Final

Fish Passage Improvement Project

at the

RED BLUFF DIVERSION DAM

EIS/EIR

ENVIRONMENTAL IMPACT STATEMENT/ENVIRONMENTAL IMPACT REPORT

CEQA Lead- Tehama-Colusa Canal Authority

NEPA Lead- U.S. Bureau of Reclamation

Prepared for

Tehama-Colusa Canal Authority

Willows, California

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Fish Passage Improvement Project at the Red Bluff Diversion Dam Tehama County, California

Final Environmental Impact Statement/Environmental Impact Report

The Tehama-Colusa Canal Authority and the Bureau of Reclamation have analyzed alternative methods to improve adult and juvenile anadromous fish passage at the Red Bluff Diversion Dam pursuant to the Central Valley Project Improvement Act, while also providing for the continued diversion of irrigation water consistent with the Sacramento Canals Unit authorizing legislation. The proposed action would increase the annual period that the dam is operated to allow unobstructed fish passage. The proposed action includes construction of a new pumping facility, including a positive barrier fish screen to preclude entrainment of fish, which would allow for the continued diversion of irrigation water into the Tehama-Colusa and Corning Canals during the periods when gravity water diversion into the canals would not be possible.

Lead Agencies:

Tehama-Colusa Canal Authority
U.S. Bureau of Reclamation

Comments must be received by July 7, 2008

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Acronyms and Abbreviations

°F	degrees Fahrenheit
ACID	Anderson-Cottonwood Irrigation District
AFRP	Anadromous Fishery Restoration Program
AMP	Adaptive Management Program
AMPC	AMP Policy Committee
AMTAC	AMP Technical Advisory Committee
Appraisal Report	Appraisal Report on the Red Bluff Diversion Dam Fish Passage Program
AWS	auxiliary water system
BA	Biological Assessment
BRT	Biological Review Team
CAR	Coordination Act Report
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
cfs	cubic feet per second
CHO	Constant Head Orifice
CIWMB	California Integrated Waste Management Board
CNFH	Coleman National Fish Hatchery
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
CVP-OCAP	Long-term Central Valley Project/State Water Project Operations Criteria and Plan
CY	cubic yard
DEIS/EIR	Draft Environmental Impact Statement/Environmental Impact Report
DPS	distinct population segment
DTM	Digital Terrain Model

DWR	California Department of Water Resources
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
ERP	Ecosystem Restoration Program
ESA	federal Endangered Species Act
ESU	Evolutionary Significant Unit
FEIS/EIR	Final Environmental Impact Statement/Environmental Impact Report
FEMA	Federal Emergency Management Agency
FGC	Fish and Game Commission
GCID	Glenn-Colusa Irrigation District
HpCDD	heptachlorodibenzo-p-dioxin
I-5	Interstate 5
Industrial PRG	Industrial Preliminary Remediation Goal
LF	linear feet
mg/kg	milligrams per kilogram
MOU	Memorandum of Understanding
MWh	megawatt-hour
NEPA	National Environmental Protection Agency
NMFS	National Marine Fisheries Service
O&M	operation and maintenance
Pactiv	Packaging Corporation of America
PCB	polychlorinated biphenyls
PeCDD	pentachlorodibenzo-p-dioxin
PFMC	Pacific Fishery Management Council
PUP	Project Use Power
RBDD	Red Bluff Diversion Dam
Reclamation	U.S. Bureau of Reclamation
ROD	Record of Decision
RPP	Research Pumping Plant
RWQCB	California Regional Water Quality Control Board

SR	spring-run
SRA	shaded riverine aquatic
SVOC	semivolatile organic compound
SWP	State Water Power
TAG	Technical Advisory Group
TC	Tehama-Colusa
TCCA	Tehama-Colusa Canal Authority
TCD	Temperature Control Device
TCFF	Tehama-Colusa Fish Facility
TDS	total dissolved solids
TTLC	total threshold limit concentration
USBR	U.S. Bureau of Reclamation
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound
WR	winter-run

SECTION 1.0

Background and Need for the Proposed Action

1.1 Introduction

This Tehama-Colusa Canal Authority (TCCA) Fish Passage Improvement Project at the Red Bluff Diversion Dam (RBDD) Final Environmental Impact Statement/Environmental Impact Report (FEIS/EIR) addresses the environmental issues, alternatives, and impacts associated with improvement of anadromous fish passage, both upstream and downstream, at RBDD. The purpose of this Environmental Impact Statement (EIS)/Environmental Impact Report (EIR) is to inform decisionmakers and stakeholders about the potential adverse and beneficial impacts of the proposed action and alternatives. This FEIS/EIR also provides responses to comments received on the Draft Environmental Impact Statement/ Environmental Impact Report (DEIS/EIR) and updates and corrects portions of the DEIS/EIR.

This FEIS/EIR, and the previous DEIS/EIR, was prepared by TCCA and the U.S Bureau of Reclamation (Reclamation) (see DEIS/EIR Section 5.1 for agency involvement and a list of the agency approvals required for the project to proceed). This document meets the legal requirements of the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) and discloses relevant information to interested parties and provides responses to interested parties who have participated in both the decision-making process and the implementation of that decision.

By preparing a single document that complies with both statutes, the involved agencies have avoided duplication of effort. The statutes are similar in that they require federal and state agencies to consider a range of alternatives to meet the project purpose, to evaluate the impacts of the alternatives, and to disclose the alternatives and impacts to the public prior to making a commitment of resources. The statutes differ in several ways; two of the more substantive are as follows:

- CEQA requires state agencies to implement feasible mitigation, whereas NEPA requires only that federal agencies consider mitigation
- CEQA requires that proposed actions be compared to existing conditions, whereas NEPA requires that they be compared to future conditions without the project

Where appropriate, these differences have been disclosed throughout the process, and they will not preclude the project from moving forward cooperatively.

1.2 Need for the Proposed Action

NEPA requires that an EIS briefly specify the purpose and need of a given proposed action. Similarly, CEQA requires that an EIR include a statement of project objectives. Both the purpose and need, and project objectives are intended to help the implementing agency develop a reasonable range of alternatives and aid decisionmakers in selecting a preferred

alternative. For the purposes of this document, the NEPA-mandated purpose and need statement and the CEQA-mandated project objective result in the same range of alternatives.

In Section 3406(b)(10) of the Central Valley Project Improvement Act (CVPIA) (106 Stat. 4706), Congress authorized and directed the Secretary of the Department of the Interior, acting through Reclamation, to:

> *[D]evelop and implement measures to minimize fish passage problems for adult and juvenile anadromous fish at the Red Bluff Diversion Dam in a manner that provides for the use of associated Central Valley Project conveyance facilities for delivery of water to the Sacramento Valley National Wildlife Refuge complex in accordance with the requirements of subsection (d) of this section…*

Subsequently, changes to Glenn-Colusa Irrigation District's (GCID) water conveyance infrastructure allowed for improvements to refuge water supply deliveries via the GCID Canal. The federal purpose of this fish passage improvement project is to substantially improve the long-term capability to reliably pass anadromous fish, both upstream and downstream, past RBDD, while also providing for continued agricultural water deliveries to the Tehama-Colusa (TC) and Corning Canals consistent with the 1950 Act authorizing construction and operation of the Sacramento Canals Unit of the Central Valley Project (CVP). The primary non-federal purpose is to continue and improve the long-term ability to reliably and cost effectively convey water through the TC Canal, for delivery to the TCCA contractors, while improving fish passage at RBDD. The project will serve both purposes, and will do so in a manner that provides for the use of associated CVP conveyance facilities for delivery of water to the Sacramento Valley National Wildlife Refuge complex in accordance with the requirements of CVPIA Section 3406(d).

Consistent with the above statements, the purpose of the project was described in the DEIS/EIR as follows:

- Substantially improve the long-term ability to reliably pass anadromous fish and other species of concern, both upstream and downstream, past RBDD.
- Substantially improve the long-term ability to reliably and cost effectively move sufficient water into the TC and Corning Canal systems to meet the needs of the water districts served by TCCA.

The need for this project is in response to the continued well-documented fish passage and agricultural water diversion reliability problems associated with the operation of RBDD. In addition, this project is necessary to meet the requirements under CVPIA Section 3406.

1.3 Background

RBDD, TC Canal, and Corning Canal were authorized as part of the Sacramento Canals Unit of the Central Valley Project (CVP) to provide irrigation water in the Sacramento Valley, mainly in Tehama, Glenn, and Colusa Counties. Prior to the completion of RBDD in the mid-1960s, anadromous fish had unimpeded passage through the current dam site. The dam created a barrier in the Sacramento River, impeding and delaying passage to spawning and rearing habitat above the dam. The dominant feature of RBDD is its gates. When the

gates are lowered (gates-in) into the Sacramento River, the elevation of the water surface behind the dam rises, allowing gravity diversion into the TC and Corning Canals for delivery to irrigation districts. Raising the gates allows the river to flow virtually unimpeded but precludes gravity diversion into the canals. When the gates are lowered, RBDD impedes both upstream- and downstream-migrating fish because fish ladders, included in the original dam design, have proven inefficient at certain flows to pass adult anadromous fish to upstream spawning grounds. Juvenile downstream migrating fish must pass the dam through the fish ladders or through high-velocity water passing under the dam gates. Additionally, the tailrace and lake created by the dam provide habitat for species that prey on juvenile salmon, reducing their overall survival rates.

In 1993, the National Marine Fisheries Service (NMFS) issued a Biological Opinion (BO) addressing the effects of CVP operations on endangered winter-run Chinook salmon, requiring that the gates be kept in the raised position (gates-out) for a greater portion of the year (September 16 through May 14) than had been required previously. This has significantly improved fish passage at RBDD, but has made the facility less effective as a water source for agriculture. The current gates-in schedule may be subject to further reduction, if it is found to be a reasonable and prudent action, to avoid jeopardy to species recently listed as endangered under the federal Endangered Species Act (ESA) or the California Endangered Species Act (CESA). Species of concern include winter-, spring-, and fall-/late-fall-run salmon; steelhead; sturgeon; and splittail. However, further reduction of the gates-in period will further reduce RBDD's ability to divert water for agriculture.

The CVPIA amends the authorization of the CVP to include fish and wildlife protection, restoration, and mitigation as project purposes having equal priority with irrigation and domestic uses. Section 3406(b)(1) of the CVPIA directs the Secretary of the Interior to develop and implement a program that makes all reasonable efforts to double natural production of anadromous fish in Central Valley streams. Section 3406(b)(10) of the CVPIA authorized and directed the Department of the Interior to "develop and implement measures to minimize fish passage problems for adult and juvenile anadromous fish at the Red Bluff Diversion Dam in a manner that provides for the use of associated Central Valley Project conveyance facilities for delivery of water to the Sacramento Valley National Wildlife Refuge…"

The DEIS/EIR was released in 2002, and it was anticipated that the FEIS/EIR would be released in 2003. However, other systemwide operational reviews, such as ESA consultations addressing the Long-term CVP/State Water Project (SWP) Operations; implementation of CVPIA; and CALFED Bay-Delta Programs, took precedence, resulting in the delay of the FEIS/EIR. Additionally, there was some concern over the potential ESA listing of the green sturgeon. Listing of green sturgeon under the ESA was initially determined to be not warranted; however, the species was listed within the Sacramento River in April 2005.

1.4 Public Review and Outreach

The lead agencies released the DEIS/EIR on August 30, 2002 (SCN#2002-042-075), for public comment and review. At the request of the City of Red Bluff, the original 60-day public

comment period was extended to 90 days. The official public comment period ended on December 6, 2002.

A public hearing was held on September 25, 2002, at the Red Bluff Community Center in Red Bluff to receive public input on the project. A court reporter was used to record all comments and create a complete transcript of the hearing. Public outreach efforts also included the publication of a monthly newsletter and a project Web site to help inform the public of the decisionmaking process.

In addition to the public outreach process, a Stakeholder Working Group and a Technical Assistance Group were formed to facilitate public and agency input and review of the project and alternatives. Each of these groups met many times between 2001 and 2007 to develop alternatives and provide technical guidance to the process.

On January 30, 2007, the NEPA lead agency (Reclamation) published a Notice of Availability for the DEIS/EIR in the Federal Register (Volume 72, No. 19), which began an additional comment period lasting through March 16, 2007. Additional requests were made at this time to extend the comment period, and this request was granted by Reclamation.

The complete public input process for the project yielded 565 individual comment letters, many of which included multiple comments to the document. Each comment to the draft has been scanned, and a response has been generated and included in Section 4.0, Responses to Comments on the DEIS/EIR, of this FEIS/EIR. (Section 4.0, Section 5.0, Appendix A, and Appendix B are available on the compact disc following Section 3.0.)

1.5 Document Organization

This FEIS/EIR has been organized into the following sections:

- **Section 1.0 – Background and Need for Proposed Action –** The background section provides the basic context and timeline that were part of the process as well as the significant issues that were addressed throughout the review period. This section also describes the proposed action that the lead agencies have chosen.
- **Section 2.0 – Changes to the DEIS/EIR –** Section 2.0 presents a table that shows each change that was made to the DEIS/EIR text. Text revisions were made as a result of editing or comments that were received from the public or agencies after the DEIS/EIR was released for review.
- **Section 3.0 – Thematic Responses –** Several commentors raised issues or concerns that were shared, in part, by other commentors. For this FEIS/EIR, six thematic responses were prepared to clarify information or discuss the specific concerns that were identified in the document. Thematic responses are included in this FEIS/EIR to provide a summary of the issues involved around a specific area of concern and are sometimes referenced in the Comments and Responses section to address an individual comment letter.
- **Section 4.0 – Responses to Comments on the DEIS/EIR –** Section 4.0 provides a complete list of all comments received on the DEIS/EIR and the response to the comment from the lead agencies (provided on compact disc).

- **Section 5.0 – Works Cited –** Section 5.0 provides complete reference information for all sources cited in this FEIS/EIR (provided on compact disc).
- **Appendix A – Climate Change Impacts Analysis** (provided on compact disc).
- **Appendix B – DEIS/EIR with Changes in Redline** (provided on compact disc).

1.6 Description of the Proposed Action and Alternatives

The proposed action is the Preferred Alternative in accordance with NEPA and the Environmentally Superior Alternative in accordance with CEQA. It represents a combination of alternatives that were evaluated in the DEIS/EIR. The analyses in the DEIS/EIR covered all of the proposed action components. Specifically, project facilities will include construction of a pumping plant at the Mill Site with an initial installed capacity of 2,180 cubic feet per second (cfs) and a footprint that will allow expansion to 2,500 cfs, if necessary. This proposed action does not include any increase in water diversions into the TC and Corning Canals, but would allow for existing water diversions to occur without using the RBDD or additional, existing pumping facilities. An expansion to 2,500 cfs would include installation of additional pumps, and it would be subject to the appropriate level of NEPA and CEQA review. Prior to completing construction of the new pumping plant, the current 4-month gates-in operation (May 15 through September 15) will continue.

Reclamation currently anticipates operating RBDD with the gates in between July 1 and the end of the Labor Day weekend after the pumping plant has been constructed and is operational. This operation will provide for improved green sturgeon and salmon passage, relative to the current status quo of 4-month gates-in operation. TCCA does not advocate a change in gate operations, but will defer to subsequent ESA Section 7 consultation determinations after the facility is operational.

Reclamation will seek measures to reduce the potential impacts of the proposed action on local recreation and economic interests, such as providing a short gates-in period to accommodate the Memorial Day boat races. Any such measures will be subject to review by fishery agencies, including ESA Section 7 consultation related to long-term operation of the CVP. Additional details of the proposed action are outlined below.

Facility

The preferred pump station option is a conventional vertical propeller pump station at the Mill Site. The Mill Site is located upstream from RBDD and Red Bank Creek. The general layout of the Mill Site facilities is shown on Figure 1-1. The pump station site configuration consists of trashracks and fish screens, a forebay, pump station, and conveyance facilities. Discharge piping will be routed to a new discharge outlet structure at the sedimentation basin.

The proposed action includes a pumping plant that could be expanded to a maximum capacity of 2,500 cfs, but the initial installed pumping capacity (and associated screened capacity) will be limited to 2,180 cfs. The facility will include a siphon under Red Bank Creek that will convey water from the pumping plant to the existing settling basin at TC Canal headworks. The pumping plant and fish screen will be located at the Mill Site, as

described in the DEIS/EIR. The total footprint will be slightly larger than that described in the DEIS/EIR because the proposed action does not include routine use of the Research Pumping Plant (RPP) facility under full buildout. However, the ESA consultation addressing construction of a new pumping plant was based on the 2,500-cfs footprint.

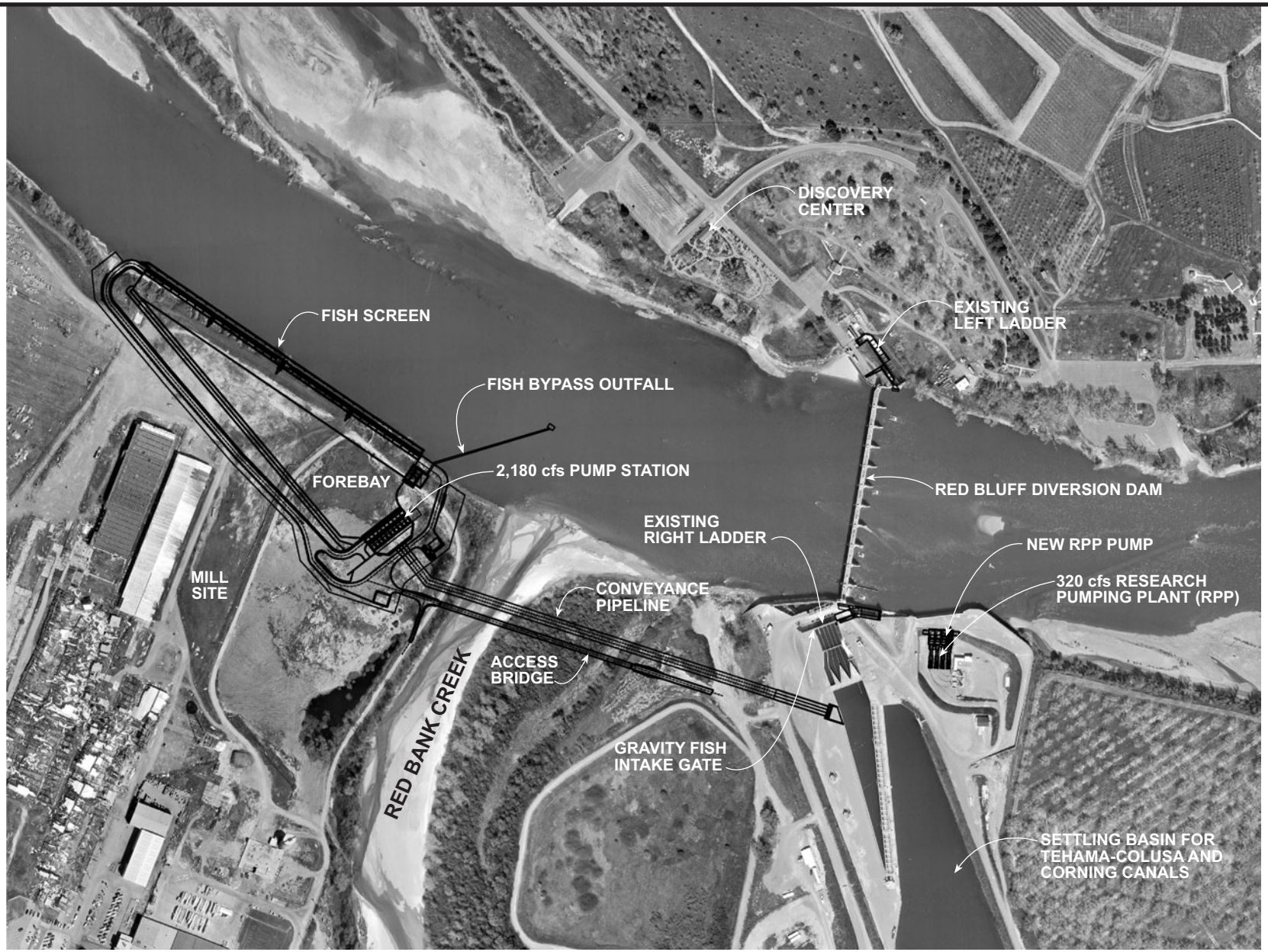
The Mill Site pump station facilities will include a fish screen along the river that will act as a positive barrier, keeping fish in the river while allowing water to be diverted into the canal system. The screens will be designed to provide a 0.33-foot-per-second (fps) approach velocity as required by the California Department of Fish and Game (CDFG). The length of the screen depends on the characteristics of the river (i.e., depth, channel geometry, flow volume, and velocity under various operating conditions), and will be precisely determined during final design. Current estimates for a 2,500-cfs-footprint facility indicate a screen length of approximately 1,100 feet with screens installed over approximately 60 bays. Blowout panels will be provided as emergency hydraulic relief in the event that differential head between the river and forebay threatened the structural integrity of the facility. The top of the bulkheads will be set at the 25-year flood elevation to limit the amount of debris in the forebay for most high-flow events.

Water will flow through the fish screens into the pump station forebay and into the vertical propeller pump station. Approximately 10 pumps will be required for full capacity. Specifics regarding the number and types of pumps to be installed will be determined during final design, as will the precise location of the pump station relative to the fish screens. Considerations will include the cost of excavation versus conveyance piping and the hydraulic flow characteristics of the forebay. During gates-in operation, water will be diverted by gravity through the new facility, without use of the pumps, into the existing sedimentation basin.

The pumps will lift the water into the pump station outlet box. The water will flow by gravity from the outlet box through a siphon under Red Bank Creek. The water will discharge into the existing settling basin at the canal headworks. The conveyance system across Red Bank Creek will consist of pipes or culverts or a combination of both; the most advantageous combination will be developed during final design. The conveyance system will be sized for a maximum velocity of 8 fps at peak flow. The discharge structure at the sedimentation basin could be located anywhere along the westerly side of the sedimentation basin and will be determined during final design, possibly including a direct connection to the Corning Canal. The option to retain drum screens and current intake facilities will be considered during final design. A vehicle access bridge will most likely be constructed across Red Bank Creek to provide access for maintenance vehicles between the Mill Site and existing RBDD facilities.

Operations

The new pumping plant will be capable of any pattern of operation throughout the year and will not constrain future RBDD gate operations. Under the proposed action, RBDD will continue 4-month gates-in operation (May 15 through September 15), with the current provision for NMFS-approved emergency gate closures when necessary, until the new pumping plant is constructed and is operational. However, no change is anticipated in the total volume of diversions allowable under current water service contracts held by TCCA member districts. Reclamation currently anticipates operating RBDD with the gates in



NOTE: CAPACITY AND SIZE OF FISH SCREEN DEPENDENT ON ALTERNATIVE SELECTED. LARGEST SIZE (2,180 cfs) SHOWN.

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FIGURE 1-1
GENERAL LAYOUT OF MILL SITE FACILITIES
FISH PASSAGE IMPROVEMENT PROJECT
RED BLUFF DIVERSION DAM EIS/EIR

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between July 1 and the end of the Labor Day weekend after the pumping plant is constructed. Green sturgeon spawn upstream of the RBDD and the majority of adult upstream and downstream migrations occur prior to July and after August. As these fish are listed as threatened under the ESA, RBDD operational details will be reviewed during ESA Section 7 consultations addressing the long-term operation of the CVP. TCCA does not advocate a change in gate operations, but will defer to ESA consultation findings after the facility is operational. Following installation of the pumping plant, emergency gate closures will not be necessary because the installed capacity will be sufficient to accommodate early season irrigation demand. Likewise, diversions from Stony Creek will no longer be necessary to supplement water supplies before the gates are lowered because water will be available from the new facility.

Proposed operations under the proposed action do not include routine use of the RPP. Reliability of the facility as a long-term method of diversion has long been a concern of the TCCA because of excessive maintenance requirements and high energy use. Accordingly, pumping capacity has been added to the Mill Site facility to offset the elimination of the RPP as a routine water supply source. The RPP will continue to be operated as a test facility for fishery research, or for other purposes as needed.

Implementation Process

Identification of the selected alternative is a necessary step for continuing toward long-term resolution of the conflict between agricultural water supply and fish passage at RBDD. It is acknowledged that the project will be implemented over several years, which will facilitate a phased approach to changes in gate operations. RBDD operations could also theoretically be affected through other processes addressing other parts of the California water system, including Bay-Delta operations, water right proceedings, regional water management programs, or offstream storage investigations. The effects of such proceedings on RBDD operations would be addressed in the environmental review in connection with those other proceedings.

Finalization of the EIS/EIR and publication of NEPA and CEQA concluding documents (i.e., Record of Decision [ROD] and Notice of Determination) is the first of several major steps necessary prior to building the proposed facilities. Following conclusion of the NEPA and CEQA processes, project engineering and permitting must be finalized, a process that is anticipated to run approximately 18 months and conclude with final engineering design suitable for open bidding for construction and final regulatory requirements of the permitting agencies.

During the final design and permitting phase, the project proponents will also work cooperatively to procure funding for construction, likely to be over $150 million. Neither project proponent can assure successful procurement of funding commitments, but both agree that the conclusion of the EIS/EIR process will assist in the solicitation of funding commitments from potential federal, state, and local funding interests.

Construction

The primary features of construction will be excavation, construction of concrete structures, and fill and re-grading operations. In basic terms, this will require large pieces of equipment

for digging, moving soil, and pouring concrete. Additionally, because a large portion of the construction activity will occur near the Sacramento River, long series of sheet pile will likely be required to establish dry areas for forming concrete structures. Sheet pile is typically installed using diesel pile driver or vibratory hammer.

Overall, approximately 750,000 cubic yards (CY) of material will need to be excavated to facilitate the construction of the Fish Passage Improvement Project. At this time, it is anticipated that the majority of this soil, or approximately 665,000 CY of material, will be stored onsite. Approximately 2,000 linear feet (LF) of sheet pile will be required to construct various cofferdams in several locations. The project will require a myriad of construction equipment including cranes, front end loaders, pile drivers, backhoes, excavators, scrapers, bulldozers, dump trucks, and other construction equipment and tools.

Construction of the Mill Site pump station will require excavation of a large forebay. About 90,000 CY of excavated material will likely be hauled offsite to a disposal facility, in coordination with responsible agencies, including Tehama County, the Regional Water Quality Control Board (RWQCB), and the California Integrated Waste Management Board (CIWMB). A complete pile-driving setup will be required, as well as a construction barge and extensive earthmoving equipment. Divers will most likely be used to cut sheet piling under water.

The construction schedule depends primarily on funding, but other factors are also important, such as acquisition of required permits and rights-of-way. The construction schedule outlined in the DEIS/EIR assumed the most complex combination of facilities; therefore, actual construction time might be less than that estimate. Further determinations of construction time will be developed during final design.

Maintenance and Operation

Responsibilities for the maintenance and operation of the proposed facility upgrades will be determined during final design. It is currently anticipated that overall system maintenance will be similar to current efforts with regard to maintenance of the settling basin, internal facilities, and control of the point of diversion on the river, but that the new pumping plant will require additional effort and attention. It is possible that continued gate operations for recreational opportunities will need to be coordinated with local interests.

Monitoring and Adaptive Management

A final Adaptive Management Program for RBDD will be developed from the draft Adaptive Management Plan included in the DEIS/EIR (Appendix H). The final Adaptive Management Program will include systematic monitoring and review of RBDD operations, including fish passage, gate operations, screen function, power management, and other issues of concern.

Adaptive management acknowledges that there is a need to constantly monitor such systems and adapt actions that are taken to restore ecological health and improve water management. These adaptations are necessary because conditions continue to change, and the knowledge base and understanding of systems continues to improve. By including an Adaptive Management Program, it is possible to acknowledge areas of uncertainty in a given system and still allow decisionmakers to take action before scientific consensus is

achieved. However, this places a great deal of importance on the design of the Adaptive Management Program.

Experiments to evaluate established hypotheses will be designed after a ROD is completed. Because the design and implementation of experiments have important ramifications to future gate operations, it is important to also include a feedback loop that includes interested Sacramento River stakeholders, including representatives interested in maximizing gates-in operations. Therefore, the following administrative processes will also constitute an important part of the overall Adaptive Management Program:

- Technical actions will be selected by members of the Adaptive Management Science Team, which will include representatives from Reclamation, TCCA, U.S. Fish and Wildlife Service (USFWS), NMFS, CDFG, and California Department of Water Resources (DWR). Technical actions will include the following:
  - Refinement of hypotheses to be tested
  - Design of experiments to test hypotheses
  - Review of applicable monitoring information from other, related efforts in the Sacramento River basin
  - Annual reporting on results of experiments, and summary reporting on results of experiments every 6 to 10 years
- Public workshops or other appropriate mechanisms for policy review will be used to provide an opportunity for stakeholder review and comment on proposed actions and annual and summary reporting of the Adaptive Management Science Team. Membership in the Policy Review Board will include representation from the following agencies/interest groups:
  - Reclamation
  - TCCA
  - City of Red Bluff
  - Lake Red Bluff special interest
  - Sacramento River sportfishing groups
  - Commercial fishing representatives

As appropriate, other special interests may be added to the Policy Review Board. The role of the Policy Review Board will be to provide input to the Adaptive Management Science Team regarding overall approach and focus.

Timeline

The proposed action is proposed to occur in three phases. The current phase will conclude with the finalization of the NEPA/CEQA processes. The design and permitting phase will commence, subject to the availability of funding, after the finalization of NEPA/CEQA and will continue for approximately 18 months. As funding permits, acquisition of the Mill Site property will also occur during this period. Funding commitments will also be secured during this time. The final phase, construction of the proposed facilities, is currently estimated to take 36 months, but will be updated during final design and permitting.

SECTION 2.0

Changes to DEIS/EIR

This section identifies changes to the DEIS/EIR that serve to correct, clarify, and update elements of the document and, in many cases, are the direct result of consideration of public comments received on the DEIS/EIR. Table 2-1 outlines changes that have been adopted into the EIS/EIR. Table 2-1 provides the page number where the changed paragraph was originally located in the DEIS/EIR. Changes are shown by strikeout for deletions and underline for additions. None of the changes associated with responding to the comments received on the DEIS/EIR constitute a significant change to the original text, nor do any of the changes alter the fundamental assessment of environmental impacts. Climate change impacts that could result from the project were analyzed and are included in Appendix A to this FEIS/EIR. Impacts on the global climate are less than significant. The complete DEIS/EIR showing the changes outlined in Table 2-1 is available on compact disc in Appendix B to this FEIS/EIR.

TABLE 2-1
Text Changes to Draft Environmental Impact Statement/Environmental Impact Report

Page	Paragraph with Change
Entire Document	All uses of "chinook" are changed by reference to "Chinook."
Entire Document	All references to Lake Red Bluff being 4 miles long are changed by reference to 6 miles long.
iii	• CEQA requires that proposed actions be compared to existing conditions, whereas NEPA requires ~~only~~ that they be compared to future conditions without the project
viii	The fishery resources in the Sacramento River near RBDD consist of a diverse collection of species including native anadromous salmonids (NAS), other native anadromous fish (NAO), non-native anadromous fish (NNA), and resident native and non-native fish (RN and RNN). The Sacramento River is the largest river system in California and more than 90 percent of the Central Valley salmon spawning and rearing occurs within this river system. The Sacramento River supports four runs (races) of chinook salmon (fall, late-fall, winter, and spring run) and steelhead. Other native anadromous species such as white sturgeon, green sturgeon, Pacific lamprey, and river lamprey also occupy or have the potential to occupy the Sacramento River at various stages of their life history and during seasonal intervals. Table ES-2 shows the life history timing for these species in the Sacramento River, near RBDD.
x	The gates on RBDD are in place from mid-May to mid-September. When RBDD gates are in, the water level in the Sacramento River just above the dam rises approximately 14~~12~~ feet, which results in the formation of Lake Red Bluff. When full, the lake contains approximately 3,900 acre-feet of water and extends approximately 6 miles upstream through the City of Red Bluff. RBDD affects river surface elevations upstream of the dam. During the gates-in period, the surface-water elevation at the dam is maintained at 252.5 feet. During the gates-out period (September 16 through May 14), surface-water elevations at RBDD range from approximately 238.5 feet (at 4,000 cfs) to 254 feet (at 100,000 cfs).
xi	**Groundwater.** Groundwater quality is generally excellent in the region. In the most recent summary of groundwater conditions conducted in 1991, total dissolved solids (TDS) in the Red Bluff area was classified as less than 200 mg/L, which is better than~~below~~ drinking water standards. No evidence of elevated levels of boron, nitrates, arsenic, or selenium has been found in the groundwater in the Red Bluff area. Any contaminated soil identified during construction would be disposed according to applicable standards. Mitigation would reduce these potential impacts to a less than significant level.

