement of any giant garter snakes that may be present in the project area should be observed prior to placement of material in the stockpile locations. Measures to reduce potential impacts to giant garter snakes are summarized from USFWS (1997) and should include, but not be limited to, the following:

- All work within potential giant garter snake habitat, including activities within aquatic habitat and activities within 200 feet of supporting upland habitat, should occur between May 1 and October 1 of any year, which coincides with the active season of this snake, with exceptions made to extend this window during periods of warm or temperate conditions, subject to the discretion of regulatory agencies;

- Any dewatered habitat should remain dry for at least 15 consecutive days after April 15 and prior to excavating or filling of dewatered habitat;

- Construction and maintenance personnel will participate in a USFWS-approved worker environmental awareness training program. Under the guidelines of this program, workers shall be informed about the presence of giant garter snakes and habitat associated with the species and that unlawful take of the animal or destruction of its habitat is a violation of the Endangered Species Act. Prior to construction activities, a qualified biologist approved by the USFWS shall instruct construction personnel about: 1) the life history of the giant garter snake; 2) the importance of irrigation canals, marshes/wetlands, and seasonally flooded areas, such as rice fields, to the species; and

3) the terms and conditions of the biological opinion. Colored photographs of the giant garter snake will be handed out during the training session for posting on the job site. Proof of this instruction shall be submitted to the USFWS;

- Within 24 hours prior to the commencement of construction activities in giant garter snake habitat, a qualified biologist shall undertake a pre-construction survey. The biologist will maintain a field report documenting the monitoring efforts and submit a copy to the USFWS;

- The monitoring biologist will be available thereafter on an on-call basis. If a snake is encountered during construction activities, the biologist will have the authority to halt work until appropriate corrective measures have been implemented or it is determined that the snake will not be harmed. Giant garter snakes encountered during construction activities will be allowed to move away from construction activities on their own. Capture and relocation of trapped or injured individuals can only be attempted by personnel or individuals with current USFWS recovery permits pursuant to Section 10(a)1(A) of the federal Endangered Species Act;

- Clearing of wetland vegetation will be confined to the minimal area necessary for fish screen construction and fill placement;

- Movement of heavy equipment to and from the project site shall be restricted to established roadways to minimize habitat disturbance; and

- Any erosion control matting will not include monofilament or plastic. Rather, the matting will be comprised of jute, straw, coconut matting, or other natural fibers.

Responsible Party: Sutter Mutual Water Company would be responsible for insuring that the giant garter snake mitigation is conducted under the supervision of a qualified wildlife biologist.

Timing: Biological surveys would be performed prior to placing dredged material at the stockpile site and on an as needed basis throughout the project construction in the event that a giant garter snake is observed in an area where construction is, or will, occur

Monitoring Program: Monitoring will be performed by a qualified wildlife biologist in accordance with established protocols and survey procedures.

Standards for Success: In the event that a giant garter snake is found at the construction or stockpile site work in the immediate area will be stopped, USFWS and USBR will be notified, and a biologist with a current USFWS recovery permit for giant garter snakes can capture and relocate the snake to a suitable habitat.

Fish

Potential adverse impacts are associated with construction activity, and the short-term, localized increase in turbidity and suspended sediments. Mitigation measures were initially evaluated for these construction activities including: (1) limiting construction activity that results in increased turbidity to the period from May 15 to September 15 to avoid potential adverse impacts on winter-run salmon, (2) use of a silt curtain to limit the aerial extent of increased turbidity during dredging and construction activity, and (3) operation of the Tisdale Pumping Plant during dredging and construction to entrain suspended sediments into the diversion facility, thereby reducing the potential for adverse impacts within the Sacramento River. Each of these three alternative mitigation measures is briefly discussed below.

Limiting construction to the period from May 15 to September 15 has been identified as a method for minimizing and avoiding potentially adverse impacts associated with dredging activity and construction on winter-run Chinook salmon and other sensitive fish species. Depending on the timing of funding, completion of environmental documentation and permitting, construction of the positive barrier screen, including dredging and site preparation, and installation of the cofferdams, may not occur during the May 15-September 15 construction window. One of the primary objectives of the project has been installation of the positive barrier fish screen as soon as possible to avoid future losses of juvenile winter-run salmon and other fish species as a result of entrainment at the unscreened Tisdale Pumping Plant diversion. Implementing additional constraints on the time period when construction activity and installation of the positive barrier fish screen can occur, has a high likelihood of delaying completion of fish screen installation. Given the desire to complete screen installation as soon as possible, constraints on construction activities should be avoided. State and federal resource agencies have been asked to approve a variance to allow construction resulting in increased turbidity and suspended sediment beyond the designated winter-run Chinook salmon construction window.

A silt curtain was used during installation of the RD108 Wilkins Slough Pumping Plant Positive Barrier Fish Screen. The silt curtain did not operate consistently, and appeared to be ineffective in reducing turbidity and suspended sediment concentrations in the area where dredging and construction activity was occurring. High velocities in the Sacramento River make operation of the silt curtain largely ineffective. Use of a silt curtain is not considered to be an effective method for avoiding increased turbidity resulting from dredging and construction activity in the Sacramento River at the Tisdale site.

Operation of the Tisdale Pumping Plant during dredging reduces the potential for increased turbidity and suspended sediment concentrations within the Sacramento River. As dredging or installation of sheet piling occurs, suspended sediments are largely entrained into the water diverted into the service area distribution canals, thereby reducing potential adverse impacts within the Sacramento River. The ability of the Tisdale Pumping Plant to divert water in association with dredging or construction activity varies seasonally in response to variation in demand within the service area. To the extent possible, the Tisdale Pumping Plant should be in operation during the period of dredging within the Sacramento River and intake forebay, and installation of the cofferdams.

Installation of the fish screen at the Tisdale Pumping Plant would exclude juvenile and adult fish from the intake forebay (Figure 3). The intake forebay and area within the Sacramento River that would be affected by the positive barrier fish screen currently provides fishery habitat. Habitat characteristics, including sand and mud substrate, riprapped levees, high current velocities, and relatively deep water (typically 10 or more feet deep), do not provide suitable habitat conditions for spawning by Chinook salmon, steelhead, and other fish species. The aquatic habitat is currently disturbed and is not considered to be unique (Figures 2 and 4). Exclusion of fish from the area of the fish screen (Figure 3) is considered a less than significant impact. Any impact resulting from exclusion to this area would be fully mitigated by the long-term benefits associated with reduced entrainment losses resulting from the proposed project. No additional aquatic habitat mitigation would be required.

Increased water velocities passing through or around the cofferdams during the period when the positive barrier fish screen is being constructed would contribute to an increased risk of entrainment losses for both resident and migratory fish species. Short-term increases in fish losses resulting from entrainment at the Tisdale Pumping Plant would be mitigated to less than significant levels through the long-term environmental benefit resulting from operation of the fish screen, and the consequent reduction in long-term entrainment losses.

Potential fishery impacts resulting from short-term increased exposure to turbidity and suspended sediments during dredging and fish screen construction, and the short-term increased risk of fish entrainment associated with increased water velocities during construction, would be mitigated to less than significant levels through the increased protection and significantly reduced long-term fish entrainment losses associated with the positive barrier fish screen. Expediting project construction would enhance the protection and benefits provided by the fish screen, and would mitigate to less than significant levels, all individual and cumulative impacts resulting from fish screen construction activities and long-term operations and maintenance.

Avoidance and Mitigation Measure: The diversion pumps would be operated to the extent possible during construction activity. Implementation of these mitigation measures would include:

> ***Responsible Party:*** Sutter Mutual Water Company would insure that diversion pumps are operated, to the extent possible, during the period of dredging and construction activity within the Sacramento River and forebay. Sutter Mutual Water Company would also be responsible for insuring long-term reliable operations and maintenance of the positive barrier fish screen.
>
> ***Timing:*** Operation of the diversion pumps would occur, to the extent possible, during periods when dredging and construction would contribute to increased turbidity levels within the mainstem Sacramento River and forebay. Long-term operations and maintenance of the positive barrier screen would be required for the life of the project.
>
> ***Monitoring Program:*** Sutter Mutual Water Company would monitor periods of

construction activity and would coordinate with the contractors to identify periods when increases in mainstem river turbidity may occur. Sutter Mutual would operate diversion pumps when possible during the construction period to reduce project-related turbidity in the mainstem river. Long-term monitoring of operation and maintenance of the positive barrier screen would include approach velocity measurements immediately after initiation of the positive barrier screen operations, with fine-tuning of velocity control baffles as necessary, to achieve uniformity of velocities in conformance with the CDFandG and NOAA Fisheries criteria (0.33 ft/sec). Sutter Mutual would also monitor the condition of the positive barrier screen on an annual basis, and would do periodic visual inspections to remove accumulated debris and repair screen panels as necessary. CDFandG and NOAA Fisheries would have access to the positive barrier screen for underwater inspections following completion of intake screen construction.

