CITY OF TURLOCK
NOTICE OF DETERMINATION
NEGATIVE DECLARATION

Filed With:

_X_ Office of Planning & Research
1400 Tenth Street
Sacramento CA 95814
Via Fax: (916)323-3018

_X_ Stanislaus County Clerk
1021 I Street
Modesto CA 95354

When Filed Mail To:
Lead Agency: City of Turlock
156 S. Broadway, Suite 270
Turlock, CA 95380-5454
Phone: (209) 668-5590

Contact: Municipal Services Division

FILED

2015 SEP -9 AM 10: 54

STANISLAUS CO. CLERK-RECORDER

Kalpana Surti

Space above this line for Clerk's Office use only.

SUBJECT: Filing of Notice of Determination in compliance with Section 21108 or 21152 of the Public Resources Code.

STATE CLEARINGHOUSE NUMBER (if applicable): 2014062006

PROJECT TITLE: City of Turlock Exchange of Recycled Water Discharged Into the San Joaquin River for Transfer of San Joaquin River Water to Del Puerto Irrigation District via Patterson Irrigation District

PROJECT APPLICANT: City of Turlock

PROJECT LOCATION: Stanislaus County near the City of Patterson (Old Las Palmas Ave / Ash Ave)

PROJECT DESCRIPTION: The City of Turlock proposes to appropriate and convey to Del Puerto Water District up to 13,400 acre-feet per year of San Joaquin River water made available by Turlock's tertiary recycled water discharge to the San Joaquin River, pursuant to California Water Code Section 1485. The area affected by the Project (Action Area) is defined as the San Joaquin River from the Harding Drain Bypass Pipeline downstream to the PID Intake and Main Canal, and the Delta-Mendota Canal from the Patterson Irrigation District Discharge to existing DPWD connection to the canal.

FINDINGS:

1. Pursuant to CEQA Guidelines Section 15070, there is no substantial evidence, in light of the whole record before the agency, that the proposed project may have a significant effect on the environment.
2. Pursuant to CEQA Guidelines Section 15162, the proposed activity is adequately described and is within the scope of the General Plan EIR.
3. The analyses of cumulative impacts, growth inducing impacts, and irreversible significant effects on the environment contained in the General Plan EIR are adequate for this subsequent project.
4. Pursuant to CEQA Guidelines Section 15162, having reviewed the General Plan EIR, the City of Turlock finds and determines that:
5. a. there are no changes being proposed in the project that will require major revisions of the General Plan EIR due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effect, and
6. b. no substantial changes have occurred with respect to the circumstances under which the General Plan EIR was certified.
7. Pursuant to CEQA Guidelines Section 15162, having reviewed the General Plan EIR, the City of Turlock finds and determines that, based on substantial evidence in the light of the whole record, there is no

new information of substantial importance that shows any significant environmental effects.

8. The proposed project does not have the potential to degrade the quality of the environment, substantially reduce the habitat of fish or wildlife species, cause fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory.

9. The proposed project does not have impacts that are individually limited, but cumulatively considerable.

10. The proposed project does not have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly.

PROJECT APPROVAL DATE: **September 8, 2015**
CITY COUNCIL: **Resolution No. 2015-191**

DETERMINATION: This is to advise that the City of Turlock has approved and has made the following determinations regarding the project as described above.

1. The project ___ will, X **will not** have a significant effect on the environment.
2. An Environmental Impact Report ___ was, X **was not** prepared for this project pursuant to the provisions of CEQA.
3. A Negative Declaration X **was,** ___ was not prepared for this project pursuant to the provisions of CEQA.
4. Mitigation measures ___ were, X **were not** made a condition of the approval of the project.
5. A mitigation monitoring plan/program ____ was, X **was not** adopted for this project.
6. A statement of Overriding Considerations ___ was, X **was not** adopted for this project.
7. Findings were made pursuant to the provisions of CEQA.

This is to certify that documentation for the X **Negative Declaration** with comments and responses and record of project approval is available to the general public at:

City of Turlock - Planning Division
City Hall, 156 S. Broadway, Suite 270
Turlock, CA 95380-5454
TELEPHONE: (209) 668-5530

This documentation can also be found on our website at
http://ci.turlock.ca.us/citydepartments/developmentservices/planning/projectenvironmentaldocuments/

BY: _____ DATE: 9/9/2015
MICHAEL I COOKE
Municipal Services Director

Date Received for filing at OPR: _____

MICHAEL I. COOKE
DIRECTOR
mcooke@turlock.ca.us

MUNICIPAL SERVICES
ADMINISTRATION

156 S. BROADWAY, SUITE 270 | TURLOCK, CALIFORNIA 95380 | PHONE 209-668-5599 EXT 4418 | FAX 209-668-5695

DATE: May 28, 2014

TO: All Interested Agencies

FROM: Michael I. Cooke, Municipal Services Director

SUBJECT: **CEQA REFERRAL INITIAL STUDY**
NOTICE OF INTENT TO ADOPT A NEGATIVE DECLARATION

PROJECT TITLE: City of Turlock Exchange of Recycled Water Discharged into the San Joaquin River for Transfer of San Joaquin River Water to Del Puerto Irrigation District via Patterson Irrigation District

PROJECT APPLICANT/CONTACT: City of Turlock, Michael I. Cooke

PROJECT LOCATION: The Project uses existing facilities in Stanislaus County and conveys water through the San Joaquin River between the Harding Drain Bypass Pipeline discharge to the San Joaquin River and the Patterson Irrigation District (PID) Intake, then through the Delta-Mendota Canal from the Patterson Irrigation District Discharge to existing DPWD connections to the canal.

PROJECT DESCRIPTION: City of Turlock proposes to appropriate and convey to Del Puerto Water District up to 13,400 acre-feet per year (AFY) of San Joaquin River water made available by Turlock's tertiary recycled water discharge. The area affected by the Project (Action Area) is defined as the San Joaquin River from the Harding Drain Bypass Pipeline downstream to the PID Intake and Main Canal, and the Delta-Mendota Canal from the Patterson Irrigation District Discharge to existing DPWD connections to the canal.

RESPONSE PERIOD STARTS: **June 5, 2014**
RESPONSE PERIOD ENDS: **July 7, 2014 at 5:00 PM**

PUBLIC HEARING: **Tuesday, July 22, 2014 @ 6:00 PM**
Turlock City Council
Turlock City Hall, Yosemite Room
156 South Broadway, Turlock, CA

The City of Turlock has determined that it is the Lead Agency for Environmental Review of the Proposed Project named above. Please review the appropriateness of the "Negative Declaration" in relation to your agency's statutory responsibilities in connection with the proposed project. Your agency will need to use the "Negative Declaration", as determined by the City of Turlock, when considering any permit or other approval of the project by your agency. Please send any supplemental responses at the earliest possible date, but not later than the **RESPONSE PERIOD ENDS** date as identified above. (These comments may be faxed to (209) 668-5695, followed by a hard copy in the mail). The Applicant's "Initial Environmental Questionnaire" is not included with this Notice. Should you need any additional information regarding this project, please do not hesitate to contact me.

You can view an electronic copy of the Initial Study/Negative Declaration and appendixes (San Joaquin River Flow Analysis and Fishery Habitat Assessment), for this project on our website at: http://ci.turlock.ca.us/citydepartments/developmentservices/planning/projectenvironmentaldocuments/

All applicable project documents are available for review at:

City of Turlock, City Hall
Municipal Services Division
156 S. Broadway, Suite 270
Turlock, CA 95380.

You may provide any comments to this address or call us at (209) 668-5590 if you have any questions.

ATTACHMENT: Initial Study, Site Plan

Filing Requested By:
City of Turlock
Municipal Services Division
156 S. Broadway, Suite 270
Turlock, CA 95380-5454

When Filed Mail To:
Same as above

SPACE ABOVE THIS LINE RESERVED FOR CLERK'S USE ONLY

CITY OF TURLOCK
X Proposed Negative Declaration

May 29, 2014

City of Turlock
156 S. Broadway, Suite 270
Turlock, CA 95380-5454
Telephone: (209) 668-5590
Project located in Merced County, Stanislaus County and San Joaquin County
Time period provided for review: 30 days.

NOTICE OF INTENT TO ADOPT A NEGATIVE DECLARATION

PROJECT TITLE: **CITY OF TURLOCK EXCHANGE OF RECYCLED WATER DISCHARGED INTO THE SAN JOAQUIN RIVER FOR TRANSFER OF SAN JOAQUIN RIVER WATER TO DEL PUERTO IRRIGATION DISTRICT VIA PATTERSON IRRIGATION DISTRICT**

PROJECT APPLICANT: CITY OF TURLOCK, MICHAEL COOKE

PROJECT DESCRIPTION: City of Turlock proposes to appropriate and convey to Del Puerto Water District up to 13,400 acre-feet per year (AFY) of San Joaquin River water made available by Turlock's tertiary recycled water discharge. The area affected by the Project (Action Area) is defined as the San Joaquin River from the Harding Drain Bypass Pipeline downstream to the PID Intake and Main Canal, and the Delta-Mendota Canal from the Patterson Irrigation District Discharge to existing DPWD connections to the canal.