TABLE 2-1
Text Changes to Draft Environmental Impact Statement/Environmental Impact Report

Page	Paragraph with Change
xiii	Construction and operations of the 4-month Bypass Alternative would result in a conflict with the existing land use plan for the Recreation Area. The bypass channel would require removal of camping sites and would isolate the Discovery Center, drastically reducing its utility. Further, the existing Recreation Area has been developed through extensive volunteer efforts and has been the focus for many educational programs, which add to its unique character. Additionally, a number of boat ramps and docks have been developed to take advantage of Lake Red Bluff. If gate operations were reduced to 2-month operations or gates-out operations year-round, these boat ramps and docks would no longer be functional during the additional gates-out period, causing impacts to current land use. No mitigation is available to offset these impacts.
xvi	The value of properties adjacent to the lake or with easy access to the lake would likely decline from the loss of the lake. While it is uncertain how large this impact would be, it is expected that, in general, the impact would be in the low end of national estimates of property values with lakeviews and proximity to a lake, resulting in potential decreases of 4 to 18 percent or roughly $7,000 to $31,000 per property.
xvi	Information on cultural resources was collected through a records search, literature review, consultation with agencies, and two archaeological surveys. According to the Northeast Information Center of the California Historical Resources Information System, three early archaeological inspections were conducted near RBDD, but the files for these surveys are missing; therefore, no information is available. Two prehistoric-period cultural resources, TEH-881 and TEH-882, were identified and recorded within a 0.5-mile radius of the project, but they are not located within the area of potential effect. Accordingly, they are not discussed further. ~~have been identified and recorded within a 0.5-mile radius of the proposed activity area.~~ Two ~~Three unrecorded~~ cultural resources (TEH-59 and TEH-66) located within the area of potential effect ~~proposed activity area~~ were plotted on Information Center maps. ~~All of these resources were noted for additional consideration.~~ The locations of these sites were thoroughly checked during the archaeological surveys. The areas were found to have been substantially modified, and no archeological materials were discovered. Based on the known disturbances to the sites and on the results of the archaeological surveys, it is assumed that these sites do not contain archaeological resources. However, USBR still needs to conclude the Section 106 process for this undertaking and will seek the State Historic Preservation Officer's (SHPO) concurrence that investigations at these sites are sufficient and complete. In addition, a small, one-room, single-story structure (PA-02-01) was identified within the APE. This small structure is believed to be ineligible for inclusion in the National Register of Historic Places, and USBR will seek the SHPO's concurrence that PA-02-01 is not eligible. Two additional structures (the Diamond Lumber Mill Site and the Red Bluff Dam and associated Diversion Facility) remain to be recorded and evaluated for possible inclusion in the National Register of Historic Places. If either is determined to be eligible for the National Register of Historic Places, then USBR will apply the criterion of adverse effect and conclude the Section 106 process, as appropriate. USBR consulted with SHPO regarding this project on May 1, 2002. As described above, consultation with SHPO regarding this project is ongoing.

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xxiv through xxxix	**TABLE ES-4** Summary of Significant Adverse Environmental Impacts and Proposed Mitigation

DEIS/EIR Action Alternative	Description of Significant Impact	Mitigation	Level of Significance after Mitigation
	Biological Resources		
Special-status Species			
1A: 4-month Improved Ladder	VELB: VELB are entirely dependent on the elderberry shrub. The six elderberry shrubs and/or groups of shrubs identified in the project area are within the 200-foot buffer area considered to be temporarily impacted in this analysis. Removal of the elderberry shrubs under this alternative has the potential to adversely affect the federal-listed VELB.	VELB: TCCA and USBR would attempt to avoid elderberry shrubs in locating staging areas, access roads, and other construction areas. Shrubs that can be avoided would be fenced and posted, and workers would be educated about VELB in accordance with the Conservation Guidelines. If elderberry shrubs cannot be avoided, they would be transplanted, and additional seedlings would be planted at a secure mitigation site in accordance with the Conservation Guidelines. Section 7 consultation with USFWS has been concluded with the issuance of a Biological Opinion.	Less than significant
Other Special-status Species			
1A: 4-month Improved Ladder	Osprey: The three osprey nest platforms on the south side of the Sacramento River would need to be removed during construction.	Osprey: Prior to the start of construction activities, all threethe two platforms that can supporting osprey nesting would be removed. TCCA and USBR would work with CDFG to identify nearby location(s) to erect two platforms to serve as replacement nesting sites. The relocated platforms would be installed concurrently with the removal of the existing platforms and be completed prior to the start of the nesting season.	Less than significant

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Summary of Significant Adverse Environmental Impacts and Proposed Mitigation

DEIS/EIR Action Alternative	Description of Significant Impact	Mitigation	Level of Significance after Mitigation
		Recreation	
1B: 4-month Bypass	New Pump Station, Right Bank Fish Ladder, Conveyance Facility, and Bypass Channel: Temporary construction-related impacts associated with the 4-month Bypass Alternative include all impacts identified for the 4-month Improved Ladder Alternative and those noted below. Temporary impacts from construction of the bypass channel include: • Extensive excavation and earthmoving equipment within the Recreation Area. • Limited access to the Discovery Center/Charter School. • Limited access to the USFS/Sycamore Grove Campground. • The relocation of Sale Lane and the USFS/Sycamore Grove Campground Road. • Removal of approximately 10 camping spaces at the Sycamore Grove Campground. • Construction-related traffic increase on Sale Lane. • Construction of an access bridge over the bypass channel. • Construction of security fencing around the bypass channel.	New Pump Station, Right Bank Fish Ladder, Conveyance Facility, and Bypass Channel: Mitigation options to address the temporary construction-related impacts include: • Use the latest construction techniques to minimize impacts (i.e., noise blankets for pile-driving operations). • Conduct an ongoing public information campaign targeted at area recreation users. This campaign would provide information on construction activities/impacts as well as information on temporary alternate recreation sites. • Maintain temporary access for vehicles, pedestrians, and cyclists to all Recreation Area facilities throughout construction. • Maintain the existing access to the Discovery Center with the construction of a bridge. • Create a new alignment of Sale Lane to access the boat ramp south of RBDD. • Design security fencing in conjunction with USFS to be minimally intrusive in size, location, color, and materials. Alternative security measures would be investigated, such as use of rock walls or other natural materials to address safety issues around the bypass channel. • Develop 10 new campsites and all supporting infrastructure (roads/trails and utilities) at an alternate location to offset those lost during construction.	1B: 4-month Bypass

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Summary of Significant Adverse Environmental Impacts and Proposed Mitigation

DEIS/EIR Action Alternative	Description of Significant Impact	Mitigation	Level of Significance after Mitigation
		Land Use	
1B: 4-month Bypass	Sycamore Grove Campground: Temporary and permanent construction-related impacts would also occur to the use of the Sycamore Grove Campground facilities located in the Recreation Area. Construction vehicles would need access to the campground area to construct the lower end of the channel. Approximately 10 camping facilities would be ~~permanently~~ removed as a result of construction of the bypass channel. A new road would need to be constructed to maintain access to the remaining camping facilities.	~~Sycamore Grove Campground: No mitigation is available.~~Although the loss of 10 campsites from Sycamore Campground is unavoidable, construction of replacement campsites (Mitigation 1B-R1), including supporting infrastructure, would mitigate the impact.	Significant
1B: 4-month Bypass	Recreation Area: Construction of the bypass channel does not comply with the current management direction in the Mendocino National Forest Land and Resource Management Plan.	Recreation Area: Amendment of the Mendocino National Forest Land and Resource Management Plan under the~~is~~ alternative would eliminate conflict with current ~~reconcile~~ management direction in the Mendocino National Forest Land and Resource Management Plan ~~with the new situation, but would not avoid the impacts~~.	Significant
		Cultural Resources	
1A: 4-month Improved Ladder	Unidentified Cultural Resources: Construction activities include excavation and other grading and digging activities. It is possible that currently unidentified cultural resources could be discovered during these activities, and destruction of such resources could result in a significant impact.	Unidentified Cultural Resources: If during construction activities, ~~unusual~~ amounts of non-native stone, bone, shell, or prehistoric or historic period artifacts are discovered, or if areas that contain dark-colored sediment that do not appear to have been created through natural processes are discovered, then work would cease in the immediate area of discovery, and USBR's Contract Inspector and the USBR Regional Archaeologist ~~a professionally qualified archeologist~~ would be contacted immediately for an onsite inspection of the discovery. USBR would consult with the SHPO pursuant to 36 CFR 800.13 to evaluate the find, assess the project's effects on the find, and resolve any potential adverse effects. ~~If any bone is uncovered that appears to be human, the Tehama County Coroner would be contacted. If the coroner determines the bone most likely represents a Native American interment, the coroner would contact the Native American Heritage Commission in Sacramento for identification of the most likely descendants. Implementation of this mitigation would reduce potentially significant impacts to a less than significant level.~~	

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Summary of Significant Adverse Environmental Impacts and Proposed Mitigation

DEIS/EIR Action Alternative	Description of Significant Impact	Mitigation	Level of Significance after Mitigation
		If any bone is uncovered from private land that appears to be human, the Tehama County coroner would be contacted, according to state law. If the coroner determines that the bone most likely represents a Native American interment, the coroner would contact the Native American Heritage Commission for identification of the most likely descendants. In the event that human remains or cultural items are discovered on USBR lands, then all work should cease in the vicinity of the discovery, and the requirements of the Native American Graves Protection and Repatriation Act and Reclamation Directives and Standards LND 07-01 shall be implemented and followed.	
		Air Quality	
1A: 4-month Improved Ladder	Fugitive Dust Emissions: During ground surface preparation, most of the PM_{10} emissions would be composed of fugitive dust. Short-term impacts with regard to dust generated during construction would be considered potentially significant because of the current exceedance of the state PM_{10} standards; however, when standard fugitive dust mitigation measures are applied, PM_{10} construction impacts would be less than significant.	Fugitive Dust Emissions: A ~~dust control program~~ fugitive dust emissions plan would be implemented in accordance with Tehama County Air Pollution Control District Rule 4:24. It would include ~~with~~ the following components: • Equipment and manual watering would be conducted on all stockpiles, dirt/gravel roads, and exposed or disturbed soil surfaces, as necessary, to reduce airborne dust. • The contractor or builder would designate a person to monitor the dust control program and to order increased watering, as necessary, to prevent transport of dust offsite. This person would respond to citizen complaints. • Dust-producing activities would be suspended when high winds create construction-induced visible dust plumes moving beyond the site in spite of dust control. • All trucks hauling soil and other loose material would be covered, or would be required to have at least 2 feet of freeboard. • All unpaved access roads and staging areas at construction sites would have soil stabilizers applied as necessary. • Streets in and adjacent to construction area would be kept swept and free of visible soil and debris. • Traffic speeds on all unpaved roads would be limited to 15 miles per hour.	Less than significant

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Summary of Significant Adverse Environmental Impacts and Proposed Mitigation

DEIS/EIR Action Alternative	Description of Significant Impact	Mitigation	Level of Significance after Mitigation
1A: 4-month Improved Ladder	Construction Exhaust Emissions: Fugitive dust impacts are significant during construction, but after mitigation is applied they are reduced to a level of less than significant. PM_{10}, NO_x, and VOC are significant during construction, but after mitigation is applied they are reduced to a level of less than significant. Operations-related impacts are less than significant.<br~~Total daily emission levels of 777.82 lb/day of CO and 238.84 lb/day Nox would exceed their respecttive significance thresholds of 550 lb/day and 219 lb/day set in the National Ambient Air Quality Standards.~~	Construction Exhaust Emissions: An equipment control program would be implemented with the following components: • Properly maintain equipment. • Limit idling time when equipment is not in operation.	Less than significant
1B: 4-month Bypass	Construction Exhaust Emissions: Fugitive dust impacts are significant during construction, but after mitigation is applied they are reduced to a level of less than significant. PM_{10}, NO_x, and VOC are significant during construction, but after mitigation is applied they are reduced to a level of less than significant. Operations-related impacts are less than significant.<br~~Total daily emission levels of 1,147.57 lb/day of CO and 352.45 lb/day Nox would exceed their respective significance thresholds of 550 lb/day and 219 lb/day set in the National Ambient Air Quality Standards.~~	Construction Exhaust Emissions: Mitigation identical to 4-month Improved Ladder Alternative.	Less than significant
2A: 2-month Improved Ladder	Construction Exhaust Emissions: Fugitive dust impacts are significant during construction, but after mitigation is applied they are reduced to a level of less than significant. PM_{10}, NO_x, and VOC are significant during construction, but after mitigation is applied they are reduced to a level of less than significant. Operations-related impacts are less than significant.<br~~Total daily emission levels of 963.73 lb/day of CO and 295.96 lb/day Nox would exceed their respective. significance thresholds of 550 lb/day and 219 lb/day set in the National Ambient Air Quality Standards.~~	Construction Exhaust Emissions: Mitigation identical to 4-month Improved Ladder Alternative.	Less than significant

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Summary of Significant Adverse Environmental Impacts and Proposed Mitigation

DEIS/EIR Action Alternative	Description of Significant Impact	Mitigation	Level of Significance after Mitigation
2B: 2-month with Existing Ladders	Construction Exhaust Emissions: Fugitive dust impacts are significant during construction, but after mitigation is applied they are reduced to a level of less than significant. PM_{10}, NO_x, and VOC are significant during construction, but after mitigation is applied they are reduced to a level of less than significant. Operations-related impacts are less than significant. ~~Total daily emission levels of 876.11 lb/day of CO and 269.04 lb/day Nox would exceed their respective significance thresholds of 550 lb/day, and 219 lb/day set in the National Ambient Air Quality Standards.~~	Construction Exhaust Emissions: Mitigation identical to 4-month Improved Ladder Alternative.	Less than significant
3: Gates-out	Construction Exhaust Emissions: Fugitive dust impacts are significant during construction, but after mitigation is applied they are reduced to a level of less than significant. PM_{10}, NO_x, and VOC are significant during construction, but after mitigation is applied they are reduced to a level of less than significant. Operations-related impacts are less than significant. ~~Total daily emission levels of 1,491.09 lb/day of CO and 457.99 lb/day Nox would exceed their respective significance thresholds of 550 lb/day and 219 lb/day set in the National Ambient Air Quality Standards.~~	Construction Exhaust Emissions: Mitigation identical to 4-month Improved Ladder Alternative.	Less than significant

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Summary of Significant Adverse Environmental Impacts and Proposed Mitigation

DEIS/EIR Action Alternative	Description of Significant Impact	Mitigation	Level of Significance after Mitigation
		Traffic and Circulation	
1A: 4-month Improved Ladder	Left and Right Banks: Large construction vehicles could exceed the capacity of Sale Lane and Altube Avenue. Neither roadway is designed to accommodate heavy truck traffic, and daily commuting by heavy trucks could impact the road surface.	Left and Right Banks: To reduce construction-related impacts on traffic and roadways, the construction contractor would be required to develop a traffic control plan with the Tehama County Public Works, City of Red Bluff Public Works, and California Department of Transportation, which would be subject to review by California Department of Transportation and the Public Works Director. This plan would ensure that construction traffic is routed in a way that maintains acceptable levels of service on all affected roadways and intersections that are currently measured and used by project-related vehicles. The traffic control plan would address the structural capacity of roads and bridges along routes that could be traveled by construction-related vehicles. The traffic control plan would ensure that the structural integrity of those roads and bridges would not be damaged by construction-related vehicle trips. If damage occurs, road surface would be repaired or replaced on Sale Lane and/or Altube Avenue.	Less than significant

1-4 This document serves as the original authorization enabling the creation of the CVP. This Act required the Department of the Interior - USBR to submit a detailed feasibility plan for the CVP to the President ~~Truman~~. This Act authorized "…the construction, repair, and preservation of certain public works on rivers and harbors, and for other purposes." The CVP was specifically authorized in Section 2 of this document. Section 2 refers to the CVP purpose stating:

1-7 The ~~report~~ Act was approved by President Truman on January 19, 1953, with the request that it be submitted to Congress for its consideration.

1973 – Endangered Species Act – Congress directs federal agencies to protect and conserve threatened and endangered fish, wildlife, and plant species, and their ecosystems. Sacramento River winter-run Chinook salmon were listed under the Act as an endangered species in 1994, winter steelhead were listed as a threatened species in 1998, spring-run Chinook salmon were listed as a threatened species in 1999, and green sturgeon were listed as a threatened species in 2006.

1984 – California Endangered Species Act – Requires the California Department of Fish and Game (CDFG) to protect and conserve threatened and endangered fish, wildlife, and plant species, and their habitat. Sacramento winter-run Chinook salmon were listed as a state-endangered species in 1989, and spring-run Chinook salmon were listed as a state-threatened species in 1999.

1988 – Salmon, Steelhead Trout and Anadromous Fisheries Program Act – Directs CDFG to implement measures to double the numbers of salmon and steelhead present in the Central Valley.

1993 – Central Valley Action Plan – CDFG adopted as a top priority, "Develop and implement permanent measures to minimize fish passage problems for adult and juvenile anadromous fish at the Red Bluff Diversion Dam in a manner that provides for the use of associated CVP conveyance facilities for delivery of water to the Sacramento Valley National Wildlife Refuge complex."

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	1992 – Central Valley Project Improvement Act – Requires USBR to "…develop and implement measures to minimize fish passage problems for adult and juvenile anadromous fish at the Red Bluff Diversion Dam in a manner that provides for the use of associated Central Valley Project conveyance facilities for delivery of water to the Sacramento Valley National Wildlife Refuge complex. Costs associated with implementation shall be reimbursed in accordance with the following formula: 37.5 percent shall be reimbursed as main project features, 37.5 percent shall be considered a non-reimbursable Federal expenditure, and 25 percent shall be paid by the State of California." **1996** – Steelhead Restoration and Management Plan for California – Directed the California Department of Fish and Game to implement actions to restore Central Valley steelhead, including determining an alternative to RBDD that would eliminate or reduce the need for the dam gates, and allow unobstructed fish passage. **1997** – Proposed Recovery Plan for the Sacramento River Winter-run Chinook Salmon – The NMFS adopted an objective to maximize the survival of juveniles passing RBDD and recommended developments and implementation of "…a permanent remedy at the Red Bluff Diversion Dam which provides maximum free passage for juvenile (and adult) winter-run Chinook through the Red Bluff area, while minimizing losses of juveniles in water diversion and fish bypass facilities." **2000** – CALFED Bay-Delta Restoration Program Record of Decision – Addressed a vision and program for various CALFED studies and actions. Congress and the State Legislature adopted the ROD as a framework for partnering agencies and stakeholders to implement a comprehensive ecosystem restoration program, which includes "Modifying or eliminating fish passage barriers, including the removal of some dams, construction of fish ladders, and construction of fish screens that use the best available technology." **2000** – CALFED Bay-Delta Ecosystem Restoration Program Plan – Adopted specific conservation measures to "Manage operations at the Red Bluff Diversion Dam to improve fish passage, reduce the level of predation on juvenile fish, and increase fish survival" and to "Prevent predatory fish from congregating below the Red Bluff Diversion Dam by modifying operations."
1-8	A fish ladder is located on each abutment of the dam. The steps of the fish ladders drop the water surfaces in the ladders in 1-foot increments as flows pass downstream. Auxiliary flow is added to the ladders near their downstream ends to create a higher flow velocity in the ladders where they enter the river below the dam. This higher velocity is intended to attract upstream migrating fish to the entrance of the fish ladder. The fish ladders have been modified and monitored in the past, and no substantial improvements in fish passage occurred (USBR, 1995).
1-8	In general, the proposed alternatives focus on the operation of RBDD and construction of structures to allow substantial RBDD operational changes. When the gates are lowered, RBDD ~~presents a barrier~~impedes passage for both upstream- and downstream-migrating fish because fish ladders, included in the original dam design, have proven to be inefficient at certain flows to pass anadromous fish to upstream spawning grounds. The direct and indirect impacts of the alternatives occur within the Sacramento River and the San Joaquin River basins.

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1-13	**TABLE 1.5-1** Summary of Public and Agency Concerns

Agency	Concern
U.S. Forest Service, Mendocino National Forest	Letter, September 17, 2001~~no date~~. Recreational development of the Red Bluff site (Recreation Area) plays a key role in the U.S. Fish and Wildlife Service's (USFWS) plan for a Sacramento River National Wildlife Refuge. The Red Bluff Recreation Area Plan (Plan) emphasizes interpretation of natural systems through displays, facilities, and programs. The bypass channel as presently envisioned (CH2M HILL 2001: 1-G-15) lies entirely within the Red Bluff Recreation Area. The only sizeable portion of the recreation area above the 100-year floodplain, and thus available for facility construction, is located within the area between the proposed bypass channel and the river. If the bypass channel were built according to the present design, the site's existing and proposed interpretive facilities would be cut off from the riparian and upland habitat they are intended to interpret by a 90-foot-wide moat surrounded by an 8-foot-tall fence (CH2M HILL 2001: 90-C-1, 90-C-2). Alternative 1B (Bypass Channel) would not comply with the Land and Resource Management Plan. It would significantly alter the character of the Lake Red Bluff Recreation Area from desired condition set forth in the Plan. Consequently, implementation of Alternative 1B would require a Plan amendment.
California Department of Fish and Game	Letter dated October 23, 2001. The ~~California Department of Fish and Game (~~CDFG~~)~~ concurs with the Planning Aid Memorandum prepared by USFWS.

1-17

- ~~Easement~~ Special Use Permit for Bypass Facility – U.S. Forest Service (USFS)
- Landfill Permitting and Closure Consultation – California Integrated Waste Management Board

2-8

TCCA must annually supplement its water supply during the times that gravity diversion at RBDD is not available. During these times, TCCA obtains water, when it is available, from Black Butte Reservoir via a diversion from Stony Creek. Diversions from Stony Creek are currently permitted for 45-day periods between April 1 and May 15 and between September 15 and October 29. The Stony Creek Diversion depends on the USACE's operation of Black Butte Reservoir. It is operated primarily for flood control purposes and not irrigation; these two needs are not always compatible. Furthermore, the volume of water in Black Butte Reservoir is decreasing because the reservoir is silting in. Because of the relatively small size of the reservoir, it is kept at its minimum capacity until late in the rainy season. Because of this, the reservoir could be at its minimum level when diversions are needed due to a change in the season from a wet to a dry year. This arrangement does not provide TCCA and the 1817 water districts it serves with sufficient water diversion reliability and flexibility because significant demand for irrigation water also occurs during spring and fall, when RBDD gates are out.

2-10

The 4-month Bypass Alternative would continue the current operation of the dam with a 4-month gates-in period of May 15 through September 15. Improved agricultural water deliveries would be achieved through 1,700 cfs of pumping capacity (320 cfs at RPP; 1,380 cfs at Mill Site). Improvements to fish passage would be achieved with construction and operation of a new ladder at the right abutment (800 cfs). A 1,000-cfs bypass channel for fish passage would be constructed at the left abutment near the existing Sacramento River Discovery Center. This alternative requires an amendment to USFS, Mendocino National Forest Land and Resource Management Plan.

USFS has jurisdiction in the elements of the decision that would authorize construction of the bypass, and all associated actions that would affect Lake Red Bluff Recreation Area. The responsible official is the

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	forest supervisor, Mendocino National Forest. A decision to implement Alternative 1B, co-signed by the forest supervisor, would authorize (1) an amendment of the Mendocino National Forest Land and Resource Management Plan to allow for the bypass, (2) the issuance of special use permits for the construction and operation of the bypass, and (3) implementation of all mitigations that occur within Lake Red Bluff Recreation Area.
2-26	Because of the inherent uncertainty in the diversion structure's interaction with fish~~involved in complex systems such as fisheries~~, all of the alternatives considered would include an Adaptive Management Program. Adaptive management acknowledges that there is a need to constantly monitor such systems and adapt actions that are taken to restore ecological health and improve water management. These adaptations are necessary because conditions continue to change, and the knowledge base and understanding of systems continues to improve. By including an Adaptive Management Program in all of the alternatives, it is possible to acknowledge areas of uncertainty in a given system and still allow decision makers to take action before scientific consensus is achieved. However, this places a great deal of importance on the design of the Adaptive Management Program. The Draft Adaptive Management Program is included as Appendix H.
3-4	The Sacramento River in the vicinity of RBDD provides essential habitat for the freshwater life stages of Chinook salmon and steelhead. Within California's Central Valley, the Sacramento River provides a corridor for the anadromous salmonid resources between upstream reaches and the tributaries to the Sacramento River and the Pacific Ocean. The Sacramento River is the largest river system in California with more than 90 percent of the Central Valley salmon spawning and rearing within the Sacramento River system. The Sacramento River supports four runs (races) of Chinook salmon: fall, late-fall, winter, and spring run. Table 3.2-2 shows the average, low, and high number of Chinook salmon and steelhead spawners estimated to pass upstream of RBDD from 1970 through 1999, as provided by CDFG on their annual "Grand-Tab" spreadsheet. Table 3.2-3 presents a summary of life history timing for native anadromous salmonids in the Sacramento River near RBDD.
3-5	Table 3.2-2 [a]Source: CDFG, unpublished. (Data from CDFG's annual Grand-Tab spreadsheet.)
3-13	Current operation of RBDD includes a 4-month period of time (mid-May through mid-September) when the dam gates are placed in the river, creating a velocity barrier and whitewater turbulence that prevents or impedes adult fish passage. Other sources of impediment to fish passage include inadequate attraction flows to the fish ladders and the orientation of the entrances to the fish ladders. Placement of the dam gates into the river results in blockage and delay of migrating adult salmon and steelhead (Vogel et al., 1988; Hallock et al., 1982; Hallock, 1987). Vogel et al., (1988) determined from salmon tagging studies conducted from 1983 through 1998, that between 8 percent and 44 percent of adult Chinook salmon, depending on run, were blocked from passing upstream of RBDD. Similarly, Hallock et al., (1982) determined that passage of 15 percent to 43 percent of adult Chinook salmon, depending on run, were blocked at~~and~~ RBDD. Fish ladders are currently operational on the east and west ends and at the center of RBDD. These currently operate during the gates-in period to provide upstream passage of adult salmonids. Vogel et al., (1988) determined that the mean time of delay in passage of adult Chinook salmon at RBDD was greater than 3 to greater than 13 days depending on the run. Vogel's (1988) determinations of passage delays were made during years when the RBDD gates were in for much longer periods annually than the current operations. Radio telemetry investigations conducted during the months of August and September from 1999 to 2001, using adult fall-run Chinook salmon, indicate that delay in passage, under existing conditions at RBDD, may average approximately 21 days (USFWS, unpublished data). CDFG has determined the existing fish ladders at RBDD ~~may be~~are inefficient in passing spring-run Chinook salmon at RBDD (CDFG, 1998). Currently adult late-fall Chinook salmon pass unimpeded at RBDD because they immigrate during months (October through March) when the RBDD gates are out of the water and no barrier exists. Figure 3.2-2 shows timing of adult salmonids in the vicinity of RBDD. The passage timing for adult salmonids was obtained from data collected from fish ladder counts conducted at RBDD from 1982 to 1986 for fall, late-fall, and winter Chinook salmon and steelhead (USFWS/CDFG, unpublished data). For spring Chinook salmon, some of which may pass RBDD prior to installation of the RBDD dam gates, the current (1995 though 2000) ladder counts were used to estimate passage timing (USFWS/CDFG, unpublished data). For ladder counts made during 1995 and 2000, the average monthly percent (44 percent) of spring Chinook passing RBDD during May were distributed equally between the before gates-in (<May 15) and after gates-in (>May 15) periods.

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3-15	Through investigations conducted at RBDD, USFWS (1981) concluded that mortality of up to 42 percent of downstream migrant steelhead and greater than 50 percent of Chinook salmon occurred, likely as a result of predation of those juveniles by pikeminnow downstream of the dam. Using divers, surface observations, and stomach contents analysis, Vogel et al., (1988) determined that adult Sacramento pikeminnow were the principal predator on juvenile salmon passing RBDD. Hallock (1987) reported that stomach content analysis confirmed that adult striped bass were also preying on juvenile salmon passing through RBDD. Furthermore, Tucker et al., (1998) determined that during summer months (gates-in operations), approximately 66 percent (by weight) of the stomach contents of Sacramento pikeminnows consisted of juvenile salmonids. Adult Sacramento pikeminnow are known to migrate upstream of RBDD in the spring months to spawn; therefore, when the RBDD gates go in, these fish can tend to congregate below the dam, especially when large numbers of juvenile salmonids are available as forage. The pikeminnow can and does readily pass through the existing fish ladders at RBDD. Operations of RBDD under the Winter-run Chinook Salmon Biological Opinion (NMFS, 1993) specified that the gates may not go in prior to May 15 each year. This has likely reduced predation impacts to juvenile salmonids because larger numbers of pikeminnows can move upstream more easily, and the period when the gates are now in coincides to low-abundance periods of juvenile salmonids. However, predators continue to congregate, including pikeminnows and striped bass, downstream of RBDD under existing conditions and the No Action Alternative when the gates are in. Striped bass currently congregate downstream of RBDD because this species does not readily use fish ladders designed for salmonids. These predators continue to feed on juvenile fish passing the facilities at RBDD (Tucker et al., 1998). Under current conditions, up to approximately 75 percent of the striped bass found at RBDD occur prior to July 1. Tucker et al. (1998) found that during sampling in 1994 to 1996, the largest catch/per unit effort (26 percent of annual total) of Sacramento pikeminnow occurred at RBDD during June when the gates were in.
3-26	American shad are anadromous fish that are found in freshwater only when they move inland to spawn. Young shad migrate into saltwater almost immediately after hatching and spend the majority of their lives (3 to 5 years) in saltwater (Moyle, 1976). Adult shad move into the lower San Francisco Bay estuary in the fall but do not move into freshwater until temperatures exceed 50 to 52°C, usually in late March or April. Spawning runs begin in late May or June when water temperatures reach 59°C or greater. Some evidence has indicated that increased flows, as well as temperature, initiate spawning runs not just temperature (Painter et al., 1980 as cited by USBR, 1997b). Spawning runs will continue until water temperatures exceed 68°C, usually in July. Spawning is done in mass in the main channels of the San Joaquin and Sacramento rivers and their tributaries. In the mainstem Sacramento River, shad spawning runs reach as far as unimpeded passage allows. American shad do not pass generally above RBDD when the gates are in (Killam, pers. comm.) and generally do not use ladders to any appreciable extent (Skinner, 1962). When the gates are in, their passage past RBDD is observed to be very limited; but the dam does not entirely block the upstream migration of this species. Adult shad are commonly found near RBDD between the months of April and July, and larval shad are found near RBDD from May to August.
3-27	American shad generally do not use the existing fish ladders at RBDD. Therefore, the gates-in operations ~~prevent~~limit this species from migrating upstream of RBDD to spawn. This restriction however, does not likely adversely affect their population because this reach of the Sacramento River is at the northernmost extent of their geographic range in the Sacramento River watershed. Optimal spawning temperature for American shad is 62 to 70°F (Skinnner, 1962), and these water temperatures are unlikely to occur in the Sacramento River during the period when American shad are in the vicinity of RBDD. Consequently, American shad are only occasionally observed upstream of RBDD (USBR, 1997b).
3-27 and 3-28	Resident native rainbow trout also are found in the Sacramento River near RBDD. The adults of this species migrate seasonally within the Sacramento River but, unlike steelhead, do not return to the ocean. Adult fish are known to use the existing ladders at RBDD to pass upstream, and juveniles are commonly observed at RBDD (Killam, pers. comm.). Adult rainbow trout migrate through RBDD mainly in August and September. These fish are seeking upstream or tributary locations for spawning and/or are re-distributing within the Sacramento River to forage. Juvenile rainbow trout are difficult to distinguish from steelhead juveniles and are captured while passing through RBDD as shown on Figure 3.2-7. The timing of juvenile rainbow trout/steelhead *(O. mykiss)* passing RBDD was obtained from data collected from rotary screw trapping investigations conducted downstream of RBDD during 1994 through 2000 (Gaines and Martin, 2001). The TAG Fishtastic! Subcommittee acknowledged that resident and anadromous forms of juvenile (*O. mykiss*) cannot be easily distinguished visually; therefore, these two life forms were treated the same in the analysis.