Standards for Success: The standards for success would be long-term reliable operation of the fish screen, and conformance with intake screen design criteria (Table 2).

Avoidance and Mitigation Measure: Installation of cofferdams and dewatering a portion of the Tisdale intake forebay during fish screen construction may result in stranding and the loss of protected fish and other species. A fish rescue and recovery effort would be implemented to collect fish from the area behind the cofferdam to be dewatered and return those fish to suitable habitat within the Sacramento River. Implementation of this mitigation measure would include:

Responsible Party: Sutter Mutual Water Company would insure that a qualified fishery biologist design and conduct a fish rescue and relocation effort as part of dewatering the area behind the cofferdam. Fish collected from the area to be dewatered would be returned to suitable habitat within the Sacramento River.

Timing: The fish rescue operation would occur as the area behind the cofferdam is being dewatered.

Monitoring Program: Sutter Mutual Water Company would monitor progress of installation of the cofferdam and the schedule for dewatering. Sutter Mutual Water Company would coordinate the dewatering schedule with the construction contractor and fishery biologist to allow for the rescue to occur when water depths are approximately 2 feet. Information on the species and sizes of fish collected in the rescue and estimates of survival immediately before release would be recorded.

Standards for Success: The standards for success would be the effective capture and removal of fish from the forebay area to be dewatered with a minimum of capture and handling mortality for those fish returned to the Sacramento River.

No-Project Alternative. Implementation of the no-project alternative would avoid the minor impacts and temporary disturbance to the existing habitat adjacent to the Tisdale

Pumping Plant forebay. The no-project alternative would also avoid short-term localized increases in turbidity and suspended sediment concentrations that may affect fish species inhabiting the Sacramento River in the immediate vicinity of the proposed project. The no-project alternative would also avoid excluding fish from the existing Tisdale forebay. Implementation of the no-project alternative would, however, result in a continuation of entrainment and mortality of winter-run and spring-run Chinook salmon, steelhead, and other resident and migratory fish as a result of operation of the unscreened diversion. Fishery impacts of the no-project alternative would be greater than with the proposed project. The environmental benefits resulting from reductions in entrainment mortality on fishery populations inhabiting the Sacramento River would not be realized with the no-project alternative.

Cultural and Historical Resources

	No Impact	Less-than-Significant Impact	Significant Impact unless Mitigated	No Mitigation Identified EIR
Cultural and Historical Resources				
a. Would the project conflict with the cultural and historic protection measures established by federal, state, or local regulatory programs?	X			
b. Would the project cause the physical disturbance of, or prevent future access to, a prehistoric, historic, or cultural site that is listed or eligible for listing on the National Register of Historic Places, the California Register of Historic Resources that has been adopted by resolution or ordinance of a local government?	X			
c. Would the project cause the physical disturbance of, or prevent future access to, a structure, parcel, or other feature of historic or cultural significance to a community, ethnic, or social group?	X			
d. Would the project cause the physical disturbance of, or prevent future access to, a unique paleontological site?	X			
e. Would the project cause the disturbance of any human remains?	X			

Affected Environment

Prehistory. At Euroamerican contact the Native Americans that lived in the area spoke a River Patwin dialect (Johnson 1978). Native American archaeological sites in the region including the proposed project area tend to be on alluvial fans adjacent to the Sacramento River. The project area contains terraces adjacent to the Sacramento River. Given the environmental setting of the project area there is a potential for Native American sites.

However, given the disturbed nature of the project area (previous dredging and levy construction: Figure 4) there is a low possibility of identifying Native American and/or historic cultural resources at the proposed project site.

Criteria for Determining Impact Significance. Cultural and historical resources, archeological sites, structures or objects listed in, or eligible for listing in, the National Register of Historic Places (NRHP) are subject to the following effects:

- Physical destruction or alteration of all or part of the property;
- Isolation of the property from, or alteration of, the property setting when that character contributes to the property's qualifications for the NRHP;
- Introduction of visual, audible, or atmospheric elements that are out of character with the property or setting;
- Neglect of a property resulting in its deterioration or destruction; and
- Transfer, lease, or sale of the property.

Discussion of Environmental Consequences. The item numbers in this section correspond to the item numbers of the checklist above.

Proposed Project

A cultural resources inventory of the proposed project area was conducted (Appendix A). No significant cultural or historic resources were identified within the area affected by the proposed project.

a. The proposed project would not conflict with the cultural and historic protection measures established by federal, state, or local regulatory programs because issuance of state and federal funding and permits would be dependent upon compliance of the National Historic Preservation Act.

b. Review of historic literature and maps for the proposed project site gave no indication of prehistoric, historic, or cultural resources that would be impacted by the proposed project, which are eligible for listing on the NRHP, California Register of Historic Resources, or local entities. Therefore, it was concluded that the project would not adversely impact or prevent future access to cultural or historical resources.

c. No features of historic or cultural significance have been identified at the proposed project site. The project, therefore, would not result in impacts to either cultural or historic resources.

d. No paleontological resources have been identified in the proposed project area.

e. No human remains have been identified in the proposed project area. If buried cultural resources, either prehistoric (i.e. chert or obsidian flakes; projectile points; mortars and pestles; and dark friable soil containing shell and bone dietary debris, heat-affected rock, or human burials) or historic (i.e. stone or adobe foundations or walls, structures and remains with square nails, and refuse deposits often in old wells or privies), are inadvertently discovered during ground-breaking activities, work will stop in that area until a qualified archaeologist can assess the significance of the find and, if necessary, develop appropriate treatment measures in consultation with the State Historic Preservation Office.

Mitigation

Mitigation Measure: In the unlikely occurrence that cultural resources are encountered after the project has begun, the procedures in 36 CFR 800.11 will be followed. The contractor will cease work at that location and notify USBR. USBR's Regional Archeologist will assess the nature and value of the site and will recommend to the State Historic Preservation Officer (SHPO) a course of action. Appropriate mitigation, as determined through negotiations with SHPO, will be completed for any significant sites.

Responsible Party: USBR will serve as lead agency responsible for compliance with Section 106 of the NHPA. USBR will insure that the identified mitigation measures are implemented.

Timing: Cultural resource mitigation measures will be implemented at the time of project construction in the identified locations.

Monitoring Program: Cultural resource monitoring will be limited to the vicinity of the find that would appear during construction of the proposed project. Monitoring would be by a qualified archaeologist after appropriate treatment measures have been identified for the find.

Standards for Success: Cultural resources that may be discovered during the project are analyzed and either protected or recovered.

No-Project Alternative. Implementation of the No-Project Alternative would avoid potential disturbance of cultural artifacts caused during proposed project construction activities, but would not achieve the project goals and objectives.

Traffic and Transportation

	No Impact	Less-than Significant Impact	Significant Impact unless Mitigated	No Mitigation Identified EIR
Traffic and Transportation				
a. Would the project cause a new violation, or exacerbate an existing violation, of an applicable legal standard or goal relating to traffic levels of service (LOS) or volume/capacity (V/C) ratios, of a state or local agency? (LOS ratings range from "A" to "F", with many California agencies ranking "E" and "F" as unacceptable. V/C ratios range from 0 to 1.0, with many California agencies ranking an incremental worsening of 0.02 as unacceptable for intersections already operating at LOS E or F. These significance thresholds should be used to evaluate average and peak-hour project traffic impacts if the local agency has not adopted any particular significance standards for the project area).	X			
b. Does the project conflict with an applicable Congestion Management Plan, air quality plan, or other plan or policy relating to automobiles or transit systems, adopted by a federal, state, or local agency?	X			
c. Would the project add traffic to a roadway that has design features (e.g., narrow width, roadside ditches, sharp curves, poor sight distance, inadequate pavement structure) or supports uses that would be incompatible with substantial increases in traffic (e.g., rural roads used by farm equipment, livestock, horseback riders, or pedestrians) that would result in safety problems with the addition of project-related traffic?		X		

d.	Does the project have adequate internal circulation capacity, including entrance and exit routes, to safely accommodate average and peak-hour traffic loads?	X			
e.	Does the project provide for safe pedestrian and bicycle circulation?	X			
f.	Does the project provide sufficient parking capacity for the projected numbers of automobiles and bicycles? If not, is there sufficient commercial parking capacity available in the immediate project vicinity? If not, will unmet project parking demand worsen parking availability for existing residents or commercial enterprises?	X			
g.	Is the project currently served by the community transit program? Is there sufficient capacity on the existing transit system for the project? If not, is there an adopted and funded plan to increase transit capacity to meet project demand?	X			

Affected Environment. The project is located in a rural agricultural area with light traffic. The primary roads serving the site are Tisdale Road and Cranmore Road, Reclamation Road, and State Highway 113. Tisdale and Cranmore roads are two-lane paved roadways with narrow shoulders. Local access to the pumping plant site is via a gravel-surfaced road on top of the flood control levee (Figure 2). Because these roads primarily serve agricultural uses and rural residences, traffic is very light, and there is no congestion.