PROJECT LOCATION: The Project uses existing facilities in Stanislaus County and conveys water through the San Joaquin River between the Harding Drain Bypass Pipeline discharge to the San Joaquin River and the Patterson Irrigation District (PID) Intake, then through the Delta-Mendota Canal from the Patterson Irrigation District Discharge to existing DPWD connections to the canal.

RESPONSE PERIOD STARTS: June 5, 2014

RESPONSE PERIOD ENDS: July 7, 2014 @ 5:00 PM

PUBLIC HEARING: July 22, 2014, 6:00 P.M.
Turlock City Council
Turlock City Hall, Yosemite Room
156 South Broadway, Turlock, CA

Documents used in preparation of this Proposed Negative Declaration are available for public review at:

City of Turlock, City Hall
Municipal Services Division
156 South Broadway, Suite 270
Turlock, CA 95380
Telephone: (209) 668-5590

You can view an electronic copy of the Initial Study/Negative Declaration and appendixes (San Joaquin River Flow Analysis and Fishery Habitat Assessment) for this project on our website at: http://ci.turlock.ca.us/citydepartments/developmentservices/planning/projectenvironmentaldocuments/

BY:_____
MICHAEL COOKE,
MUNICIPAL SERVICES DIRECTOR

Enclosure: Initial Study
Site Plan

Initial Study-Negative Declaration

City of Turlock Exchange of Recycled Water Discharged into the San Joaquin River for Transfer of San Joaquin River Water to Del Puerto Water District via Patterson Irrigation District

Prepared for:

156 S. Broadway
Turlock, CA 95380

October 2013

May 28, 2014

Initial Study-Negative Declaration for the City of Turlock Exchange of Recycled Water Discharged into the San Joaquin River for Transfer of San Joaquin River Water to Del Puerto Water District via Patterson Irrigation District

CEQA Lead Agency and Contact Person

Michael Cooke
City of Turlock
156 S. Broadway, Suite 270
Turlock, CA 95380
(209) 668-5590 ext. 4418

Project Sponsor

City of Turlock

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Acronym List

AF	acre-feet
AFY	acre-feet per year
APE	Area of Potential Effect
BMPs	Best Management Practices
Caltrans	California Department of Transportation
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CNPS	California Native Plant Society
Corps	US Army Corps of Engineers
CRLF	California red-legged frog
CTS	California tiger salamander
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
CWA	Clean Water Act
DMC	Delta-Mendota Canal
DPWD	Del Puerto Water District
DTSC	(California) Department of Toxic Substances Control
EA	Environmental Assessment
FESA	Federal Endangered Species Act
FONSI	Finding of No Significant Impact
FWCA	Fish and Wildlife Conservation Act
GHG	Greenhouse gases
HCP	Habitat Conservation Plan
IS-ND	Initial Study-Negative Declaration
ITA	Indian Trust Assets
MBTA	Migratory Bird Treaty Act
MGD	million gallons per day
NHPA	National Historic Preservation Act
NPDES	National Pollutant Discharge Elimination System
NMFS	National Marine Fisheries Service

MBTA	Migratory Bird Treaty Act
OHW	Ordinary High Water
PID	Patterson Irrigation District
PM	Particulate Matter
Reclamation	U.S. Bureau of Reclamation
RWQCB	Regional Water Quality Control Board
RMC	RMC Water and Environment
SAA	Streambed Alteration Agreement
SJVAPCD	San Joaquin Valley Air Pollution Control District
SWP	State Water Project
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TID	Turlock Irrigation District
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey
WAC	Warren Act Contract

Chapter 1 Introduction

1.1 Purpose of this Document

The City of Turlock and Del Puerto Water District (DPWD) propose to transfer up to 13,400 acre-feet per year (AFY) of water from Turlock to DPWD. The transfer would include 10,000 AFY of existing flows, which are currently discharged to the San Joaquin River, plus future flows up to a total of 13,400 AFY. The transfer would require implementation of the following actions:

- Appropriation of San Joaquin River flows under Section 1485 of the Water Code, in an amount equal to quantities discharged by Turlock to the river;
- Transfer of the appropriated flows to the DPWD;
- Conveyance of the flows through the Patterson Irrigation District intake facility and Main Canal to the Delta-Mendota Canal (DMC);
- Conveyance of flows to DPWD through the DMC, pursuant to a Warrant Act Contract with the U.S. Bureau of Reclamation.

Throughout this document "transfer" refers to this appropriation and conveyance of water.

The City of Turlock has prepared this Initial Study Negative Declaration (IS-ND) to provide the public and Responsible and Trustee Agencies reviewing the proposed Project with information about the potential impacts on the environment. This IS-ND was prepared in compliance with Sections 15070 to 15075 of the California Environmental Quality Act (CEQA) Guidelines of 1970 (as amended), and California Administrative Code, Title 14, Division 6, Chapter 3. In accordance with Section 15070, a Negative Declaration (ND) shall be prepared if the initial study shows that there is no substantial evidence, in light of the whole record before the agency, that the project may have a significant effect on the environment. The City of Turlock as the CEQA lead agency has determined that an IS-ND should be prepared for the proposed Project.

In accordance with Section 15073 of the CEQA Guidelines, this document is being circulated to local, State, and federal agencies and to interested organizations and individuals who may wish to review and comment on the report. The City of Turlock has circulated the IS-ND to the State Clearinghouse for distribution and a 30-day public review, and has posted a Notice of Intent to Adopt a Negative Declaration in the office of the Stanislaus County Clerk. The City of Turlock will evaluate comments received on the draft IS-ND, and will prepare responses to address any substantial evidence that the proposed project could have a significant impact on the environment. If there is no such substantial evidence, the City of Turlock as lead agency will adopt the ND in compliance with CEQA.

The Project would also require approval from the U.S. Bureau of Reclamation (Reclamation). DPWD is requesting that Reclamation approve a Warren Act Contract (WAC) for the conveyance of non-project water in the DMC. The City of Turlock is requesting approval of the appropriation of San Joaquin River flows from the State Water Resources Control Board. Reclamation is the lead Federal agency and has prepared a separate Environmental Assessment for compliance under NEPA.

1.2 Scope of this Document

The IS/ND was prepared to examine any impacts on environmental resources that would result from implementation of the water transfer (the proposed Project) and Reclamation's approval of a WAC (the proposed Action). Areas of potential impacts that were evaluated include:

- Aesthetics
- Agricultural and Forestry Resources
- Land Use and Planning
- Mineral Resources

- Air Quality
- Biological Resources
- Cultural Resources
- Geology and Soils
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Noise
- Population and Housing
- Public Services
- Recreation
- Transportation/Traffic
- Utilities and Service Systems

1.3 Impact Terminology

The environmental impact analysis for each resource defines the criteria used to judge whether an impact is significant based on the CEQA Initial Study Checklist and regulatory agency standards. Impacts that exceed identified threshold levels are considered significant. In describing the significance of impacts, the following categories of significance are used and are based on the best professional judgment of the preparers of the Initial Study:

No Impact: An effect that would have no impact, or would have a positive impact on the environment, such as reducing an existing environmental problem.

Less than Significant: An impact that may be adverse, but does not exceed the threshold levels and does not require mitigation measures.

Less than Significant with Mitigation: An impact is potentially significant, but can be reduced to below the threshold level (to less than significant) given reasonable and available mitigation measures.

Potentially Significant: An impact that would cause substantial, or potentially substantial, impacts above the threshold level. Such an impact triggers consideration of mitigation measures and requires further evaluation that would trigger the preparation of an Environmental Impact Report for the project.

Chapter 2 Project Description

2.1 Project Overview

The City of Turlock is proposing to transfer up to 13,400 acre-feet (AF) of water to Del Puerto Water District using existing facilities in Stanislaus County. Figure 2-1 shows the project vicinity.

2.2 Purpose and Need for Project

Del Puerto Water District (DPWD) is a Central Valley Project (CVP) Contractor located on the west side of the San Joaquin Valley south of the Sacramento-San Joaquin Delta. Currently, DPWD's primary source of water is through a contract with the United States Bureau of Reclamation for the delivery of up to 140,210 acre-feet (AF) of water annually. Since the early 1990's, DPWD has experienced reductions in its CVP entitlements due to drought conditions and regulatory restrictions imposed on CVP operations. In 2009, due to hydrologic conditions as well as increased Delta pumping restrictions resulting from the biological opinions of the National Marine Fisheries Service (NMFS) and the United States Fish and Wildlife Service (USFWS), DPWD received only 10 percent (approximately 14,000 acre-feet) of its CVP contract amount. While the District's supply was 80 percent in 2012, currently in 2013, DPWD is only receiving 20 percent (approximately 28,000 acre-feet) of its CVP contract amount. On average, DPWD has received about 36 percent (51,000 AF) of its CVP contract amount over the last seven years. The difference between the CVP supply and the demand for water has been made up by purchasing additional supplies when available, plus additional groundwater pumping and fallowing of farmland. The water shortages and the lack of water supply reliability that DPWD has experienced have resulted in economic hardships to the District and its growers. In 2009, approximately 11,000 acres of lands were fallowed, representing almost 25 percent of the District's productive farmland. Furthermore, in the future it is expected that Delta exports and surface water supplies will become even less reliable due to the impacts of climate change and regulations to maintain the Delta ecosystem. The purpose of the Project is to appropriate and convey a quantity of San Joaquin River flows equal to the City of Turlock's tertiary treated recycled water discharge to DPWD to make up a portion of the shortage of CVP water.