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3-28	Operation of the gates at RBDD may not directly adversely affect populations of most of the resident species, but operations may seasonally limit their access into their respective optimal habitats. Rates of predation on juveniles of species such as rainbow trout and other native fishes near RBDD may be increased over that for an undammed river. This may be due to congregations of adult pikeminnow and striped bass when the RBDD gates are in. However, the extent of any increase in predation as a result of RBDD operations is unknown. Except for juvenile rainbow trout, predation on juvenile RN and RNN fish may be inconsequential, as these species are less-preferred prey.
3-36	**TABLE 3.2-6** Index Value, Relative Difference, and Improvement in Passage Index for Adult Anadromous Salmonids

Alternative	Index Value[a]	Difference[a]	Percent Improved[a]	Effect
Spring-run Chinook Salmon				
No Action Alternative	52	n/a	n/a	*No Change*
4-month Improved Ladder Alternative	61	8	16	*~~No~~ Measurable Benefit*
4-month Bypass Alternative	57	5	9	*No Measurable Benefit*
2-month Improved Ladder Alternative	94	41	79	*Large Measurable Benefit*
2-month with Existing Ladders Alternative	93	40	77	*Large Measurable Benefit*
Gates-out Alternative	100	48	91	*Large Measurable Benefit*

[a]Rounded to the nearest whole number.

3-37	The analysis of consequences of changes in passage indices for adult native anadromous salmonids is summarized in Table 3.2-6. In this table, the calculated adult passage indices and their differences from those for the No Action Alternative are presented for each of the five species. Also summarized in Table 3.2-6, for each species, is the percentage improvement from the No Action Alternative and the effect of each alternative compared to the No Action Alternative. In all cases, for all species and all alternatives, the adult passage indices were equal to or greater than those for the No Action Alternative. Therefore, no alternative resulted in ~~significant (~~measurable~~)~~ adverse impacts to adults of any of the five native anadromous salmonid species.
3-71	Figure 3.3-2 was incorrect; a revised Figure 3.3-2 follows this table.
3-74	Since April 1993, water has been diverted from the Black Butte Reservoir through a CHO that is located on the canal at the Stony Creek Canal siphon. The CHO is used as the diversion point on Stony Creek to direct releases from Black Butte Reservoir into the TC Canal. Although it has never been used for its intended purpose, the CHO was originally installed to enhance aquatic habitat conditions through the release of TC Canal water into Stony Creek (USBR, 1998). A maximum of 38,296 acre-feet (approximately 53 cfs) may be diverted annually from Stony Creek to TC Canal (Stamets, 2001, pers. comm.).
3-86	• Place within a 100-year flood hazard area structures or vegetation that would impede or redirect flood flows.
3-106	~~Groundwater quality is generally excellent in the region.~~ An analysis of groundwater conditions conducted in 1991 indicated that, total dissolved solids (TDS) in the Red Bluff area were classified as less than 200 mg/L, which is below U.S. Environmental Protection Agency (EPA) and SWRCB Maximum Contaminant Levels (MCL) for drinking water. ~~No evidence of elevated levels of boron, nitrates, arsenic, or selenium has been found in the groundwater in the Red Bluff area.~~

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3-118	The immediate project area contains about 26 acres of riparian habitat. Most of the riparian habitat occurs along Red Bank Creek, with additional narrow bands located along the mainstem of the Sacramento River (Figure 3.4-1). Primary plant species are cottonwoods *(Populus fremontii*), willows (*Salix* sp.), and sycamores (*Platamus racemosa*). The riparian zone also contains many non-native species, including star thistle, sticky weed, tree-of-heaven, pyracantha, and pampas grass. As with much of the Sacramento River, blackberries are found in abundance on the banks and levees.
3-167	~~The impacts on Swainson's hawk under Alternative 1B would be the same as those identified for Alternative 1A (see Impact 1A–BR8).~~The removal of large trees in the mixed woodland habitat would reduce the value of the area to support nesting Swainson's hawk.
3-184	TCCA and USBR would follow the USFWS (1999) Conservation Guidelines for VELB (Conservation Guidelines; see Appendix F) to avoid, minimize, and mitigate impacts to VELB. TCCA and USBR would attempt to avoid elderberry shrubs in locating staging areas, access roads and other construction areas. Shrubs that can be avoided would be fenced and posted, and workers would be educated about VELB in accordance with the Conservation Guidelines. If elderberry shrubs cannot be avoided, they would be transplanted, and additional seedlings would be planted at a secure mitigation site in accordance with the Conservation Guidelines. Section 7 consultation with USFWS has been concluded with the issuance of a Biological Opinion. With this mitigation, impacts to VELB would be less than significant.
3-184	Prior to the start of construction activities, all~~the~~ three~~two~~ platforms that can support~~ing~~ osprey nesting would be removed. The platforms would be removed in winter, prior to initiation of nesting activities. TCCA and USBR would work with CDFG to identify nearby location(s) to erect two platforms to serve as replacement nesting sites. The relocated platforms would be installed concurrently with the removal of the existing platforms and be completed prior to the start of the nesting season.
3-216	• Develop 10 new campsites and all supporting infrastructure (roads/trails and utilities) at an alternate location to offset those lost during construction.
3-233	Temporary and permanent construction-related impacts would also occur to the use of the Sycamore Grove Campground facilities located in the Recreation Area. Construction vehicles would need access to the campground area to construct the lower end of the channel. Approximately 10 camping facilities would be ~~permanently~~ removed as a result of construction of the bypass channel. A new road would need to be constructed to maintain access to the remaining camping facilities. Although the loss of 10 campsites from Sycamore Campground is unavoidable, construction of replacement campsites (Mitigation 1B-R1), including supporting infrastructure, would mitigate the impact. ***The impacts from construction on the Sycamore Grove Campground would be significant ~~and unavoidable~~.***
3-234	The goal of the Recreation Area Plan is to develop overnight and day-use recreation facilities integrated with the existing riparian woodland and annual grassland-oak area. A large part of this Recreation Area Plan is to develop interpretive displays and programs that illustrate the management of fish, wildlife, and their habitat, and to provide visitors with recreation information for activities and facilities available in Northern California. Several million dollars and thousands of hours of volunteer's time have been invested in restoring riparian habitat and constructing recreation and interpretive facilities under the Recreation Area Plan. Replacement planting (Mitigation 1B-BR4) would mitigate the riparian plantings lost to the bypass construction.
3-234	Because of the unique quality of the Recreation Area, the thousands of hours of volunteer time spent on the development of the recreation area, and the education potential for future students and visitors of the interconnected ecosystems of Sacramento River Valley, construction of the bypass channel does not comply with the current management direction in the Mendocino National Forest Land and Resource Management Plan. Amendment of the Mendocino National Forest Land and Resource Management Plan under this alternative would ~~reconcile management direction~~ eliminate conflict with the new situation, but would not avoid the impacts.

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3-237	To the extent possible, disturbance to the camping facilities would remain in the footprint and construction easement for the bypass channel. To maintain access to the Sycamore Grove camping facilities, a temporary road would be constructed to allow traffic to and from the facilities to bypass construction. ~~The permanent removal of the camping facilities however, cannot be mitigated, and thus would remain a significant, unavoidable impact.~~Construction of replacement campsites (Mitigation 1B-R1), including supporting infrastructure, would mitigate the impact.
3-237	Construction of the bypass channel does not comply with the Mendocino National Forest Land and Resource Management Plan. ~~This is a significant, unavoidable impact.~~Amendment of the Mendocino National Forest Land and Resource Management Plan under the alternative would eliminate conflict with current management direction in the Mendocino National Forest Land and Resource Management Plan. A footbridge (illustrated on Figure 2.3-4) would be constructed that would partially mitigate the separation of Sycamore Campground from other camping facilities and the southeast portion of the Recreation Area.
3-247	In addition, this site includes an active wastewater treatment plant that currently discharges approximately 1.9 million gallons per day to the Sacramento River. The Pactiv wastewater plant discharges into the Sacramento River via an outfall diffuser. This diffuser is presently located within the proposed pumping facility footprint. It is possible that the diffuser will need to be relocated and/or incorporated into the design of the pumping facility. The design team will coordinate with Pactiv and RWQCB to incorporate the diffuser into the final project design. Wastewater is monitored for 5-day biochemical oxygen demand, chemical oxygen demand (COD), total suspended solids (TSS), total organic carbon, and pH.
3-288	From this, it can be concluded that the use of PUP to serve any increased loads resulting from Alternative 1A would have an insignificant effect on Western's power marketing., ~~except in the winter. In the winter, California usually has sufficient in-state electrical generation to export power to the Northwest.~~
3-310	A&J Events staff forecast that this year's event would attract 25,000 spectators. Spending by those spectators and boaters were estimated and are presented in Table 3.10-8. Spectator spending on meals, refreshments, and other expenses were derived using historical spending estimates updated for inflation. ~~Only spending from out-of-region spectators and boaters were included in the spending estimates.~~ Spending estimates reflect distinctions in likely spending by local and out-of-region spectators. As shown, it was estimated that the 2002 boat drag event would result in new spending of approximately $1.9 million from spectators and $429,000 from boaters. Table 3.10-9 shows estimates of sales from lodging and total tax revenues. As shown, it was estimated that total sales to motels and RV parks during the event would be $134,000. Total City and County tax revenue from sales and use taxes and the County motel tax were estimated to be $45,000. Total direct spending on the event of $2.7 million was broken down into sectors in Table 3.10-10. The spending profile shown in this table was derived and prepared using confidential expense information provided by A&J Events (A&J Events, 2002).
3-323 through 3-331	**3.11 Cultural Resources** **3.11.1 Affected Environment** This section addresses potential impacts to archaeological resources, historic buildings and structures, and traditional cultural resources (collectively known as cultural resources) as a result of project implementation. ~~The cultural resources of the project area were reviewed to determine whether sensitive or important resources might be impacted as a result of the project. This section reviews known and potential resources that may be impacted by project implementation.~~ **Prehistoric and Historic Background** **Prehistoric Background.** Chartkoff and Chartkoff (1984) identified three major periods of prehistory observed throughout California: Pre-Archaic, Archaic, and Pacific. During the Pre-Archaic period (prior to 11,000 years before present), evidence throughout California and the Western United States generally suggests that populations were small, and their subsistence economies included the capture of big game, such as now-extinct mammoth and mastodon. Large, fluted lanceolate projectile points known as Clovis points, which are the most widely recognized markers for this time period, have been found sporadically in California. Archaeologists have suggested that very early sites may be buried in alluvium in the Sacramento Valley and foothills (Moratto, 1984). During the Early and Middle Archaic periods (11,000 to 6,000 years before present), Northern California prehistoric cultures, as elsewhere, began to put less emphasis on large game hunting. Advances in

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technology, such as the advent of milling stones, indicate that new food processing methods became important during these periods, enabling more efficient use of certain plant foods including grains and plants with hard seeds. Evidence of human occupation in the Sacramento Valley and adjacent foothills during these periods is rare, but present (Willig and Aikens, 1988). During the Late Archaic period, aggregations of food resources, such as occurred at the shores of a large body of water or along a major fish-producing river, allowed for larger aggregations of people, at least seasonally.

The beginning of the Pacific period is marked by the advent of acorn meal as the most important staple food resource for most California Indians (Chartkoff and Chartkoff, 1984). During the Late and Final Pacific period (1,500 years before present), the bow and arrow replaced the spear thrower and dart as the hunting tool and weapon of choice. The most useful markers for this period tend to be the small projectile points used as arrow tips. Late and Final Pacific period sites are generally well-developed midden deposits, some with surface components. The midden deposits contain both cremated and intact human burials and residential features, including house floors, reflecting the increasingly sedentary populations.

Ethnography. The dominant group of native inhabitants of the Red Bluff area is the Wintu. The Wintu are the northernmost dialectical groups of the Wintun, whose territory roughly incorporates the western side of the Sacramento Valley from the Carquinez Straits north to include most of the upper Sacramento River drainage, the McCloud River, and the lower reaches of the Pit River. The Wintun, a collective name, were divided into three subgroups with the southern, central, and the northern dialects known respectively as Patwin, Nomlaki, and Wintu. The area surrounding RBDD has been identified as belonging to the River Nomlaki (Goldschmidt, 1978). The River Nomlaki village of Tehemet was near the confluence of the Sacramento River and Elder Creek, approximately 5 miles south of the current RBDD (Goldschmidt, 1978).

Although subsistence was heavily weighted toward the acorn, the staple of the diet, the Sacramento River supplied a large variety of foods. These likely included not only fish but also large and small game found at or near the river. Hunting and seasonal gathering of vegetables occurred throughout the villages' territories.

Villages were usually situated along rivers and streams or close to springs where reliable water supplies allowed a semi-permanent occupation. Major villages were located along the riverbanks, with locations oriented to higher spots on the natural levees. Smaller villages tended to be along the tributary streams and near springs. Cultural resources surveys in the region have demonstrated that there was very heavy use of tributary streams and other areas at a distance from the main river, while early ethnographies had emphasized the concentration of population along the Sacramento River.

~~**Historical Settlement**~~ **Historic Background.** Tehama County began in 1856, with the incorporation of portions of Colusa, Butte, and Shasta Counties. The community of Tehama was the first county seat, but this honor was transferred to Red Bluff in 1857 (Hoover et al., 1970).

The earliest European explorer in the area was most likely the Spanish explorer Luis Arguello in 1821, followed 7 years later by Jedediah Strong Smith. Other fur trappers and travelers followed, and the route along the Sacramento River became known as the California-Oregon Trail, and later, the California-Oregon Road (Hoover et al., 1970).

Interest in settlement in the county began somewhat by accident when John Bidwell, Peter Lassen, and John Burheim were in pursuit of horse thieves in 1843, and ended their chase somewhere near Red Bluff. Peter Lassen was so impressed with the area that he applied for a Mexican Land Grant.

The community of Red Bluff was named after the prominent geologic feature, the bluffs, located along the Sacramento River. The earliest known reference to the future town is in May 1850, when Sashel Woods and Charles L. Wilson were noted to be laying out a town at Red Bluffs, or the Bluffs (Bruff cited in Gudde, 1969). Other early names applied to Red Bluff include Leodocia and Covertsburg. By 1854, maps showed the community as Red Bluffs (Gudde, 1969). The community of Proberta, located approximately 4 miles south of RBDD, was named after a railroad station in 1889, in honor of Edward Proberta (Gudde, 1969).

Methods to Collect Information for Affected Environment

For archaeological resources, the area of potential effect is the area that could experience direct impacts from ground disturbance. The area of potential effect included the potential footprint of each alternative, including the pump station and the bypass channel (Figure 3.11-1). For historic buildings and structures,

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the area of potential effect is the area that could experience indirect effects (e.g., visual) as a result of project implementation. Information on cultural resources was collected through a records search, literature review, consultation with agencies, and two archaeological surveys. The records search and literature review were conducted at the Northeast Information Center of the California Historical Resources Information System.

A request for information concerning Sacred Lands and the names of individuals and groups who might have knowledge of the study area was submitted to the Native American Heritage Commission. The Native American Heritage Commission replied with a list of three names of individuals and organizations that might have knowledge of the area, and with information indicating that no Sacred Lands are known to be located within the study area. Letters with accompanying maps were sent to the three Native American individuals and organizations. The letters requested information on the study area and information about individuals who might have knowledge of the area. Letters and maps were also sent to the Tehama County Genealogical and Historical Society, and the Tehama County Museum Foundation requesting information they might have concerning the study area.

Two responses to these inquires were received. The first, from the Paskenta Band of Nomlaki Indians, noted that any area adjacent to a water course is sensitive and has the potential to contain cultural resources. The second, from the Tehama County Genealogical and Historical Society, noted that they were not aware of any historic-period resources in the study area.

In addition, USBR sent a letter of inquiry to the Paskenta Band of Nomelaki Indians. No response to this specific inquiry was received.

Two archaeological surveys were conducted in the study area (Peak and Associates, 2002; Welch, 2002). The first survey included evaluation of the study area by a professional archaeologist by means of parallel transects not exceeding 15 meters in width (Peak and Associates, 2002). Every effort was made to inspect all exposed sediment, including the cutbanks along both banks of the Sacramento River. One area, consisting of a dense stand of riparian species, was not inspected because of limited access (see Figure 3.11-1). In addition, portions of the Recreation Area in the Mendocino National Forest were covered with sod, and surface visibility was limited to small, disturbed areas. The remaining areas studied were generally free of vegetative cover.

The second archaeological survey included excavation of four trenches in areas thought to represent the recorded location of sites TEH-59 and TEH-66 (Welch, 2002). One trench was excavated within the mapped location of TEH-66 (6 meters long by 2.9 meters deep), two were excavated in the mapped location of TEH-59 (5 meters by 3.5 meters and 5 meters by 3.8 meters), and one was excavated for comparative purposes (4.5 meters by 2.5 meters). No cultural resources were identified in these trenches.

Known Prehistoric Resources. The records search identified three previous archaeological surveys in the vicinity of RBDD (Information Center File Numbers T-6, T-14, and T-L-121), but the files for these surveys are missing; therefore, no information is available. Two prehistoric-period cultural resources, THE-881 and TEH-882, were identified and recorded within a 0.5-mile radius of the study area, but they are not located within the area of potential effect (Peak and Associates, 2002). Accordingly, they are not discussed further.

The literature review and records search revealed that there were three sites recorded in the area of potential effect: TEH-32, TEH-59, and THE-66 (at Redbank). Little information is available on the nature and location of these sites. After the record search, Peak and Associates (1978) described sites TEH-32 and TEH-66 as having been adjacent to each other and modified by activities associated with the Diamond Lumber Mill. According to the recorder of the sites, the sites had been “destroyed or extensively modified” by activities at the Diamond Lumber Mill. Site TEH-59 was described by Peak and Associates (1978) as potentially a part of the ethnographically known Village of Damak. However, Johnson and Johnson (1974) reported the site as damaged by activities of the Diamond Lumber Mill. After reviewing the site forms, Peak and Associates concluded that the site had “low research value.”

The locations of sites TEH-59 and TEH-66 were thoroughly checked during the 2002 archaeological surveys. The areas were found to have been substantially modified, and no archaeological materials were discovered (Peak and Associates, 2002). The USGS topographic map shows the area surrounding the sites as purple, indicating that the area was disturbed sometime between 1951 and 1969. In addition, four trenches were dug at the recorded locations of sites TEH-59 and THE-66. No archaeological materials

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were discovered (Welch, 2002). Because of the known disturbances to the area of these sites and because of the results of the archaeological surveys, it is assumed that these sites have been destroyed. However, USBR still needs to conclude the Section 106 process for this undertaking and will seek the State Historic Preservation Officer's concurrence that no historic properties will be affected by the project.

Known Structural Resources. During the field survey, o~~O~~ne cultural resource, a small, one-room, single-story structure was identified within the ~~proposed activity area~~ area of potential effect ~~of all of the action alternatives~~. This resource was assigned a temporary designation, PA-02-01, and was recorded to current California Office of Historic Preservation standards. California Department of Parks and Recreation 523 Series forms, photographs, a scaled sketch map, and location map were also documented (Peak and Associates, 2002). This small structure is believed to be ineligible for inclusion in the National Register of Historic Places (NRHP), although USBR still needs to conclude the Section 106 process for this undertaking and will seek the State Historic Preservation Officer's concurrence that PA-02-01 is not eligible. ~~The reported locations of cultural resources identified in the literature search were thoroughly checked, but the area was found to have been substantially modified during recent times; accordingly, they are not considered further.~~

~~PA-02-01 consists of a front gable, rectangular-shaped, single-story, wood frame building with tongue-and-groove siding, galvanized sheet metal roof (replacement over green composition rolled roofing), with two, double-sash windows, close eaves, and a plywood door (replacement). It measures approximately 20 by 10 feet. A 20- by 8-foot platform (34 inches high) is located directly adjacent to the building on the south side. A concrete pad, measuring 30 by 30 feet, with threaded rebar imbedded, is located approximately 11 feet to the east. Some evidence of recent (unauthorized) habitation was evident, with refuse and a chair (overturned) in the building.~~

~~Given the size of the building, it is unlikely that it ever served as a residence. It is more likely that the building was used for storage, or as a temporary work station. Three power poles also are located in proximity, possibly indicating use as some support building for water pumping activities. The presence of an elevated platform adjacent to the building (at window height) may also imply that the building was not originally built or designed for the use at this locale, but was moved to the site after construction. The building is not shown on the USGS Red Bluff East 7.5-minute series topographic quadrangle.~~

~~It is questionable as to whether or not the structure was originally built at this site. The small size and lack of internal elements that would allow for habitation essentially precludes the possibility that this structure was associated with an individual important in history. It most likely was a small support structure building used during the operation of the Diamond International Lumber Yard, a development itself that is less than 50 years in age.~~

Two additional structures or facilities remain to be recorded and evaluated for possible inclusion in the NRHP because they lie adjacent to the area of potential effect. The Diamond International Lumber Mill (Mill Site) and associated buildings are abandoned and dilapidated. The Mill Site is assumed to be ineligible for the NRHP. USBR still needs to conclude the Section 106 process for this undertaking and will seek the State Historic Preservation Officer's concurrence that the Mill Site is not eligible. If it is determined that the Mill Site is eligible, then USBR will invoke the criterion of adverse effect found at 36 CFR Part 800.5 and assess effects of the projects to the Mill Site.

The Red Bluff Dam and Diversion Facility will be affected by the proposed undertaking. The dam and associated facility will be evaluated for possible inclusion in the NRHP. As with the Mill Site, if the Red Bluff Dam and Diversion Facility is determined to be eligible, then USBR will apply the criterion of adverse effect and conclude the Section 106 process, as appropriate.

3.11.2 Environmental Consequences

As with most construction projects, implementation of any of the build alternatives has the potential to impact cultural resources in the project vicinity. Following is a description of the methods used to determine the existence of archaeological resources, historic buildings and structures, and traditional cultural resources, ~~sensitive resources~~ as well as the potential for impacts to those resources.

Methodology

Using existing data references, cultural resource impacts were categorized as either direct or indirect impacts. Direct impacts are those that may directly, physically affect archaeological and historic resources

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as a result of excavations or other disturbances. Indirect impacts may include effects to the visual setting of resources through new construction or noise and vibration impacts. ~~A literature review was conducted on the project vicinity. According to the Northeast Information Center of the California Historical Resources Information, three early archeological inspections were conducted in the vicinity of RBDD. Two prehistoric-period cultural resources have been identified and recorded within a one-half-mile radius of the proposed activity area. Three unrecorded cultural resources to be located within the proposed activity area were plotted on Information Center maps. All of these resources were noted for additional consideration.~~

~~A request for information concerning Sacred Lands and the names of individuals and/or groups who may have knowledge of the proposed activity area was submitted to the Native American Heritage Commission. The Heritage Commission replied with a list of names of individuals and organizations that may have knowledge of the area, and with information indicating that no Sacred Lands are known to be located within the proposed activity area. Letters with accompanying maps were sent to three Native American individuals and groups listed to request information on the proposed activity area, or information concerning individuals who might have knowledge of the area. Letters and maps were also sent to the Tehama County Genealogical and Historical Society and Tehama County Museum Foundation requesting information they might have concerning the proposed activity area.~~

~~Two responses to these inquires were received. One noted that any area adjacent to a water course is sensitive and could have the potential to contain cultural resources. The second, from the Tehama County Genealogical and Historical Society, noted that they were not aware of any historic-period resources at the proposed activity area.~~

~~The proposed activity area incorporates two areas administered by federal agencies, USFS and USBR. Both agencies were contacted for assistance in obtaining the necessary permits for an archeological inspection.~~

~~The proposed project area was evaluated by a professional archeologist by means of parallel transects not exceeding 15 meters in width. Every effort was made to inspect all exposed sediment, including the cutbanks along both banks of the Sacramento River. One area, consisting of a dense stand of riparian species, was not inspected because of limited access. Portions of the Recreation Area, administered by Mendocino National Forest, were covered with sod; and surface visibility was limited to small, disturbed areas. The remaining area was generally free of vegetative cover. The results of the inspections, consultations, and research form the basis of the impact analysis.~~

Significance Criteria

The proposed TCCA Fish Passage Improvement Project requires compliance with both the National Historic Preservation Act (NHPA) and cultural resources requirements found in CEQA, although federal law generally supersedes state law in the event of a conflict. Section 106 of the NHPA requires the federal government to take into account the effects of an undertaking on cultural resources listed on or eligible for listing on the NRHP and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment. Those resources that are listed on or eligible for inclusion in the NRHP are referred to as historic properties. Historic properties are “districts, sites, buildings, structures, or objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association (36 CFR Part 60.4)” and meet at least one of four eligibility criteria. Historic properties must:

a) be associated with events that have made a significant contribution to the broad patterns of our history;

b) be associated with the lives of important people;

c) embody distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic value; or

d) yield or have yielded information important in prehistory or history.

The 36 CFR Part 800 regulations that implement Section 106 follow a series of steps that are designed to identify interested parties, determine the area of potential effect, conduct cultural resource inventories, evaluate the cultural resources to determine if they are historic properties, and assess effects to any historic properties within the area of potential effect. In the event that identified historic properties will experience adverse effects, then the federal agency seeks to resolve these adverse effects through development and implementation of an agreement document. All steps identified within the 36 CFR Part

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800 regulations require consultation with interested parties, State Historic Preservation Officer, and Indian tribes.

Native American tribes are participants in the Section 106 process. The regulations require federal agencies to consult with federally recognized tribes to determine if sites of religious or cultural significance are present within the area of potential effect for a specific action. Non-federally recognized tribes may also have concerns, and USBR involves such tribes as interested members of the public pursuant to 36 CFR Part 800.2(c)(5) and 800.2(d).

According to CEQA and the provisions of the NHPA, an impact would be considered significant if it:

a) Caused a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines Section 15064.5;

b) Caused a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines Section 15064.5;

c) Directly or indirectly destroyed a unique paleontologic resource or site or unique geologic feature; or

d) Disturbed any human remains, including those interred outside of formal cemeteries.

~~The Proposed TCCA Fish Passage Improvement Project requires compliance with Section 106 of the National Historic Preservation Act of 1966. Section 106 requires that federal agencies take into account the effect of their actions on properties that may be eligible for, or listed in, the National Register of Historic Places (NRHP). Further, decisions regarding management of cultural resources hinge on determinations of their significance (36 CFR 60.2). As part of this decision-making process, the National Park Service has identified components that must be considered in the evaluation process, including:~~

- ~~NRHP criteria for significance~~
- ~~Historical context~~
- ~~Integrity~~

~~The NRHP criteria for evaluation are those resources:~~

~~(a) That are associated with events that have made a significant contribution to the broad patterns of our history; or~~

~~(b) That are associated with the lives of persons significant in our past; or~~

~~(c) That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or~~

~~(d) That have yielded, or may be likely to yield, information important in prehistory or history (36 CFR 60.4).~~

~~For this analysis, the historical context is defined as a narrative statement "that groups information about a series of historic properties based on a shared theme, specific time period, and geographical area." To evaluate resources in accordance with federal guidelines, these sites must be examined to determine whether they are examples of a defined "property type." The property type is a "grouping of individual properties based on shared physical or associative characteristics." Through this evaluation, each site is viewed as a representative of a class of similar properties rather than as a unique phenomenon.~~

~~A well-developed historical context helps determine the association between property types and broad patterns of American history. Once this linkage is established, each resource's potential to address specific research issues can be explicated.~~

~~For a property to be eligible for listing in the NRHP, it must meet one of the criteria for significance (36 CFR 60.4 [a, b, c, or d]) and retain integrity. Integrity is defined as "the authenticity of a property's historic identity, evidenced by the survival of physical characteristics that existed during the property's historic or prehistoric period."~~

~~To define the concept of integrity, this analysis uses seven aspects or qualities that define integrity in various combinations. The seven aspects are location, design, setting, materials, workmanship, feeling,~~

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~~and association. To retain historic integrity, a property will possess several or usually most of these aspects. The retention of specific aspects is necessary for a property to convey this significance. Determining which of the seven aspects are important involves knowing why, where, and when the property is significant.~~

~~This evaluation used the following steps in assessing integrity:~~

- ~~Define the essential physical features that must be present for a property to represent its significance~~
- ~~Determine whether the essential physical features are visible enough to convey their significance~~
- ~~Determine whether the property needs to be compared with similar properties~~
- ~~Determine, based on the significance and essential physical features, which aspects of integrity are particularly vital to the property being nominated and if they are present~~

~~Ultimately, the question of integrity is answered by whether or not the property retains the identity for which it is significant. All properties change over time. It is not necessary for a property to retain all its historic physical features or characteristics. However, the property must retain the essential physical features that enable it to convey its historic identity. The essential physical features are those features that define why a property is significant.~~

~~A property's historical significance depends on certain aspects of integrity. Determining which of the aspects is most important to a particular property requires an understanding of the property's significance and its essential physical features. For example, a property's historic significance can be related to its association with an important event, historical pattern, or person. A property that is significant for its historic association is eligible for listing if it retains the essential physical features that made up its character or appearance during the period of its association with the important event, historical pattern, or person.~~

~~A property important for association with an event, historical pattern, or person ideally might retain some features of all seven aspects of integrity. Integrity of design and workmanship, however, might not be as important to the significance, and would not be relevant if the property were an archeological site. A basic integrity test for a property associated with an important event or person is whether a historical contemporary would recognize the property as it exists today. For archeological sites that are eligible under Criteria a and b, the seven aspects of integrity can be applied in much the same way as they are to buildings, structures, or objects.~~

~~In summary, the assessment of a resource's NRHP eligibility hinges on meeting two conditions:~~

- ~~The site must meet at least one of the NRHP evaluation criteria either individually or as a contributing element of a district based on the historic context that is established~~
- ~~The site must possess sufficient integrity, i.e., it must retain the qualities that make it eligible for the NRHP~~

Consultation

USBR consulted with State Historic Preservation Officer regarding this project on May 1, 2002, with a request for them to concur with the determination that two archaeological sites, TEH-59 and TEH-60, and the structure PA-02-01 were not eligible for inclusion in the NRHP. It was also requested that the State Historic Preservation Officer comment on the adequacy of USBR's efforts to identify historic properties within the area of potential effect. State Historic Preservation Officer response, dated July 3, 2002, did not concur with either request. The response letter indicated that the area of potential effect was not clearly identified, that they could not concur with USBR's determinations of eligibility for any of the sites, and that additional structures were located adjacent to the project area that needed to be discussed. USBR will continue consultation on these issues and on the eligibility of the Mill Site and on the Diversion Facility.

No Action Alternative

No changes to hydrology or surface-water management would occur. Gates would be operated during the current 4-month gates-in period. Construction activity would be limited to the installation of the fourth pump at RPP. No other construction activity would occur as a result of the No Action Alternative.