Criteria for Determining Impact Significance. The following criteria were used to determine the level of significance of traffic impacts; these criteria were developed based on State CEQA Guidelines and professional judgment. The proposed project would result in a significant impact if it would:

- Substantially increase traffic in relation to existing traffic load and capacity;
- Substantially disrupt traffic flow, or
- Create an unsafe roadway condition.

Discussion of Environmental Consequences. The item numbers in this section correspond to the item numbers of the checklist above.

Proposed Project

a. During construction the project would generate a maximum of 35 vehicle trips per day, which would not cause a violation of any traffic standard. There are no transportation-related plans that apply to the project. New traffic generated during construction is primarily associated with trucks hauling aggregate base and concrete cement, and construction workers driving to the work site. New truck trips associated with construction of the project are broken out as follows:

Access Roadway. Delivery of aggregate base - 34 one-way truck trips (15 cubic yards/truck) over 5-weekday period = 7 truck trips/day

Barrier. Aggregate base - 186 one-way truck trips (15 cubic yards/truck) over 14-weekday period = 13 trips/day

Concrete for structure base - 312 one-way truck trips (9 cubic yards/truck) over 14-weekday period = 22 trucks/day

Concrete for walls and top slab - 244 one-way truck trips (9 cubic yards/truck) over 93 weekday period = 3 truck trips/day

Concrete for road base on top of structure - 66 one-way truck trips (9 cubic yards/truck) over 8-weekday period = 8 truck trips/day

Upon project completion, no new trips would be created - existing personnel would operate the positive barrier fish screen.

b. Sutter County has not adopted, nor implemented, a congestion management plan, air quality plan, or other plan/policy relating to vehicles.

c. Roadway safety problems would be minimal. The roadways in the area have narrow shoulders, but they are adequate for automobiles and trucks. Existing traffic is light, and the project would not generate substantial new vehicle trips to make a difference in LOS conditions.

d. Existing accesses would be used to accommodate expected traffic.

e. The project would not have any effect on pedestrian or bicycle circulation.

f. The parking and staging area at the project site could adequately accommodate parking during the construction period (CH2M HILL 2001). The project would not create a parking demand in the project vicinity.

g. The project area is not served by a transit system, and there is not sufficient demand to justify transit service to the area.

Mitigation. No mitigation measures are required.

No-Project Alternative. Implementation of the No-Project Alternative would avoid the potential short-term transportation effects of the proposed project, but would not achieve the project goals and objectives.

Visual Quality and Aesthetics

	No Impact	Less-than-Significant Impact	Significant Impact unless Mitigated	No Mitigation Identified EIR
Visual Quality and Aesthetics				
a. Would the project conflict with applicable vista projection standards, scenic resource protection requirements, and design criteria of federal, state, and local agencies?	X			
b. Does the project alter or obstruct existing public viewsheds from or across the project site, including scenic features associated with designated scenic highways?		X		
c. Does the project change the existing visual quality and character at the project site in a manner that is inconsistent with other uses that currently exist or have been approved for the area? Are such changes attributable to project size, massing, density, landscaping, regrading, or other changes to the physical environment?		X		
d. Does the project increase light and glare in the project vicinity so as to cause a hazard or nuisance condition?	X			
e. Does the project significantly reduce sunlight or introduce shadows in public areas? Would loss of sunlight or increase in shadows adversely affect sensitive species or habitats?		X		

Affected Environment. The proposed project would be located on the river side of the existing levee (Figure 3). The visual landscape in the vicinity of the project site is composed primarily of agricultural row crops and rice fields. The pump-house site and adjacent levees are relatively bare and there is little riparian vegetation (Figure 4). With the exception of the levees, the land is flat. The Sacramento River is visible from the top of the levee. Motorists traveling along Wilson Bend Road, located on the west side of the Sacramento River, would

not be able to see diversion pumps and intake forebay. Views of the project site from the river and opposite bank currently include the existing intake superstructure and diversion pumps as shown in Figure 4. Distant views to the west, across the river, are of the levee, flat agricultural lands, and riparian vegetation (Figure 4). Views to the east take in agricultural land and the foothills. The Sutter Buttes, located in Sutter County, northeast of the site, can be viewed along State Highway 113, Reclamation Road, and on portions of Tisdale and Cranmore roads. A boat ramp and river access project have been proposed at the Tisdale Weir located immediately upstream of the existing pumping plant and proposed fish screen site. The proposed project would be visible from the boat ramp area and by boaters from the river.

Criteria for Determining Impact Significance. According to the State CEQA Guidelines, visual resource impacts are considered significant if a project has a "substantial demonstrable negative aesthetic effect". Based on professional standards and practices, a project will normally be considered to have a significant impact if it would:

- Conflict with adopted visual resource policies;
- Substantially reduce the vividness, intactness, or unity of high-quality views; or
- Introduce a substantial source of light and glare into the viewshed.

Discussion of Environmental Consequences. The item numbers in this section correspond to the item numbers of the checklist above.

Proposed Project

a. There are no identified scenic resources in the project vicinity; thus the project would not conflict with known protection requirements or design criteria of federal, state and local agencies.

b-c. The positive barrier fish screen would be a part of an existing pump intake facility. Such a replacement would be consistent with the existing visual landscape at the project site. The new fish screen would extend to elevation 54 with an additional 42 inches of concrete guardrail extending above the deck. When the river is at its lowest, elevation 27.1 feet, approximately 30.5 vertical feet of the structure would extend above the water line and be visible from the river and/or Tisdale Weir. From a beneficial standpoint, the concrete barrier would partially block views from the river of the existing intake superstructure and diversion pumps, and would be a part of the overall pumphouse/intake facility. Conversely, it would present a high concrete face to boaters and fishermen that pass by. However, the number of recreationalists/fishermen that would view the structure at any given time is minimal. Furthermore, the beneficial effect of protecting winter-run and spring-run Chinook salmon and other fish species outweigh the visual

impact to users of the river. The proposed project is consistent with current visual quality and characteristics of the Sutter Mutual Tisdale Pumping Plant diversion. Impacts are considered less than significant.

d. The project would not require the use of lights, therefore it would not increase light and glare in the project vicinity.

e. The barrier would create a shadow across the forebay. However, this would not adversely affect sensitive species or habitats (see Biological Resources). This impact is considered less than significant.

Mitigation. No mitigation measures are required.

No-Project Alternative. Visual impacts of the No-Project Alternative would be the same as the existing Tisdale Pumping Plant (Figures 2 and 4). The No-Project Alternative would not achieve the project objectives.

Air Quality

	No Impact	Less-than-Significant Impact	Significant Impact unless Mitigated	No Mitigation Identified EIR
Air Quality				
a. Would the project violate any law or regulation designed to achieve or maintain compliance with ambient air quality standards or protect against adverse health effects caused by air pollution?		X		
b. Would the project violate any approved plan or policy regarding air pollution, including federal or state air quality management plans for achieving or maintaining compliance with applicable ambient air quality standards, local or regional growth or congestion management plans, or local or regional CEQA significance standards for air quality?	X			
c. Would the project result in a net increase of any criteria pollutant for which the project area has not attained applicable federal or state ambient air quality standards?	X			
d. Using the approved or established risk assessment methodologies of the air quality control agencies, would project toxic air contaminant (TAC) emissions cause a significant short- or long-term health risk? Would project TAC emissions cause an increased cancer risk of greater than ten per million?	X			
e. Would the project require the removal or demolition of building components containing asbestos, or the excavation or crushing of serpentine rock containing asbestos?	X			

f. Would the project require the removal or movement of soils contaminated by hazardous materials that can cause adverse health impacts if airborne?	**X**			
g. Would the project concentrate vehicle trips or vehicle-related emissions in a localized area (e.g., intersections, parking areas), which would cause a violation of the carbon monoxide ambient air quality standard?	**X**			
h. Does the project have the potential to cause an odor, visibility, or other problem that would create a public nuisance condition?	**X**			

Affected Environment

Air Quality Pollutants and Existing Air Quality Conditions. The pollutants of greatest concern in the project area are ozone and inhalable particulate matter (PM10). Ozone is not emitted directly into the air, but instead is formed by photochemical reactions in the atmosphere. Ozone precursors, reactive organic gases (ROB) and oxides of nitrogen (No_x) react in the atmosphere in the presence of sunlight to form ozone. Because photochemical reaction rates depend on the intensity of ultraviolet light and air temperature, ozone is primarily a summer air pollution problem. PM10 emissions are generated by a variety of sources, including agricultural activities, construction, and traffic. Carbon monoxide concentrations are generally elevated near heavily traveled intersections. Because the positive barrier fish screen would be located in a rural area, carbon monoxide is not a concern.

Sutter County experiences occasional violations of the State ozone and PM10 standards. The State annual PM10 standard is also exceeded in most years. PM10 levels near the project site may be elevated because of the proximity of agricultural activities.