2.3 Background

The City of Turlock (Turlock) and the Del Puerto Water District (DPWD) are proposing to transfer up to 13,400 acre-feet (AF) of San Joaquin River water made available by virtue of Turlock's tertiary treated recycled water discharge, using only existing infrastructure as seen in Figure 2-2 and Figure 2-3 below.

The transfer would occur as follows:

- The City of Turlock would continue its existing discharge to the San Joaquin River through the Harding Drain. (The Harding Drain Bypass Pipeline is scheduled for completion in January 2014, which will allow the City to discharge directly to the San Joaquin River).
- Water would be diverted at the Patterson Irrigation District (PID) river diversion facility and transferred to the Delta-Mendota Canal (DMC) using PID's existing conveyance system.
- DPWD would divert water through their existing turnouts off of the DMC.

Figure 2-1: Vicinity Map

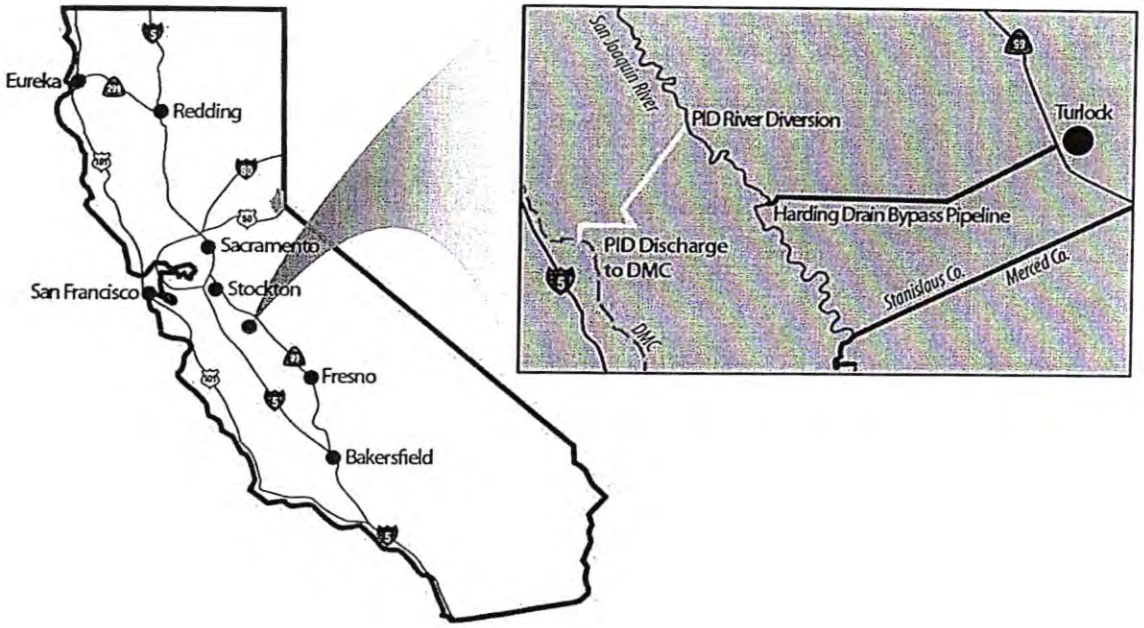


Figure 2-2: Project Overview

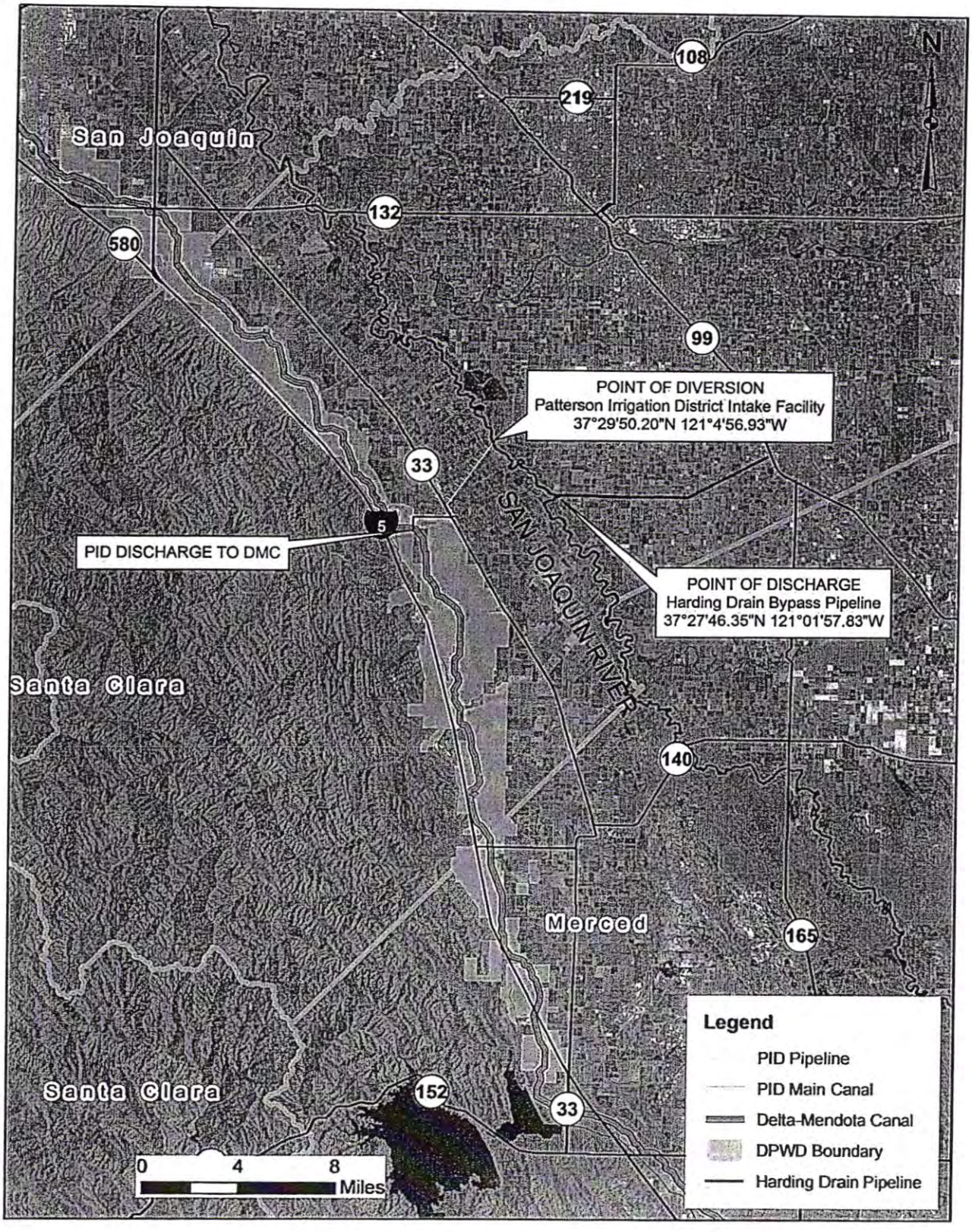
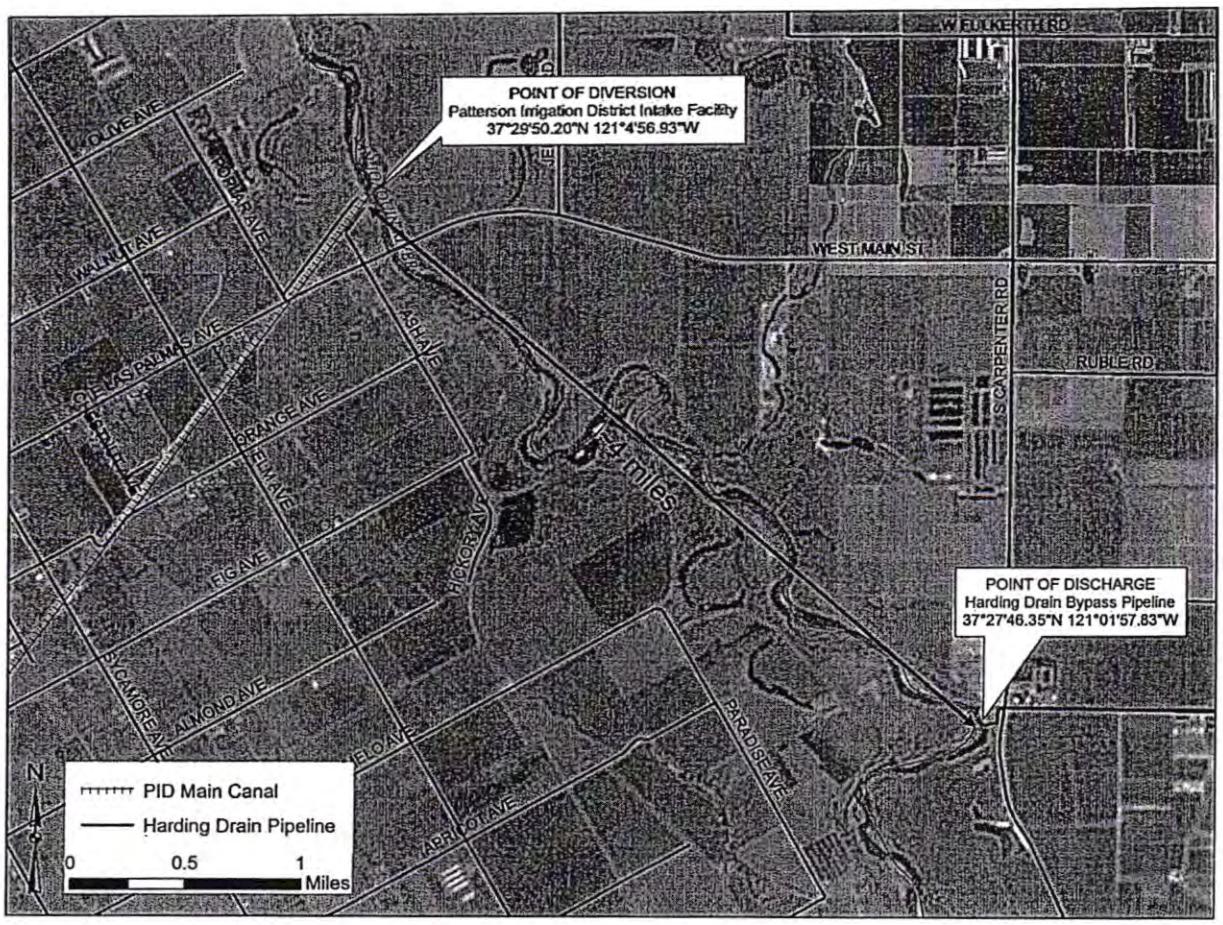