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	1A: 4-month Improved Ladder Alternative
	Construction-related Impacts. ***Impact1A–CR1: Identified Structural Resources.*** The one-story structure, PA-02-01, does ~~not retain integrity as indicated in the replaced front door, new roof, and addition of the raised platform on the south side.~~ not appear eligible for inclusion in the NRHP. In addition, the Mill Site does not appear eligible for inclusion in the NRHP. USBR still needs to conclude the Section 106 process for this undertaking and will seek State Historic Preservation Officer concurrence that PA-02-01 and the Mill Site are not eligible for inclusion in the NRHP. The eligibility of the Diversion Facility also remains to be determined in consultation with the State Historic Preservation Officer. If the Diversion Facility is determined eligible, then USBR will apply the criterion of adverse effect found at 36 CFR Part 800.5 and conclude the Section 106 process, as appropriate.~~This resource does not qualify as a historic property under the NRHP criteria.~~
	~~***The impacts from construction activities on this structure would be less than significant; therefore, no mitigation is required.***~~
	The impacts from construction activities on these structures would be less than significant; therefore, no mitigation is required unless the Diversion Facility is found to be a historic property. If so, then USBR will assess effects to the Diversion Facility and develop mitigation measures.
	Impact 1A–CR2: Unidentified Cultural Resources. Construction activities related to this alternative include excavation and other grading and digging activities.
	It is possible that currently unidentified cultural resources could be discovered during these activities, and destruction of such resources could result in a significant impact.
	Operations-related Impacts. ***No impacts are anticipated during operations under Alternative 1A; therefore, no mitigation is required.***
	1B: 4-month Bypass Alternative
	Construction-related Impacts.
	Impact1B–CR1: Identified Structural Resources. Impacts on identified cultural resources from construction under Alternative 1B would be the same as those identified for Alternative 1A (see Impact 1A–CR1).
	The impacts from construction activities on this structure would be less than significant; therefore, no mitigation is required.
	Impact 1B–CR2: Unidentified Cultural Resources. Impacts on unidentified cultural resources from construction under Alternative 1B would be the same as those identified for Alternative 1A (see Impact 1A–CR2).
	It is possible that currently unidentified cultural resources could be discovered during these activities, and destruction of such resources could result in a significant impact.
	Operations-related Impacts. ***No impacts are anticipated during operations under Alternative 1B; therefore, no mitigation is required.***
	2A: 2-month Improved Ladder Alternative
	Construction-related Impacts.
	Impact 2A–CR1: Identified Structural Resources. Impacts on identified cultural resources under Alternative 2A would be the same as those identified for Alternative 1A (see Impact 1A–CR1).
	The impacts from construction activities on this structure would be less than significant; therefore, no mitigation is required.
	Impact 2A–CR2: Unidentified Cultural Resources. Impacts on unidentified cultural resources from construction under Alternative 2A would be the same as those identified for Alternative 1A (see Impact 1A–CR2).
	It is possible that currently unidentified cultural resources could be discovered during these activities, and destruction of such resources could result in a significant impact.
	Operations-related Impacts. ***No impacts are anticipated during operations under Alternative 2A; therefore, no mitigation is required.***

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2B: 2-month with Existing Ladders Alternative

Construction-related Impacts.

Impact 2B–CR1: Identified Structural Resources. Impacts on identified cultural resources under Alternative 2B would be the same as those identified for Alternative 1A (see Impact 1A–CR1).

The impacts from construction activities on this structure would be less than significant; therefore, no mitigation is required.

Impact 2B–CR2: Unidentified Cultural Resources. Impacts on unidentified cultural resources from construction under Alternative 2B would be the same as those identified for Alternative 1A (see Impact 1A–CR2).

It is possible that currently unidentified cultural resources could be discovered during these activities, and destruction of such resources could result in a significant impact.

Operations-related Impacts. ***No impacts are anticipated during operations under Alternative 2B, therefore, no mitigation is required.***

3: Gates-out Alternative

Construction-related Impacts.

Impact 3–CR1: Identified Structural Resources. Impacts on identified cultural resources from construction under Alternative 3 would be the same as those identified for Alternative 1A (see Impact 1A–CR1).

The impacts from construction activities on this structure would be less than significant; therefore, no mitigation is required.

Impact 3–CR2: Unidentified Cultural Resources. Impacts on unidentified cultural resources from construction under Alternative 3 would be the same as those identified for Alternative 2A (see Impact 1A–CR2).

It is possible that currently unidentified cultural resources could be discovered during these activities, and destruction of such resources could result in a significant impact.

Operations-related Impacts. ***No impacts are anticipated during operations under Alternative 3; therefore, no mitigation is required.***

3.11.3 Mitigation

This section discusses mitigations for each potentially significant impact described in Environmental Consequences.

1A: 4-month Improved Ladder Alternative

Mitigation 1A–CR2. With any surface inspection there is always a remote possibility that previous activities (both natural and cultural) have obscured prehistoric or historic period artifacts or habitation areas, leaving no surface evidence that would permit discovery of these cultural resources. If during construction activities, ~~unusual~~ amounts of non-native stone (obsidian, fine-grained silicates, basalt), bone, shell, or prehistoric or historic period artifacts (purple glass) are discovered, or if areas that contain dark-colored sediment that do not appear to have been created through natural processes are discovered, then work should cease in the immediate area of discovery, and USBR's Contract Inspector and the USBR Regional Archaeologist ~~a professionally qualified archeologist should~~ would be contacted immediately for an onsite inspection of the discovery. USBR would consult with State Historic Preservation Officer pursuant to 36 CFR 800.13 to evaluate the find, assess the project's effects on the find, and resolve any potential adverse effects.

~~If any bone is uncovered that appears to be human, the Tehama County Coroner would be contacted, according to state law. If the coroner determines that the bone most likely represents a Native American interment, the Coroner would contact the Native American Heritage Commission in Sacramento for identification of the most likely descendants. Implementation of this mitigation would reduce potentially significant impacts to a less than significant level.~~ If any bone is uncovered that appears to be human, the Tehama County Coroner would be contacted, according to state law. If the coroner determines that the

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bone most likely represents a Native American interment, the coroner would contact the Native American Heritage Commission for identification of the most likely descendants.

In the event that human remains or cultural items are discovered on USBR lands, then all work should cease in the vicinity of the discovery, and the requirements of the Native American Graves Protection and Repatriation Act and Reclamation Directives and Standards LND 07-01 shall be implemented and followed.

1B: 4-month Bypass Alternative

Mitigation 1B–CR2. See Mitigation 1A–CR2.

2A: 2-month Improved Ladder Alternative

Mitigation 2A–CR2. See Mitigation 1A–CR2.

2B: 2-month with Existing Ladders Alternative

Mitigation 2B–CR2. See Mitigation 1A–CR2.

3: Gates-out Alternative

Mitigation 3–CR2. See Mitigation 1A–CR2.

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3.13 Air Quality

3.13.1 Affected Environment

The proposed project is located in the Northern Sacramento Valley Air Basin, which includes Shasta, Tehama, Glenn, Butte, Colusa, Sutter, and Yuba counties. Air quality in the basin is regulated under the authority of both the federal Clean Air Act and the California Clear Air Act with the Tehama County Air Pollution Control District as the local agency responsible for regulating air quality in Tehama County. Pursuant to the federal Clean Air Act of 1970, EPA has established national ambient air quality standards (NAAQS) for several major pollutants. Pollutants of primary concern for this project are ozone and its precursors, and particulate matter less than 10 microns in aerodynamic diameter (PM_{10}). The State of California has established ambient air quality standards pursuant to the California Clean Air Act (see Table 3.13-1).

TABLE 3.13-1
State and National Ambient Air Quality Standards

			Federal Standard	
Pollutant	**Averaging Time**	**State Standard**	**Primary Standard**	**Secondary Standard**
PM_{10}	~~Annual Geometric Mean~~ 24-hour	~~30~~ 50 µg/m^3	150 µg/m^3	Same as primary
	~~24-hour~~ Annual Arithmetic Mean	~~50~~ 20 µg/m^3	~~150 µg/m^3~~ ---	Same as primary
Ozone	~~Annual Arithmetic Mean~~ 1-hour	~~---~~ 0.09 ppm (180 µg/m^3)	~~50 µg/m^3~~ ---	Same as primary
~~Ozone~~	~~18~~-hour	~~0.09~~ 0.070 ppm (~~180~~ 137 µg/m^3)	~~0.12~~ 0.08 ppm (~~235~~ 157 µg/m^3)	Same as primary

ppm = parts per million.
µg/m^3 = micrograms per cubic meter.

Currently, Tehama County is not in attainment with the state standard for PM_{10} and ozone. Tehama County is in attainment with all the federal ambient air quality standards, including the federal PM_{10} standard~~,~~ and ~~was in~~the federal ozone standard. The County's attainment status with ~~the federal 1-hour ozone standard. Recent monitoring suggests that the area would not be in attainment with the federal 8-hour ozone~~respect to the federal $PM_{2.5}$ standard~~. Because of this status, the County Air Pollution Control District has developed an Air Quality Attainment Plan. The intent of this plan~~ is ~~to implement control strategies for the County to bring the air district into a level of attainment~~currently unclassified and, therefore, considered in attainment. Table 3.13-2 shows the attainment status for Tehama County.

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Ozone is a pollutant formed through a complex series of temperature-dependent photochemical reactions involving precursor pollutants such as nitrogen oxide (NO_x) and reactive organic gases (ROG) also referred to as volatile organic compounds (VOC). High ozone concentrations typically occur during multi-day periods of hot, sunny days accompanied by stagnant weather patterns. Under these conditions, pollution from outside the region is transported into the area, compounding the problem. This makes ozone a regional-scale pollutant and can affect rural areas outside major metropolitan areas.

TABLE 3.13-2
Tehama County Attainment Status

Pollutant	Attainment with State Standard?	Attainment with Federal Standard?
CO[a]	Yes	Yes
PM_{10}	No	Yes
$PM_{2.5}$[b]	---Unclassified	---Unclassified
Nitrogen Dioxide[b]	Yes	Yes
Ozone	No	Yes/No[c]
SO_2[bd]	Yes	Yes
Other	Yes	Yes

[a]Carbon monoxide.

[b]Attainment status for $PM_{2.5}$ will not be determined until the year 2005.

[c]The area was in attainment with the old federal 1-hour standard. Recent monitoring suggests that the area would not be in attainment with the new federal 8-hour standard.

[bd]Sulfur dioxide.

The topography of the basin enhances the accumulation of ozone. Mountain ranges surrounding the Tehama County area reach heights of over 6,000 feet, making a barrier to locally created pollution as well as pollution transported northward from the Sacramento metropolitan area. Because of these conditions, the valley portion of the air basin (i.e., those areas below Elevation 1,000 feet) is often subjected to temperature inversions that restrict vertical mixing and dilution of pollutants.

In 1996, EPA promulgatedpromulgatedThe California Air Resources Board conducted a new 8-hour standard for ozone (61 Federal Register 65752, December 3, 1996) to replace the previous 1-hour ozone standard. When this rule took effect, the County was in attainment with the old federal 1-hour standard. Table 3.13-3 shows 1-hour ozone concentrations at the Red Bluff Oak Street monitoring site and the Tuscan Butte monitoring site. However, recent monitoring suggest that the area may not be in attainment with the new federal 8-hour standard. The attainment status for this area is not yet available for the year 2000. The California Air Resources Board conducts a basinwide study to quantify the relative contributions of local emissions, upwind transported emissions, and non-local vehicle emissions to exceedances of the California ozone standard in Tehama County. The major finding of the 2000 study was that substantial transport of ozone and ozone precursors from the broader Sacramento Valley washas been responsible for Tehama County's ozone violations. The study also concluded that localized pollution sources by themselves did not exceedcause exceedances of the ozone standard.

Tehama County's emissions are a small part (around 4.7 percent) of the entire Sacramento Valley emissions inventory. It is clear from this study that sources in Tehama County do not cause ozone violations. Table 3.13-34 shows the criteria pollutant emissions inventory for Tehama County in relation to the overall air basin. Natural source emissions make up a significant portion of the emissions.

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TABLE 3.13-~~3~~4
2000 Estimated Annual Average Emissions—Tehama County

	Emission in Tons/Day							
	TOG[a]	ROG	CO	NO_x	SO_x[b]	PM	PM_{10}	$PM_{2.5}$
Stationary Sources	2.9 ~~2.74~~	1.3 ~~1.35~~	1.3 ~~1.12~~	1.7 ~~1.05~~	0.1 ~~0.01~~	1.6 ~~0.74~~	0.9 ~~0.45~~	0.5
Areawide Sources	21.4 ~~3.87~~	3.6 ~~2.44~~	15.7 ~~15.97~~	0.3 ~~0.31~~	0.0 ~~0.06~~	23.2 ~~24.02~~	13.6 ~~14.15~~	3.5
Mobile Sources	4.8 ~~5.76~~	4.4 ~~5.26~~	30.3 ~~48.52~~	17.6 ~~9.62~~	0.2 ~~0.66~~	0.8 ~~0.42~~	0.8 ~~0.42~~	0.7
Natural Sources	87.7 ~~1.07~~	70.8 ~~0.60~~	170.1 ~~14.91~~	5.3 ~~0.65~~	1.6 ~~-~~	18.0 ~~3.00~~	17.3 ~~2.89~~	14.7
Total	**116.8** ~~**13.44**~~	**80.1** ~~**9.65**~~	**217.3** ~~**80.52**~~	**25.0** ~~**11.62**~~	**2.0** ~~**0.73**~~	**43.5** ~~**28.18**~~	**32.6** ~~**17.91**~~	**18.3**
Sacramento Valley Air Basin Total	**872.1**	**578.2**	**1538.1**	**302.7**	**9.3**	**443.8**	**266.7**	**107.2**

[a]Toxic organic gases.
[b]Sulfur oxide.
Source: California Air Resources Board, ~~2000~~2006, Emissions Inventory.
~~http://www.arb.ca.gov/emisinv/emsmain/emsmain.htm~~

In 1996, EPA promulgated a new 8-hour standard for ozone (61 Federal Register 65752, December 3, 1996) to replace the previous 1-hour ozone standard. When this rule took effect, the County was in attainment with the old federal 1-hour standard. At this time, the County is also in attainment with the new 8-hour standard for ozone. Table 3.13-4 shows 1-hour ozone concentrations at the Red Bluff Oak Street monitoring site and the Tuscan Butte monitoring site.

TABLE 3.13-~~3~~4
Ozone Monitoring at Red Bluff Oak Street and Tuscan Butte

Location	Year	High 1-hour Ozone (ppm)	Second High 1-hour Ozone (ppm)
Red Bluff – Oak Street	2006 ~~1999~~	0.094 ~~0.110~~	0.090 ~~0.110~~
Red Bluff – Oak Street	2005 ~~1998~~	0.090 ~~0.120~~	0.089 ~~0.120~~
Red Bluff – Oak Street	2004 ~~1997~~	0.085 ~~0.100~~	0.083 ~~0.090~~
Red Bluff – Oak Street	2003 ~~1996~~	0.102 ~~0.090~~	0.099 ~~0.090~~
Tuscan Butte	2006 ~~1999~~	0.099 ~~0.128~~	0.099 ~~0.114~~
Tuscan Butte	2005 ~~1998~~	0.098 ~~0.120~~	0.095 ~~0.108~~
Tuscan Butte	2004 ~~1997~~	0.097 ~~0.101~~	0.096 ~~0.092~~
Tuscan Butte	2003 ~~1996~~	0.100 ~~0.108~~	0.099

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~~Table 3.13-5 shows monitoring data for PM_{10} at the Red Bluff Riverside Drive monitoring stations.~~

~~Residential woodstove and fireplace use during wintertime inversion conditions is the major contributor of stationary source PM_{10}.~~

~~Mobile source emissions make up a significant portion of the ROG and NO_x emissions. Unpaved road emissions (areawide source) make up most of the PM_{10} emissions.~~

Residential woodstove and fireplace use during wintertime inversion conditions is the major contributor of stationary source PM_{10}. Unpaved road emissions (areawide source) make up most of the PM_{10} emissions. Table 3.13-5 shows monitoring data for PM_{10} at the Red Bluff Riverside Drive monitoring stations. There are no $PM_{2.5}$ monitoring stations in Tehama County.

TABLE 3.13-5
PM_{10} Monitoring at Red Bluff Riverside Drive

Location	Year	High 24-hour PM_{10} (µg/m^3)	Second High 24-hour PM_{10} (µg/m^3)	Days > 24-hour State Standard	~~Annual PM_{10} (µg/m^3)~~	~~Days > Annual State Standard~~
Red Bluff – Riverside Drive	2006 ~~1999~~	70.0 ~~98.0~~	66.0 ~~75.0~~	4 ~~8~~	~~28~~	~~48~~
Red Bluff – Riverside Drive	2005 ~~1998~~	41.0 ~~119.0~~	40.0 ~~67.0~~	0 ~~8~~	~~21.3~~	~~48~~
Red Bluff – Riverside Drive	2004 ~~1997~~	57.0 ~~58~~	55.0 ~~52~~	2	~~19~~	~~12~~
Red Bluff – Riverside Drive	2003 ~~1996~~	58.0 ~~56~~	46.0 ~~49~~	1	~~22.3~~	~~6~~

3.13.2 Environmental Consequences

This section provides a discussion of the consequences of the project alternatives on air quality as compared to the No Action Alternative.

Methodology

~~Air quality impacts of the various alternatives were evaluated by determining the worst-case emission for each process. Vehicle emissions were calculated using the URBEMIS 7G computer model. The direct project emission and total project~~

Tehama County Air Pollution Control District does not have any established emission thresholds for determining the significance of construction projects. However, emission estimates were calculated and provided below for information purposes only. To estimate the maximum daily construction emissions, emissions ~~were compared to the first tier trigger thresholds. The fugitive dust emissions~~ of each pollutant were calculated ~~from the CEQA equation: $E_{ce}(lbs/day) = 0.77 tons/acre/month * acres$ Diesel- and gasoline-powered vehicle exhaust contains CO, ROG, NO_x, SO_x, and PM_{10}. Exhaust emissions from worker vehicles traveling to and from the site and onsite~~ for the individual construction activities ~~were considered. For the onsite construction vehicles, the daily emission rates were estimated based on the projected amount~~ of ~~material removed and added for the project, assuming~~ each ~~phase of the project takes 60 days. Specifically, the~~ alternative (for example, Mill Site, Conveyance Facility, and Bypass). It was

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assumed that none of the construction activities or phases would occur simultaneously. The worst-case daily emissions ~~from construction exhaust (E_{ce}) were assumed to be:~~ $E_{ce}(lbs/day) = \frac{M(CY) * EF(g/CY)}{60 days * 454(g/lbs)}$ ~~Where M is the total amount of material removed and added (in CY), EF is the pollutant-specific emission factor from the Bay Area Air Quality Management District CEQA Guidelines.~~

~~The maximum number~~ were determined by selecting the maximum emissions of ~~vehicle trips was considered, and emissions were estimated using the URBEMIS 7G computer software. During the peak of each~~ construction activity~~, it was assumed that there would be 20 workers, each with his or her own car and a maximum of three trucks per day. The URBEMIS 7G program requires the number of one-way trips, so the number of one-way trips is double the number of vehicles.~~
~~Additionally, thresholds were established to determine significance and are shown in Table 3.13-6.~~

~~**TABLE 3.13-6**~~
~~Thresholds for Determining Significance~~

~~Pollutant/Source~~	~~Threshold~~	~~Applicable Rule~~
~~CO~~	~~550 lb/day~~	~~PSD~~
~~NO_x~~	~~219 lb/day~~	~~PSD~~
~~PM_{10}~~	~~82 lb/day~~	~~PSD~~
~~ROG~~	~~219 lb/day~~	~~PSD~~
~~SO_2~~	~~219 lb/day~~	~~PSD~~

~~Source: Prevention of Significant Deterioration.~~

~~lb/day = pounds per day.~~

It was assumed that construction of the proposed action would take approximately 3 years starting from 2009. The construction would involve activities such as site grubbing and clearing, earthwork, and cement and civil work. These activities would involve the use of diesel- and gasoline-powered equipment or vehicles that would generate emissions of criteria pollutants such as CO, NO_X, VOC, SO_X, PM_{10}, and $PM_{2.5}$. In addition, the site preparation and earthwork would result in fugitive PM_{10} and $PM_{2.5}$ emissions. The assumption was made that construction activities at each location would occur in three phases over the 3-year construction period. Phase I would involve clearing and grubbing; and Phase II would involve earthwork, excavation, sorting, and transporting excavated and fill material. Phase III would include concrete work and civil construction.

The Mill Site assumptions included three sub-phases for Phase II. Phase II-A included the excavation and transport of material from the proposed forebay (up to 580,000 CY). Phase II-B included onsite transport and temporary storage of approximately 170,000 CY of potential landfill material, and Phase II-C included transportation of the 170,000 CY of material to an offsite facility.

Exhaust emissions of VOC, CO, NO_X, SO_2, and PM_{10} from diesel-powered construction equipment were calculated by using emission factors derived from the California Air Resources Board OFFROAD2007 Emissions Model (California Air Resources Board, 2007). Default horsepower rating of each type of equipment was obtained from URBEMIS2007. $PM_{2.5}$ emission factors were not readily available from the OFFROAD model; they were estimated following the methodology recommended by South Coast Air Quality Management District (SCAQMD) and used its published fraction of $PM_{2.5}$ to PM_{10} for diesel combustion exhaust (SCAQMD, 2006a).

Exhaust emissions of VOC, CO, NO_X, SO_2, $PM_{2.5}$, and PM_{10} from on-road vehicles, including the heavy-duty diesel trucks and workers' commute, were calculated using emission factors generated by the EMFAC2007 model with the vehicle fleet representative of the Tehama County (California Air Resources Board, 2007). The emissions from vehicles included both the onsite and offsite emissions and for vehicle traveling and idling.

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Fugitive dust emissions from construction were calculated by using the total area of disturbance. Uncontrolled fugitive PM_{10} emissions were estimated using the default URBEMIS2007 emission factor of 10 pounds per acre of disturbed area. To be conservative, it was assumed that 3 acres of area would be disturbed on any given day. The PM_{10} was assumed to be 68 percent controlled by watering the site three times per day, according to the SCAQMD CEQA Handbook (SCAQMD, 2006b). No emission factors are available to calculate the fugitive $PM_{2.5}$ emissions. The $PM_{2.5}$ emissions were calculated following the methodology recommended by SCAQMD and using the $PM_{2.5}$ fraction of PM_{10} in fugitive dusts (SCAQMD, 2006a).

General Conformity

Clean Air Act Section 176(c), General Conformity, established certain statutory requirements for federal agencies with proposed federal activities to demonstrate conformity of the proposed activities with each state's implementation plan for attainment of NAAQS. General conformity applies only to non-attainment and maintenance areas. Because the proposed project is in an area that is in attainment with all NAAQS, a conformity analysis is not required.

Significance Criteria

Significance criteria represent the thresholds that were used to identify whether an impact would be potentially significant. These criteria are based on Appendix G of the *CEQA Guidelines* and professional judgment.

Impacts on air quality would be significant if they would result in any of the following:

- Conflict with or obstruct implementation of the applicable air quality plan.
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation.
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors).
- Expose sensitive receptors to substantial pollutant concentrations.
- Create objectionable odors affecting a substantial number of people.

The main area of concern for construction impacts is fugitive dust emissions. If project impacts are found to be significant, then mitigation should be applied~~. If standard mitigation measures are applied, then the impacts are considered to be insignificant for the construction impacts~~. Because the area is non-attainment with the state ambient air quality standards for PM_{10}, standard fugitive dust mitigation measures would need to be applied (see Section 3.7.3, Mitigation). When standard fugitive dust mitigation measures are applied, PM_{10} construction impacts would be insignificant.

Vehicle emissions of NO_x and ROG during construction are also of concern because the area is non-attainment with the state ambient air quality standards for ozone (see Section 3.7.3, Mitigation).

Tehama County Air Pollution Control District does not have any established emission thresholds for determining significance of construction projects. The worst-case daily emissions for each construction activity are provided below as additional information.

No Action Alternative

No changes to hydrology or surface-water management would occur. Gates would be operated during the current 4-month gates-in period. Construction activity would be limited to the installation of the fourth pump at RPP. No other construction activity would occur as a result of the No Action Alternative.

1A: 4-month Improved Ladder Alternative

Construction-related Impacts.
Impact 1A–AQ1: Fugitive Dust Emissions. During ground surface preparation for this alternative, most of the PM_{10} emissions would be composed of fugitive dust. Emission sources would include vehicles and construction equipment traveling over dirt surfaces, site clearing, grading, cut and fill operations, and wind-blown dust.

TABLE 2-1
Text Changes to Draft EIS/EIR

Page	Paragraph with Change

Short-term impacts with regard to dust generated during construction would be considered potentially significant because of the current exceedance of the state PM_{10} standards; however, when standard fugitive dust mitigation measures are applied, PM_{10} construction impacts would be insignificant.

Impact 1A–AQ2: Construction Equipment and Vehicle Exhaust Emissions. Table 3.13-67 shows the vehicle emissions that would be expected during project construction. CO and NO_x would exceed the significance threshold. No significant or unusual odors are anticipated to be generated during construction.

TABLE 3.13-7
Impact 1A–AQ2: Construction Equipment and Vehicles Exhaust Emissions and Fugitive Dust

Location	PM_{10}	CO	ROG	NO_x	So_x
Mill Site	6.94	435.54	29.04	133.82	14.52
Left Bank Fish Ladder	1.03	64.62	4.31	19.85	2.15
Right Bank Fish Ladder	0.37	23.00	1.53	7.07	0.77
Conveyance Facility	4.03	253.30	16.89	77.83	8.44
Disturbed Land	51.33				
Worker Vehicle Trips	0.10	1.36	0.16	0.27	0.10
Entrained Road Dust	0.61				
Total (lb/day)	**64.41**	**777.82**	**57.93**	**238.84**	**25.98**
Significance Threshold (lb/day)	***82***	***550***	***219***	***219***	***219***

TABLE 3.13-6
Impact 1A-AQ2: Construction Equipment and Vehicles Exhaust Emissions and Fugitive Dust

		VOC (lb/day)	CO (lb/day)	NO_x (lb/day)	SO_x (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)
Mill Site	Phase I	9.8	42.0	86.2	0.1	11.2	4.9
	Phase II-A	14.0	54.1	99.7	0.1	12.2	5.8
	Phase II-B	17.5	73.5	146.3	0.1	13.9	7.4
	Phase II-C	15.8	73.8	160.6	0.1	14.2	7.6
	Phase III	32.1	128.6	355.0	0.4	21.1	13.9
Right Bank Fish Ladder	Phase I	5.3	21.7	42.9	0.0	9.5	3.3
	Phase II	11.9	48.2	134.9	0.1	12.6	6.1
Conveyance Facility	Phase I	15.2	66.7	134.2	0.1	13.3	6.8
	Phase II	21.0	90.8	230.6	0.2	16.5	9.6
Left Bank Fish Ladder	Phase I	15.2	67.5	134.2	0.1	13.3	6.9
	Phase II	5.3	21.7	42.9	0.0	9.5	3.3
	Phase III	11.8	46.0	133.9	0.1	12.6	6.1
Maximum Daily Emissions for Alternative 1A		32.1	128.6	355.0	0.4	21.1	13.9

Notes:
It is assumed that the construction phases would not overlap with each other. Therefore, the maximum daily emissions represent the worst-case daily emissions from one of the phases.

Fugitive PM_{10} and $PM_{2.5}$ emissions took into account 68 percent control efficiency by watering the site three times a day (according to the control efficiencies in SCAQMD Air Quality Handbook Table 11-4).

TABLE 2-1
Text Changes to Draft EIS/EIR

Page	Paragraph with Change

The impact on air quality under Alternative 1A would be temporary but significant for ~~CO and~~PM_{10}, NO_x, and ~~NO_x~~ VOC because of the County's current exceedance of the state PM_{10} and ozone standards. However, ~~Construction impacts would be temporary, and~~ when mitigation is applied, the impacts would be less than significant.

Operations-related Impacts. Impacts from operations under Alternative 1A would not be significant since (1) the project would not increase traffic flow to the area, ~~and~~ (2) the pumps would only be operated ~~turned on~~ at limited times, and (3) the pumps would be electrically powered with no associated direct emissions; therefore, no mitigation is required.

1B: 4-month Bypass Alternative

Construction-related Impacts.
Impact 1B–AQ1: Fugitive Dust Emissions. Impacts from construction under Alternative 1B would be the same as those identified for Alternative 1A (see Impact 1A–AQ1).

Short-term impacts with regard to dust generated during construction would be considered potentially significant because of the current exceedances of the state PM_{10} standards; however, when standard fugitive dust mitigation measures are applied, PM_{10} construction impacts would be insignificant.

Impact 1B–AQ2: Construction Equipment and Vehicle Exhaust Emissions. Table 3.13-~~7~~8 shows the ~~vehicle~~ emissions that would be expected during project construction. ~~CO and NO_x would exceed the significance threshold.~~ No significant or unusual odors would be anticipated to be generated during construction.

~~**TABLE 3.13-8**~~
~~Impact 1B–AQ2: Construction Equipment and Vehicles Exhaust Emission and Fugitive Dust~~

~~Location~~	~~PM_{10}~~	~~CO~~	~~ROG~~	~~NO_x~~	~~SO_x~~
~~Mill Site~~	~~6.94~~	~~435.54~~	~~29.04~~	~~133.82~~	~~14.52~~
~~Bypass Channel~~	~~6.92~~	~~434.37~~	~~28.96~~	~~133.46~~	~~14.48~~
~~Right Bank Fish Ladder~~	~~0.37~~	~~23.00~~	~~1.53~~	~~7.07~~	~~0.77~~
~~Conveyance Facility~~	~~4.03~~	~~253.30~~	~~16.89~~	~~77.83~~	~~8.44~~
~~Disturbed Land~~	~~51.33~~				
~~Worker Vehicle Trips~~	~~0.10~~	~~1.36~~	~~0.16~~	~~0.27~~	~~0.10~~
~~Entrained Road Dust~~	~~0.61~~				
~~**Total (lb/day)**~~	~~**70.30**~~	~~**1,147.57**~~	~~**76.58**~~	~~**352.45**~~	~~**38.31**~~
~~***Significance Threshold (lb/day)***~~	~~***82***~~	~~***550***~~	~~***219***~~	~~***219***~~	~~***219***~~

TABLE 2-1
Text Changes to Draft EIS/EIR

Page	Paragraph with Change

TABLE 3.13-7
Impact 1B–AQ2: Construction Equipment and Vehicles Exhaust Emission and Fugitive Dust

		VOC (lb/day)	CO (lb/day)	NO_x (lb/day)	SO_x (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)
Mill Site	Phase I	9.8	42.0	86.2	0.1	11.2	4.9
	Phase II-A	14.0	54.1	99.7	0.1	12.2	5.8
	Phase II-B	17.5	73.5	146.3	0.1	13.9	7.4
	Phase II-C	15.8	73.8	160.6	0.1	14.2	7.6
	Phase III	32.1	128.6	355.0	0.4	21.1	13.9
Bypass Channel	Phase I	15.2	67.5	134.2	0.1	13.3	6.9
	Phase II	17.5	74.3	146.4	0.1	13.9	7.4
	Phase III	16.5	64.4	181.9	0.2	14.5	7.9
Right Bank Fish Ladder	Phase I	5.3	21.7	42.9	0.0	9.5	3.3
	Phase II	11.9	48.2	134.9	0.1	12.6	6.1
Conveyance Facility	Phase I	15.2	66.7	134.2	0.1	13.3	6.8
	Phase II	21.0	90.8	230.6	0.2	16.5	9.6
Maximum Daily Emissions for Alternative 1B		32.1	128.6	355.0	0.4	21.1	13.9

Notes:

It is assumed that the construction phases would not overlap with each other. Therefore, the maximum daily emissions represent the worst-case daily emissions from one of the phases.

Fugitive PM_{10} and $PM_{2.5}$ emissions took into account 68 percent control efficiency by watering the site three times a day (according to the control efficiencies in SCAQMD Air Quality Handbook Table 11-4).

The impact on air quality under Alternative 1B would be temporary but significant for ~~CO and~~PM_{10}, NO_x, and ~~NO_x~~ VOC because of the County's current exceedance of the state PM_{10} and ozone standards. Construction impacts would be temporary, and when mitigation is applied, the impacts would be less than significant.

Operations-related Impacts. ***Impacts from operations under Alternative 1B would not be significant since (1) the project would not increase traffic flow to the area, ~~and~~ (2) the pumps would only be operated ~~turned on~~ at limited times, and (3) the pumps would be electrically powered with no associated direct emissions; therefore, no mitigation is required.***

2A: 2-month Improved Ladder Alternative

Construction-related Impacts.

Impact 2A–AQ1: Fugitive Dust Emissions. Impacts from construction under Alternative 2A would be the same as those identified for Alternative 1A (see Impact 1A–AQ1).

Short-term impacts with regard to dust generated during construction would be considered potentially significant because of the current exceedances of the state PM_{10} standards; however, when standard fugitive dust mitigation measures are applied, PM_{10} construction impacts would be insignificant.