Air Quality Conformity. The EPA has promulgated a rule requiring that all Federal actions in federally designated non-attainment areas comply with applicable state implementation plans (SIPs) (40 Code of Federal Regulations [CFR] Parts 6, 51, and 93). Federally funded projects in Federal attainment areas are potentially subject to the conformity rule. Northern Sutter County, where the proposed project site is located, is a federal attainment area for carbon monoxide. Thresholds are 100 tons/year for offsets and Best Available Control Technology (BACT) threshold of 500 ppb.

Criteria for Determining Impact Significance. The following criteria, used to determine the level of significance of air quality impacts, were developed based on State CEQA

Guidelines and professional judgment. The project would result in a significant impact if it would:

- Violate any ambient air quality standard;
- Contribute substantially to an existing or projected air quality violation;
- Expose sensitive receptors to substantial pollutant concentrations;
- Result in substantial air emissions or deterioration of air quality (substantial emissions would be emissions above the Sutter County Air Pollution Control District [APCD] emission offset threshold levels of 100 tons/year for carbon monoxide and BACT of 500 ppb;
- Create objectionable odors; or
- Alter air movement, moisture, or temperature, or result in any change in climate either locally or regionally.

Discussion of Environmental Consequences. The item numbers in this section correspond to the item numbers of the checklist above.

Proposed Project

a. Implementation of the project would result in short-term emissions from construction activities. These emissions would result from grading and earth moving and from equipment exhaust. Sutter County is a non-attainment area for PM10 and ozone. The construction emissions of greatest concern are PM10, ROG, and No_x. This impact is considered less than significant because the design specifications for the project require that the engineering contractor prepare and implement a dust suppression plan as part of the project design (Section 3.7)**.**

b. Operation of the screen cleaning device will be conducted through the use of electrical motors and would not contribute emissions to the air basin.

c. As described above, the project would not result in emissions exceeding any of the established parameters for ROG, No_x, or carbon monoxide.

d. The project would not generate any toxic air contaminant emissions.

e. The project would not require any removal or demolition of building components, or the excavation of serpentine rock. Asbestos, therefore, is not a concern.

f. The project would be located on the Sacramento River and it is not expected that the project would require the removal or movement of any contaminated soil.

g. Long-term operation and maintenance of the project would generate no more than a few vehicle trips each day. This small number of trips would not result in violations of the carbon monoxide standard.

h. The project is not located near any sensitive land uses and is not expected to produce any odor or other air quality problems that would create a public nuisance.

Mitigation

Mitigation Measure: The contractor selected to construct the positive barrier fish screen will be required to prepared an acceptable dust suppression plan (Section 3.7) to avoid and minimize adverse impacts on air quality. The dust suppression plan will be implemented and in effect throughout the period of intake construction.

Responsible Party: The contractor will be responsible for preparation of an acceptable dust suppression plan.

Timing: The dust suppression plan will be prepared in advance of on-site construction activity, and will be in effect throughout the period of construction.

Monitoring Program: Visual inspections will periodically be made to insure implementation of the dust suppression plan including, but not limited to, periodic watering of graded areas.

Standards for Success: Wind-blown dust originating at the project site will be minimal.

No-Project Alternative. Implementation of the No-Project Alternative would avoid air quality impacts of the proposed project, but would not achieve the project objectives.

Noise and Vibration

	No Impact	Less-than-Significant Impact	Significant Impact unless Mitigated	No Mitigation Identified EIR
Noise and Vibration				
a. Would the project violate any established noise or vibration law, regulation, or standard?	X			
b. Would the project cause a permanent increase in ambient noise or vibration levels that would be perceptible to humans in the project vicinity, and that is perceptibly greater than the noise or vibration levels caused by existing development in the project area?	X			
c. Would the project cause a temporary or periodic increase in ambient noise or vibration levels that would be perceptible to humans in the project vicinity, and that is perceptibly greater than the noise or vibration levels caused by existing development and activity in the project area?		X		
d. Can the project noise and vibration level during construction activities be limited to daylight, weekday hours and be comparable to that required for construction of existing development in the project area?	X			

Affected Environment. The positive barrier fish screen would be located on the river side of the levee, in an agricultural area. With the exception of the four residences in the area (three owned by Sutter Mutual Water Company and one private residence), there are no noise-sensitive land uses near the project site. The levee provides a sound barrier between the four houses and construction site. Existing noise conditions in the project vicinity are influenced by agricultural activities, traffic on Tisdale and Cranmore Roads, occasional aircraft flights, and natural sources such as birds and wind. Existing noise levels in rural locations such as the project vicinity are generally low, with 24-hour values in the range of 40 to 50 dBA Ldn. (Ldn is a 24-hour noise descriptor that adds a 10 dB penalty to nighttime noise to account for people's increased sensitivity to nighttime noise).

Criteria for Determining Impact Significance. The following criteria, used to determine the level of significance of noise impacts, were developed based on of the State CEQA Guidelines and professional judgment. The proposed project would result in a significant impact if it would:

- Substantially increase noise levels at noise-sensitive land uses, or
- Expose people to severe noise levels.

Discussion of Environmental Consequences. The item numbers in this section correspond to the item numbers of the checklist above.

Proposed Project

a. The fish screen and its ancillary functions would not create a noise impact that would be heard by residents of the area. The four houses located across the road, are separated from the facility by the levee. The only noise associated with this project is that of electrical motors used to control the gates at the intake to the pumping plant and to operate the screen cleaning device. The noise level would not violate any established law, regulation, or standard. The project is not expected to produce any noticeable vibrations.

b. Noise levels will not increase with implementation of the fish screen.

c. Short-term noise increases will occur with the onset of construction activities, such as noise associated with truck traffic, pile driving and grading activities. However, this is not considered a significant impact due to the limited number of sensitive receptors in the area, the provision of a physical barrier (levee) separating the activities from the four residences, and construction contained to daytime hours, Monday through Friday.

Mitigation. No mitigation measures are necessary.

No-Project Alternative. Implementation of the No-Project Alternative would avoid potential construction noise but would not achieve the goals and objectives of the project.

Utilities and Infrastructure

		No Impact	Less-than Significant Impact	Significant Impact unless Mitigated	No Mitigation Identified EIR
Utilities and Infrastructure					
a.	*Electricity:* Will the project require expansions in existing electrical generating facilities and existing high-power transmission lines?	**X**			
b.	*Water:* Will the project comply with water conservation and supply requirements imposed by state and local agencies? Will the project require expansions in existing water supply treatment facilities or trunk conveyance lines? Has the water purveyor determined that it has adequate treatment facilities, conveyance capacity, and water supplies to serve project demand? Will the water supply be drawn from a groundwater basin that is overdrawn in relation to demand and historical levels?	**X**			
c.	*Wastewater Treatment:* Will the project comply with wastewater pretreatment standards enforced by federal, state, and local regulatory agencies? Will the project require expansions of the wastewater treatment facilities and trunk conveyance lines? Has the wastewater treatment provider determined that is has adequate treatment and conveyance capacity to serve project demand?	**X**			
d.	*Solid Waste:* Will the project comply with state and local requirements relating to recycling, litter control, and solid waste handling? Is a landfill available with sufficient capacity to accommodate on a long-term basis (10 or more years) solid waste generated by the proposed project?	**X**			

Affected Environment. Electricity to the site is provided by PG&E through the local electrical lines. Potable water supply is provided through the use of wells, but potable water supply would not be utilized for this project. Wastewater treatment is provided through the use of septic systems. Solid waste is hauled away by the local solid waste hauler.

Criteria for Determining Impact Significance. CEQA Guidelines identify a significant effect on the environment if it will:

- Breach published national, state, or local standards relating to solid waste or litter control;
- Contaminate a public water supply;
- Encourage activities which result in the use of large amounts of fuel, water or energy; and
- Extend a sewer trunk line with capacity to serve new development

Discussion of Environmental Consequences. The item numbers in this section correspond to the item numbers of the checklist above.

Proposed Project

a. The demand for electricity to operate the proposed screen cleaner would be similar to the existing demand.

b-d. There is no demand generated by this project for water supply, no impact on wastewater treatment capacity or on solid waste facilities. Construction debris would be hauled away by the contractor.

Mitigation. No mitigation measures are necessary.

No-Project Alternative. Implementation of the No-Project Alternative would have the same effects on public utilities as the proposed project.