Figure 2-3: San Joaquin River Discharge and Diversion Locations



2.3.1 Water Rights

The City of Turlock is seeking confirmation of the water rights necessary to complete the transfer. Turlock will file an application to acquire a water right under Section 1485 of the California Water Code, which states the following:

> *§1485. Application for permit to appropriate water; granting of permit; sale or use of water*
>
> *Any municipality, governmental agency, or political subdivision operating waste disposal plants producing disposal water meeting the requirements of the appropriate regional board, and disposing of said water in the San Joaquin River may file an application for a permit to appropriate an equal amount of water, less diminution by seepage, evaporation, transpiration or other natural causes between the point of discharge and the point of recovery, downstream from said disposal plant and out of the San Joaquin River or the Sacramento-San Joaquin Delta. A permit to appropriate such amount of water may be granted by the board upon such terms and conditions as in the board's judgment are necessary for the protection of the rights of others. Water so appropriated may be sold or utilized for any beneficial purpose. The right to the use of water granted by this section shall not include water flowing in underground streams.*
>
> *The Legislature finds and declares that the problems incident to the full utilization of the waters of the San Joaquin River and the Sacramento-San Joaquin Delta into which it flows, are unique and that a general law cannot be made applicable thereto.*

Upon securing the water right, the City of Turlock would enter into an agreement to transfer to DPWD water available under this right. DPWD would enter into an agreement with Patterson Irrigation District (PID) to divert water through PID's existing facilities located on the San Joaquin River. Diverted water would then be conveyed through the PID system to PID's existing connection to the Delta-Mendota Canal (DMC).

To allow an appropriation under Section 1485, the City of Turlock needs to demonstrate that its discharge of recycled water constitutes "new" water that would not have flowed into the river unless discharged by the City. The source of the City's water supply, which is the original source of the recycled water discharge, is groundwater from a confined aquifer. The groundwater conditions in and around the City of Turlock are such that water that is not pumped by the City would stay within the groundwater system until pumped by other users. Groundwater flows are to the east and/or downward, and not toward the river. If it were not intercepted the groundwater that serves as the City's water supply would not be expected to flow into the San Joaquin River. The discharge of recycled water to the river thus constitutes new water.

2.3.2 Reclamation's Legal and Statutory Authorities and Jurisdiction Relevant to the Proposed Federal Action

Federal laws, permits, licenses and policy requirements have directed, limited, or guided the National Environmental Policy Act analysis and decision-making process of an Environmental Assessment (EA), which has been independently issued by Reclamation and include the following as amended, updated, and/or superseded (all of which are incorporated by reference):

Warren Act

DPWD would enter into a multi-year Warren Act contract with the Bureau of Reclamation for the conveyance, storage, and delivery of non-project water. The Warren Act of February 21, 1911, as quoted below, authorized the United States to execute contracts for the conveyance and storage of non-project (non-CVP) water in Federal facilities when excess capacity exists.

> *US Code: Title 43 (Public Lands), Chapter 12 (Reclamation and Irrigation of Lands by Federal Government), Subchapter XIII (Sale or lease of surplus waters, water power, storage capacity, and water transpiration facilities), §523 (Storage and transportation of water for irrigation districts, etc.)*
>
> *Whenever in carrying out the provisions of the reclamation law, storage or carrying capacity has been or may be provided in excess of the requirements of the lands to be irrigated under any project, the Secretary of the Interior, preserving a first right to lands and entrymen under the project, is authorized, upon such terms as he may determine to be just and equitable, to contract for the impounding, storage, and carriage of water to an extent not exceeding such excess capacity with irrigation systems operating under section 641 of this title, and individuals, corporations, associations, and irrigation districts organized for or engaged in furnishing or in distributing water for irrigation. Water so impounded, stored, or carried under any such contract shall be for the purpose of distribution to individual water users by the party with whom the contract is made: Provided, however, that water so impounded, stored, or carried shall not be used otherwise than as prescribed by law as to lands held in private ownership within Government reclamation projects. In fixing the charges under any such contract for impounding, storing, or carrying water for any irrigation system, corporation, association, district, or individual, as herein provided, the Secretary shall take into consideration the cost of construction and maintenance of the reservoir by which such water is to be impounded or stored and the canal by which it is to be carried, and such charges shall be just and equitable as to water users under the Government project. No irrigation system, district, association, corporation, or individual so contracting shall make any charge for the storage, carriage, or delivery of such water in excess*

of the charge paid to the United States except to such extent as may be reasonably necessary to cover cost of carriage and delivery of such water through their works.

Water Quality Standards

Reclamation requires that the operation and maintenance of CVP facilities shall be performed in such a manner as is practical to maintain the quality of raw water at the highest level that is reasonably attainable. Water quality and monitoring requirements are established annually by Reclamation and are instituted to protect water quality in federal facilities by ensuring that imported non-CVP water does not impair existing uses or negatively impact existing water quality conditions. These standards are updated periodically. The water quality standards are the maximum concentrations of certain contaminants that may occur in each source of non-CVP water. The water quality standards for non-CVP water to be stored and conveyed in federal facilities are currently those set out in the 2013 Delta-Mendota Canal Groundwater Pump-in Program Water Quality Monitoring Program (USBR 2013).

2.4 Existing Facilities

The project would use existing facilities of the City of Turlock, Patterson Irrigation District and Del Puerto Water District, and the USBR's Delta-Mendota Canal. Those facilities are described below.

2.4.1 City of Turlock

Turlock's Regional Water Quality Control Facility has a design capacity of 20 MGD; currently the plant treats an annual average flow of approximately 10 MGD. All recycled water produced at Turlock meets the State of California Title 22 Code of Regulations standards for disinfected tertiary recycled water which is suitable for unrestricted uses such as direct irrigation of food crops, recreational impoundments, cooling towers, commercial laundries, and a variety of other uses, including firefighting. As of 2013, the majority of recycled water produced at Turlock is discharged year-round to the San Joaquin River via the Harding Drain. (Up to 2.0 MGD is delivered to the Turlock Irrigation District for use as cooling water in an existing cogeneration facility and a small amount is used for landscape irrigation at a City park.) The Harding Drain is a man-made open channel agricultural drain owned by Turlock Irrigation District (TID). Because Turlock is permitted to discharge year-round to the San Joaquin River, recycled water storage is not needed. Turlock is currently constructing a pipeline (Harding Drain Bypass Pipeline) that will convey recycled water directly to the San Joaquin River for discharge (NPDES No. CA0078948). The Harding Drain Bypass Pipeline is designed to convey recycled water to the San Joaquin River and also to enable recycled water deliveries to customers along the pipeline alignment; it is expected to be completed by January 2014. The Project/Action would thus use the Harding Drain Bypass Pipeline to convey recycled water to the river.