Impact 2A–AQ2: Construction Equipment and Vehicle Exhaust Emissions. Table 3.13-~~8~~9 shows the ~~vehicle~~ emissions that would be expected during project construction. ~~CO and NO_x would exceed the significance threshold.~~ No significant or unusual odors would be anticipated to be generated during construction.

TABLE 2-1
Text Changes to Draft EIS/EIR

Page	Paragraph with Change

~~**TABLE 3.13-9**~~
~~Impact 2A–AQ2: Construction Equipment and Vehicles Exhaust Emissions and Fugitive Dust~~

~~Location~~	~~PM_{10}~~	~~CO~~	~~ROG~~	~~NO_x~~	~~SO_x~~
~~Mill Site~~	~~9.91~~	~~621.45~~	~~41.43~~	~~190.94~~	~~20.72~~
~~Left Bank Fish Ladder~~	~~1.03~~	~~64.62~~	~~4.31~~	~~19.85~~	~~2.15~~
~~Right Bank Fish Ladder~~	~~0.37~~	~~23.00~~	~~1.53~~	~~7.07~~	~~0.77~~
~~Conveyance Facility~~	~~4.03~~	~~253.30~~	~~16.89~~	~~77.83~~	~~8.44~~
~~Disturbed Land~~	~~51.33~~				
~~Worker Vehicle Trips~~	~~0.10~~	~~1.36~~	~~0.16~~	~~0.27~~	~~0.10~~
~~Entrained Road Dust~~	~~0.61~~				
~~**Total (lb/day)**~~	~~**67.38**~~	~~**963.73**~~	~~**64.32**~~	~~**295.96**~~	~~**32.18**~~
~~***Significance Threshold (lb/day)***~~	~~***82***~~	~~***550***~~	~~***219***~~	~~***219***~~	~~***219***~~

TABLE 3.13-8
Impact 2A–AQ2: Construction Equipment and Vehicles Exhaust Emissions and Fugitive Dust

		VOC (lb/day)	CO (lb/day)	NO_x (lb/day)	SO_x (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)
Mill Site	Phase I	9.8	42.0	86.2	0.1	11.2	4.9
	Phase II-A	14.0	54.1	99.7	0.1	12.2	5.8
	Phase II-B	17.5	73.5	146.3	0.1	13.9	7.4
	Phase II-C	15.8	73.8	160.6	0.1	14.2	7.6
	Phase III	32.1	128.6	355.0	0.4	21.1	13.9
Right Bank Fish Ladder	Phase I	5.3	21.7	42.9	0.0	9.5	3.3
	Phase II	11.9	48.2	134.9	0.1	12.6	6.1
Conveyance Facility	Phase I	15.2	66.7	134.2	0.1	13.3	6.8
	Phase II	21.0	90.8	230.6	0.2	16.5	9.6
Left Bank Fish Ladder	Phase I	15.2	67.5	134.2	0.1	13.3	6.9
	Phase II	5.3	21.7	42.9	0.0	9.5	3.3
	Phase III	11.8	46.0	133.9	0.1	12.6	6.1
Maximum Daily Emissions for Alternative 2A		32.1	128.6	355.0	0.4	21.1	13.9

Notes:

It is assumed that the construction phases would not overlap with each other. Therefore, the maximum daily emissions represent the worst-case daily emissions from one of the phases.

Fugitive PM_{10} and $PM_{2.5}$ emissions took into account 68 percent control efficiency by watering the site three times a day (according to the control efficiencies in SCAQMD Air Quality Handbook Table 11-4).

TABLE 2-1
Text Changes to Draft EIS/EIR

Page	Paragraph with Change

~~***The impact on air quality under Alternative 2A would be temporary but significant for CO and NO_x. Construction impacts would be temporary, and when mitigation is applied, the impacts would be less than significant.***~~

Operations-related Impacts. ***Impacts from operations under Alternative 2A would not be significant since (1) the project would not increase traffic flow to the area, and (2) the pumps would only be operated turned on at limited times, and (3) the pumps would be electrically powered with no associated direct emissions; therefore, no mitigation is required.***

2B: 2-month with Existing Ladders Alternative

Construction-related Impacts.
Impact 2B–AQ1: Fugitive Dust Emissions. Impacts from construction under Alternative 2B would be the same as those identified for Alternative 1A (see Impact 1A–AQ1).

Short-term impacts with regard to dust generated during construction would be considered potentially significant because of the current exceedances of the state PM_{10} standards; however, when standard fugitive dust mitigation measures are applied, PM_{10} construction impacts would be insignificant.

Impact 2B–AQ2: Construction Equipment and Vehicle Exhaust Emissions. Table 3.13-9~~10~~ shows the ~~vehicle~~ emissions that would be expected during project construction. ~~CO and NO_x would exceed the significance threshold.~~ No significant or unusual odors are anticipated to be generated during construction

~~**TABLE 3.13-10**~~
~~Impact 2B–AQ2: Construction Equipment and Vehicles Exhaust Emissions and Fugitive Dust~~

~~**Location**~~	~~**PM_{10}**~~	~~**CO**~~	~~**ROG**~~	~~**NO_x**~~	~~**SO_x**~~
~~Mill Site~~	~~9.91~~	~~621.45~~	~~41.43~~	~~190.94~~	~~20.72~~
~~Conveyance Facility~~	~~4.03~~	~~253.30~~	~~16.89~~	~~77.83~~	~~8.44~~
~~Disturbed Land~~	~~51.33~~				
~~Worker Vehicle Trips~~	~~0.10~~	~~1.36~~	~~0.16~~	~~0.27~~	~~0.10~~
~~Entrained Road Dust~~	~~0.61~~				
~~**Total (lb/day)**~~	~~**65.98**~~	~~**876.11**~~	~~**58.48**~~	~~**269.04**~~	~~**29.26**~~
~~***Significance Threshold (lb/day)***~~	~~***82***~~	~~***550***~~	~~***219***~~	~~***219***~~	~~***219***~~

TABLE 2-1
Text Changes to Draft EIS/EIR

Page	Paragraph with Change

TABLE 3.13-9
Impact 2B–AQ2: Construction Equipment and Vehicles Exhaust Emissions and Fugitive Dust

		VOC (lb/day)	CO (lb/day)	NO_x (lb/day)	SO_x (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)
Mill Site	Phase I	9.8	42.0	86.2	0.1	11.2	4.9
	Phase II-A	14.0	54.1	99.7	0.1	12.2	5.8
	Phase II-B	17.5	73.5	146.3	0.1	13.9	7.4
	Phase II-C	15.8	73.8	160.6	0.1	14.2	7.6
	Phase III	32.1	128.6	355.0	0.4	21.1	13.9
Conveyance Facility	Phase I	15.2	66.7	134.2	0.1	13.3	6.8
	Phase II	21.0	90.8	230.6	0.2	16.5	9.6
Maximum Daily Emissions for Alternative 2B		32.1	128.6	355.0	0.4	21.1	13.9

Notes:

It is assumed that the construction phases would not overlap with each other. Therefore, the maximum daily emissions represent the worst-case daily emissions from one of the phases.

Fugitive PM_{10} and $PM_{2.5}$ emissions took into account 68 percent control efficiency by watering the site three times a day (according to the control efficiencies in SCAQMD Air Quality Handbook Table 11-4).

The impact on air quality under Alternative 2B would be temporary but significant for ~~CO and~~ PM_{10}, NO_x, and ~~NO_x~~ VOC because of the County's current exceedance of the state PM_{10} and ozone standards. Construction impacts would be temporary, and when mitigation is applied, the impacts would be less than significant.

Operations-related Impacts. ***Impacts from operations under Alternative 2B would not be significant since (1) the project would not increase traffic flow to the area, ~~and~~ (2) the pumps would only be operated ~~turned on~~ at limited times, and (3) the pumps would be electrically powered with no associated direct emissions; therefore, no mitigation is required.***

3: Gates-out Alternative

Construction-related Impacts.
Impact 3–AQ1: Fugitive Dust Emissions. Impacts from construction under Alternative 3 would be the same as those identified for Alternative 1A (see Impact 1A–AQ1).

Short-term impacts with regard to dust generated during construction would be considered potentially significant because of the current exceedances of the state PM_{10} standards; however, when standard fugitive dust mitigation measures are applied, PM_{10} construction impacts would be insignificant.

Impact 3–AQ2: Construction Equipment and Vehicle Exhaust Emissions. Table 3.13-10~~11~~ shows the ~~vehicle~~ emissions that would be expected during project construction. ~~CO and NO_x would exceed the significance threshold.~~ No significant or unusual odors would be anticipated to be generated during construction.

TABLE 2-1
Text Changes to Draft EIS/EIR

Page	Paragraph with Change

~~**TABLE 3.13-11**~~
~~Impact 3–AQ2: Construction Equipment and Vehicles Exhaust Emissions and Fugitive Dust~~

~~Location~~	~~PM_{10}~~	~~CO~~	~~ROG~~	~~NO_x~~	~~So_x~~
~~Mill Site~~	~~19.71~~	~~1236.43~~	~~82.43~~	~~379.89~~	~~41.21~~
~~Conveyance Facility~~	~~4.03~~	~~253.30~~	~~16.89~~	~~77.83~~	~~8.44~~
~~Disturbed Land~~	~~51.33~~				
~~Worker Vehicle Trips~~	~~0.10~~	~~1.36~~	~~0.16~~	~~0.27~~	~~0.10~~
~~Entrained Road Dust~~	~~0.61~~				
~~**Total (lb/day)**~~	~~**75.78**~~	~~**1,491.09**~~	~~**99.48**~~	~~**457.99**~~	~~**49.75**~~
~~***Significance Threshold (lb/day)***~~	~~***82***~~	~~***550***~~	~~***219***~~	~~***219***~~	~~***219***~~

TABLE 3.13-10
Impact 3–AQ2: Construction Equipment and Vehicles Exhaust Emissions and Fugitive Dust

		VOC (lb/day)	CO (lb/day)	NO_x (lb/day)	SO_x (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)
Mill Site	Phase I	9.8	42.0	86.2	0.1	11.2	4.9
	Phase II-A	14.0	54.1	99.7	0.1	12.2	5.8
	Phase II-B	17.5	73.5	146.3	0.1	13.9	7.4
	Phase II-C	15.8	73.8	160.6	0.1	14.2	7.6
	Phase III	32.1	128.6	355.0	0.4	21.1	13.9
Conveyance Facility	Phase I	15.2	66.7	134.2	0.1	13.3	6.8
	Phase II	21.0	90.8	230.6	0.2	16.5	9.6
Maximum Daily Emissions for Alternative 3		32.1	128.6	355.0	0.4	21.1	13.9

Notes:

It is assumed that the construction phases would not overlap with each other. Therefore, the maximum daily emissions represent the worst-case daily emissions from one of the phases.

Fugitive PM_{10} and $PM_{2.5}$ emissions took into account 68 percent control efficiency by watering the site three times a day (according to the control efficiencies in SCAQMD Air Quality Handbook Table 11-4).

The impact on air quality under Alternative 3 would be temporary but significant for ~~CO and~~PM_{10}, NO_x, and ~~NO_x,~~ VOC because of the County's current exceedance of the state PM_{10} and ozone standards. Construction impacts would be temporary, and when mitigation is applied, the impacts would be less than significant.

Operations-related Impacts. ***Impacts from operations under Alternative 3 would not be significant since (1) the project would not increase traffic flow to the area, ~~and~~ (2) the pumps would only be operated ~~turned on~~ at limited times, and (3) the pumps would be electrically powered with no associated direct emissions; therefore, no mitigation is required.***

TABLE 2-1
Text Changes to Draft EIS/EIR

Page	Paragraph with Change

3.13.3 Mitigation

This section discusses mitigations for each significant impact described in Environmental Consequences.

1A: 4-month Improved Ladder Alternative

Mitigation 1A–AQ1. To mitigate for short-term air quality impacts associated with the proposed project from dust generated during periods of construction activities, a fugitive dust emissions control plan ~~dust control program~~ would be implemented in accordance with Tehama County Air Pollution Control District Rule 4:24, with the following components:

- Equipment and manual watering would be conducted on all stockpiles, dirt/gravel roads, and exposed or disturbed soil surfaces, as necessary, to reduce airborne dust.
- The contractor or builder would designate a person to monitor the dust control program and to order increased watering, as necessary, to prevent transport of dust offsite. This person would respond to citizen complaints.
- Dust-producing activities would be suspended when high winds create construction-induced visible dust plumes moving beyond the site in spite of dust control.
- All trucks hauling soil and other loose material would be covered, or would be required to have at least 2 feet of freeboard.
- All unpaved access roads and staging areas at construction sites would have soil stabilizers applied as necessary.
- Streets in and adjacent to construction area would be kept swept and free of visible soil and debris.
- Traffic speeds on all unpaved roads would be limited to 15 miles per hour.

Mitigation 1A–AQ2. To mitigate for short-term air quality impacts associated with the proposed project from construction equipment emission, an equipment control program would be implemented with the following components:

- Properly maintain equipment.
- Limit idling time when the equipment is not in operation.

1B: 4-month Bypass Alternative

Mitigation 1B–AQ1. See Mitigation 1A–AQ1.

Mitigation 1B–AQ2. See Mitigation 1A–AQ2.

2A: 2-month Improved Ladder Alternative

Mitigation 2A–AQ1. See Mitigation 1A–AQ1.

Mitigation 2A–AQ2. See Mitigation 1A–AQ2.

2B: 2-month with Existing Ladders Alternative

Mitigation 2B–AQ1. See Mitigation 1A–AQ1.

Mitigation 2B–AQ2. See Mitigation 1A–AQ2.

3: Gates-out Alternative

Mitigation 3–AQ1. See Mitigation 1A–AQ1.

Mitigation 3–AQ2. See Mitigation 1A–AQ2.

TABLE 2-1
Text Changes to Draft EIS/EIR

Page	Paragraph with Change
3-482	**Mitigation 1A–TC1.** To reduce construction-related impacts on traffic and roadways, the construction contractor would be required to develop a traffic control plan (TCP) with the Tehama County Public Works, City of Red Bluff Public Works, and Caltrans, which would be subject to review by Caltrans and the Public Works Director. This plan would ensure that construction traffic is routed in a way that maintains acceptable LOS levels on all affected roadways and intersections that are currently measured and used by project-related vehicles. The TCP would address the structural capacity of roads and bridges along routes that could be traveled by construction-related vehicles. The TCP would ensure that the structural integrity of those roads and bridges would not be damaged by construction-related vehicle trips. If damage occurs, road surface would be repaired or replaced on Sale Lane and/or Altube Avenue. This mitigation would reduce the impact to a less than significant level.
3-483	**Mitigation 1A–TC2.** To reduce construction-related impacts on traffic and roadways, the construction contractor would be required to develop a TCP with the Tehama County Public Works, City of Red Bluff Public Works, and Caltrans, which would be subject to review by Caltrans and the Public Works Director. This plan would ensure that construction traffic is routed in a way that maintains acceptable LOS levels on all affected roadways and intersections that are currently measured and used by project-related vehicles. The TCP would address the structural capacity of roads and bridges along routes that could be traveled by construction-related vehicles. The TCP would ensure that the structural integrity of those roads and bridges would not be damaged by construction-related vehicle trips. If damage occurs, road surface would be repaired or replaced on Sale Lane and/or Altube Avenue. This mitigation would reduce the impact to a less than significant level.
4-2	As stated above, the implementation of CVPIA was modeled and included in the cumulative impact analysis. The ~~Draft~~ CVPIA PEIS, ~~which was released for public review in September 1997 and is available for review from USBR~~was approved in the January 9, 2001, Record of Decision. The CVPIA PEIS~~,~~ evaluated:
4-2 and 4-3	Implementation of the alternatives considered in the ~~Draft~~ CVPIA PEIS would improve fish and wildlife habitats, but would also reduce water supply reliability to CVP water service contractors. Assumed increases in groundwater pumping to substitute for decreased surface-water supplies would increase the potential for ground subsidence in portions of the Central Valley, as well as increase the cost of groundwater pumping. Some of the alternatives would increase the amount of fallow land in portions of the Central Valley. The ~~Draft~~ CVPIA PEIS also considered acquisition of water from water rights holders for purposes of increasing in-stream fish flows. These actions could also lead to more fallowed lands. The regional economies could be impacted by primary and secondary impacts associated with the reduction in irrigated lands. The ~~Draft~~ CVPIA PEIS alternatives also would modify the flow release patterns from CVP reservoirs by increasing releases in spring and reducing releases in summer. This change would reduce the amount of power generated at CVP facilities and substantially reduce the value of power produced. This would lead to an increase in power costs and a reduction in available CVP-generated power for preference power customers served by Western. In addition, changes in reservoir levels would potentially impact recreational use at various CVP and State Water Project reservoirs.
4-11	The potential Storage Project could result in offstream reservoir capacity of up to 2.0 million acre-feet north of the Bay-Delta in the northern Sacramento Valley. The study of offstream storage north of the Delta was authorized by Proposition 204 and has been identified in concept through the CALFED Integrated Storage Investigations program. The storage concept was further developed through the 2000 CALFED Programmatic EIR/EIS (PEIR/EIS). The PEIR/EIS resulted in the adoption of a long-term comprehensive program to restore ecological health and improve water management for beneficial uses of the San Francisco Bay/Sacramento-San Joaquin River Delta system and its tributary watersheds. The Storage Project is a specific action that would implement, in part, the Preferred Programmatic Alternative adopted by the PEIR/EIS. The objectives of the Storage Project are as directed in the PEIR/EIS ROD and consist of enhanced water management flexibility in the Sacramento Valley, reduced water diversion from the Sacramento River during critical fish-migration periods, increased reliability of supplies for a significant portion of the Sacramento Valley, additional storage, and operational benefits for other CALFED programs (including

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	Delta water quality and the Environmental Water Account). Specific details on the beneficiaries of these objectives, conditions under which diversion could occur, means of conveyance, associated costs to beneficiaries for acquiring the water, and other implementation and operational details are being developed. The Storage Project is currently undergoing separate environmental analysis and feasibility study. The state lead agency is DWR, and the federal lead agency is USBR. Multiple federal, state, and local agencies have also been identified as participants in the analysis and study process, in addition to interested members of the public. Public scoping was conducted from October 2001 through January 2002. The DEIR/EIS and the Feasibility Study are expected to be available to the public in 2010. Alternatives to the project, including a Preferred Alternative, are currently undergoing development. In addition to a No Project Alternative (existing conditions) and a No Action Condition (anticipated 2030 conditions if the project is not approved), the possible project alternatives as presented in the Notice of Preparation/Notice of Intent are summarized in Table 4.1-1. The Storage Project EIR/EIS will analyze a specific implementation action for program elements previously identified in the PEIR/EIS and, therefore, will tier from the programmatic document. The Storage Project EIR/EIS will specifically identify the benefits and impacts of the proposed offstream Storage Project and determine the significance of these impacts. Initial evaluation and scoping have identified that potential impacts could occur to environmental resources and socioeconomic conditions as a result of the construction and operation of surface storage, diversion, and conveyance facilities associated with the Storage Project. Table 4.1-2 summarizes the environmental resources and socioeconomic conditions that could be affected. The degree of the impact and potential mitigation if the impact is found to be significantly adverse is being developed as part of the EIR/EIS process. ~~The Storage Project could result in offstream reservoir capacity of up to 1.9 million acre-feet north of the Bay-Delta in the northern Sacramento Valley. The concept of offstream storage north of the Delta is authorized by Proposition 204 and has been identified in concept through the CALFED 1999 Integrated Storage Investigations program. The storage concept was further developed through the CALFED 2000 Programmatic EIR/EIS (PEIR/EIS). The PEIR/EIS resulted in the adoption of a long-term comprehensive program to restore ecological health and improve water management for beneficial uses of the San Francisco Bay/Sacramento-San Joaquin River Delta system and its tributary watersheds. The Storage Project is a specific action that would implement, in part, the Preferred Programmatic Alternative adopted by the PEIR/EIS.~~ ~~The objectives of the Storage Project are as directed in the PEIR/EIS ROD and consist of: enhanced water management flexibility in the Sacramento Valley, reduced water diversion on the Sacramento River during critical fish migration periods, increased reliability of supplies for a significant portion of the Sacramento Valley, storage, and operational benefits for other CALFED programs (including Delta water quality and the Environmental Water Account). Specific details on the beneficiaries of these objectives, conditions under which diversion could occur, means of conveyance, associated costs to beneficiaries for acquiring the water, and other implementation and operational details are being developed.~~ ~~The Storage Project is currently undergoing separate environmental analysis and feasibility study. The lead agency for the EIR is DWR, and USBR for the EIS. Multiple federal, state, and local agencies have also been identified as participants in the analysis and study process, in addition to interested members of the public. Public scoping was conducted from October 2001 through January 2002. The DEIR/EIS and the Feasibility Study is expected to be available to the public in June 2003. It is expected that a ROD will be certified in August 2004.~~ ~~Alternatives to the project, including a Preferred Alternative, are currently undergoing development. In addition to a No Project Alternative (the project would not be approved or constructed) and a No Action condition (anticipated 2020 conditions if the project is not approved), the possible project alternatives as presented in the Notice of Preparation/Notice of Intent are summarized in Table 4.1-1.~~ ~~The Storage Project EIR/EIS will analyze a specific implementation action for program elements previously identified in the PEIR/EIS and therefore will tier from the programmatic document. The Storage Project EIR/EIS will specifically identify the benefits and impacts of the proposed offstream storage project and determine the significance of these impacts. Initial evaluation and scoping have identified that potential impacts may occur to environmental resources and socioeconomic conditions as a result of the construction and operation of surface storage, diversions, conveyance, and groundwater storage facilities associated with the Storage Project. Table 4.1-2 summarizes the environmental resources and~~

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	~~socioeconomic conditions that could be affected. The degree of the impact and potential mitigation if the impact is found to be significantly adverse is being developed as part of the EIR/EIS process.~~
4-13	**TABLE 4.1-1** Possible Project Alternatives for Storage Project EIR/EIS

Possible Project Alternative	Features of Alternative
Sites Reservoir Alternative	Offstream reservoir with capacity of up to 1.9 maf, approximately 10 miles west of Maxwell, California. The alternative would inundate the communities of Sites and most of Antelope Valley. The main dams would be constructed on Funks Creek and Stone Corral Creek; up to nine saddle dams would be needed. Sources and conveyance options for this alternative include: • The use of the Glenn-Colusa Irrigation District diversion and canal, either in its current capacity or in an enlarged capacity • The use of the Tehama-Colusa diversion and canal in its current capacity or enlarged • A new diversion and conveyance facility from the Sacramento River near Moutlon Weir • A new diversion and conveyance facility from the Colusa Basin Drain • Diversion and conveyance from East Park Reservoir and/or Stony Gorge Reservoir • A combination of these options ~~A subalternative to the Sites Reservoir Alternative would include the integration of conjunctive use with operation of the reservoir.~~
Newville Reservoir	Offstream reservoir capacity between 1.9 to 3.0 maf, approximately 18 miles west of Orland, California. A single earth embankment on North Fork Stony Creek along with various saddle dams would create the impoundment area. Diversion and conveyance facilities would be needed because North Fork Stony Creek is a relatively small drainage area. Options being considered include: • Development of the Stony Creek Diversion to move water from Black Butte Lake to the proposed Newville Reservoir by canal to Tehenn Reservoir; Tehenn Reservoir would serve as a forebay/afterbay to the Thomes-Newville Reservoir • A direct canal from Black Butte Reservoir to Thomes-Newville Reservoir (to avoid a historical cemetery) • A diversion nearby Thomes Creek, which has an annual runoff of approximately 200 thousand acre-feet, would require a small dam and a pipeline over a ridge separating the creek from Thomas-Newville Reservoir • Diversion and conveyance facility from the Sacramento River • A combination of the above options ~~A subalternative to the Newville Reservoir Alternative would include the integration of conjunctive use with operation of the reservoir.~~

4-16	Those impacts that are found to be significant and unavoidable would require TCCA to prepare a Statement of Overriding Considerations per state *CEQA Guidelines* Section 15093. The following impacts are identified as potentially significant and unavoidable: ~~**Fishery Resources.** Construction-related impacts that could affect incubating embryos and adult and juvenile fish in the work area would be caused by pile-driving activities, earth-movement and sheet-pile installation, dewatering activities, and sediment disturbances and turbidity.~~ ~~**Biological Resources.** Up to 7.74 acres of riparian habitat would be removed for construction of the access bridge, conveyance pipeline, left fish ladder, and the fish screen and forebay. At least 0.05 acre of freshwater marsh habitat would be permanently lost with construction of the conveyance pipeline and access bridge. Up to 9 elderberry shrubs and three osprey nests would be removed as part of the proposed project.~~

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	~~**Power.** If a new pump station receives CVP-generated electricity (Project Use), it would result in a slight decrease in the amount of electricity available to preference power customers. Regardless of the ultimate source of electricity, any of the action alternatives would add to the overall electrical demand in California.~~ **Socioeconomic.** The loss of Lake Red Bluff by removal of the gates would result in a significant economic impact to the local community. The combined impact from reduced recreation and tourism spending and from the loss of the Nitro National drag boat races is estimated to be about $4.2 million per year. Value of property located adjacent to the lake or with easy access to the lake could decline because of loss of the lake. Although difficult to quantify, the loss of Lake Red Bluff would result in a noticeable impact to local residents in a number of social aspects such as a reduction in the quality of life and reduced community cohesion.
4-22 through 4-37	**TABLE 4.6-1** Summary of Significant Adverse Environmental Impacts and Proposed Mitigation

DEIS/EIR Action Alternative	Description of Significant Impact	Mitigation	Level of Significance after Mitigation
	Biological Resources		
Special-status Species			
1A: 4-month Improved Ladder	VELB: VELB are entirely dependent on the elderberry shrub. The six elderberry shrubs and/or groups of shrubs identified in the project area are within the 200-foot buffer area considered to be temporarily impacted in this analysis. Removal of the elderberry shrubs under this alternative has the potential to adversely affect the federal-listed VELB.	VELB: TCCA and USBR would attempt to avoid elderberry shrubs in locating staging areas, access roads, and other construction areas. Shrubs that can be avoided would be fenced and posted, and workers would be educated about VELB in accordance with the Conservation Guidelines. If elderberry shrubs cannot be avoided, they would be transplanted, and additional seedlings would be planted at a secure mitigation site in accordance with the Conservation Guidelines. Section 7 consultation with the USFWS has been concluded with the issuance of a Biological Opinion.	Less than significant
Other Special-status Species			
1A: 4-month Improved Ladder	Osprey: The three osprey nest platforms on the south side of the Sacramento River would need to be removed during construction.	Osprey: Prior to the start of construction activities, all three~~the two~~ platforms that can support~~ing~~ osprey nesting would be removed. TCCA and USBR would work with CDFG to identify nearby location(s) to erect two platforms to serve as replacement nesting sites. The relocated platforms would be installed concurrently with the removal of the existing platforms and be completed prior to the start of the nesting season.	Less than significant

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Summary of Significant Adverse Environmental Impacts and Proposed Mitigation

DEIS/EIR Action Alternative	Description of Significant Impact	Mitigation	Level of Significance after Mitigation
		Recreation	
1B: 4-month Bypass	New Pump Station, Right Bank Fish Ladder, Conveyance Facility, and Bypass Channel: Temporary construction-related impacts associated with the 4-month Bypass Alternative include all impacts identified for the 4-month Improved Ladder Alternative and those noted below. Temporary impacts from construction of the bypass channel include: • Extensive excavation and earthmoving equipment within the Recreation Area. • Limited access to the Discovery Center/Charter School. • Limited access to the USFS/Sycamore Grove Campground. • The relocation of Sale Lane and the USFS/Sycamore Grove Campground Road. • Removal of approximately 10 camping spaces at the Sycamore Grove Campground. • Construction-related traffic increase on Sale Lane. • Construction of an access bridge over the bypass channel. • Construction of security fencing around the bypass channel.	New Pump Station, Right Bank Fish Ladder, Conveyance Facility, and Bypass Channel: Mitigation options to address the temporary construction-related impacts include: • Use the latest construction techniques to minimize impacts (i.e., noise blankets for pile-driving operations). • Conduct an ongoing public information campaign targeted at area recreation users. This campaign would provide information on construction activities/ impacts as well as information on temporary alternate recreation sites. • Maintain temporary access for vehicles, pedestrians, and cyclists to all Recreation Area facilities throughout construction. • Maintain the existing access to the Discovery Center with the construction of a bridge. • Create a new alignment of Sale Lane to access the boat ramp south of RBDD. • Design security fencing in conjunction with USFS to be minimally intrusive in size, location, color, and materials. Alternative security measures would be investigated, such as use of rock walls or other natural materials to address safety issues around the bypass channel. • Develop 10 new campsites and all supporting infrastructure (roads/trails and utilities) at an alternate location to offset those lost during construction.	1B: 4-month Bypass

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Summary of Significant Adverse Environmental Impacts and Proposed Mitigation

DEIS/EIR Action Alternative	Description of Significant Impact	Mitigation	Level of Significance after Mitigation
		Land Use	
1B: 4-month Bypass	Sycamore Grove Campground: Temporary and permanent construction-related impacts would also occur to the use of the Sycamore Grove Campground facilities located in the Recreation Area. Construction vehicles would need access to the campground area to construct the lower end of the channel. Approximately 10 camping facilities would be ~~permanently~~ removed as a result of construction of the bypass channel. A new road would need to be constructed to maintain access to the remaining camping facilities.	~~Sycamore Grove Campground: No mitigation is available.~~Although the loss of 10 campsites from Sycamore Campground is unavoidable, construction of replacement campsites (Mitigation 1B–R1), including supporting infrastructure, would mitigate the impact.	Significant
1B: 4-month Bypass	Recreation Area: Construction of the bypass channel does not comply with the current management direction in the Mendocino National Forest Land and Resource Management Plan.	Recreation Area: Amendment of the Mendocino National Forest Land and Resource Management Plan under the~~is~~ alternative would eliminate conflict with current ~~reconcile~~ management direction in the Mendocino National Forest Land and Resource Management Plan ~~with the new situation, but would not avoid the impacts~~.	Significant
		Cultural Resources	
1A: 4-month Improved Ladder	Unidentified Cultural Resources: Construction activities include excavation and other grading and digging activities. It is possible that currently unidentified cultural resources could be discovered during these activities, and destruction of such resources could result in a significant impact.	Unidentified Cultural Resources: If during construction activities, ~~unusual~~ amounts of non-native stone, bone, shell, or prehistoric or historic period artifacts are discovered, or if areas that contain dark-colored sediment that do not appear to have been created through natural processes are discovered, then work would cease in the immediate area of discovery, and USBR's Contract Inspector and the USBR Regional Archaeologist ~~a professionally qualified archeologist~~ would be contacted immediately for an onsite inspection of the discovery. USBR would consult with the State Historic Preservation Officer pursuant to 36 CFR 800.13 to evaluate the find, assess the project's effects on the find, and resolve any potential adverse effects. ~~If any bone is uncovered that appears to be human, the Tehama County Coroner would be contacted. If the coroner determines the bone most likely represents a Native American interment, the coroner would contact the Native American Heritage Commission in Sacramento for identification of the most likely descendants. Implementation of this mitigation would reduce potentially significant impacts to a less than significant level.~~	

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Summary of Significant Adverse Environmental Impacts and Proposed Mitigation