Public Services

		No Impact	Less-than Significant Impact	Significant Impact unless Mitigated	No Mitigation Identified EIR
Public Services					
a.	*Sheriff:* Will the project require additional staff or equipment to maintain acceptable service ratios, response time, or other performance objectives?	**X**			
b.	*Fire:* Will the project require additional staff or equipment to maintain an acceptable level of service (i.e., response time, equipment capacity)?	**X**			
c.	*Schools:* Will the project increase the population of school-age children in a K-12 school district that is or will be operating without adequate staff, equipment, or facilities?	**X**			
d.	*Parks and Recreation:* Will the project increase use of existing park and recreational facilities, or require the creation of new park and recreational facilities, to comply with locally adopted park and recreational service standards?	**X**			

Affected Environment. The Sutter County Sheriff's Department provides law enforcement in the project vicinity. Fire service to the project area is provided by the Meridian Fire Department. The project site is located in an area designated as a low fire hazard severity zone. There are no parks or schools in the immediate vicinity of the project site. The nearest parks, including the Sacramento River State Recreation Area, are located in Colusa, 18 miles from the project site. The school nearest to the project site is Whinship Elementary School.

Criteria for Determining Impact Significance. CEQA Guidelines do not provide criteria to determine significant impact on public services. However, it does state that a project will normally have a significant effect on the environment if it will induce substantial growth or concentration of population which in turn could significantly create a demand on public services. Thus, it is this criteria that will be used to assess the significance of the proposed positive fish screen barrier project.

Discussion of Environmental Consequences. The item numbers in this section correspond to the item numbers of the checklist above.

Proposed Project

a-d. Construction and operation of the positive barrier fish screen would not have any effect on the above public services. It would not induce substantial growth or concentration of population that would in turn place a significant demand on police, fire, school and parks. There are plans in the immediate project vicinity to develop river access at the Tisdale Weir.

Mitigation. No mitigation measures are necessary.

No-Project Alternative. Implementation of the No-Project Alternative would have the same effects on public services as the proposed project.

Energy

		No Impact	Less-than Significant Impact	Significant Impact unless Mitigated	No Mitigation Identified EIR
Energy					
a.	Does the project comply with applicable laws and regulations regarding energy conservation?	X			
b.	Does the project require quantities of nonrenewable sources of energy in excess of quantities required by recent, similar projects?	X			
c.	Do the energy suppliers have the capacity to supply the project's energy needs with existing and planned energy sources and conveyance systems?	X			

Affected Environment. The proposed project, located on the Sacramento River at the existing unscreened Tisdale Pumping Plant site, will include a stationary positive barrier fish screen, electrically operated screen cleaning mechanism, electrically operated control gates, and the existing Tisdale Pumping Plant. The existing Tisdale Pumping Plant No. 1 and 2 include 8 electrically powered diversion pumps. The proposed project would not alter electrical supplies to the diversion pumps. Energy would be used, however, to operate the screen cleaning mechanism, control gates, and during routine maintenance of the intake screens. No additional electrical service will be required to the site.

Criteria for Determining Impact Significance. CEQA Guidelines state a project will normally have a significant effect on the environment if it will:

- Use fuel, water, or energy in a wasteful manner; and
- Encourage activities which result in the use of large amount of fuel, water, or energy.

Discussion of Environmental Consequences. The item numbers in this section correspond to the item numbers of the checklist above.

Proposed Project

a. Project specifications call for the most up-to-date energy efficient equipment.

b. The proposed project would not increase the demand for non-renewable energy resources. The energy demand would be similar to existing conditions.

c. The energy supply for the fish screen would remain essentially the same as existing conditions.

Mitigation. No mitigation measures are necessary.

No-Project Alternative. Implementation of the No-Project Alternative would have the same effect on energy resources as the proposed project.

Hazardous Materials

		No Impact	Less-than Significant Impact	Significant Impact unless Mitigated	No Mitigation Identified EIR
Hazardous Materials					
a.	Will the project comply with applicable federal, state, and local laws, regulations, and standards relating to hazardous materials?	X			
b.	Is the soil or groundwater at the project site contaminated by hazardous materials? Is such contamination known to exist at another location that is within 2,000 feet of the project site?	X			
c.	Does the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	X			
d.	Does the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials to the environment?		X		
e.	Will the project interfere with community emergency response plans or emergency evacuation plans in the event of a reasonably foreseeable emergency situation involving a hazardous material exposure or release?	X			
f.	Are there hazardous material re-use, or one or more hazardous waste treatment or disposal, facilities available to lawfully accept and handle hazardous wastes generated by the project?	X			

Affected Environment. Hazardous materials which could be found in the vicinity of the project site would be those associated with agricultural activities, such as

pesticide/herbicide sprays and petroleum products. The operation of the Tisdale Pumping Plant includes the use of oil and grease and paint. The affected environment in the vicinity of the project site includes the Sacramento River, agricultural land and four local rural residences.

Criteria for Determining Impact Significance. CEQA Guidelines state that a project will normally have a significant effect on the environment if it will:

- Create a potential public health hazard or involve the use, production or disposal of materials which pose a hazard to people or animal or plant populations in the area affected.

Discussion of Environmental Consequences. The item numbers in this section correspond to the item numbers of the checklist above.

Proposed Project

a-f. There are no known hazardous materials contained in the river silts that will be dredged, or in the soil on the levee that will be graded. Hazardous materials used in the construction of the positive barrier fish screen will include gas, oil, and grease associated with construction equipment. In addition, paint and solvents will be used on-site during construction. Concrete and other common construction materials will also be used. There would be no hazardous materials removed from the site.

Mitigation. As part of the proposed project, the engineering contractor will be required to prepare an acceptable hazardous materials control and spill prevention plan (Section 3.7). No additional mitigation measures are necessary.

No-Project Alternative. Implementation of the No-Project Alternative would have the same effect as the proposed project.

Recreation

		No Impact	Less-than-Significant Impact	Significant Impact unless Mitigated	No Mitigation Identified EIR
Recreation					
a.	Increase the demand for neighborhood regional parks or other recreational facilities?	X			
b.	Affect existing recreational opportunities?		X		

Affected Environment. The Sacramento River, in the vicinity of the Tisdale Pumping Plant Positive Barrier Fish Screening Project is used by recreational boaters for cruising and water-skiing, and by recreational fishermen. Primary recreational use in the area occurs during the spring, summer, and fall. The nearest public park is the Sacramento River State Recreation Area, located in Colusa, approximately 18 miles from the project site. Plans are currently being developed to construct a boat ramp and river access at the Tisdale Weir, located upstream of the Tisdale Pumping Plant site.

Criteria for Determining Impact Significance. Recreational impacts were considered significant if the proposed project would increase the demand for neighborhood or regional parks, or other recreational facilities, or adversely affect existing recreational opportunities.

Discussion of Environmental Consequences. The item numbers in this section correspond to the item numbers of the checklist above.

Proposed Project

a. The proposed project would not contribute to an increase in population density in the area. The project would not result in an increased demand for neighborhood or regional parks or other recreational facilities.

b. The proposed project would not impact recreational fishing in the Sacramento River. The project would not preclude or obstruct recreational boating in the Sacramento River. Boater speeds in the immediate vicinity of the project would be restricted to a five-mile-per-hour zone to reduce wave-induced erosion and wave activity adversely impacting construction and/or long-term operational and maintenance of the positive barrier fish screen. The five-mile-per-hour speed zone in the immediate vicinity of the proposed project would affect recreational water-skiing in the immediate project vicinity. Since the area of restricted speeds would be limited to the immediate project vicinity, this impact is considered to be less than significant.

Mitigation. No mitigation measures are required.

No-Project Alternative. Implementation of the No-Project Alternative would avoid the less-than-significant impact to recreational water-skiing in the immediate vicinity of the project. The No-Project Alternative would not, however, meet the objectives of providing increased protection for winter-run and spring-run Chinook salmon, steelhead, and other fishery resources inhabiting the Sacramento River.

Socioeconomic Effects

		No Impact	Less-than-Significant Impact	Significant Impact unless Mitigated	No Mitigation Identified EIR
Socioeconomic Effects					
a.	Result in any adverse socioeconomic effects?	X			
b.	Conflict with Executive Order 12898 (Environmental Justice) policies?	X			
c.	Affect Indian Trust Assets?	X			

Affected Environment. Land use in the project area is predominantly agriculture. The area is characterized as rural. Orchards, row crops, and rice fields dominate the landscape. Four residences are located in the general vicinity of the proposed project.

Criteria for Determining Impact Significance. Socioeconomic impacts were considered significant if the proposed project would result in any adverse socioeconomic affects, conflict with executive order 12898 (Environmental Justice) policies, or adversely affect Indian Trust Assets.

Discussion of Environmental Consequences. The item numbers in this section correspond to the item numbers of the checklist above.