Water would be conveyed approximately 3.6 miles from the point where the Harding Drain Bypass Pipeline discharges to the river to the PID intake. Conveyance losses in the River would be 0.63 percent of the discharged flows on an average annual basis.

2.4.2 Patterson Irrigation District River Diversion

PID pumps water from the San Joaquin River into their Main Canal through a series of pump and lift stations. Water is diverted from the San Joaquin River at an existing intake facility, with a modern fish screen that was newly constructed in 2011 to prevent entrainment of at-risk native fish species. Environmental review under both CEQA and NEPA was completed for the new intake facility (Patterson Irrigation District 2006), which is approved to divert up to 195 cfs from the river. The Project would make use of existing approved capacity and would not increase diversions at the PID intake above the previously approved amount. The PID intake is shown in Figure 2-4. The Main Canal currently has a peak capacity of 200 cubic feet per second (cfs). The canal begins at the San Joaquin River, just north of the Las Palmas Bridge. The canal alignment heads southwest towards the City of Patterson for approximately 3.3 miles, before heading south along HWY 33. There are five lift stations along the main

canal. The Main Canal supplies thirteen lateral canals that distribute water north and south from the main canal. At the west end of the PID Main Canal, up to 35 cfs can be conveyed to the DMC via a 30-inch pipeline allowing for inter-agency transfers supported by wheeling agreements and / or Warren Act Contracts allowing for conveyance and storage of non-CVP supplies in Federal facilities. Figure 2-5 shows the PID main canal discharge into the DMC.

The PID Main Canal was originally constructed in the 1920s and has a pre-1914 water right to draw surface water from the San Joaquin River. As noted above, PID recently completed construction of a new fish screen and main pump station, located on the San Joaquin River and discharging to the PID Main Canal.

Figure 2-4: Patterson Irrigation District Fish Screen and Intake Facility, 2011

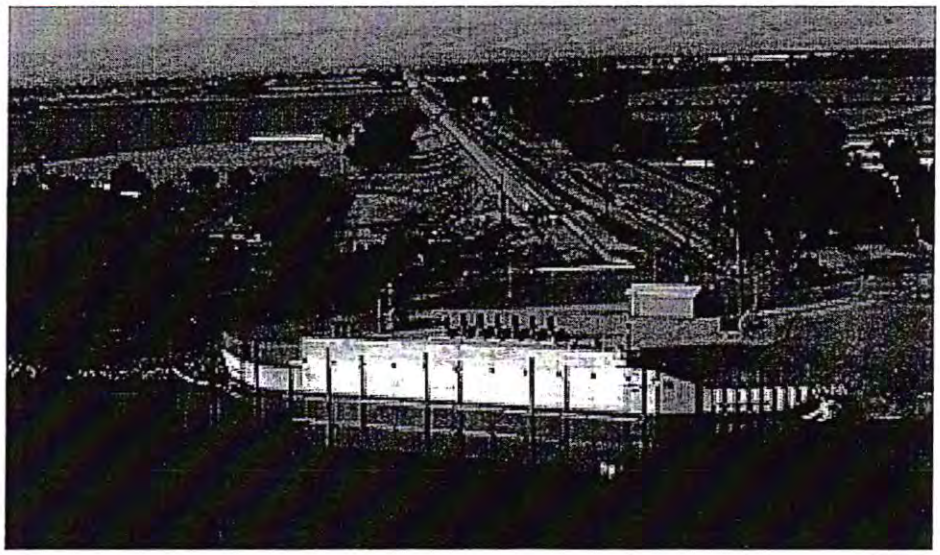


Photo by Patterson Irrigation District

Figure 2-5: PID Main Canal Diversion into DMC

2.4.3 Delta-Mendota Canal

The DMC is a 117-mile long canal that serves as the main conveyance facility for south of Delta deliveries for the United States Bureau of Reclamation's Central Valley Project (CVP). The canal begins in the southern Sacramento-San Joaquin Delta at the C.W. Bill Jones Pumping Plant near the City of Tracy with a peak discharge of 4,600 cfs. Completed in 1951, the DMC runs through the DPWD service area and is parallel to the State Water Project's (SWP) California Aqueduct. The DMC travels south from Tracy, CA to Mendota, CA, gradually reducing capacity to 3,200 cfs.

2.4.4 Del Puerto Water District

DPWD is located along the west side of the San Joaquin Valley and extends from Vernalis to Santa Nella. The District includes approximately 45,000 acres of productive farmland with an estimated production value of over $139 million gross farm dollars annually in Stanislaus, San Joaquin and Merced Counties. DPWD would divert water to their users through existing connections to the DMC.

2.5 Permits/Authorizations

Anticipated permits and other authorizations include:

- Water rights permit for the City of Turlock from State Water Resources Control Board
- U.S. Bureau of Reclamation approval of Warren Act Contract with Del Puerto Water District
- Approval of a wheeling agreement by and between the Patterson Irrigation District and Del Puerto Water District
- Approval of a wholesale water supply agreement by and between Del Puerto Water District and the City of Turlock

Chapter 3 Environmental Checklist Form

1. Project Title: City of Turlock Exchange of Recycled Water Discharged into the San Joaquin River for Transfer of San Joaquin River Water to Del Puerto Irrigation District via Patterson Irrigation District.

2. Lead Agency Name and Address: City of Turlock
156 S. Broadway
Turlock, CA 95380

3. Contact Person and Phone Number: Michael Cooke
City of Turlock
156 S. Broadway
Turlock, CA 95380
(209) 668-5590 ext. 4418

4. Project Location: The Project uses existing facilities in Stanislaus County and conveys water through the San Joaquin River between the Harding Drain Bypass Pipeline discharge to the San Joaquin River and the Patterson Irrigation District (PID) Intake, then through the Delta-Mendota Canal from the Patterson Irrigation District Discharge to existing DPWD connections to the canal.

5. Project Sponsor's Name: City of Turlock

6. General Plan Designation: Not Applicable, no new facilities would be constructed

7. Zoning: Not applicable, no new facilities would be constructed

8. Description of Project: City of Turlock proposes to appropriate and convey to Del Puerto Water District up to 13,400 acre-feet per year (AFY) of San Joaquin River water made available by Turlock's tertiary recycled water discharge. The area affected by the Project (Action Area) is defined as the San Joaquin River from the Harding Drain Bypass Pipeline downstream to the PID Intake and Main Canal, and the Delta-Mendota Canal from the Patterson Irrigation District Discharge to existing DPWD connections to the canal.

9. Surrounding Land Uses and Setting. Project facilities already exist and are generally located in agricultural areas.

10. Other public agencies whose approval is required (e.g., permits, financing approval, or participation agreement.)

- Water rights permit for the City of Turlock from State Water Resources Control Board
- U.S. Bureau of Reclamation approval of Warren Act Contract with Del Puerto Water District
- Approval of wheeling agreement by and between the Patterson Irrigation District and Del Puerto Water District
- Approval of a wholesale water supply agreement by and between Del Puerto Water District and the City of Turlock

Environmental Factors Potentially Affected

The proposed project could potentially affect ("Less than Significant Impact") the environmental factor(s) checked below. The following pages present a more detailed checklist and discussion of each environmental factor.

☐ Land Use	☐ Air Quality	☐ Geology and Soils
☐ Aesthetics	☐ Wind and Shadow	☒ Hydrology and Water Quality
☐ Population and Housing	☐ Recreation	☐ Hazards/Hazardous Materials
☐ Cultural and Paleo. Resources	☐ Utilities and Service Systems	☐ Mineral/Energy Resources
☐ Transportation and Circulation	☐ Public Services	☐ Agricultural and Forestry Resources
☐ Noise	☒ Biological Resources	☐ Greenhouse Gas Emissions
☐ Environmental Justice	☐ Indian Trust Assets	☐ Mandatory Findings of Significance

DETERMINATION: (To be completed by Lead Agency)

On the basis of this initial study:

☒ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, no further environmental documentation is required.

Signature: _____ Date: 5.29.2014

Printed Name: MICHAEL COOKE For: CITY OF TURLOCK

3.1 Aesthetics

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

Discussion

a-d) Because no facilities would be constructed there would be no effects on scenic vistas or scenic resources, and the Project/Action would not degrade the existing visual character of the Project/Action area. Flows in the San Joaquin River would be reduced by less than 1 percent, on average, and the maximum reduction would be less than 2.5 percent. This would not result in a perceptible change in the visual character of the river because the reduction in river stage height would be less than 1 inch (Hanson Environmental Inc, 2013). The Project/Action would not create any sources of light or glare.

Mitigation Measures: None required or recommended.