DEIS/EIR Action Alternative	Description of Significant Impact	Mitigation	Level of Significance after Mitigation
		If any bone is uncovered from private land that appears to be human, the Tehama County coroner would be contacted, according to state law. If the coroner determines that the bone most likely represents a Native American interment, the coroner would contact the Native American Heritage Commission for identification of the most likely descendants. In the event that human remains or cultural items are discovered on USBR lands, then all work should cease in the vicinity of the discovery, and the requirements of the Native American Graves Protection and Repatriation Act and Reclamation Directives and Standards LND 07-01 shall be implemented and followed.	
		Air Quality	
1A: 4-month Improved Ladder	Fugitive Dust Emissions: During ground surface preparation, most of the PM_{10} emissions would be composed of fugitive dust. Short-term impacts with regard to dust generated during construction would be considered potentially significant because of the current exceedance of the state PM_{10} standards~~.~~; however, when standard fugitive dust mitigation measures are applied, PM_{10} construction impacts would be less than significant.	Fugitive Dust Emissions: A ~~dust control program~~ fugitive dust emissions plan would be implemented in accordance with Tehama County Air Pollution Control District Rule 4:24. It would include ~~with~~ the following components: • Equipment and manual watering would be conducted on all stockpiles, dirt/gravel roads, and exposed or disturbed soil surfaces, as necessary, to reduce airborne dust. • The contractor or builder would designate a person to monitor the dust control program and to order increased watering, as necessary, to prevent transport of dust offsite. This person would respond to citizen complaints. • Dust-producing activities would be suspended when high winds create construction-induced visible dust plumes moving beyond the site in spite of dust control. • All trucks hauling soil and other loose material would be covered, or would be required to have at least 2 feet of freeboard. • All unpaved access roads and staging areas at construction sites would have soil stabilizers applied as necessary. • Streets in and adjacent to construction area would be kept swept and free of visible soil and debris. • Traffic speeds on all unpaved roads would be limited to 15 miles per hour.	Less than significant

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Summary of Significant Adverse Environmental Impacts and Proposed Mitigation

DEIS/EIR Action Alternative	Description of Significant Impact	Mitigation	Level of Significance after Mitigation
1A: 4-month Improved Ladder	Construction Exhaust Emissions: Fugitive dust impacts are significant during construction, but after mitigation is applied they are reduced to a level of less than significant. PM_{10}, NO_x, and VOC are significant during construction, but after mitigation is applied they are reduced to a level of less than significant. Operations-related impacts are less than significant. ~~Total daily emission levels of 777.82 lb/day of CO and 238.84 lb/day Nox would exceed their respecttive significance thresholds of 550 lb/day and 219 lb/day set in the National Ambient Air Quality Standards.~~	Construction Exhaust Emissions: An equipment control program would be implemented with the following components: • Properly maintain equipment. • Limit idling time when equipment is not in operation.	Less than significant
1B: 4-month Bypass	Construction Exhaust Emissions: Fugitive dust impacts are significant during construction, but after mitigation is applied they are reduced to a level of less than significant. PM_{10}, NO_x, and VOC are significant during construction, but after mitigation is applied they are reduced to a level of less than significant. Operations-related impacts are less than significant. ~~Total daily emission levels of 1,147.57 lb/day of CO and 352.45 lb/day Nox would exceed their respective significance thresholds of 550 lb/day and 219 lb/day set in the National Ambient Air Quality Standards.~~	Construction Exhaust Emissions: Mitigation identical to 4-month Improved Ladder Alternative.	Less than significant
2A: 2-month Improved Ladder	Construction Exhaust Emissions: Fugitive dust impacts are significant during construction, but after mitigation is applied they are reduced to a level of less than significant. PM_{10}, NO_x, and VOC are significant during construction, but after mitigation is applied they are reduced to a level of less than significant. Operations-related impacts are less than significant. ~~Total daily emission levels of 963.73 lb/day of CO and 295.96 lb/day Nox would exceed their respective. significance thresholds of 550 lb/day and 219 lb/day set in the National Ambient Air Quality Standards.~~	Construction Exhaust Emissions: Mitigation identical to 4-month Improved Ladder Alternative.	Less than significant

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TABLE 4.6-1
Summary of Significant Adverse Environmental Impacts and Proposed Mitigation

DEIS/EIR Action Alternative	Description of Significant Impact	Mitigation	Level of Significance after Mitigation
2B: 2-month with Existing Ladders	Construction Exhaust Emissions: Fugitive dust impacts are significant during construction, but after mitigation is applied they are reduced to a level of less than significant. PM_{10}, NO_x, and VOC are significant during construction, but after mitigation is applied they are reduced to a level of less than significant. Operations-related impacts are less than significant. ~~Total daily emission levels of 876.11 lb/day of CO and 269.04 lb/day Nox would exceed their respective significance thresholds of 550 lb/day, and 219 lb/day set in the National Ambient Air Quality Standards.~~	Construction Exhaust Emissions: Mitigation identical to 4-month Improved Ladder Alternative.	Less than significant
3: Gates-out	Construction Exhaust Emissions: Fugitive dust impacts are significant during construction, but after mitigation is applied they are reduced to a level of less than significant. PM_{10}, NO_x, and VOC are significant during construction, but after mitigation is applied they are reduced to a level of less than significant. Operations-related impacts are less than significant. ~~Total daily emission levels of 1,491.09 lb/day of CO and 457.99 lb/day Nox would exceed their respective significance thresholds of 550 lb/day and 219 lb/day set in the National Ambient Air Quality Standards.~~	Construction Exhaust Emissions: Mitigation identical to 4-month Improved Ladder Alternative.	Less than significant

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TABLE 4.6-1
Summary of Significant Adverse Environmental Impacts and Proposed Mitigation

DEIS/EIR Action Alternative	Description of Significant Impact	Mitigation	Level of Significance after Mitigation
		Traffic and Circulation	
1A: 4-month Improved Ladder	Left and Right Banks: Large construction vehicles could exceed the capacity of Sale Lane and Altube Avenue. Neither roadway is designed to accommodate heavy truck traffic, and daily commuting by heavy trucks could impact the road surface.	Left and Right Banks: To reduce construction-related impacts on traffic and roadways, the construction contractor would be required to develop a traffic control plan with the Tehama County Public Works, City of Red Bluff Public Works, and California Department of Transportation, which would be subject to review by California Department of Transportation and the Public Works Director. This plan would ensure that construction traffic is routed in a way that maintains acceptable levels of service on all affected roadways and intersections that are currently measured and used by project-related vehicles. The traffic control plan would address the structural capacity of roads and bridges along routes that could be traveled by construction-related vehicles. The traffic control plan would ensure that the structural integrity of those roads and bridges would not be damaged by construction-related vehicle trips. If damage occurs, road surface would be repaired or replaced on Sale Lane and/or Altube Avenue.	Less than significant

5-2 **National Historic Preservation Act**. Section 106 of the ~~National Historic Preservation Act (~~NHPA~~)~~ requires that federal agencies evaluate the effects of federal undertakings on historical, archaeological, and cultural resources and afford the Advisory Council on Historic Preservation the opportunity to comment on the proposed undertaking. The first step in the process is to identify cultural resources included on (or eligible for inclusion on) NRHP that are located in or near the project area. The second step is to identify the possible effects of proposed actions. The lead agency must examine whether feasible alternatives exist that would avoid such effects. Compliance with NRHP is discussed in Section 3.11. historic properties and afford the Advisory Council an opportunity to comment on the proposed undertaking. Federal agencies are required to identify historic properties that lie within the area of potential effect and to assess effects to such properties. If the undertaking results in an adverse effect to historic properties, then the federal agency seeks to resolve adverse effects to the property through consultation with consulting parties and through development of a memorandum of agreement. Compliance with the 36 CFR Part 800 regulations that implement the NHPA is discussed in Section 3.11.

5-5 Wetlands are those areas that are inundated or saturated by surface or groundwater at a frequency and duration (wetland hydrology) sufficient to support, and that under normal circumstances do support, a prevalence of wetlands vegetation (hydrophytic vegetation) typically adapted for life in saturated soil conditions (hydric soils). Wetlands generally include swamps, marshes, bogs, and similar areas (40 CFR 230.3 and 33 CFR 328*)*. Any actions that involve the placement of fill material into jurisdictional waters and wetlands, including such activities as sidecasting material during ditch excavation or temporary fills to provide equipment access during construction, must comply with Section 404 of the Clean Water Act.
The 1987 Wetland Delineation Manual requires an examination for the presence of indicators of three mandatory diagnostic characteristics. These characteristics, or wetland parameters, are hydrophytic vegetation, wetland hydrology, and hydric soils. Except in limited instances, the 1987 Wetland Delineation Model requires that evidence of a minimum of one positive indicator from each of the three mandatory wetlands parameters be present for an area to be called a “wetland” under Section 404 jurisdiction.

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5-6	**Clean Water Act, Section 10** Under Section 10 of the Rivers and Harbors Act of 1899, USACE also regulates the obstruction or alteration of navigable waters (including tidal waters) of the United States. It is important to note that Section 10 jurisdiction includes navigable waters within the mean high water line that have been diked or filled. ~~The 1987 Wetland Delineation Manual requires an examination for the presence of indicators of three mandatory diagnostic characteristics. These characteristics, or wetland parameters, are hydrophytic vegetation, wetland hydrology, and hydric soils. Except in limited instances, the 1987 Wetland Delineation Model requires that evidence of a minimum of one positive indicator from each of the three mandatory wetlands parameters be present for an area to be called a "wetland" under Section 404 jurisdiction.~~
5-9	**NewFields** Andrea Schmid, Sacramento Mike Urkov, Sacramento **CH2M HILL** John Schoonover/Redding Mark Oliver/Redding Pete Rude/Redding Stacia Dugan/Seattle Clay Hinkle/San Diego Hong Zhuang/San Diego
6-1 through 6-9	California Air Resources Board. 2007. OFFROAD2007 Emissions Model. California Air Resources Board. 2006. *Emissions Inventory*. Gaines, P. D. and C. D. Martin. 2001. *Abundance and Seasonal Spatial and Diel Distribution Patterns of Juvenile Salmonids Passing the Red Bluff Diversion Dam, Sacramento River.~~Draft Progress Report,~~* Red Bluff Research Pumping Plant Report Series, Volume 14. U.S. Fish and Wildlife Service, Red Bluff, CA~~June 4~~. Johnson, Jerald and P. Johnson. 1974. "Cultural Resources along the Sacramento River from Keswick Dam to Sacramento." U.S. Army Corps of Engineers. Unpublished manuscript on file at the Mid-Pacific Region, Bureau of Reclamation, Sacramento, California. Moratto, M. 1984. *California Archaeology*. NY: Academic Press. Peak, Ann S. and Associates. 1978. "Recorded Cultural Resources in and near the Proposed Recreation Area near Red Bluff Diversion Dam." Unpublished manuscript on file at the Mid-Pacific Region, Bureau of Reclamation, Sacramento, California. Peak and Associates. 2002. "Cultural Resources Assessment of the Proposed Tehama Colusa Canal Authority Fish Passage Project, Located near the Red Bluff Diversion Dam, Tehama County." Unpublished manuscript on file at the Mid-Pacific Region, Bureau of Reclamation, Sacramento, California. South Coast Air Quality Management District (SCAQMD). 2006a. *Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5 Significance Thresholds*. October. South Coast Air Quality Management District (SCAQMD). 2006b. *California Environmental Quality Act (CEQA) Air Quality Handbook*. Available at: <http://www.aqmd.gov/ceqa/hdbk.html> Accessed January 31, 2007. Welch, Patrick. 2002. "Test Trenching at the Location of TEH-59 and TEH-66, Tehama County." Unpublished manuscript on file at the Mid-Pacific Region, Bureau of Reclamation, Sacramento, California. Willig, J. A. and C. M. Aikens. 1988. "The Clovis-Archaic Interface in Far Western North America." In: *Early Human Occupation in Far Western North America*: *The Clovis-Archaic Interface*, edited by J. A. Willig, C. M. Aikens, and J. L. Fagan, pp. 1-40. Nevada State Museum Anthropological Papers 21.

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Attachment A	NAAQS — National Ambient Air Quality Standard SCAQMD — South Coast Air Quality Management District VOC — volatile organic compound
A-35	**Environmental** • There would be some impact associated with construction of the intake facilities. Cofferdams would be constructed in the river for the construction of the intake channel. The cofferdams could impact the effectiveness of the right bank fish ladder. • ~~The site in the~~ The area near the intake channel is already used for water diversion, so there are no impacts on cultural resources or land uses.
B-5	Current operation of RBDD includes a 4-month period of time (mid-May through mid-September) when the dam gates are placed in the river, creating a velocity barrier and whitewater turbulence that prevents or impedes adult fish passage. Placement of the dam gates into the river results in blockage and delay of migrating adult salmon and steelhead (Vogel et al., 1988; Hallock et al., 1982; Hallock, 1987). Vogel et al., (1988) determined from salmon tagging studies conducted from 1983 through 1998 that between 8 percent and 44 percent of adult chinook salmon, depending on run, were blocked from passing upstream of RBDD. Similarly, Hallock et al., (1982) determined that passage of 15 percent to 43 percent of adult chinook salmon, depending on run, were blocked by RBDD. Fish ladders are currently operational on the east and west ends and at the center of RBDD. These currently operate during the gates-in period to provide upstream passage of adult salmonids. Vogel et al., (1988) determined that the mean time of delay in passage of adult chinook salmon at RBDD was greater than 3 to greater than 13 days, depending on the run. Radio telemetry investigations conducted from during the months of August and September 1999 to 2001, using adult fall-run chinook salmon, indicate that delay in passage, under existing conditions at RBDD, may average approximately 21 days (USFWS, unpublished data). However, the existing fish ladders at RBDD may be inefficient in passing spring-run chinook salmon at RBDD (CDFG, 1998). Currently adult late-fall chinook salmon pass unimpeded at RBDD because they immigrate during months (October through March) when the RBDD gates are out of the water and, therefore, no barrier exists. The passage timing for adult salmonids was obtained from data collected from fish ladder counts conducted at RBDD from 1982 to 1986 for fall, late-fall, and winter chinook salmon and steelhead (USFWS/CDFG, unpublished data). For spring chinook salmon, some of which may pass RBDD prior to installation of the RBDD dam gates, the current (1995 though 2000) ladder counts were used to estimate passage timing (USFWS/CDFG, unpublished data). For ladder counts made during 1995 and 2000, the average monthly percent (44) of spring chinook passing RBDD during May were distributed equally between the before gates-in (<May 15) and after gates-in (>May 15) periods. For the following discussion, refer to Figure B-7 for timing of adult salmonids near RBDD.
B-12	Green sturgeon populations have been reduced throughout their entire range. In North America, only three known spawning populations still exist (Sacramento, Klamath, and Rogue rivers), with several historically important populations ~~expirated~~ extirpated (Eel River and South Fork Trinity River) (Moyle et al., 1995). The primary causes for this decline include: (1) loss of access to spawning habitat by dam construction, (2) degraded spawning habitat, and (3) overfishing by commercial, sport, Native American, and illegal fisheries. In studies conducted by CDFG between 1954 and 1991, a ratio of green sturgeon to white sturgeon for fish <101 centimeter (cm) fork length (approximately 40 inches) of 1:9 and fish >101 cm fork length of 1:76 has been determined (Moyle et al., 1995). Assuming that green and white sturgeon are equally vulnerable to CDFG's capture gear, and using those ratios, green sturgeon populations (fish greater than 101 cm) in the San Francisco Bay estuary are approximately 200 to 1,800 fish (Moyle et al., 1995).

TABLE 2-1
Text Changes to Draft EIS/EIR

Page	Paragraph with Change
B-14	Following egg hatching, larvae drift passively downstream and reach juvenile stages beginning at about 2 cm in length. Juvenile sturgeon are routinely captured in traps at RBDD during the summer months (K. Brown, pers. comm.). The presence of juvenile green sturgeon near RBDD as indicated by trapping data is shown on Figure B-11. The passage timing for juvenile green sturgeon was obtained from data collected from rotary screw trapping investigations conducted downstream of RBDD during 1994 through 2000 (Gaines and Martin, 2001). The majority of juveniles pass through the vicinity of RBDD from June through August (Figure B-11). Juvenile green sturgeon emigrate downstream ~~are transported~~ and rear in the Sacramento-San Joaquin Delta and Suisun-San Pablo Bay estuary for one or more years before entering the deeper San Francisco Bay and exiting into the ocean primarily during the summer and fall before they are 2 years old (Moyle et al., 1995). Individual green sturgeon have been tagged in San Pablo Bay and recovered from Santo Cruz, California, to Gray's Harbor, Washington (Chadwick, 1959 and Miller, 1972 as cited by Moyle, 1995). Little is known about the age and growth of green sturgeon except that they are long lived and reach a maximum size of 2.3 meters fork length and 159 kilograms (Skinner, 1962).
B-18	The two non-native anadromous fish species found in the Sacramento River in the vicinity of the RBDD are: striped bass (stripers) (*Morone saxatilis*) and American shad (*Alosa sapidissima*). Both of these species were introduced into California from the eastern United States between 1871 and 1882 (Moyle, 1976). Striped bass populations were established from a total of 432 fish released into the San Francisco-San Pablo Bay estuary from two shipments delivered in 1879 and ~~1982~~1882. By 1888 a commercial fishery had been established, harvesting in excess of 1.2 million pounds by 1899 (Moyle, 1976). American shad were derived from approximately 830,000 fry collected in New York State and released into the Sacramento River between 1871 and 1881. A commercial fishery for American shad was developed in California by 1879, and over 1 million mature shad were captured in the commercial fishery by 1886, soon glutting the market (Skinner, 1962).
B-46	Gaines, P. D. and C. D. Martin. 2001. *Abundance and Seasonal Spatial and Diel Distribution Patterns of Juvenile Salmonids Passing the Red Bluff Diversion Dam, Sacramento River.* ~~Draft Progress Report~~ Red Bluff Research Pumping Plant Report Series,~~:~~ Volume 14. U.S. Fish and Wildlife Service, Red Bluff, CA.~~June 4. 182p.~~
B1-2	The number of days of delay related to locating RBDD dam facilities are shown in Table 2. These values are based on radio telemetry data collected from 1999 through 2001 for fall-run chinook salmon captured and released at RBDD by the U.S. Fish and Wildlife Service (USFWS). The existing (with "old" ladders) average delay value, which was based on seasonal (August through September, during 3 different years, 1999 through 2001) ~~the 3 years of~~ radio telemetry data currently available, is approximately 21 days to pass RBDD. The efficiency values assigned to the "future" facilities (e.g., "new" ladders) were estimated based on perceptions of their relative efficiency as compared to the existing facilities' efficiencies. For example, new ladders as compared to the existing ladders that were designed for salmonids, but are decades old, may reduce average passage by 3 days. However, compared to the old ladders alone, the old ladders with a bypass channel may only reduce passage delay by 1 day.
B1-13	This step requires the user to enter an estimate of the average behavioral delay (in days) exhibited by each species with a given facility configuration. The delay data used here were empirically derived from radio-tagging studies recently performed by USFWS (unpublished data) over a limited number of years with data collected seasonally with chinook salmon at RBDD and are consistent with findings of Vogel (1989). A discussion of the derivation of the delay times is provided in the assumptions for the adult analysis module above. It is important to note that these delays are not flow-based (flow-weighted) (i.e., varying time of delay depending on the proportion of the ladder flow to river flow during any month). Flow-weighted delay relationship data was omitted for two reasons: 1) flow-specific delay data are not available; and 2) the use of flow-weighted delay values without supporting empirical data increases the complexity of the analysis methodology without a concomitant increase in precision. Thus, given the limitations in available data, the approach that minimizes the magnitude of the error is that which maintains simplicity.

TABLE 2-1
Text Changes to Draft EIS/EIR

Page	Paragraph with Change
B2-1	Except for spring-run Chinook salmon (measurable benefit), t~~T~~he implementation of the 4-month gates-in with new fish ladder (1A) and the 4-month gates-in with bypass channel (1B) alternatives resulted in no measurable improvements for adult passage for any of the five NAS species (Table 1 and Figure 2). The 2-month gates-in with new fish ladder (2A) and 2-month gates-in with existing fish ladders (2B) alternatives provided large measurable differences and improvements for passage of spring-run chinook as compared to the No Action Alternative. The improvement in the passage index difference over that for the No Action Alternative was 41, a 79 percent passage improvement for Alternative 2A. A passage index difference of 40 over that for the No Action Alternative and a 77 percent improvement was seen for Alternative 2B. The monthly adult passage indices for all alternatives for spring-run chinook salmon are shown on Figure 1c.
B2-2	**TABLE 1** Adult Passage Indices, Relative Difference, and the Improvement in Passage Indices for Native Anadromous Salmonid Species between No Action and the Action Alternatives.

Alternative	Index Value	Difference	% Improvement	Effect on Species
Spring-run Chinook Salmon				
No Action	52	n/a	n/a	*n/a*
1A	61	8	16	~~*No*~~ *Measurable Benefit*
1B	57	5	9	*No Measurable Benefit*
2A	94	41	79	*Large Measurable Benefit*
2B	93	40	77	*Large Measurable Benefit*
3	100	48	91	*Large Measurable Benefit*

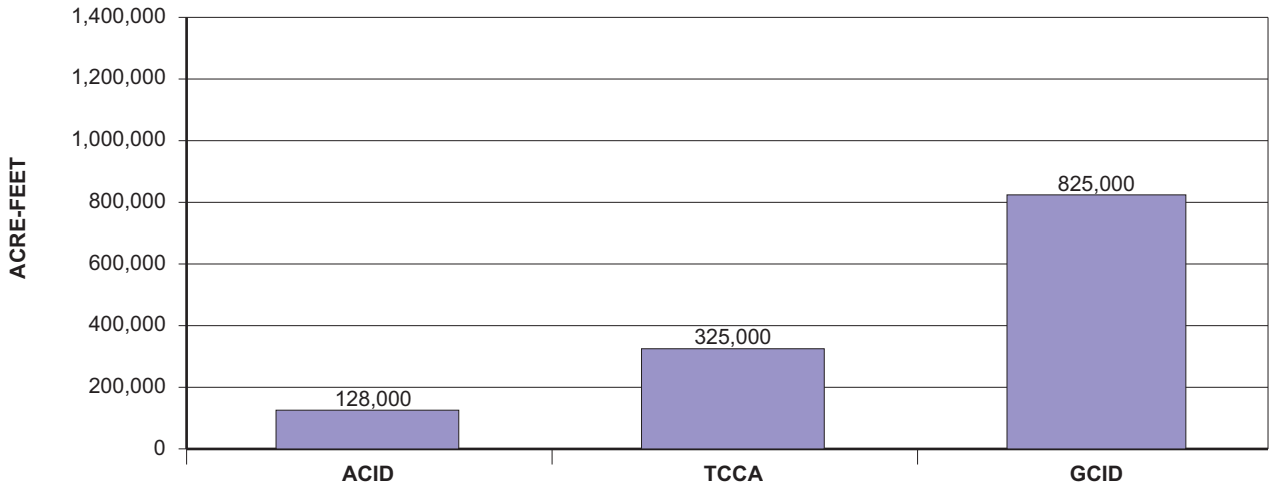

FIGURE 3.3-2 *(REVISED)*
CVP WATER CONTRACT VOLUMES FROM THE SACRAMENTO RIVER (VICINITY OF RBDD)
FISH PASSAGE IMPROVEMENT PROJECT
RED BLUFF DIVERSION DAM EIS/EIR

CH2MHILL

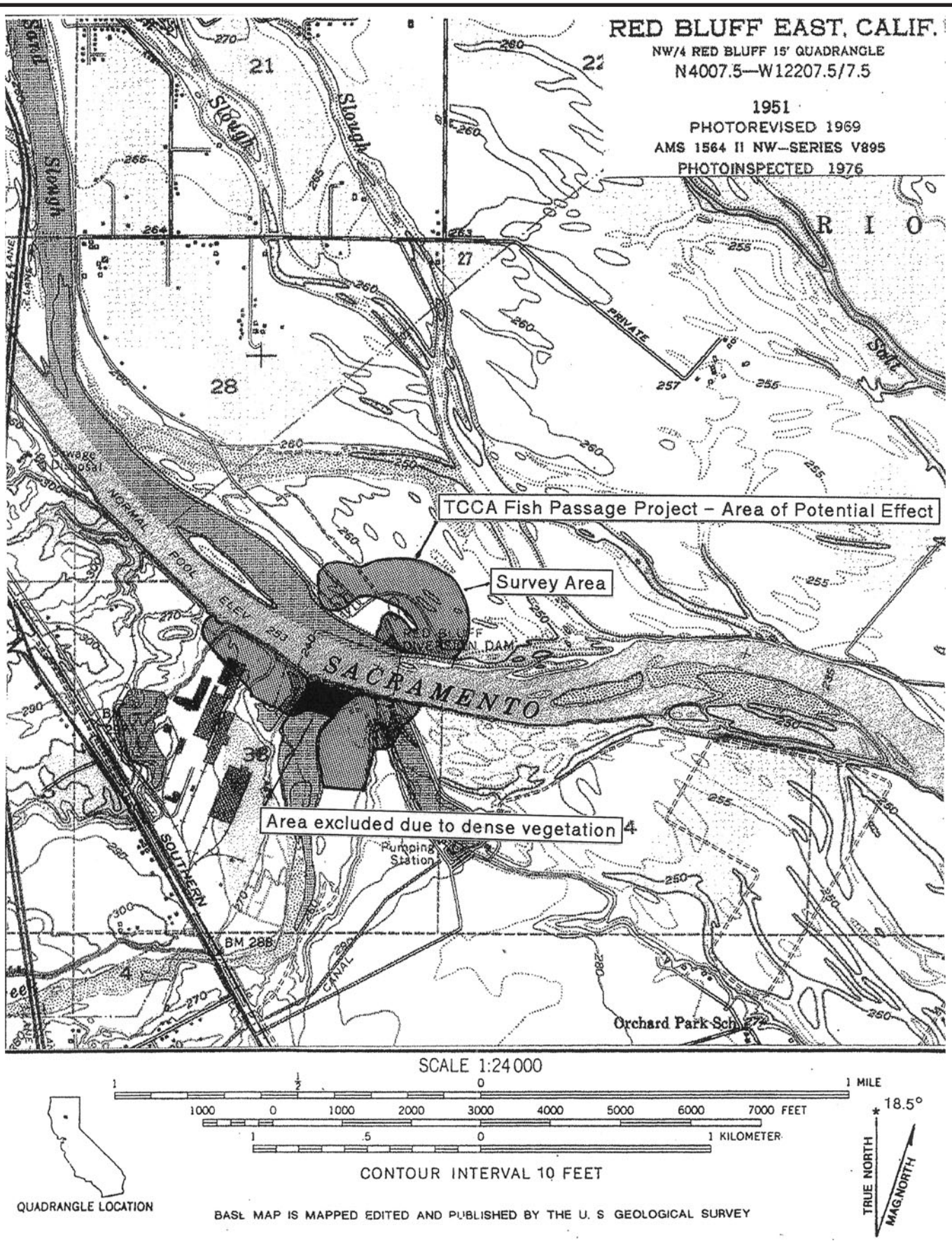

FIGURE 3.11-1
AREA OF POTENTIAL EFFECT
FISH PASSAGE IMPROVEMENT PROJECT
RED BLUFF DIVERSION DAM EIS/EIR

SECTION 3.0

Thematic Responses

Thematic responses provide a detailed explanation for the decisions and analyses presented in the EIS/EIR. Six Thematic responses were prepared after consideration of comments received on the DEIS/EIR. The first one discusses the use of the *Fishtastic!* analysis tool; the second addresses hatchery-related issues; the third discusses water temperature effects of gate operations; the fourth addresses the handing and disposal of material to be excavated from the landfill at the Mill Site; the fifth discusses the preservation of Lake Red Bluff; and the last thematic response addresses the potential increase in electrical usage.

3.1 Thematic Response No. 1

Fishtastic! Sensitivity Analysis

Introduction

A sensitivity analysis was conducted in response to comments on the sensitivity or precision of the *Fishtastic!* analysis tool used to evaluate the project alternatives. The purpose of the sensitivity analysis was to determine performance and the significance of each impact mechanism integrated into the *Fishtastic!* analysis tool. A technical memorandum, dated March 11, 2002 (attached), was prepared to document this analysis.

Methodology

The sensitivity analysis consisted of two parts, one analysis each for adult passage and juvenile passage at RBDD. Both analyses evaluated the performance of the tool in calculating the passage efficiencies for four Chinook salmon species, steelhead, and, for the adult passage evaluation, a sensitivity analysis for green sturgeon was also conducted. In each of the analyses performed, the factors (variables) considered the most responsible for the results generated by the tool were evaluated. For adults, the three variables evaluated were facility passage efficiency (facility efficiency), passage delay efficiency (delay in locating the facility), and gate operation (duration of RBDD gates in). The juvenile passage sensitivity analysis evaluated the sensitivity of the tool to estimate predation rates and gates operation.

Results – Adult Passage

The effect of varying the facility passage efficiencies, in increments of ±25 percent up to 50 percent of the value used in the *Fishtastic!* analysis tool (=70 percent efficient), on the annual adult passage index indicated that, for the No Action Alternative, the index for the most vulnerable species (spring-run Chinook salmon) ranged from 41 (using a 50 percent reduction in facility efficiency) to 64 (using a 50 percent increase in facility efficiency). The resulting adult passage index ranged 23 units (41 to 64) when varying the facility's efficiency from 0.4 (40 percent efficient) to 1.0 (100 percent efficient).

The effect of varying the delay efficiency factor, in increments of 7 days up to a total of 21 days, on the annual adult passage index indicated that the index for the No Action Alternative, for the most vulnerable species (spring-run Chinook salmon) ranged from 52 (using a delay efficiency value of 0.46 for 21 days of delay) to 79 (using a delay efficiency of 1.0 for 0 days delay). The corresponding change in annual adult passage index for the No Action Alternative ranged 27 units (52 to 79) when varying facility delay efficiency from 0.46 (40 percent efficient) to 1.0 (100 percent efficient).

The effect of varying the gates-in operations, in increments of 2 months (0, 2, 4 months), on the adult passage index, indicated that the index for the most vulnerable species (spring-run Chinook salmon) ranged from 52 for a 4-month gates-in operation to 100 for a gates-out operation. The corresponding change in annual adult passage index was 48 units (52 to 100) when varying gates-in operations from 4 months to 0 months.

Of the three adult passage variables evaluated, the gates-in operational period had the greatest effect on the annual indices calculated by *Fishtastic!* analysis tool. See the attached technical memorandum for further discussion on these analyses.

Results – Juvenile Passage

The effects of varying the rates of predation on juveniles resulted in small changes in the annual juvenile passage indices. However, for juvenile green sturgeon (the most vulnerable species), index values changed approximately threefold over the range of predation rates evaluated. These results indicated that the juvenile passage indices for green sturgeon ranged from 22 (using a predation rate of 79 percent) to 64 (using a predation rate of 33 percent). The difference is 42 index points (22 to 64). The changes in annual juvenile passage index values for anadromous salmonids were significantly smaller than that for green sturgeon, ranging from approximately 0 to 11, depending on the species.

The sensitivity analysis of the effect of gates-in operational period on juvenile green sturgeon indicated that the changes from 4 months to 0 months resulted in indices ranging from 43 to 100, a difference of 57 index points.

The juvenile passage sensitivity analyses for green sturgeon indicated that of the two variables evaluated, the annual juvenile indices were more sensitive to changes in the gate operations than increased rates of predation. See the attached technical memorandum for further discussion on these analyses.

Summary

The results of these analyses indicated that, when varying the assumed values of the factors used to calculate the passage indices, the results were generally most sensitive to the length of time the gates were in (see attached technical memorandum).

Comments on the DEIS/EIR

About 60 letters provided comments on the technical aspects of the fish analysis presented in the DEIS/EIR. The following list represents the majority of comment topics (comments supporting gates-out operations are not included here):

- Sensitivity of the *Fishtastic!* analysis to passage assumptions
- Mischaracterization of existing conditions, including recent improvements in fish passage
- Misrepresentation of the status of green sturgeon
- Dramatic improvements are possible with large fish ladders

Responses to Comments in the FEIS/EIR

Responses to comments focused on the exhaustive series of interagency meetings that were used to develop, review, and assess the alternatives considered in the DEIS/EIR. The findings that resulted from the analysis were the subject of a USFWS Planning Aid Memorandum that concurred with the findings in the DEIS/EIR. That memorandum received concurrence from CDFG, NMFS, and DWR. The *Fishtastic!* analysis was subjected to a sensitivity analysis prior to inclusion in the DEIS/EIR, and the basic conclusions were

found to be sound under a wide range of potential assumptions. Green sturgeon were recently found to be threatened under ESA, consistent with the special status projected in the DEIS/EIR. The DEIS/EIR included consideration of very large fish ladders, but it is recognized that there will still be some uncertainty and that there is a tradeoff between the cost of large fish ladders and a screened diversion that will allow for reduced gate operations.