Proposed Project

a. The proposed project would effectively implement a positive barrier fish screen for the Tisdale Pumping Plant diversion located on the Sacramento River. This would meet the project objectives of insuring a reliable long-term water supply and would also contribute to the restoration of anadromous and resident fish resources within the Sacramento River. By providing fish screening for the Tisdale Pumping Plant diversion, Sutter Mutual Water Company would be able to meet their irrigation commitments throughout the year without any regulatory or other restrictions. Existing agricultural operations and practices would continue.

b. Environmental Justice - Executive Order 12898 requires each Federal agency to achieve environmental justice as part of its mission, by identifying and addressing disproportionately high and adverse human health or environmental effects, including social and economic effects of its programs, policies, and activities on minority populations and low-income populations of the United States. The proposed project would involve construction and operation of a positive barrier

fish screen at the Tisdale Pumping Plant, and would allow for the continued irrigation of agricultural lands within the Sutter Mutual Water Company service area, while also providing increased protection for fishery resources inhabiting the Sacramento River. The project site is located in a sparsely developed, rural agricultural area. The proposed project would not result in adverse human health or environmental effects that cannot be mitigated, and therefore would have no physical effect on minority or low-income populations. The project would not significantly alter socioeconomic conditions of populations that reside or work in the region.

c. Indian Trust Assets are legal interests in property or rights held by the United States for Indian Tribes or individuals. Trust status originates from rights imparted by treaties, statutes, or executive orders. Indian Trust Assets, for example, are lands, including reservations and public domain allotments, minerals, water rights, hunting and fishing rights, other natural resources, money, or claims. Assets can be real property, physical assets, or intangible property rights. Indian Trust Assets cannot be sold, leased, or otherwise alienated without Federal approval. No Indian Trust Assets have been identified at the project site.

Mitigation. No mitigation measures are required.

No-Project Alternative. Implementation of the No-Project Alternative could result in irrigation season regulatory restrictions on diversion operations at the Tisdale Pumping Plant, which could adversely affect agricultural production and practices in the region. Increased restrictions on operation of the Tisdale Pumping Plant could result in a negative effect on the socioeconomics of the regional farming economy. Furthermore, the No-Project Alternative would not meet the primary objectives of providing long-term reliable operation of the Tisdale Pumping Plant, or protections for winter-run and spring-run Chinook salmon, steelhead and other fishery resources inhabiting the Sacramento River, which are currently vulnerable to entrainment losses and increased mortality at a result of operation of the unscreened diversion.

Mandatory Findings of Significance

		No Impact	Less-than-Significant Impact	Significant Impact unless Mitigated	No Mitigation Identified EIR
Mandatory Findings of Significance					
a.	Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of fish or wildlife species, cause fish or wildlife populations to drop below self-sustaining levels, threaten to eliminate a plan or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or pre-history?		**X**		
b.	Does the project have the potential to achieve short-term, to the disadvantage of long-term, environmental goals? (A short-term impact on the environment is one that occurs in a relatively brief, definitive period of time while long-term impacts will endure well into the future.)	**X**			
c.	Does the project have impacts that are individually limited, but cumulatively significant when placed in the context of other reasonably foreseeable projects?		**X**		
d.	Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?	**X**			

Discussion of Environmental Consequences. The items numbers in this section correspond to the item numbers in the environmental checklist.

Proposed Project

a. The purpose of the proposed project is to benefit fishery populations

inhabiting the Sacramento River through a reduction in entrainment losses at the currently unscreened Tisdale Pumping Plant. The project would have some short-term temporary impacts associated with dredging, site preparation, and installation and removal of cofferdams that will result in short-term localized increases in turbidity and suspended sediment concentrations within the Sacramento River. The long-term benefits to Sacramento River fishery populations through reduced entrainment mortality would fully mitigate and compensate for any short-term construction-related impacts. Construction and operation of the proposed fish screen would not result in direct impacts or loss of habitat that would result in populations of fish or wildlife being reduced below self-sustaining levels. The project would not reduce the number or restrict the range of threatened or endangered species, or species of special concern. No significant impacts were identified for cultural or historic resources.

b. The proposed project would have long-term benefits to fishery populations inhabiting the Sacramento River. The project is intended to reduce entrainment mortality for resident and migratory fish, including winter-run and spring-run Chinook salmon, other races of Chinook salmon, steelhead, sturgeon, splittail, lamprey, etc. The project would result in short-term localized impacts on water quality. The proposed project would improve conditions within the Sacramento River for fishery populations above the no-project alternative baseline.

c. The proposed project would result in short-term localized increases in turbidity within the mainstem Sacramento River during construction. Increased turbidity would result from dredging within the Sacramento River and Tisdale intake forebay, and installation and removal of cofferdams, in addition to soil erosion from the north and south access areas. Each of these activities has the potential for contributing to increased turbidity within the river. The cumulative impacts of these activities are considered less than significant.

d. As part of the proposed project, the engineering contractor will be required to prepare an erosion control plan, which will be implemented throughout the period of project construction. The project site will be re-vegetated after completion of construction to reduce long-term erosion. Other mitigation measures have also been implemented in an effort to reduce increased turbidity within the river during construction. During the period of construction, the cross-sectional area for water flowing into the Tisdale Pumping Plant will be reduced, resulting in an increase in both water velocity and the susceptibility of fish to entrainment at the diversion during construction. No cost-effective practical method has been identified for providing fish protection during the construction period. The short-term increase in vulnerability of resident and migratory fish to entrainment losses is considered less than significant as both an individual and cumulative impact. The long-term benefits of reduced fish entrainment losses resulting from operation of the fish screen will compensate and mitigate for short-term individual and cumulative impacts.

e. The project will not cause substantial adverse effects on human beings. The project is sited in a rural area, having low human population densities. Impacts of the proposed project on air quality, noise, exposure to hazardous materials, and other human health and safety risks are considered to be less than significant.

Conclusions

The proposed project will have a beneficial impact on fishery populations inhabiting the Sacramento River through a reduction in entrainment losses at the unscreened Tisdale Pumping Plant. Potential impacts of the proposed project are considered less-than-significant. Many of the potential impacts are typical of construction-related pumping plant and water diversion projects within the Sacramento River. The project includes specific actions designed to avoid adverse environmental impacts, such as the inclusion of a dust-suppression plan, hazardous material control and spill prevention plan, fish rescue and relocation from areas within the cofferdam to be dewatered, Swainson's hawk nest monitoring, and erosion control plan. These and other environmental mitigation requirements will be included in bid specifications for the engineering contractor. State and Federal resource and regulatory agencies, Sutter Mutual Water Company, and the engineering contractor will be responsible for insuring that mitigation actions during project construction are implemented. Overall, the proposed project will result in a substantial net environmental benefit to Sacramento River fishery populations, with no or less-than-significant impacts to other resources.

6.0 REPORT PREPARATION AND AGENCY CONSULTATION

Initial Study/Environmental Assessment Preparers

This Environmental Assessment/Initial Study was prepared by Hanson Environmental, Inc., and Miriam Green Associates. The following individuals were responsible for preparing and reviewing the document.

Reclamation District 1500 / Sutter Mutual Water Company

Max Sakato, State Lead Agency Contact
Richard Jenness, Engineering
Wendy Anderson, Legal

U. S. Bureau of Reclamation

CH2M HILL

Peter H.Rude, Project Manager, Engineering

Hanson Environmental, Inc.

Charles H. Hanson, Project Manager, Fisheries
Jennifer Johnson, Permitting
Justin Taplin, Fishery and Water Quality

Miriam Green Associates

Miriam Green, Vegetation and Wildlife

Federal Agencies Consulted

The following agencies and individuals were contacted as part of the development of the proposed positive barrier fish screen project and/or provided information used in this Environmental Assessment/Initial Study:

U.S. Fish and Wildlife Service (USFWS)

The U.S. Fish and Wildlife Service has been an active participant in the CVPIA Anadromous Fish Screen Program Technical Team, and has provided review and comment on the Tisdale Fish Screen feasibility analyses and intake structure engineering design. A Biological Assessment has been prepared for the proposed project for review and evaluation by USFWS. USFWS will be asked by USBR to concur with findings of the biological assessment regarding the potential of the fish screen project to adversely affect protected wildlife.

National Marine Fisheries Service (NOAA Fisheries)

The National Marine Fisheries Service has been an active participant in the CVPIA Anadromous Fish Screen Technical Committee, and has provided review and comment on the Tisdale Fish Screen feasibility analyses and intake structure engineering design. A Biological Assessment has been prepared for the proposed project for review and evaluation by NOAA Fisheries. NOAA Fisheries will be asked by USBR to concur with findings of the biological assessment regarding the potential of the fish screen project to adversely affect protected fish.

U.S. Army Corps of Engineers

An application for a U.S. Department of the Army permit pursuant to Section 10 of the Rivers and Harbors Act, and Section 404 of the Clean Water Act, has been submitted to the U.S. Army Corps of Engineers. All terms and conditions of the Corps permit would be implemented. The application was submitted to Mr. Tom Cavanaugh, U.S. Army Corps of Engineers Regulatory Branch, Sacramento, California.