3.2 Agriculture Resources and Forestry Resources

Would the Project:	*Potentially Significant Impact*	*Less Than Significant With Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒

b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220 (g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104 (g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

Discussion

a-e) Because the Project/Action would not require the construction of any new facilities there would be no conflicts in zoning and no adverse effects on agricultural or forest lands. The Project/Action would address current water shortages that resulted in fallowing of about 11,000 acres of farmland in 2009. The Project/Action would thus benefit local agriculture, and would encourage agricultural use.

Mitigation Measures: None required or recommended.

3.3 Air Quality

	Potentially Significant Impact	*Less Than Significant With Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
Would the Project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☐	☒
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	☐	☒
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☐	☐	☒

d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☐	☒
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☐	☒

Discussion

a-e) Section 176 (C) of the Clean Air Act [CAA] (42 U.S.C. 7506 (C)) requires any entity of the federal government that engages in, supports, or in any way provides financial support for, licenses or permits, or approves any activity to demonstrate that the action conforms to the applicable State Implementation Plan (SIP) required under Section 110 (a) of the Federal CAA (42 U.S.C. 7401 [a]) before the action is otherwise approved. In this context, conformity means that such federal actions must be consistent with the SIP's purpose of eliminating or reducing the severity and number of violations of the National Ambient Air Quality Standards and achieving expeditious attainment of those standards. Each federal agency must determine that any action that is proposed by the agency and that is subject to the regulations implementing the conformity requirements would, in fact, conform to the applicable SIP before the action is taken.

On November 30, 1993, the EPA promulgated final general conformity regulations at 40 CFR Subpart B for all federal activities except those covered under transportation conformity. The general conformity regulations apply to a proposed federal action in a non-attainment or maintenance area if the total of direct and indirect emissions of the relevant criteria pollutants and precursor pollutant caused by the Proposed Action equal or exceed certain *de mimimis* amounts thus requiring the federal agency to make a determination of general conformity.

The Project/Action would not generate any construction-period emissions because there is no construction associated with the proposed Project / Action. Operation of the Project/Action would use existing facilities and is not expected to result in additional emissions. Water would be pumped out of the river at the existing PID intake, and conveyed to the DMC through their existing system. DPWD would remove water from the DMC using existing facilities and the amount of pumping would not increase because the new water source would replace water that is no longer available through their CVP allocation. Pumping of surface water would not be a source of odors. The Project/Action would thus not result in new operational emissions.

Mitigation Measures: None required or recommended.

3.4 Biological Resources

	Potentially Significant Impact	*Less Than Significant With Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
Would the Project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☒	☐

b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☐	☒	☐
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☒
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☐	☒
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

Discussion

a) Table 3-1and Table 3-2 were prepared using a list obtained by accessing the U.S. Fish and Wildlife Service Database: http://www.fws.gov/sacramento/es_species/Lists/es_species_lists.cfm, on July 17, 2013. For the list, the following 7 ½ minute U.S. Geological Survey quadrangles were queried: Brush Lake, Crows Landing, Gustine, Hatch, and Patterson. The information collected above, in addition to information from previous environmental documentation prepared by Reclamation for the San Joaquin River, including the San Joaquin River Restoration Program (Reclamation and DWR 2011), was combined to determine the likelihood of protected species occurrence within the action area. Terrestrial species that could occur in the action area are listed in Table 3-1.

The Project/Action does not include construction of new facilities and thus would have no effects on any terrestrial species of concern.

Because the Project/Action would have a small effect on flows in the San Joaquin River (a maximum of 2.5 percent, which is roughly equivalent to a 1-inch reduction in river stage height), it would have the potential to affect aquatic species of concern. Aquatic species of concern in the San Joaquin River are listed in Table 3-2. According to Reclamation and DWR (2011) the San Joaquin River downstream from the Merced River to the Delta, which includes the Project/Action area, provides transitory habitat for Central Valley steelhead and the NOAA Fisheries species of

Table 3-2: Special-Status Fish Species with Potential to Occur within the Action Area

Species	Status	Effects	Summary Basis for ESA determination
Central Valley fall-/late-fall-run Chinook salmon *(Oncorhynchus tshawytscha)*	FSC, CSC	No Effect	Magnitude of predicted changes in juvenile salmon survival and adult escapement, habitat quality in the lower San Joaquin River, and the location of the estuarine low salinity zone (X2 location) would not be detectable in field studies and is considered to be less than significant (Hanson Environmental 2013)
Central Valley spring-run Chinook salmon *(Oncorhynchus tshawytscha)*	T, ST	No Effect	Spring-run Chinook are not present in the Action area, and their reintroduction has been delayed.
Winter-run Chinook salmon *(Oncorhynchus tshawytscha)*	E, SE	No Effect	The proposed Action area does not include the Delta or the Sacramento River
Central Valley steelhead *(Oncorhynchus mykiss)*	T	No Effect	Effects on steelhead are expected to be similar to effects on Chinook salmon, described above, and are expected to be less than significant
Delta smelt *(Hypomesus transpacificus)*	T, SE	No Effect	The proposed Action area does not include the Delta
Sacramento splittail *(Pogonichthys macrolepidotus)*	CSC	No Effect	Effects on splittail are expected to be similar to or less than effects on Chinook salmon, described above, and are expected to be less than significant
Hardhead *(Mylopharodon conocephalus)*	CSC	No Effect	Effects on hardhead are expected to be similar to or less than effects on Chinook salmon, described above, and are expected to be less than significant
California/San Joaquin roach *(Lavinia symmetricus symmetricus)*	CSC	No Effect	Effects on roach are expected to be similar to or less than effects on Chinook salmon, described above, and are expected to be less than significant
Green sturgeon *(Acipenser medirostris)*	T, CSC	No Effect	Effects on sturgeon are expected to be similar to or less than effects on Chinook salmon, described above, and are expected to be less than significant

Key: CSC = State Species of Special Concern; FSC = Federal Species of Concern; ST = State Threatened; SE = State Endangered; T = Federal Threatened; E = Federal Endangered

Effects of reductions in flows associated with withdrawing water from the San Joaquin River were evaluated by Hanson Environmental, Inc. (2013). The evaluation used Chinook salmon as the indicator species. The two primary conclusions from this assessment are:

special concern, the Central Valley fall-run Chinook; other native species present in the area include Sacramento sucker, Sacramento pikeminnow, Sacramento splittail, tule perch, prickly sculpin, Sacramento blackfish, lamprey, and hardhead. The San Joaquin River in the Proposed Action area is Essential Fish Habitat for fall-run Chinook salmon. The winter-run (endangered) and spring-run (threatened) Chinook salmon have most likely been extirpated from the river based on the lack of recent occurrences/detections and the increase in human-induced alterations to the San Joaquin River system.

Table 3-1: Special-Status Terrestrial Species with Potential to Occur within the Action Area

Species	Status	Effects	Summary Basis for ESA determination
Conservancy fairy shrimp *(Branchinecta conservatio)*	E	No Effect	No change in land use as a result of the Proposed Action
Longhorn fairy shrimp *(Branchinecta longiantenna)*	E	No Effect	No change in land use as a result of the Proposed Action
Vernal pool fairy shrimp *(Branchinecta lynchi)*	T	No Effect	No change in land use as a result of the Proposed Action
Valley elderberry longhorn beetle *(Desmocerus californicus dimorphus)*	T	No Effect	No change in land use as a result of the Proposed Action
Vernal pool tadpole shrimp *(Lepidurus packardi)*	E	No Effect	No change in land use as a result of the Proposed Action
California tiger salamander, central population *(Ambystoma californiense)*	T, ST	No Effect	No change in land use as a result of the Proposed Action
California red-legged frog *(Rana draytonii)*	T	No Effect	No change in land use as a result of the Proposed Action
Blunt-nosed leopard lizard *(Gambelia sila)*	E, SE	No Effect	No change in land use as a result of the Proposed Action
Giant garter snake *(Thamnophis gigas)*	T, ST	No Effect	No change in land use as a result of the Proposed Action
Fresno kangaroo rat *(Dipodomys nitratoides exilis)*	E, SE	No Effect	No change in land use as a result of the Proposed Action
San Joaquin kit fox *(Vulpes macrotis mutica)*	E, ST	No Effect	No change in land use as a result of the Proposed Action

Key: CSC = State Species of Special Concern; ST = State Threatened; T = Federal Threatened; FSC = Federal Species of Concern; SE = State Endangered; E = Federal Endangered

- The reduction in San Joaquin River flow would contribute, based on the best scientific information available, to an incremental reduction in juvenile Chinook salmon survival during spring outmigration, a reduction in adult salmon escapement to the San Joaquin River tributaries, and an incremental reduction in habitat quality and availability in the lower river and estuary.
- The magnitude of predicted changes in juvenile salmon survival, adult escapement, and habitat conditions in the lower river and estuary is small (typically less than 1 percent when compared to current baseline conditions) and is well within the natural observed variation in the regression relationships used in these analyses. The magnitude of predicted changes in juvenile salmon survival and adult escapement, habitat quality in the lower San Joaquin River, and the location of the estuarine low salinity zone (X2 location) would not be detectable in field studies and is considered to be less than significant. Because Chinook salmon are among the fish species most sensitive to changes in instream flows and other associated environmental factors, the potential effects of the proposed reductions in flows associated with diversion at the PID intake would be expected to be less for other resident and migratory fish inhabiting the San Joaquin River.