3.2 Attachment to Thematic Response No. 1

TECHNICAL MEMORANDUM CH2MHILL

Sensitivity Analysis for the TCCA Fish Passage Improvement Project's Fishery Passage Analysis Tool (*"Fishtastic!"* v. 5.5)

PREPARED FOR: File

PREPARED BY: Tim Hamaker

DATE: March 11, 2002

Introduction

The following summarizes the results of a sensitivity analysis conducted for version 5.5 of the Fish Passage Impact Analysis Tool *"Fishtastic!"* The purpose of this analysis was to document the performance and evaluate the impact mechanisms most responsible for the results generated by this tool. The analysis consisted of two sensitivity analysis modules: adult passage and juvenile passage. The analysis evaluated the performance of the tool in calculating the passage efficiencies for the four Chinook salmon species, steelhead, and green sturgeon. The adult module evaluated the three variables (factors) most responsible for the performance of the tool in determining differences in migratory passage between project alternatives. For adult passage, the three variables evaluated were facilities' passage efficiency, passage delay efficiency, and RBDD gate operations. The juvenile passage module included an evaluation of the sensitivity of the tool to the temporal distribution of predators, and variable RBDD gate operations. The description of the methods and the results follows.

Methods

Adults

Facility Passage Efficiency

This analysis held several variables constant and varied each facility's passage efficiency for each species by 25 percent. The factors held constant were:

A 4 months gates-in operation (mid-May through mid-September)
Old (existing) ladders were chosen to represent a facility
The facility delay was fixed at 21 days
The facility delay efficiency was fixed at 0.46 (representing a 21-day delay)

The existing ladders' (the "facility") total passage efficiency of 0.7 used in *Fishtastic!* v. 5.5 was selected as a basis of comparison. This passage efficiency (0.7) was then varied by ±25 percent to determine the tool's sensitivity to the efficiency assigned to those facilities (old ladders) in *Fishtastic!* v. 5.5.

Passage Delay Efficiency

This analysis kept the gate operation constant at the 4 months gates-in (mid-May through mid-September) and set the facilities at the old (existing) ladders. The variable that was evaluated was change(s) in the passage delay time/efficiency. A 21-day delay period (efficiency of 0.46) was the efficiency used in *Fishtastic!* v. 5.5 analysis. Any gate operation would likely not be less than a 7-day interval (7 days from gates-in to gates-out). Therefore, the increments of delay used in the sensitivity were multiples of 7 days. These included 0, 7, 14, and 21 days with corresponding passage efficiencies of 1.0, 0.88, 0.67, and 0.46 respectively. The analysis evaluated the delay efficiency variable as compared to the No Action alternative with its 21-day delay.

Gate Operations

This analysis kept the old ladder facility passage efficiency constant at 0.7 and assumed a constant passage delay efficiency of 0.46 (21-day delay). The variable that was analyzed was the period of gates-in operation. The increments of gates-in operations were chosen to bracket the proposed alternatives. These gates-in periods were 0 months; 2 months (July through August), and 4 months (mid-May through mid-September). The analysis evaluated the effect of gate operations on the annual passage indices for the five species of anadromous salmonids and green sturgeon.

Juveniles

Predation Rate

The stream/facility flows at RBDD were held constant for the sensitivity analysis of juvenile predation rate and are shown in Table 3-1. As an additional constant, the gate operations were fixed at a 4-month gates-in (mid-May through mid-September) operation. The physical facilities were assumed those for the No Action Alternative. The variable evaluated was the juvenile predation rate. The maximum predation rate used in the juvenile passage analysis

in *Fishtastic!* v. 5.5 was 45 percent and was based on the evidence provided in Vogel et al. (1988). This maximum rate was scaled to predator presence information as derived from Tucker (1997). This is described in Attachment A of the Fisheries Appendix. For the sensitivity analysis of the maximum predation rate, 55 percent, was varied by increments of 25 percent. For the analysis, the rates were set at 33 percent, 44 percent, 55 percent, 67 percent, and 79 percent. The resulting monthly predation rates used to calculate predation impacts to juveniles are summarized in Table 3-2.

Gate Operations

The factors that were fixed constant were the flow schedules that were set as shown in Table 3-1 and the maximum predator rate (55 percent) as shown in Table 3-2. The facilities were those for the No Action alternative. The variable that was evaluated was the gate operation and how it affects the distribution of predators. The gate operations evaluated for the sensitivity analysis were the gates-out (zero months), 2-month (in July and August), and the 4-month operation (gates in mid-May through mid-September).

TABLE 3-1
Summary of Flow Conditions Held Constant for the Juvenile Predation Rate Sensitivity Analysis

Average Flow (cfs)	Jan	Feb	Mar	Apr	May (1-15)	May (16-30)	Jun	Jul	Aug	Sep (1-15)	Sep (16-30)	Oct	Nov	Dec
River Flow	4,830	4,690	5,300	5,200	8,050	8,050	8,400	9,310	8,460	5,730	5,730	4,540	4,380	4,380
River-Right Bank														
Diversion Flow	6	25	73	352	1,005	628	1,022	1,269	1,302	485	462	212	81	28
Right Bank Ladder Flow	338	338	338	338	338	338	338	338	338	338	338	338	338	338
Right Bank Dam Spill Flow	1,266	1,200	1,356	1,043	1,340	1,717	1,440	1,496	1,180	1,087	1,110	963	1,041	1,094
River-Center														
Center Ladder	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Center Dam Spill Flow	1,510	1,463	1,667	1,633	2,583	2,583	2,700	3,003	2,720	1,810	1,810	1,413	1,360	1,360
River-Left Bank														
Left Bank Ladder Flow	338	338	338	338	338	338	338	338	338	338	338	338	338	338
Dam Bypass	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lock	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Left Bank Dam Spill Flow	1,272	1,225	1,429	1,395	2,345	2,345	2,462	2,765	2,482	1,572	1,572	1,175	1,122	1,122

TABLE 3-2
The Summary of the Monthly Predation Rates and Resultant Monthly Survival Rates Used in the Predation Rates Sensitivity Analysis

	Maximum Predation Rates				
	33%	44%	55%	67%	79%
Month	Resultant Monthly Survival Rates				
January	15.0%	12.5%	10.0%	7.5%	5.0%
February	22.5%	18.8%	15.0%	11.3%	7.5%
March	22.5%	18.8%	15.0%	11.3%	7.5%
April	37.5%	31.3%	25.0%	18.8%	12.5%
May (1-15)	22.5%	18.8%	15.0%	11.3%	7.5%
May (16-30)	22.5%	18.8%	15.0%	11.3%	7.5%
June	60.0%	50.0%	40.0%	30.0%	20.0%
July	67.5%	56.3%	45.0%	33.8%	22.5%
August	60.0%	50.0%	40.0%	30.0%	20.0%
September (1-15)	25.5%	21.3%	17.0%	12.8%	8.5%
September (16-30)	24.0%	20.0%	16.0%	12.0%	8.0%
October	30.0%	25.0%	20.0%	15.0%	10.0%
November	22.5%	18.8%	15.0%	11.3%	7.5%
December	7.5%	6.3%	5.0%	3.8%	2.5%

Results

Adult

Passage Facility Efficiency

The effect of varying the facility passage efficiency in increments of ±25 percent up to 50 percent on the annual adult passage index is shown in Table 3-3. As seen in Table 3-3 it was assumed that green sturgeon would not pass fish ladders, so there was no change in the annual index (constant value of 0). These results indicated that the No Action annual passage index for the most vulnerable species (spring-run Chinook salmon) ranged from an index of 41 for No Action minus 50 percent change in facility efficiency to an index of 64 for No Action plus a 50 percent increase in facility efficiency. The change in annual adult passage index ranges approximately 23 index units when varying facility efficiency from 0.4 (40 percent efficient) to 1.0 (100 percent efficient).

TABLE 3-3
Results of Varying the Adult Passage Facility Efficiency on the Annual Passage Indices for Six Anadromous Species

Species	Right Bank Ladder	Center Ladder	Left Bank Ladder	Bypass	Total Facilities Passage Efficiency	Total Annual Adult Passage Index
No Action						
Winter-run Chinook Salmon	0.30	0.1	0.3	0	0.7	90
Spring-run Chinook Salmon	0.3	0.1	0.3	0	0.7	52
Fall-run Chinook Salmon	0.3	0.1	0.3	0	0.7	83
Late-fall-run Chinook Salmon	0.3	0.1	0.3	0	0.7	100
Steelhead	0.3	0.1	0.3	0	0.7	89
Green Sturgeon	0	0	0	0	0.0	65
No Action minus 25 percent						
Winter-run Chinook Salmon	0.225	0.075	0.225	0	0.5	**88**
Spring-run Chinook Salmon	0.225	0.075	0.225	0	0.5	**47**
Fall-run Chinook Salmon	0.225	0.075	0.225	0	0.5	**81**
Late-fall-run Chinook Salmon	0.225	0.075	0.225	0	0.5	**100**
Steelhead	0.225	0.075	0.225	0	0.5	**88**
Green Sturgeon	0	0	0	0	0.0	**65**
No Action minus 50 percent						
Winter-run Chinook Salmon	0.15	0.05	0.15	0	0.4	**87**
Spring-run Chinook Salmon	0.15	0.05	0.15	0	0.4	**41**
Fall-run Chinook Salmon	0.15	0.05	0.15	0	0.4	**79**
Late-fall-run Chinook Salmon	0.15	0.05	0.15	0	0.4	**100**
Steelhead	0.15	0.05	0.15	0	0.4	**86**
Green Sturgeon	0	0	0	0	0.0	**65**
No Action plus 25 percent						
Winter-run Chinook Salmon	0.375	0.125	0.375	0	0.9	**91**
Spring-run Chinook Salmon	0.375	0.125	0.375	0	0.9	**58**
Fall-run Chinook Salmon	0.375	0.125	0.375	0	0.9	**85**
Late-fall-run Chinook Salmon	0.375	0.125	0.375	0	0.9	**100**
Steelhead	0.375	0.125	0.375	0	0.9	**90**
Green Sturgeon	0	0	0	0	0.0	**65**
No Action plus 50 percent						
Winter-run Chinook Salmon	0.45	0.15	0.45	0	1.0	**92**
Spring-run Chinook Salmon	0.45	0.15	0.45	0	1.0	**64**
Fall-run Chinook Salmon	0.45	0.15	0.45	0	1.0	**87**
Late-fall-run Chinook Salmon	0.45	0.15	0.45	0	1.0	**100**
Steelhead	0.45	0.15	0.45	0	1.0	**92**
Green Sturgeon	0	0	0	0	0.0	**65**

Delay Efficiency

The effect of varying the delay efficiency in increments of 7 days up to a total of 21 days on the annual adult passage index is shown in Table 3-4. As seen in Table 3-4, it was assumed that green sturgeon would not pass fish ladders, so an evaluation of varying the delay efficiency is not applicable, and there is no change in the annual passage index. These results indicated that the No Action annual passage index for the most vulnerable species (spring-run Chinook salmon) ranged from an index of 52 for No Action with a delay efficiency of 0.46 (21 days) to an index of 79 for No Action for a delay efficiency of 1.0 (0 days). The corresponding change in annual adult passage index ranges approximately 27 index units when varying delay efficiency from 0.46 (40 percent efficient) to 1.0 (100 percent efficient).

TABLE 3-4
Results of Varying the Adult Passage Delay Efficiency on the Annual Passage Indices for Six Anadromous Species

Species	Delay Days	Delay Efficiency	Total Annual Adult Passage Index
Winter-run Chinook Salmon	21	0.46	**90**
Spring-run Chinook Salmon	21	0.46	**52**
Fall-run Chinook Salmon	21	0.46	**83**
Late-fall-run Chinook Salmon	21	0.46	**100**
Steelhead	21	0.46	**89**
Green Sturgeon		Not Applicable	
Winter-run Chinook Salmon	14	0.67	**92**
Spring-run Chinook Salmon	14	0.67	**63**
Fall-run Chinook Salmon	14	0.67	**87**
Late-fall-run Chinook Salmon	14	0.67	**100**
Steelhead	14	0.67	**91**
Green Sturgeon		Not applicable	
Winter-run Chinook Salmon	7	0.88	**94**
Spring-run Chinook Salmon	7	0.88	**73**
Fall-run Chinook Salmon	7	0.88	**90**
Late-fall-run Chinook Salmon	7	0.88	**100**
Steelhead	7	0.88	**94**
Green Sturgeon		Not Applicable	
Winter-run Chinook Salmon	0	1.00	**95**
Spring-run Chinook Salmon	0	1.00	**79**
Fall-run Chinook Salmon	0	1.00	**93**
Late-fall-run Chinook Salmon	0	1.00	**100**
Steelhead	0	1.00	**95**
Green Sturgeon	0	1.00	**65**

Gate Operations

The effect of varying the gate operation in increments of 2 months on the annual adult passage index is shown in Table 3-5. As seen in Table 3-5, it was assumed that green sturgeon would successfully pass RBDD, and there is a corresponding change in their annual passage indices with varying gates-in operations. These results indicated that the annual passage index for the most vulnerable species (spring-run Chinook salmon) ranged from an index of 52 with a 4-month gates-in operation to an index of 100 for 0-month gates-in operation. The corresponding change in annual adult passage index ranges approximately 48 index units when varying gates-in operations for up to 4 months.

TABLE 3-5
The Results of Varying the Period of Gates-in Operations on the Annual Adult Passage Indices for Six Anadromous Species

Species	Gate Operation (months)	Total Annual Adult Passage Index
Winter-run Chinook Salmon	4	**90**
Spring-run Chinook Salmon	4	**52**
Fall-run Chinook Salmon	4	**83**
Late-fall-run Chinook Salmon	4	**100**
Steelhead	4	**89**
Green Sturgeon	4	**65**
Winter-run Chinook Salmon	2	**98**
Spring-run Chinook Salmon	2	**93**
Fall-run Chinook Salmon	2	**90**
Late-fall-run Chinook Salmon	2	**100**
Steelhead	2	**96**
Green Sturgeon	2	**100**
Winter-run Chinook Salmon	0	**100**
Spring-run Chinook Salmon	0	**100**
Fall-run Chinook Salmon	0	**100**
Late-fall-run Chinook Salmon	0	**100**
Steelhead	0	**100**
Green Sturgeon	0	**100**

Summary of Adult Passage Sensitivity Analyses

Table 3-6 summarizes the results of the three adult passage sensitivity analyses. As shown in Table 3-6, of the variables evaluated, the period of gates-in operations had the greatest effect on the annual adult passage indices generated by *Fishtastic!* v. 5.5.

TABLE 3-6
Summary of the Results of the Sensitivity Analyses for Adult Spring-run Chinook Salmon

Facilities Passage Efficiency	Total Annual Adult Passage Index
0.7	**52**
0.5	**47**
0.4	**41**
0.9	**58**
1.0	**64**
Range	**23**
Delay Efficiency	**Total Annual Adult Passage Index**
0.46	**52**
0.67	**63**
0.88	**73**
1.00	**79**
Range	**27**
Gate Operations (months-in)	**Total Annual Adult Passage Index**
4.0	**52**
2.0	**93**
0.0	**100**
Range	**48**

Juveniles

Maximum Predation Rate

The effects of varying the juvenile predation on the annual juvenile passage indices are shown in Table 3-7. As seen in Table 3-7, by varying the maximum rate of predation from 33 percent to 79 percent, generally small changes in the annual juvenile passage indices resulted. However, for juvenile green sturgeon indices values changed approximately three-fold over the range of maximum predation rates evaluated. These results indicated that the annual juvenile passage indices for the most vulnerable species (green sturgeon) ranged from 22 (using a predation rate of 79 percent) to 64 (using a predation rate of 33 percent). The changes in annual juvenile passage indices for anadromous salmonids were much smaller than that for green sturgeon, ranging approximately 0 to 11 depending on species (Table 3-7).

TABLE 3-7
Summary of the Results of the Juvenile Predation Rate Sensitivity Analysis

Maximum Predation Rates:	33%	44%	55%	67%	79%
Species	**Total Annual Juvenile Passage Index**				
Winter-run Chinook Salmon	75	73	70	68	65
Spring-run Chinook Salmon	99	99	99	99	99
Fall-run Chinook Salmon	96	96	95	94	94
Late-fall-run Chinook Salmon	83	81	78	75	72
Steelhead	80	77	74	72	69
Green Sturgeon	64	54	43	33	22

Gate Operations

The summary of the results of the sensitivity analysis of the effect of gate operations on juvenile anadromous salmonids and green sturgeon is shown in Table 3-8. As seen in Table 3-8, depending on the species and its temporal presence at RBDD, the changes in gate operations resulted in changes in juvenile passage indices ranging from 43 to 100 for green sturgeon to 99 to 100 for spring-run Chinook salmon.

TABLE 3-8
Summary of the Results of Juvenile Gate Operation Sensitivity Analysis

	Total Passage Index		
Species	**4-month Gate Operations**	**2-month Gate Operations**	**Gates-out Operations**
Winter-run Chinook Salmon	70	92	100
Spring-run Chinook Salmon	99	100	100
Fall-run Chinook Salmon	95	99	100
Late-fall-run Chinook Salmon	78	88	100
Steelhead	74	91	100
Green Sturgeon	43	66	100

Summary of Juvenile Sensitivity Analyses

Table 3-9 summarizes of the results of the juvenile sensitivity analyses for the most vulnerable species analyzed (green sturgeon). From Table 3-9, of the two variables evaluated, the total annual juvenile indices were more sensitive to changes in the gate operations as opposed to the maximum predation rates.

TABLE 3-9
Summary of the Results of Sensitivity Analyses for Juvenile Green Sturgeon

Analyses	**Total Annual Juvenile Passage Index**
Maximum Predation Rate (%)	
33.0	**64**
44.0	**54**
55.0	**43**
67.0	**33**
79.0	**22**
Range	**42**
Standard Error	**7.41**
Standard Deviation	**16.56**
Gate Operations	
4 months	**43**
2 months	**66**
0 months	**100**
Range	**57**
Standard Error	**16.54**
Standard Deviation	**28.64**

3.3 Thematic Response No. 2

Salmonid Populations and Hatchery Production in the Sacramento River

Several comments questioned the role and need for additional recovery actions in the watershed when hatchery production is at a very high level and there is a perception of abundant Chinook salmon population. This response addresses hatchery-related issues pertaining to the TCCA Fish Passage Improvement Project.

The following are current production goals for the four anadromous salmonid fish hatcheries within Sacramento Valley:

1. Coleman National Fish Hatchery (CNFH) (USFWS hatchery on Battle Creek, tributary to the Sacramento River near Anderson):

   12,000,000 fall-run Chinook salmon smolts
   1,000,000 late-fall run Chinook salmon smolts
   600,000 steelhead smolts

2. Livingston Stone National Fish Hatchery (USFWS hatchery at Shasta Dam on the mainstem Sacramento River near Redding):

   200,000 winter-run Chinook salmon smolts

3. Feather River Hatchery (CDFG hatchery on the Feather River, tributary to the Sacramento River in Oroville):

   5,000,000 spring-run Chinook salmon smolts
   6,000,000 fall-run Chinook salmon smolts, 2,000,000 post-smolts, and 750,000 fry
   450,000 steelhead yearlings

4. Nimbus Hatchery (CDFG hatchery on the American River, tributary to the Sacramento River in Sacramento):

   4,000,000 fall-run Chinook salmon smolts
   430,000 steelhead yearlings

These production goals are set to meet various needs for salmonid production in the Sacramento River Basin. Fish hatcheries and artificial propagation programs in California serve different purposes. The hatcheries listed above operate to meet the following purposes: (1) mitigate the loss of spawning habitat above dams and other impacts on salmonid fisheries, (2) enhance ocean and river fisheries, and (3) supplement populations limited by spawning adults.

Hatchery programs for non-listed species are designed to meet the first two purposes: mitigate and enhance fisheries. Hatchery programs for listed species have been established to supplement natural spawning by accelerating recovery or re-establishing natural populations in suitable habitat (CDFG/NMFS, 2001). For example, production of winter-run Chinook salmon at the Livingston Stone National Fish Hatchery aids and supplements the recovery of this species in the Sacramento River. Fall-run Chinook production at CNFH

mitigates natural spawning in the Sacramento River lost as a result of the Shasta Dam construction, and enhances ocean and river fisheries.

A recent review of the anadromous fish hatchery production in California, by the CDFG/NMFS Review Committee, concluded that the decrease in hatchery production is not the root problem that has brought the need to protect salmonid species under the federal ESA or CESA (CDFG/NMFS, 2001). Statutes and policies in the California Fish and Game Code for anadromous salmonid hatcheries direct or conclude the following:

- Hatchery production is currently at the maximum proportion (in the mix of hatchery/natural production) that should occur artificially
- Preference should be given to increasing natural production over hatchery production
- Increases in natural production should be accomplished through stream habitat restoration and improvement
- Artificial production should not be considered appropriate mitigation for future losses of habitat
- Chinook salmon and steelhead should be managed to protect, restore, and maintain the populations and genetics of all stocks
- The state can participate in cooperative rearing programs, but the goal of increasing natural production should take precedence over such programs

The listing of certain salmonids under CESA has resulted in harvest restrictions to protect natural populations in both the ocean and inland fisheries (CDFG/NMFS, 2001). Hatchery stocks of salmon are generally more productive than natural stocks because of higher rates of recruits per spawner. In mixed-stock (hatchery and natural) salmon fisheries, harvest rates set for recreational and commercial fisheries are designed to protect natural populations and usually result in under-harvest of hatchery populations in the mixed-stock fishery. Therefore, the under-harvest of hatchery-produced salmon coupled with the success of modern hatcheries in meeting their production goals has resulted in an overabundance of hatchery spawners in the Sacramento River watershed (e.g., Battle Creek/CNFH). The CDFG/NMFS Review Committee suggested that it might be appropriate to review hatchery enhancement and mitigation goals in light of the ESA status of many salmonid species in California. It recommended that hatchery production levels be periodically reviewed as they could affect natural and listed populations (CDFG/NMFS, 2001).

The 1992 Central Valley Project Improvement Act (CVPIA) and the Anadromous Fish Restoration Plan (AFRP) for implementing CVPIA directed Reclamation and USFWS to operate CVPIA in a manner so as to double the natural populations of anadromous fish in the Central Valley of California by the year 2002. Included in these goals were actions designed to improve habitat conditions for doubling the natural populations of salmon, steelhead, sturgeon, striped bass, and American shad, among other species. CVPIA specifically mandated doubling of **natural populations** as opposed to hatchery-supported populations in the Central Valley. Restoration actions throughout California have been implemented and are being developed to meet this mandate to double natural populations.

As a result of a recent federal court ruling (Alsea decision), NMFS is presently reviewing its policy when considering hatchery populations of listed salmonid Evolutionarily Significant Units (ESU). Of the four runs of Chinook salmon and steelhead in the Sacramento River watershed, the Sacramento River winter-run Chinook salmon (endangered), Central Valley spring-run Chinook salmon, and Central Valley steelhead ESUs (both threatened) are included in the re-evaluation of federal ESA listings based on the Alsea decision. The findings of this review could change species status under ESA, future management actions for those species, and any recovery plans for those listed species in California.

3.4 Thematic Response No. 3

Water Temperature Effects of Gate Operations at Red Bluff Diversion Dam

Re-analysis of the water temperature information available from the Red Bluff recording station (DWR water monitoring station RDB), for the years 1990 through 2007, provides some insight into the suitability of water temperature for salmonid fish at and near Lake Red Bluff and RBDD. In the previous analysis of the effects of water temperature at RBDD, water temperatures at RBDD and Bend Bridge were compared. Because approximately 15 river miles are between these two monitoring locations, this comparison might not have represented the best approach to estimating the effects of RBDD gate operations on water temperature in Lake Red Bluff.

DEIS/EIR Figure 3.3-9 (updated and presented at the end of this Thematic Response No. 3) summarizes the range of average daily water temperatures at RDBB for the years 1990 through 2007. According to these data, the water temperature objective that was stipulated by Order 90-5 for the Sacramento River (56 degrees Fahrenheit [°F]) was exceeded 87 percent of the days during gates-in operation (mid-May through mid-September) during the years 1998 through 2006. The average temperature of Lake Red Bluff during the gates-in period for those years was 57.1°F. The average temperature year-round during 1998 to 2006 was 53.9°F. Approximately 43 percent of the time, water temperatures exceeded the 56°F water temperature standard during gates-in periods.

The average maximum daily water temperature at Lake Red Bluff during the mid-May to mid-September gates-in period was approximately 63.5°F in 1990 through 1992. During the mid-May through mid-September gates-in period in 1998 through 2006, average maximum daily water temperature declined to 60.0°F. Average daily water temperatures exceeded 60°F for only 5 days during 1998 through 2006. However, none of those temperature exceedances occurred during the gates-in period from mid-May to mid-September. Water temperatures greater than 60°F are unsuitable for some lifestages of salmonids, including Chinook salmon fry. The highest daily average water temperature during 1998 through 2006 was 61.0°F on April 14, 2002, and the highest measured hourly water temperature of 64.2°F was recorded at 4 p.m. on September 18, 2000. Both days were outside of the RBDD gates-in period.

The following describes the approach for analyzing the effect of gate operations on water temperatures at RBDD for years since the Shasta Dam Temperature Control Device (TCD) went into operation (1998). For each year from 1998 through 2006, the average hourly water temperatures were measured for the weeks before and after the gates-in operation in mid-May, and the weeks before and after the gates-out operation in mid-September. Table 3-10 provides the before and after gates-in average hourly water temperatures and their differences for the years 1998 through 2006. Similarly, Table 3-10 provides the before and after gates-out average hourly water temperatures and their differences for the same period. The notes column identifies the change (e.g., warmer, cooler, no change) for each before-and-after scenario.

The analysis of the effects of gate operation on water temperatures in Lake Red Bluff must be tempered with the following observations. Because of warmer weather and longer

daylight periods, water temperatures in the spring months will generally be expected to increase naturally in May when gates-in operations at RBDD begin. Similarly, with shorter periods of daylight, water temperatures will be expected to naturally decrease in the fall months, including September, when the gates come out at RBDD. These seasonal trends are likely modified by differences in annual weather conditions and hydrology, including flow releases from Shasta Dam. These weather conditions could affect water temperatures at RBDD to a greater or lesser degree than those for RBDD gate operations.

TABLE 3-10
Summary of the Average Water Temperatures at RBDD the Week Before and After Gates-in and Gates-out Operations since the Shasta Dam Temperature Control Device Began Operating (1998)

	May				September			
Year	Before 5/16 (°F)	After 5/16 (°F)	Difference (°F)	Notes	Before 9/16 (°F)	After 9/16 (°F)	Difference (°F)	Notes
1998	53.5	55.2	1.8	Warmer	57.5	57.4	-0.1	Cooler
1999	55.6	57.3	1.7	Warmer	56.8	57.3	0.5	Warmer
2000	55.0	56.9	1.9	Warmer	58.6	59.6	1.0	Warmer
2001	57.0	56.9	0.0	No change	57.5	59.6	2.1	Warmer
2002	56.7	56.2	-0.5	Cooler	57.3	57.2	-0.1	Cooler
2003	56.5	56.0	-0.5	Cooler	58.3	58.1	-0.2	Cooler
2004	55.6	57.1	1.5	Warmer	59.6	58.5	-1.0	Cooler
2005	55.4	55.4	0.0	No change	58.4	58.6	0.3	Warmer
2006	55.9	56.3	0.4	Warmer	56.4	55.7	-0.7	Cooler

The effect of gates-in operation in the spring for years 1998 through 2006 are as follows. In 5 of the 9 years (56 percent), water temperatures in Lake Red Bluff increased the week following the RBDD gates-in operation. Of those, in 4 out of 5 years, the water temperature increase was greater than 1.5°F. In 3 of those 5 years, the average water temperatures were increased to a temperature above the 56°F suitability threshold for salmonid embryos. In 4 of 9 years (44 percent), water temperatures decreased or remained the same the week following gates-in operations. However, of those years when water temperature decreased or remained the same, none of the temperatures decreased by more than 0.5°F.

In the fall, in 5 of 9 years (56 percent), water temperatures decreased the week after gates-in operations ended. In only 1 of the 5 years, the decrease was greater than 1.0°F. However, in 4 of 9 years (44 percent), water temperatures increased the week after gates-in operations ended. In 4 of those 9 years, 2 years resulted in temperature increases of more than 1.0°F, with 1 year resulting in an increase of 2.1°F following gates-out operation.

In assessing these effects, about 50 percent of the years since the Shasta Dam TCD went into operation, water temperatures at RBDD increased from 1.5 to 1.9°F immediately following gates-in operations in mid-May. This temperature increase will be an adverse effect on salmonid early life stages, especially in the years (33 percent) for which water temperature increased above 56°F. In the fall period, in 2 of the 9 years (20 percent), the average water

temperatures decreased from 0.7 to 1.0°F (a beneficial effect). However, this effect was offset in 2 years (20 percent) when water temperatures increased up to 2.1°F (an adverse effect) immediately following gates-out operations in mid-September. Gates-in operations in the spring resulted in adverse water temperature effects in about one-half of the years, and gates-out operation in the fall resulted in both adverse and beneficial effects in 20 percent of the years.

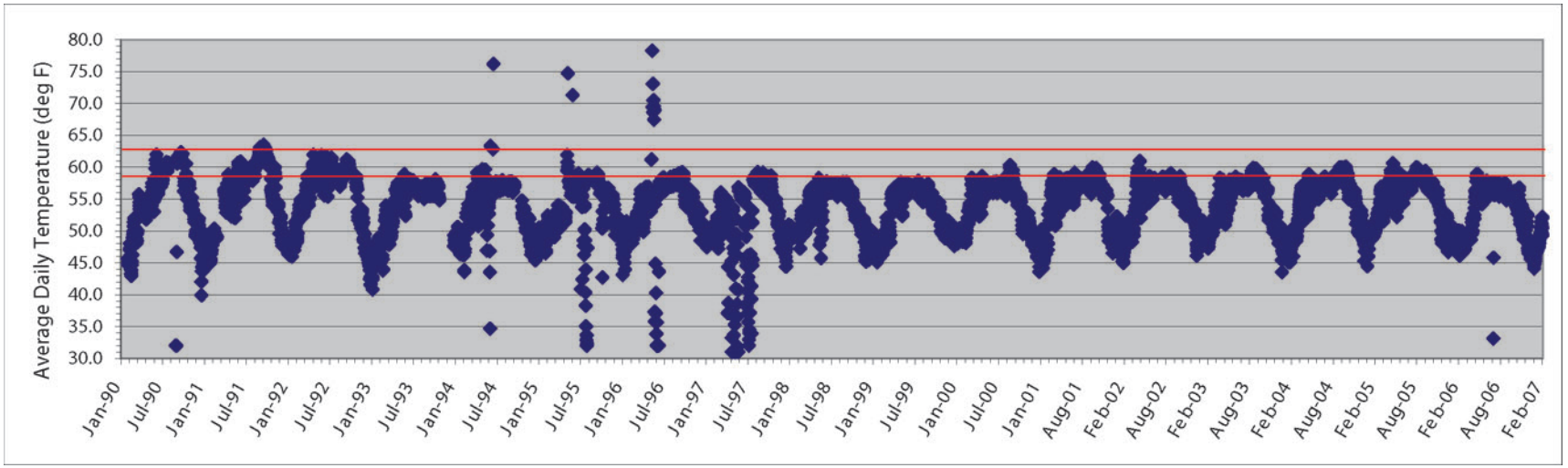

FIGURE 3.3-9 *(REVISED)*
TEMPERATURE AT RBDD
FISH PASSAGE IMPROVEMENT PROJECT
RED BLUFF DIVERSION DAM EIS/EIR

WB082007001RDD_3-3-9 (11/30/07)

CH2MHILL

3.5 Thematic Response No. 4

Landfill Issues and the Proposed Project Location

Background

The proposed location of the fish screen and pump station will be on two properties, one of which is currently operating as a nonpermitted landfill by the Packaging Corporation of America (Pactiv). This thematic response presents information on how the landfill was addressed in the DEIS/EIR and how the issue is being addressed in the FEIS/EIR.