State Agencies Consulted

California Department of Fish and Game (CDFandG)

The California Department of Fish and Game has been an active participant in the CVPIA Anadromous Fish Screen Technical Committee, and has provided review and comment on the Tisdale Fish Screen feasibility analyses and intake structure engineering design. An application for a CDFandG Streambed Alteration Agreement, pursuant to Section 1603 of the Fish and Game Code of California, has been submitted for the proposed project. A copy of the draft Environmental Assessment/Initial Study was provided in support of the Section 1603 permit application. All terms and conditions of this agreement would be implemented. The fish screen design and construction would comply with the currently accepted CDFandG and NOAA Fisheries Fish Screen Design Criteria.

State Reclamation Board

An application has been submitted to the State Reclamation Board for an encroachment permit for the proposed fish screen project. A copy of the draft Environmental Assessment/Initial Study was provided in support of the Reclamation Board permit application.

Regional Water Quality Control Board - Central Valley Region

The contractor selected to construct the proposed fish screen would be required to prepare and Erosion Control Plan in order to comply with the water quality objectives established for sediment loading and turbidity. A Clean Water Act Section 401 water quality certification, or waiver thereof, would be obtained for the Corps of Engineers permit compliance, or other permits or authorizations. An application for a Regional Water Quality Control Board 404 certification or waiver has been submitted by a letter dated September 4, 2003. A copy of the draft Environmental Assessment/Initial Study, application for a CDFandG Streambed Alteration Agreement, and Army Corps permit application were submitted to the California Regional Water Control Board in support of the water quality certification.

State Lands Commission

An application for a State Lands Commission for the proposed project has been submitted by letter dated September 4, 2003. A copy of the draft Environmental Assessment/Initial Study was submitted in support of the State Lands Commission application.

Local Agencies Consulted

Sutter County Air Pollution Control District

Steve Speckert, Air Pollution Control Officer for the Sutter River Air Quality Managment District, was contacted to determine if this agency has any set air quality guidelines that would need to be adhered to for project construction or operations.

Fish and Wildlife Coordination Act

Whenever the waters of any stream or other body of water are proposed or authorized to be impounded, diverted, or otherwise controlled for any purpose whatever, by any federal department or agency, or by any public or private agency under federal permit or license, such department or agency would consult with the USFWS to view the conservation of wildlife resources by preventing loss of, or damage to, such resources.

The proposed project has complied with the Fish and Wildlife Coordination Act through the Central Valley Project Improvement Act (CVPIA) Anadromous Fish Screen Program (AFSP). This is demonstrated in the role of the USFWS, NOAA Fisheries, USBR, and CDFandG in participating in the technical review and comment on the feasibility assessment and fish screen engineering design, review and comment on preliminary engineering designs and design criteria for the proposed project, and participation in review of the draft Biological Assessment and draft Environmental Assessment/Initial Study. The USBR as the lead federal agency for NEPA compliance, and the role of other agencies in the review of this joint CEQA/NEPA document has insured equal consideration of fish and wildlife resources. The interdisciplinary involvement within the USBR, NOAA Fisheries, USFWS, CDFandG, and the Corps has fulfilled the consultation requirements under the Fish and Wildlife

Coordination Act.

National Historic Preservation Act

As discussed in Section 5 of this EA/IS, the proposed project would not affect any cultural or historic resources (Appendix A).

7.0 LITERATURE CITED

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PERSONAL COMMUNICATIONS

Holland, Elizabeth. May 14, 2002. Environmental Manager. U.S. Army Corps of Engineers, Sacramento District, Sacramento, CA. Telephone conversation.

Appendix A

Results of Cultural/Historic Site Review

The Northeast Center of the California
Historical Resources Information System

BUTTE SIERRA
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May 8, 2002

Hanson Environmental, Inc.
132 Cottage Lane
Walnut Creek, CA 94595
ATTN: Ms. Jennifer Johnson

RE: Sutter Mutual Water Company Positive Barrier Fish Screen
I.C. File # D02-29
T14N, R1E, Sections 35 and 36;
USGS Tisdale Weir 7.5' and Sutter Buttes 15' quadrangles
Approximately 80 acres estimated from project map (Sutter County)

Dear Ms. Johnson,

In response to your request, a record search for the above-cited project was conducted by examining the official maps and records for archaeological sites and surveys in Sutter County.

RESULTS:

PREHISTORIC RESOURCES: According to our records, there are no previously recorded sites of this type known to be located within the project area. The project area is located within an area known to have been utilized by the Valley Patwin and the Valley Nisenan. The Valley Patwin utilized both sides of the Sacramento River. The Valley Nisenan built villages on low, natural rises along streams and rivers or on gentle slopes with a southern exposure. The Valley Nisenan also used the valley plain for hunting and gathering grounds. There may be unrecorded sites of this type located within the project area.

HISTORIC RESOURCES: According to our records, there are no previously recorded sites of this type known to be located within project boundaries. The USGS Sutter Buttes 15' quad map (1954) indicates a pumphouse and towers are located within the project area, and roads, structures, the Westside Canal, the Tisdale Bypasss, the Tisdale Weir, and a levee are located in the project vicinity. There may be unrecorded sites of this type located within the project area.

PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS: According to our records, no portion of the project area has been previously surveyed for cultural resources by a professional archaeologist.

LITERATURE SEARCH: Reviewed were the official records and maps for archaeological sites and surveys in Sutter County. Also reviewed were the **National Register of Historic Places - Listed Properties and Determined Eligible Properties** (1988, Computer Listings 1966 through 7-00 by National Park Service), the **California Register of Historical Resources** (2001), the **California Points of Historical Interest** (1992), the **Gold Districts of California** (1970), the **California Inventory of Historic Resources** (1976), the **California Historical Landmarks** (1996), and the **Directory of Properties in the Historic Property Data File for Sutter County** (2002).

RECOMMENDATIONS: Based upon the above information and the local topography, the project is located in an area considered to be highly sensitive for prehistoric, protohistoric, and historic cultural resources. Therefore, we recommend that a professional archaeologist should be contacted to conduct a cultural resources survey of the entire project area, prior to any ground disturbing activities. This person will be able to prepare appropriate preservation/mitigation measures for any unrecorded cultural resources that may be encountered as a result of the cultural resources survey. If any potential prehistoric, protohistoric, and/or historic cultural resources are encountered during any phase of project operations, all work should cease in the area of the find pending an examination of the site and materials by the project archaeologist. This request to cease work in the area of a potential cultural resource find should be made a condition of project approval.

The charge for this record search is $120.00 (1 hour of Information Center time @ $120.00 per hour0). An invoice from the CSUC Research Foundation for billing purposes will follow. Thank you for your concern in preserving California's cultural heritage, and please feel free to contact us if you have any questions or need any further information.

Sincerely,

Frank E. Bayham, Interim Coordinator
Northeast Information Center

Appendix B

Environmental Commitments

ENVIRONMENTAL COMMITMENTS			
Potential Impact	**Mitigation**	**Monitoring**	**Timing**
Construction Runoff/ Erosion Control	**Prepare Erosion Control Plan that shall include Best Management Practices, including, but not limited to, the following:**	**Verify construction documents contain Erosion Control Plan measures and BMPs.**	**Prior to construction.**
	Use sedimentation basins/straw bales;	**Periodic inspections.**	**During construction.**
	Cover graded areas with protective materials;		
	Incorporate retaining walls into the project design;		
	Minimize surface disturbance of soil and vegetation;		
	Place any stockpiled soil where it would not be subject to accelerated erosion;		
	Revegetate and place erosion controls, when a graded area has attained a finished grade.		
	Implement Best Management Practices		

	ENVIRONMENTAL COMMITMENTS		
Potential Impact	**Mitigation**	**Monitoring**	**Timing**
Construction-generated fugitive dust	**Prepare a dust suppression plan that will include, but not be limited to, the following:** **Water exposed earth surfaces periodically during construction;** **Remove visible mud and dust carried onto Tisdale and/or Cranmore Roads;** **Cover haul trucks or water sufficiently to eliminate dust emissions.** **Implement identified site controls.**	**Verify construction contracts include dust emission controls.** **Periodic inspection to verify compliance.**	**Prior to construction.** **During construction.**
Construction-related effects on winter-run Chinook salmon, steelhead, and Sacramento splittail	**Install in-river sheet-pile cofferdam to isolate work site from rest of river.** **Operate Tisdale Pumping Plant pumps, when possible, during dredging, and during Cofferdam installation/removal to reduce river turbidity** **Conduct a fish rescue and relocation from the Cofferdam area to be dewatered.**	**Verify specifications included in construction contract.** **Periodic inspections to verify compliance.** **Inspection by a qualified fishery Biologist to verify compliance.**	**Prior to construction** **During construction.** **During dewatering of the cofferdam.**

ENVIRONMENTAL COMMITMENTS			
Potential Impact	**Mitigation**	**Monitoring**	**Timing**
Use of hazardous materials during construction.	**Comply with applicable Health and Safety laws and regulations.**	**Verify construction documents specify requirements, include hazardous materials control, spill prevention, and response plan.**	**Prior to construction.**
Hazardous material spill.	**Prepare a hazardous materials control and spill prevention and response plan that will include, but not be limited to, the following:**		
	Prevent hazardous materials from contaminating soil or entering water courses;	**Verify plan prepared**	**Prior to construction.**
	Establish a spill prevention and counter-measure plan before project construction begins;	**Periodic inspections to verify compliance.**	**During construction.**
	Clean up all spills immediately and agency notification;		
	Provide staging and storage areas for equipment, and possible contaminants away from water courses and their watersheds.		