b) Hanson Environmental (2013) evaluated the effect of reductions in river flows on habitat in the San Joaquin River. Reduced flows would lower river stage height (a reflection of water depth in the river) by less than ¼ to 1 inch, which would not result in a perceptible change in water level. This minor change in water level would not be expected to have adverse effects on riparian habitat, or on any other sensitive natural habitat.

c) The Project/Action requires no new construction and thus would not involve direct removal, filling or hydrological interruption of any federally protected wetlands as defined by Section 404 of the Clean Water Act.

d) As noted above, under item a), impacts on migratory fish, including salmon and steelhead, are expected to be less than significant. The magnitude of predicted changes in juvenile Chinook salmon survival and adult escapement is small and well within the natural observed variation (Hanson Environmental, Inc, 2013). The magnitude of predicted changes in juvenile salmon survival and adult escapement would not be detectable in field studies and is considered to be less than significant. Effects would be expected to be less for other migratory fish inhabiting the San Joaquin River.

e) Because the Project/Action would not require construction of new facilities there would be no need for tree removal. Because there are no effects on terrestrial biological resources, there would be no conflicts with policies protecting biological resources.

f) There are no Habitat Conservation Plans or Natural Community Conservation Plans that cover the Project/Action area in Stanislaus County.

Mitigation Measures: None required or recommended.

3.5 Cultural Resources

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

Discussion

a-d) Because there would be no construction of facilities, there would be no ground disturbance with the potential to affect archaeological, historic, or paleontological resources, or to disturb human remains.

Mitigation Measures: None required or recommended.

3.6 Geology and Soils

Would the Project:	*Potentially Significant Impact*	*Less Than Significant With Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer				

to Division of Mines and Geology Special Publication 42.	☐	☐	☐	☒
ii) Strong seismic ground shaking?	☐	☐	☐	☒
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☐	☒
iv) Landslides?	☐	☐	☐	☒
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☐	☒
c) Be located on geologic unit or soil that is unstable, or that would become unstable as a result of the Project, and potentially result in on-or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	☐	☐	☐	☒
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☐	☒
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒

Discussion

a-e) Because there would be no construction of facilities, the Project/Action would not expose people or structures to any geologic hazards, would not result in erosion, would not locate structures on unstable or expansive soils, and would not include use of septic systems.

Mitigation Measures: None required or recommended.

3.7 Greenhouse Gas Emissions

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

Discussion

a,b) Because there would be no construction of facilities, the Project/Action would not generate any construction-period emissions of greenhouse gases. Operation of the Project/Action would use existing facilities and is not expected to result in additional greenhouse gas emissions. Water would be pumped out of the river at the existing PID intake, and conveyed to the DMC through their existing system. The amount of pumping is not expected to exceed the amounts that were assumed in PID's environmental documentation for fish screen improvements at their existing intake. DPWD would remove water from the DMC using existing facilities and the amount of pumping would not increase because the new water source would replace water that is no longer available through their CVP allocation.

Mitigation Measures: None required or recommended.

3.8 Hazards and Hazardous Materials

Would the Project:	*Potentially Significant Impact*	*Less Than Significant With Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☐	☒
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☐	☒
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the Project area?	☐	☐	☐	☒

g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☒

Discussion

a-d) The Project/Action involves no new facilities and would not require use or transport of hazardous materials. There would be no hazardous emissions associated with operation, and because no new facilities would be constructed there is no potential to locate facilities within any hazardous materials sites compiled pursuant to Government Code Section 65962.5.

e,f) Operation of the Project/Action would require no new facilities and operation of existing facilities would not result in safety hazards relative to any nearby public airport operations.

g) Because there are no new facilities required for the Project/Action, and thus no construction, there is no potential for interference with an emergency response plans or evacuation plans.

h) There are no activities or new facilities that would expose people or structures to the risk of wildland fires.

Mitigation Measures: None required or recommended.

3.9 Hydrology and Water Quality

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

d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☐	☐	☐	☒
e) Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☐	☒
f) Otherwise substantially degrade water quality?	☐	☐	☒	☐
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	☒
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☒
j) Inundation of seiche, tsunami, or mudflow?	☐	☐	☐	☒

Discussion

a,f) Because the Project/Action does not require construction of any new facilities, there would be no potential for construction-period water quality impacts. The Project/Action proposes to divert water from the San Joaquin River at the existing PID intake facility, and convey that water to DPWD through the DMC. As noted in the Project Description, the Project would make use of existing approved capacity at the PID intake and would not increase diversions at the PID intake above the previously approved amount. PID is currently conveying San Joaquin River water through the DMC, and thus the proposed use of the DMC to convey river water is not expected to result in a measureable change in water quality. Key water quality parameters established by USBR for the DMC include a limit of 2 parts per billion (ppb) for selenium and a TDS limit of 1,500 milligrams/liter (mg/L) (USBR 2013). USBR has tested river water and determined that it has less than 2 ppb of selenium. The salinity gage at Patterson operated by the U.S. Geological Survey indicates that salinity in the river ranges from about 600 to 1,200 mg/L, and is typically less than 1,000 mg/L. River water is thus within the water quality standards established by Reclamation.

b) The Project/Action does not include any groundwater pumping and would not construct any new facilities. There would thus not be any increase in impervious surface, and therefore no interference with groundwater recharge. As noted above in Project Description, the original source of the recycled water discharge to the river is groundwater from a confined aquifer. If it were not intercepted, the groundwater that serves as the City's water supply would flow to the east and/or downward, and would not be expected to flow into the San Joaquin River. The

Project would thus not reduce San Joaquin River flows below the level that would have occurred without the City's present discharge of recycled water.

c,d,e) The Project/Action does not include construction of any new facilities, and thus has no potential to alter drainage patterns, increase runoff or to cause erosion or siltation. Ongoing operation of existing facilities that would be used for the Project/Action would not be changed in such a way as to increase runoff, erosion, or siltation.

The Project/Action would result in diversion of additional water at the PID intake facility; there would be an incremental reduction in flow in the San Joaquin River downstream of the PID intake. Changes in flows were evaluated in the context of the overall operations of the Central Valley Project based on the CalSimII Statewide operations model used by the Department of Water Resources and the Bureau of Reclamation to simulate the operations of the SWP and CVP systems. The analysis used CalSim II data developed as part of the Department of Water Resources 2009 Delivery Reliability Report. The analysis of effects thus takes into account the operation of the entire CVP, and incorporates other reasonably foreseeable projects that affect the system (RMC Water and Environment 2013). The results of this analysis show no measurable effect on in-stream flows in the San Joaquin River.

g-j) The Project/Action does not include housing or other new structures within flood hazard areas and does not include any new structures that would expose people to risk of flooding or inundation of seiche, tsunami or mudflow.

Mitigation Measures: None required or recommended.

3.10 Land Use and Planning

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

Discussion

a-c) The Project/Action does not include any new facilities and thus would not divide an established community and has no potential to conflict with land use plans, policies or regulations. There are no Habitat Conservation Plans or Natural Community Conservation Plans that cover the Project/Action area in Stanislaus County.

Mitigation Measures: None required or recommended.

3.11 Mineral Resources

Would the Project:	*Potentially Significant Impact*	*Less Than Significant With Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒

Discussion

a,b) Because the Project/Action includes no new facilities there would be no effect on the availability of mineral resources.

Mitigation Measures: None required or recommended.

3.12 Noise

Would the Project result in:	*Potentially Significant Impact*	*Less Than Significant With Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☐	☒
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☐	☒
c) A substantial permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project?	☐	☐	☐	☒

d) A substantial temporary or periodic increase in ambient noise levels in the Project vicinity above levels existing without the Project?	☐	☐	☐	☒
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the Project expose people residing or working in the Project area to excessive noise levels?	☐	☐	☐	☒

Discussion

a-d) There would be no construction noise because no new facilities would be constructed. Operation of the Project/Action would use existing facilities and is not expected to result in increased operational noise. Water would be pumped out of the river at the existing PID intake, and conveyed to the DMC through their existing system. DPWD would remove water from the DMC using existing facilities and the amount of pumping would not increase because the new water source would replace water that is no longer available through their CVP allocation. The Project/Action would thus not increase operational noise.

e,f) Operation of the Project/Action would require no new facilities and would not include construction of housing that would expose people to noise from airport operations.

Mitigation Measures: None required or recommended.