Analysis in DEIS/EIR

The Pactiv landfill is used for the disposal of dried paper sludge generated at the onsite industrial wastewater treatment facility. Typically, 2,500 CY of waste are dumped each year (URS Corporation, 2000), although it is not uncommon for no waste to be disposed of in a given year (RWQCB, 1990). The proximity of the landfill to the Sacramento River has been noted as a concern by the RWQCB. Groundwater quality at the landfill is currently monitored for several constituents, including total dissolved solids (TDS), turbidity, iron, and manganese, among others. Pactiv completed a corrective action plan that called for closing the landfill, either by capping the landfill with a geosynthetic clay layer or designing a containment zone. However, both of these actions required further site characterization, which was underway at the time of the DEIS/EIR.

The DEIS/EIR estimated that all of the alternatives will excavate approximately 750,000 to 800,000 CY during construction of the facilities, of which approximately 580,000 to 600,000 CY will be stored onsite. Mitigation will include soil erosion plans and erosion control measures to ensure that stockpiles of excavated soils will be properly managed.

The analysis in the DEIS/EIR was based on an environmental investigation of the Mill Site that included a literature review investigation into the history of the site and a field exploration effort, including data collection and sampling. Field exploration included 18 soil borings and 17 test pits. The effort identified a thin burn layer distributed across the landfill and found a steel drum of liquid waste (likely motor oil). Samples were below total threshold limit concentration (TTLC) levels, and were therefore not considered hazardous waste, although one sample found a slightly elevated concentration of chromium.

Additional Analysis

A follow-up analysis was conducted at the landfill after the release of the DEIS/EIR. Efforts undertaken during the follow-up efforts have included additional field reconnaissance, data collection, chemical analysis, and evaluation of disposal options. Fourteen additional test pits were used to gather 20 soil samples. Samples were tested for the presence of metals, hydrocarbons (primarily diesel and motor oils), polychlorinated biphenyls (PCB), dioxins, volatile organic compounds (VOC), and semivolatile organic compounds (SVOC). One sample was in excess of the Industrial Preliminary Remediation Goal (Industrial PRG) for motor oil. Two samples were in excess of Industrial PRG for dioxin congeners. Sample results are presented in Table 3-11.

TABLE 3-11
Summary Results from Follow-up Analysis

Analyte	Maximum Detect (mg/kg)	Industrial PRG (mg/kg)
Motor Oil	1,200	1,000
1,2,3,4,6,7,8-HpCDD	0.00225	0.00167
1,2,3,7,8-PeCDD	0.0000366	0.0000167

Notes:
mg/kg = milligrams per kilogram
HpCDD = heptachlorodibenzo-p-dioxin
PeCDD = pentachlorodibenzo-p-dioxin

The follow-up analysis also included an evaluation of disposal options, which consisted of various combinations of disposal methods, ranging from onsite stockpiling to offsite disposal at a Class I hazardous waste landfill. The follow-up analysis was recently amended to account for volumes of material expected to be encountered during excavation. By using an approximate footprint of 250,000 square feet on the landfill (approximately 203,000 square feet is on the Myers property), excavated soil is likely to be segregated into the following categories:

Cover soil – 46,000 CY
Paper sludge – 56,000 CY
Garbage (wood, metal, and plastic) – 56,000 CY
Burn material – 28,000 CY
Native soil – 93,000+ CY

Of these categories, the burn material is the greatest concern because of the potential for dioxins. Sampling results indicate that none of the excavated material will be classified as hazardous waste. It is anticipated that excavated materials will be segregated and handled according to procedures defined by RWQCB and CIWMB. Much of the excavated material is expected to remain onsite, with some being transported to an appropriate landfill. It is also possible that some material will be stockpiled onsite and bioremediated (for petroleum-contaminated soils), and other material might need to be contained in an onsite disposal cell, which will likely need to be permitted by CIWMB. The actual volumes that are kept onsite versus volumes hauled to offsite locations will be dependent on deliberations among RWQCB, CIWMB, Pactiv, Reclamation, and TCCA.

Comments on the DEIS/EIR

Commentors generally focused on the volume of excavation, characterization of the landfill material, groundwater interaction with the Sacramento River, and the proposed location of offsite disposal. Alan Abbs from the Tehama County Landfill noted that the volume of material excavated from the landfill had the potential to outstrip the annual maximum allowed in the Tehama County Landfill's permit, potentially resulting in large fines. Mr. Abbs estimated that the projected 100,000 tons of offsite waste (200,000 CY at 1,200 pounds per yard) disclosed in the DEIS/EIR was about twice the annual amount received at the landfill.

Responses to Comments in the FEIS/EIR

In response to the comments received, additional analysis has been conducted on the expected volume of excavated material and the characterization of excavated material. Responses also note that some of the investigations to date are confidential, in accordance with the agreements between TCCA and Pactiv. Additionally, the refinement of the excavated material has reduced the estimated volume of material that will potentially be hauled offsite from 200,000 CY to 84,000 CY or less.

3.6 Thematic Response No. 5

Preservation of Lake Red Bluff

Background

The potential elimination of Lake Red Bluff elicited far more comments than any other topic in the DEIS/EIR. Lake Red Bluff is formed when RBDD gates are lowered into the Sacramento River, raising the elevation of the Sacramento River and allowing for gravity diversion into the headworks of the TC and Corning Canals. RBDD gates were originally left in the river year-round, but over time, gates-in operations have been reduced – primarily to improve fish passage. However, many in the local population of the City of Red Bluff have strongly stated their preference for the lake, resulting in several organized commenting efforts to "Save Lake Red Bluff." This thematic response presents information on the different ways in which the social effects of changes to gate operations were analyzed in the DEIS/EIR and how the issues are being addressed in the FEIS/EIR.

Analysis in DEIS/EIR

Potential changes to gate operation were a major physical effect evaluated throughout the DEIS/EIR. The following four sections of the document focused on the different types of social effects that would result from changes to Lake Red Bluff.

Recreation

Project impacts to the recreational opportunities, activities, and facilities of the project area were identified as a key concern of project stakeholders. Recreation activities at area facilities involved approximately 64,000 individuals in 1995, and was focused at three primary locations: River Park (also known as City Park), Ide Adobe State Historic Park, and the boat launch area south of RBDD. Popular recreation activities include fishing, boating, biking, and hiking. More than half of the recreational use occurred between May and September. Figure 3-1 shows the distribution of user days by month, separated into the current gates-in and gates-out time periods. Figure 3-2 displays user days by activity.

Another important activity held on Lake Red Bluff is the Nitro National Drag Boat Festival held over the Memorial Day weekend. The event has attracted national television coverage. The 1995 recreation survey does not capture the current attendance levels. The event accounted for approximately $1.9 million in spending in 1999, with an attendance of approximately 19,000. The DEIS/EIR estimated the 2-day event attracted 25,000 spectators in 2002, 58 percent of which were from outside the Red Bluff-Redding-Chico area.

The DEIS/EIR determined that Alternative 1A was the only alternative that would not result in significant impacts to recreation. Two-month or gates-out operations (Alternatives 2A, 2B, and 3 in the DEIS/EIR) would reduce gates-in periods, and the impacts would be significant and unavoidable. Mitigation in the form of recreation plans to transition from lake-dependent to river-focused recreation is proposed; however, the significant impact would remain. In addition, the transitional recreation plan could include providing a short gates-in period to accommodate recreation events (i.e., the Memorial Day boat races). Any such measures would be subject to review by fishery agencies, including ESA Section 7 consultation related to long-term operation of the CVP. The bypass facility included in

Alternative 1B would affect access to the campground and Discovery Center facilities on the left bank of the Sacramento River. Mitigation is proposed to offset this impact.

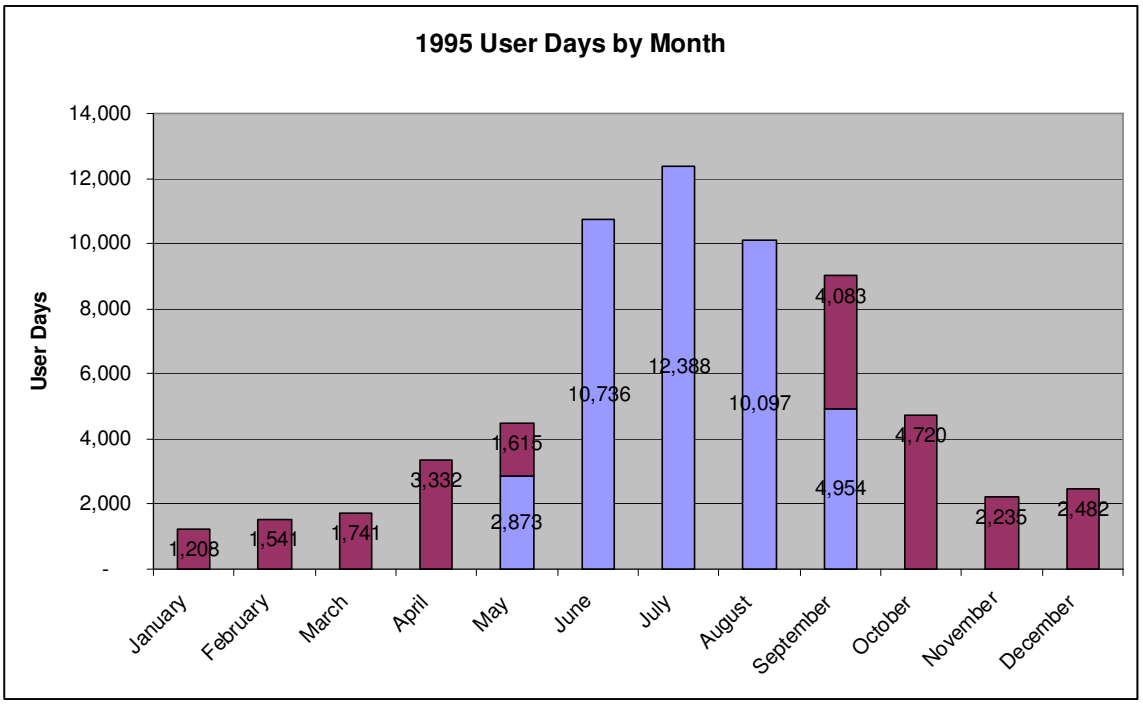

FIGURE 3-1
1995 User Days by Month

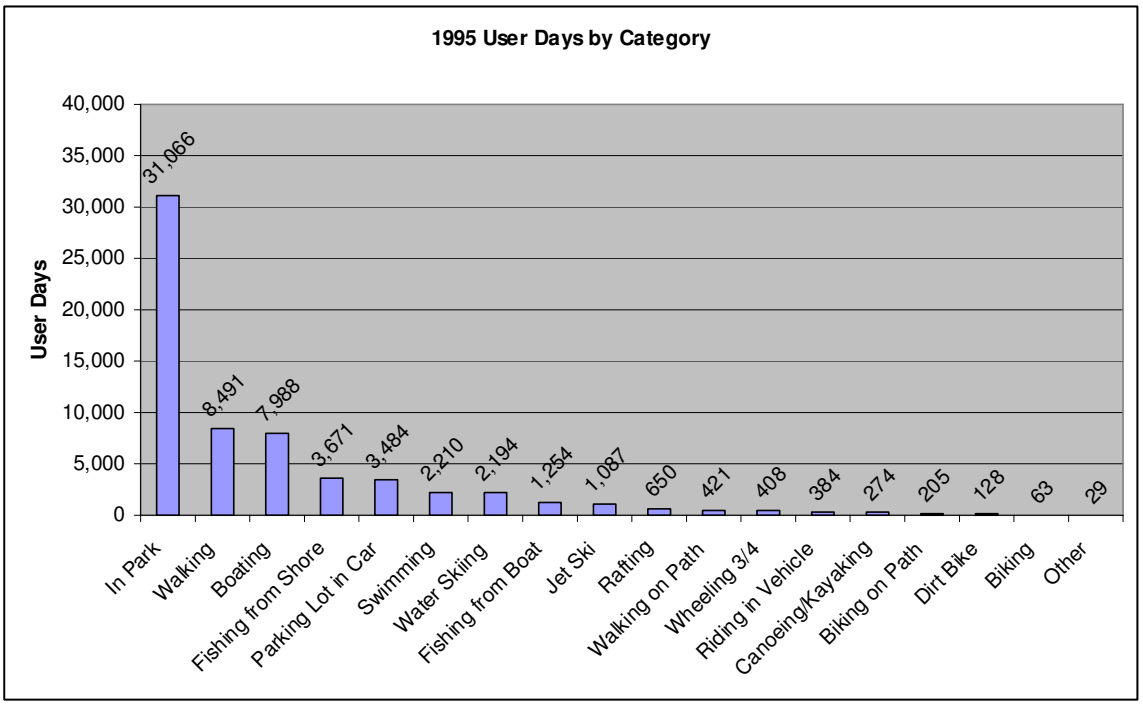

FIGURE 3-2
1995 User Days by Category

Land Use

The Land Use section of the DEIS/EIR focuses on the compatibility of the proposed alternatives with the existing land use designations in applicable general plan and zoning documents. The section concludes that the facilities proposed are consistent with local land use plans and zoning, with the exception of the bypass facility proposed under Alternative 1B, which would be inconsistent with the designated Resource Management Plan for the area surrounding the Discovery Center. Also, impacts to existing boat ramps and docks are found to be significant under alternatives that reduce the gates-in period.

Socioeconomics

Potential project impacts to the local economy of the City of Red Bluff and Tehama County were identified as a key concern of stakeholders. The proposed project was found to have both positive and negative impacts on the local economy. Positive impacts include construction income from the installation of facilities and potential long-term benefits from improvement in the fish runs. Negative impacts include losses from lake-dependent recreation and tourism (including the boat drags), property values decreasing along the lake, tax revenue losses to the City of Red Bluff, and the loss of quality of life and community cohesion. Much of the analysis centered on the results of an Input-Output economic analysis. This allowed for a relative comparison of alternatives.

The DEIS/EIR analysis concluded that in-region sales associated with construction of facilities would range from $80 to $90 million, and would require approximately 715 to 889 full-time equivalents during the building phase. In addition, local increases in fishing expenditures are possible under reduced gates-in operations because of the potential for increased fish populations and the resultant expenditures (e.g., groceries, fuel, and fishing supplies) for fishing opportunities.

The loss of the lake was found to have several economic consequences. In terms of the local economy associated with the lake, a 2-month gate operation was found to result in the loss of six full-time equivalents and approximately $363,000 in spending annually. The gates-out operation would result in the loss of 19 full-time equivalents and approximately $1.1 million in spending annually. Loss of the Nitro National drag boat races would result in a loss of 49 full-time equivalents (mostly in the form of lost temporary positions during the races) and the loss of $3.1 million in spending annually. Interviews with local real estate agents revealed that lake-front homes could benefit from a 4 to 18 percent "premium" resulting from their proximity to the lake; however, property value effects are difficult to project because of the numerous factors that affect real estate prices. Approximately 88 properties were identified as being on the lake, with a total assessed value of $14.4 million. Assuming the real estate agents' estimates are correct, the total reduction in assessed value as a result of loss of the "premium" would range from $576,000 to $2,592,000, spread over all the properties concerned. Tax revenue losses associated with the potential loss of the lake were found to be small.

The DEIS/EIR notes that the greater Red Bluff community would experience a negative impact in terms of quality of life for local residents if the gates-out condition were implemented. This conclusion is based on many residents' assertions that they benefit from the lake in a number of nonquantifiable ways, including lower temperatures during the summer months, or the knowledge that the lake is available for a visit, if desired. The

impact on quality of life was found to be much greater under the Gates-out Alternative than under the 2-month gate operation alternatives.

The DEIS/EIR concludes that the socioeconomic impacts from Alternatives 1A and 1B would be less than significant. Impacts from Alternatives 2A and 2B would be noticeable, but would remain less than significant because the lake would be present during the peak summer months. However, impacts from Alternative 3 would be significant and unavoidable because of the perceived loss of quality of life and community cohesion.

Aesthetics and Visual Resources

The Sacramento River is considered an important aesthetic and visual resource for residents of the City of Red Bluff and Tehama County and the region. For northbound travelers along Interstate 5 (I-5), the Sacramento River is the first large body of water north of Sacramento County. Some Red Bluff residents take pride in the fact that I-5 crosses the Sacramento River twice in the area. Depending on river flow, Lake Red Bluff extends approximately 4 to 6 miles upstream of RBDD when the gates are lowered.

The DEIS/EIR conducted an analysis of viewpoints throughout the project area. Photographs were taken at the viewpoints under both the gates-in and gates-out operations. Viewpoints and general assessments were reviewed with a Stakeholder Working Group to develop the analysis. Representative viewpoints are presented on Figures 3-3a, 3-3b, 3-4a, and 3-4b.

FIGURE 3-3A
Lower River/Red Bluff Recreation Area Viewpoint #1 Gates-out Condition

FIGURE 3-3B
Lower River/Red Bluff Recreation Area Viewpoint #1 Gates-in Condition

FIGURE 3-4A
Middle River Viewpoint #10 Gates-out Condition

FIGURE 3-4B
Middle River Viewpoint #10 Gates-in Condition

The DEIS/EIR concluded that all of the proposed alternatives would result in changes to the landscape that would be significant and could not be mitigated.

Comments on the DEIS/EIR

In all, about 70 comment letters commented on the social aspects of Lake Red Bluff, resulting in several hundred individual comments. Commentors' concerns generally fell into the following topics:

- Support for Alternative 1A, 4-months gates-in, with improved fish ladders and a new pump station/fish screen
- Determinations of significance, particularly the less-than-significant determination for Alternative 2A under Socioeconomics
- Outdated nature of the study used for the recreation analysis
- Lack of mitigation for significant effects and/or lack of detail in proposed mitigation

Responses to Comments in the FEIS/EIR

Many of the responses to comments simply note the commentor's preference for a particular alternative without a substantive response. The majority of the impacts relating to the elimination of Lake Red Bluff conclude that significant impacts would result in the various resource categories, with the exception of Alternative 2A, which would have less than significant impacts on Socioeconomics. These conclusions are largely subjective, but were conducted in a methodical manner by appropriately trained and experienced professionals, with substantive consideration of public input. The recreation study that formed the basis of the analysis in the DEIS/EIR was used in a comparative manner. An updated recreation study will likely reinforce the conclusions presented in the DEIS/EIR. Final mitigation plans to help offset potential impacts from changes to gate operations will be implemented as outlined in the DEIS/EIR.

3.7 Thematic Response No. 6

Pumping Power Use Versus Gravity Drain System

Background

The potential switch from a gravity diversion to a pumped diversion resulted in comments relating to the potential increase in electrical usage. As currently envisioned, the pump station will be eligible for Project Use Power (PUP), consistent with its status as a facility of the CVP. Commentors expressed concerns about the proposed facility's eligibility for PUP, the cost of electric power, the effect on the overall supply of electricity, and other details relating to the effects of the switch from gravity to electricity. This thematic response presents information on how the power resources were addressed in the DEIS/EIR, and how the issue is being addressed in the FEIS/EIR.

Analysis in DEIS/EIR

The DEIS/EIR addressed the power consumption of the various alternatives as well as the potential sources of power that might supply the needs of the project. Power supply was described in terms of the overall California market structure as well as the hydroelectric characteristics of CVP generation. The analysis concluded that the impacts of the proposed alternatives were less than significant.

RBDD is owned and operated by Reclamation and provided with PUP electricity. The DEIS/EIR assumes that any new facility at RBDD will also be served with PUP. This assumption was based on a Reclamation Mid-Pacific Region Draft Policy Statement dated September 8, 2000. PUP is electrical power that is defined by Reclamation law and used to operate CVP or Washoe Project facilities. This is a key assumption in terms of operational cost of the project.

The DEIS/EIR notes that annual CVP generation is variable depending on hydrologic conditions, as is PUP, and the net energy available for marketing by the Western Area Power Administration. Generation ranges from about 3.0 to 6.5 million megawatt-hours (MWh). PUP usage was estimated at 0.8 to 1.4 million MWh, leaving 2.1 to 5.1 million MWh for sale to the Western Area Power Administration customers. Figure 3-5 presents average generation statistics by month as presented in the DEIS/EIR. Figure 3-6 presents generation statistics by month for a dry water-year scenario. The dry water-year scenario is based on 12 consecutive months of actual dry-weather hydrology, and thus makes projected comparisons difficult because it is uncertain what actual water deliveries or allocations will be in those 12 months. Regardless, the dry-year scenario presents a valuable comparison for general comparisons between future operations.

Existing power use at RBDD is based on the demands of the Corning Pumping Plant, RPP, drum screens, seasonal pumps, and administrative facilities. Precise attribution of the power use of individual facilities is difficult because all of RBDD is serviced through a single electrical meter. However, several years of measurements resulted in the estimated energy use presented on Figure 3-7, and formed the basis for the comparative analysis conducted for the DEIS/EIR. The analysis assumed that loads from the seasonal pumps and RPP diversion would change under the proposed alternatives.

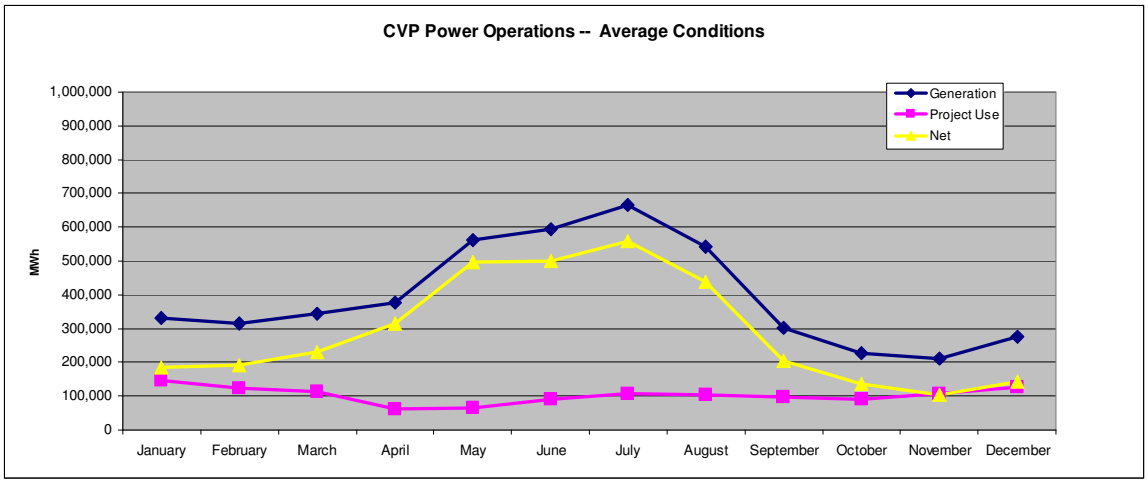

FIGURE 3-5
CVP Power Operations – Average Conditions

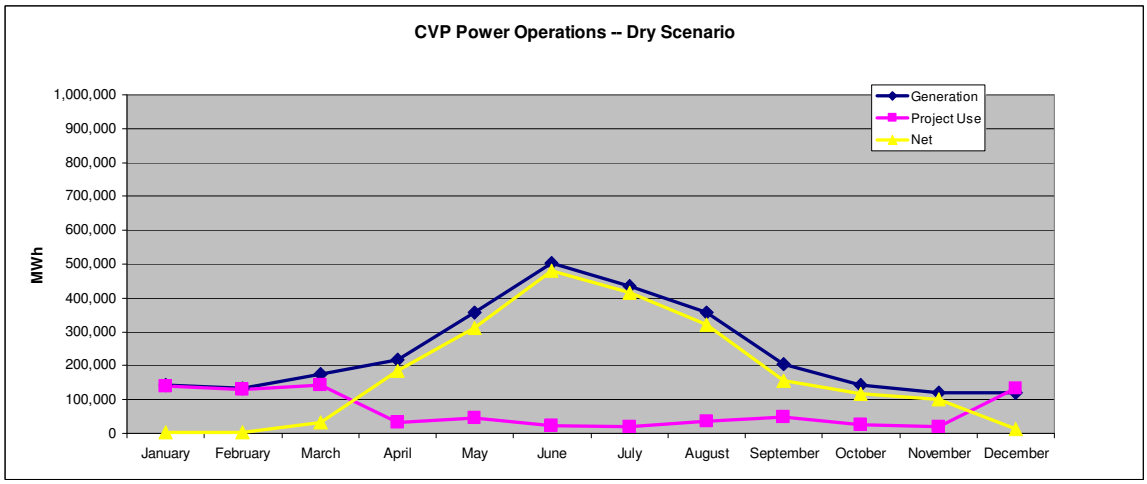

FIGURE 3-6
CVP Power Operations – Dry Scenario

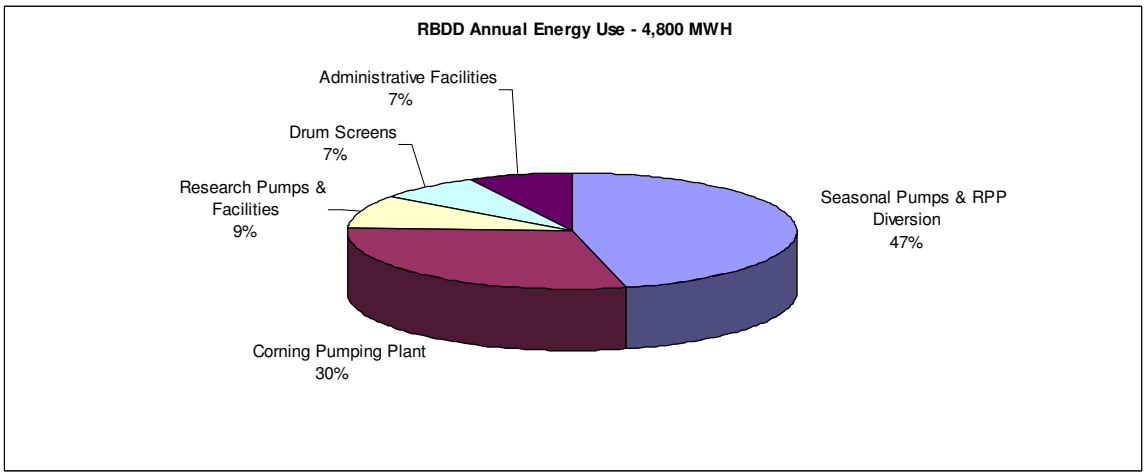

FIGURE 3-7
RBDD Annual Energy Use

Figures 3-8 and 3-9 present power usage of RBDD under the alternatives considered in the DEIS/EIR as a percentage of overall PUP. Figure 3-9 presents a worst-case scenario, whereby the CVP is operating under an extreme dry scenario, and a new facility at RBDD is delivering full water service contract supplies to TCCA member districts. In an actual dry-year scenario, it is more likely that the water supply allocations will be less than 100 percent. The DEIS/EIR concluded that the impacts on power resources were less than significant and would not require mitigation because the potential net impacts on Western Area Power Administration customers in terms of needs for replacement power was small and was well within normal variability of the system.

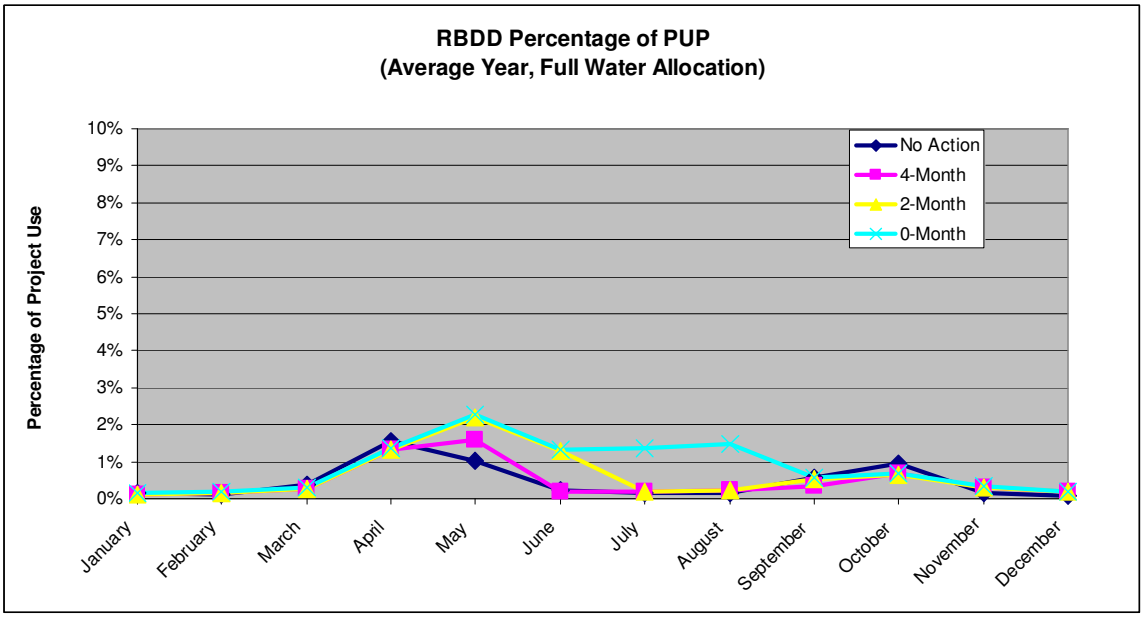

FIGURE 3-8
RBDD Percentage of PUP – Average Year

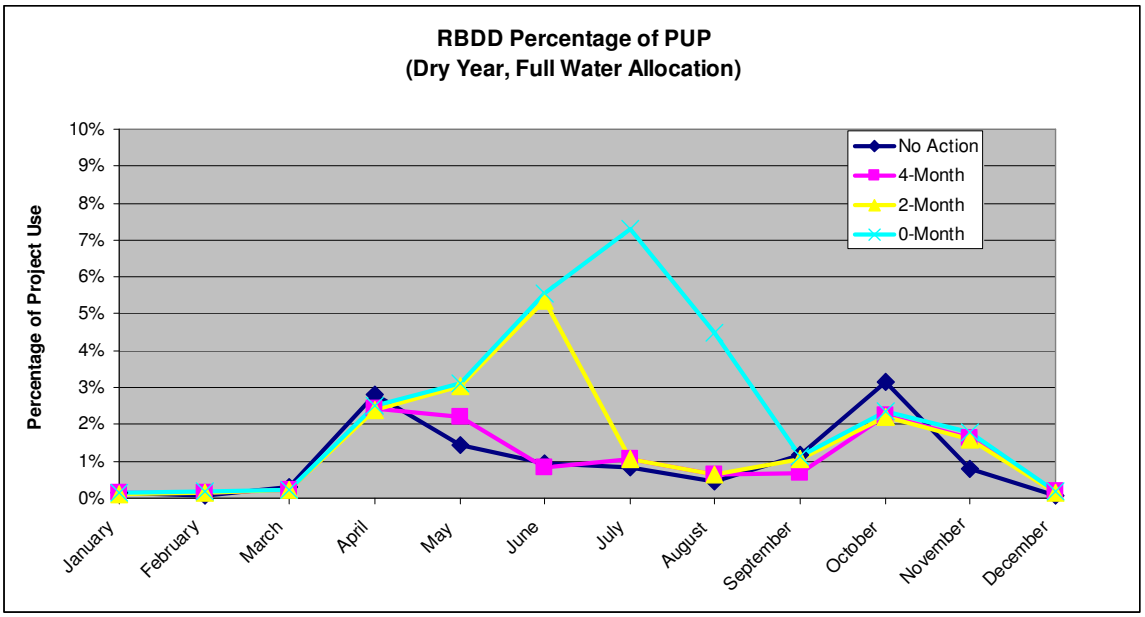

FIGURE 3-9
RBDD Percentage of PUP – Dry Year

Comments on the DEIS/EIR

In all, about 14 comment letters commented on power resources. Commentors' concerns regarding power resources generally fell into the following topics:

- Effect of the project on other customers, particularly existing preference power customers
- Cost effectiveness of the project in light of the TCCA member districts' relief from full repayment customers of the CVP
- Availability of alternative sources of power for the proposed facilities
- Additional detail on operational characteristics of the project
- Availability of PUP for the proposed facilities

Responses to Comments in the FEIS/EIR

Responses to comments focused on the relatively small amount of power required for the proposed facilities compared to existing generation of the CVP and the use of PUP, as determined by Reclamation's policy guidance. Additional detail on projected operations is difficult to provide given the extreme variability of the system and the relatively small proportion that will be used by the proposed facilities.