ENVIRONMENTAL COMMITMENTS			
Potential Impact	**Mitigation**	**Monitoring**	**Timing**
Potential to damage, disturb, or destroy unidentified archaeological or historical resources during construction.	**During construction, if artifacts or non-native stone are exposed or if unusual amounts of bone or shell are observed, or if areas that contain dark-colored sediment that do not appear to have been created through natural processes are discovered, then all work shall cease within 100 feet of the discovery and a qualified archaeologist shall be contacted immediately for an on-site inspection of the discovery. No construction activities shall commence within 100 feet of the find until a determination of significance has been made by a qualified archaeologist and additional mitigation measures implemented that would reduce any potential impacts to less than significant. Such measures could require capping the site and/or data recovery excavations to determine the extent and significance of the site. If any bone is uncovered that appears to be human, then State law requires that the Sutter County Coroner must be contacted. If the Coroner determines that the bone most likely represents a Native American interment, then he/she must contact the Native American Heritage Commission in Sacramento so the most**	**Verify construction contract includes discovery/notification requirements and provisions for stop-work.** **Periodic inspections to verify compliance.**	**Prior to construction.** **During construction.**

ENVIRONMENTAL COMMITMENTS			
Potential Impact	**Mitigation**	**Monitoring**	**Timing**
Recreational and boater navigation on the Sacramento River	**Notify the Commander, 11th Coast Guard District and supply information regarding the size, timing, and identification of barges and other construction-related equipment within the river.** **Five mile-per-hour marker buoys would be located both upstream and downstream of the project area.** **Equip floating construction equipment with appropriate nighttime lighting and daytime markers.**	**Verify construction documents require notification of navigation hazards.** **Written notification of 11th Coast Guard District.** **Verify compliance** **Periodic inspections to verify compliance.**	**Prior to construction.** **Prior to construction.** **During construction.**
Disruption of Swainson's hawk nesting.	**Perform one raptor survey between mid-April to mid-May by a qualified biologist, to identify Swainson's hawk nesting sites.** **Notify CDFandG if Swainson's hawk nests are identified within one-quarter mile of the project site.** **Coordinate with CDFandG regarding appropriate construction activities.**	**Verify construction documents contain Swainson's hawk nesting surveys.** **Nest survey to verify compliance.**	**Prior to construction.** **During construction.**

ENVIRONMENTAL COMMITMENTS			
Potential Impact	**Mitigation**	**Monitoring**	**Timing**
Direct damage to mature trees, or soil compaction around trees within the south access area.	**Mark exclusion areas around mature trees.**	**Verify construction documents contain marking of exclusion areas for heavy equipment.**	**Prior to construction.**
	Exclude the use of heavy equipment within the exclusion areas.	**Periodic inspection to verify compliance.**	**During construction.**

Appendix C

Comments Received on Draft EA/IS

Response to Comments

Notices of Public Distribution

Comments from the Department of Fish and Game, Sacramento Valley Central Sierra Region

Comment: Pg. 3, 2nd paragraph, 1st sentence: "…a reliable water supply for agricultural irrigation and rice straw decomposition…" Are there any plans to make changes in use such as, municipal use or to sell water in the future?

Response: The following language has been added to the EA/IS: "The proposed project would not result in a change in water use by the Sutter Mutual Water Company. Water use by Sutter Mutual Water Company is regulated by both a State Water Resources Control Board water right permit and contract deliveries. The construction and operation of the proposed positive barrier fish screen would not result in an increase in water use for municipal or industrial purposes or result in the sale and transfer of water that would not have occurred under the no project alternative operations."

Comment: Pg. 4, 3rd paragraph, 2nd sentence: "(AFSP) is anticipated to contribute 50% toward the fish screen." The CVPIA is authorized to contribute up to 50%. There is no guarantee that CVPIA will provide the 50%.

Response: The text of the EA/IS has been changed to: "The CVPIA Anadromous Fish Screen Program (AFSP) is anticipated to contribute 50% toward the fish screen; however, this contribution is not guaranteed."

Comment: Pg. 9, 3rd paragraph, 1st sentence: "screen cleaning frequency with a mechanical brush system will be at least once every five minutes." The cleaning mechanism should be capable of cycling once every five minutes.

Response: The text of the EA/IS has been changed to: "A mechanical bush system for screen cleaning will be capable of cycling once every five minutes." The sentence, "Screen cleaning frequency with a mechanical brush system will be at least once every 5 minutes" has been deleted.

Comment: Pg. 12, 4th paragraph: Whenever a fish screen panel is removed, regardless of reason, a block-off panel should be installed to prevent any entrainment. Also, pumping rates should be decreased appropriately so that the approach velocity criteria are not violated.

Response: The following language has been added to the EA/IS: "Block-off and/or replacement screen panels will be stored on site and used to replace screen panels removed for routine maintenance or repair. Screen panels will be blocked off only during those time periods that water diversions are occurring at the Tisdale pumping plants. Water diversions will be

reduced, to the extent possible given existing facilities and constraints, during periods when screen panels have been removed from service in an effort to achieve approach velocity criteria. Spare screen panels will be maintained on site, or at other suitable storage locations, that can be used to replace screen panels removed for repair or maintenance."

Comment: Pg. 15, 1st paragraph, 7th sentence: A long-term permit for maintenance dredging should be allowed within the forebay. Any dredging in the Sacramento River should require a separate permit on an "as needed basis."

Response: Comment noted. A long-term permit for maintenance dredging within the intake forebay should be granted to Sutter Mutual Water Company. The positive barrier fish screen has been designed to minimize sediment accumulation within the Sacramento River in an effort to reduce requirements for maintenance dredging. Should maintenance dredging be required within the Sacramento River outside of the positive barrier fish screen structure applications will be submitted for separate maintenance dredging permits to the appropriate Sate and federal agencies. An addition to the text of the EA/IS reflects the concern regarding the need for application submission regarding maintenance in the Sacramento River.

Comment: Pg. 34, 1st paragraph: Hydraulic testing was conducted with a physical model. Why did you not include the results from this evaluation?

Response: Results of hydraulic model testing were used in developing the engineering design for the proposed positive barrier fish screen. Results of hydraulic model testing have been incorporated into the Sutter Mutual Water Company Tisdale positive barrier fish screen feasibility analysis which has been submitted to both State and federal agencies participating in the AFSP for review and comment as part of the basic foundation for engineering design for the proposed fish screen. Detailed engineering information and support studies, such as the hydraulic model testing results, have not been included as part of EA/IS but rather have been documented as separate technical reports prepared for the proposed project. Information from these technical reports has been summarized and included as part of the project description presented in the EA/IS for use as part of the basis in assessing and evaluating potential adverse impacts of the proposed project.

Comment: Pg. 64: There is no mention of potential problems with predators or predation associated with the installation of a new structure in the river. What measures have been taken to minimize predation or predatory accumulation around the new structure?

Response: Predation associated with the physical structure resulting from the installation of a positive barrier fish screen within the Sacramento River was identified as an issue in the original engineering design for the proposed fish screen project. The fish screen has been designed to minimize potential areas where predator accumulation may occur and to minimize areas where potential prey may be concentrated and therefore experience increased vulnerability to potential predation. The fish screen has been designed to minimize turbulence along the screen surface, to

maintain a smooth and uninterrupted screen surface, and to avoid areas of predator and/or prey concentration. Transition areas constructed on both the upstream and downstream sides of the fish screen structure to provide continuity with the Sacramento River channel bank would also reduce areas of potential predation associated with the structure. The design of the positive barrier fish screen has been reviewed by both State and federal resource agencies as part of development of the proposed project.

Comments from the California State Land Commission:

Comment: The proposed project involves the Sacramento River, which is a State sovereign land under the jurisdiction of the CSLC. Section 6372 of the Public Resources Code provides that if a facility is for the "procurement of fresh-water from and construction of drainage facilities into navigable rivers, streams, lakes and bays," and if the applicant obtains a permit from the local reclamation district, State Reclamation Board, the U.S. Army Corps of Engineers, or the Department of Water Resources, an application shall not be required by the Commission. Since the proposed project appears to fall within this section, you will not need to obtain a lease from the Commission, provided you obtain one of the above-listed permits. Please forward a copy of the permit to Diana (?) Jones, Public Land Manager, State Lands Commission…

Response: When a Section 10/404 permit or other relevant permit or authorization for the proposed project is issued by the U.S. Army Corps of Engineers or other authorizing agency, copies of the permits will be forwarded as requested.