3.13 Population and Housing

Would the Project:	*Potentially Significant Impact*	*Less Than Significant With Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

c) Displace substantial numbers of people necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

Discussion

a) The Project/Action would provide a water supply that would augment water that currently comes from DPWD's CVP contract, which is DPWD's primary source of water. The contract allows for the delivery of up to 140,210 AF water annually. However, since the early 1990's, DPWD has experienced reductions in CVP entitlements due to drought conditions and regulatory restrictions imposed on CVP operations. In 2013, DPWD received 20 percent (approximately 28,000 AF) of its CVP contract amount. The additional 13,400 AF supplied by the Project/Action would make up only a small portion of the shortfall and would be supplied to existing agricultural users only. The Project/Action would thus not accommodate any additional growth in the Project/Action area.

b, c) Because no new facilities would be constructed, the Project/Action would not displace housing or people.

Mitigation Measures: None required or recommended.

3.14 Public Services

	Potentially Significant Impact	*Less Than Significant With Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
Would the Project:				
a) Would the Project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services:				
Fire protection?	☐	☐	☐	☒
Police protection?	☐	☐	☐	☒
Schools?	☐	☐	☐	☒
Parks?	☐	☐	☐	☒
Other public facilities?	☐	☐	☐	☒

Discussion

a) The Project/Action would not require construction of new facilities and would not allow growth that would require provision of new or physically altered public service facilities.

Mitigation Measures: None required or recommended.

3.15 Recreation

	Potentially Significant Impact	*Less Than Significant With Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
Would the Project:				
a) Would the Project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b) Does the Project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒

Discussion

a, b) The Project/Action would not allow growth that would increase use of recreation facilities and would not require expansion of facilities. The Project/Action would not affect recreational opportunities in the San Joaquin River. Flows in the river would be reduced by less than 1 percent, on average, and the maximum reduction would be less than 2.5 percent. This would not result in a perceptible change in the recreational use of the river because the reduction in river stage height would be less than 1 inch (Hanson Environmental Inc, 2013).

Mitigation Measures: None required or recommended.

3.16 Transportation/Traffic

	Potentially Significant Impact	*Less Than Significant With Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
Would the Project:				
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of a circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersection, streets, highways				

and freeways, pedestrian and bicycle paths, and mass transit?	☐	☐	☐	☒
b) Conflict with an applicable congestion management program, including, but not limited to level of services standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☐	☐	☐	☒
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☒
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
e) Result in inadequate emergency access?	☐	☐	☐	☒
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☐	☐	☒

Discussion

a-c) The Project/Action would not generate construction or operational traffic and would thus not conflict with any plan, ordinance or policy regarding effectiveness of the circulation system. Because it would not generate any traffic, the Project/Action would also not conflict with any congestion management program or violate any level of service standards. The Project/Action would not change air traffic patterns

d-f) No facilities would be constructed, so there would be no design features or uses that could result in traffic hazards, and there would be no effect on emergency access. The Project/Action would have no effect on programs regarding public transit, bicycle or pedestrian facilities.

Mitigation Measures: None required or recommended.

3.17 Utilities and Service Systems

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

Discussion

a-c) The Project/Action does not require the construction of any new water or wastewater treatment facilities. The Project/Action would be operated completely with existing facilities. The Project/Action would also not require any new storm drainage facilities.

d) As part of the Project/Action, the City of Turlock would request approval of the proposed water transfer from the State Water Resources Control Board. This environmental document evaluates the effects of that transfer.

e) The Project/Action would not result in any demand for wastewater treatment.

f,g) The Project/Action would not generate any solid waste, and would not require any disposal of solid waste.

Mitigation Measures: None required or recommended.

3.18 Mandatory Findings of Significance

	Potentially Significant Impact	*Less Than Significant With Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
a) Does the Project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☐	☒	☐
b) Does the Project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☐	☐	☒
c) Does the Project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☐	☒

Discussion

a) Because the Project/Action would be implemented entirely with existing facilities, there is no potential for impacts on terrestrial biota or cultural resources associated with construction or operation of new facilities. Minor changes in flows in the San Joaquin River would not have a significant effect on aquatic species.

b) The only physical effect of the Project/Action is a minor reduction in flows in the San Joaquin River downstream of the PID intake. Changes in flows were evaluated in the context of the overall operations of the Central Valley Project based on the CalSimII Statewide operations model used by the Department of Water Resources and the Bureau of Reclamation to simulate the operations of the SWP and CVP systems. The analysis used CalSim II data developed as part of the Department of Water Resources 2009 Delivery Reliability Report. The analysis of effects thus takes into account the operation of the entire CVP, and incorporates other reasonably foreseeable projects that affect the system (RMC Water and Environment 2013). Cumulative effects of the flow reduction would be less than significant.

c) The Project/Action would have no adverse effects on human beings, and would provide benefits to agricultural water users served by the Del Puerto Water District.

Chapter 4 Other Required Analyses

4.1 Environmental Justice

Executive Order 12898 (February 11, 1994) mandates Federal agencies to identify and address disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations. Because the Project/Action would not require construction of any new facilities there is no potential for effects on housing or employment, and the Project/Action would have no adverse human health or environmental effects. There is, therefore, no potential for disproportionate impacts on minority or low-income populations. The additional agricultural water supply for DPWD could support and maintain jobs that low-income and disadvantaged populations rely upon.

4.2 Socioeconomic Resources

The lands within the DPWD are primarily rural and in agricultural use. The proposed Project/Action would provide water supply for agriculture that would replace CVP water that is no longer available due to pumping restrictions. Lack of water supply reliability has resulted in economic hardships to growers in the DPWD. To the extent that the proposed Project/Action would restore water supplies it would allow farmland to remain in production and would thus provide a socioeconomic benefit.

4.3 Indian Trust Assets

Indian trust assets (ITAs) are legal interests in assets that are held in trust by the U.S. Government for federally recognized Indian tribes or individuals. The trust relationship usually stems from a treaty, Executive Order, or act of Congress. The Project/Action would have no physical impacts and thus has no potential to affect Indian Trust Assets.

4.4 Indian Sacred Sites

Sacred sites are defined in Executive Order 13007 (May 24, 1996) as "any specific, discrete, narrowly delineated location on Federal land that is identified by an Indian tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site." The proposed Project/Action would not be located on or impact any Federal lands and therefore would not affect any Indian sacred sites.

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Chapter 5 Consultation and Coordination

The City of Turlock, as lead agency for the Project, has worked together with all of the responsible agencies for the Project in defining the Project and developing information needed to obtain required permits. The City has been working with DPWD and PID to define the Project and reach agreements regarding project operation. The City has discussed the appropriation of San Joaquin River flows with the State Water Resources Control Board, and has submitted an application to acquire a water right.

5.1 Summary of Public Involvement

This document is a CEQA Initial Study-Negative Declaration (IS-ND). The City of Turlock will conduct public outreach during the environmental review process, as required by CEQA. Notices of Intent to Adopt a Negative Declaration (ND) will be published, and a public meeting will be held by the City of Turlock City Council to consider adoption of the IS-ND. The Initial Study (IS) will be available for review for 30 days.

5.2 IS Document Distribution

The CEQA public review period will start with publication of this document and will end after 30 days. The City of Turlock has publish notices, posted a Notice of Intent to Adopt a Negative Declaration in the office of the Stanislaus County Clerk, and submitted the IS-ND to the State Clearinghouse.

5.3 Final ND

The City of Turlock will consider adoption of the ND at a regular meeting of the City Council. Meetings occur on the second and fourth Tuesdays of the month. The date for consideration of adoption of the IS-ND has not yet been determined.

5.4 Public Meetings

As noted above, the City of Turlock will consider adoption of the IS-ND at a regular City Council meeting. The public will have the opportunity to provide comments at that meeting.

5.5 Compliance with Federal Statutes and Regulations

This section describes the status of compliance with relevant federal laws, executive orders, and policies, and the consultation that has occurred to date or will occur in the near future. Most of these regulations involve ongoing compliance, which would occur in coordination with preparation of the IS.

5.5.1 Federal Endangered Species Act (16 U.S.C. § 1531 et seq.)

Section 7 of the Federal Endangered Species Act (FESA) requires federal agencies, in consultation with the Secretary of the Interior, to ensure that their actions do not jeopardize the continued existence of endangered or threatened species, or result in the destruction or adverse modification of the critical habitat of these species. Reclamation has determined that the project would have no effect on threatened or endangered species or their designated critical habitats under the jurisdiction of U.S. Fish and Wildlife Service. Reclamation will consult with National Marine Fisheries Service (NMFS) regarding potential effects on anadromous fish species and designated critical habitats. .

5.5.2 Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. § 1801 et seq.)

The Magnuson-Stevens Conservation and Management At is the primary law governing marine fisheries management in the United States federal water. The Act was first enacted in 1976 and amended in 1996.

NMFS will be consulted for potential effect in the action area to Essential Fish Habitat (EFH) for Pacific salmon and any conservation recommendations would be adopted.

5.5.3 National Historic Preservation Act

The purpose of this act is to protect, preserve, rehabilitate, or restore significant historical, archeological, and cultural resources. Section 106 requires Federal agencies to take into account effects on historic properties. Once an undertaking has been established, the Section 106 review involves a step-by-step procedure described in detail in the implementing regulations (36 CFR Part 800). As described in Section 3.8, Cultural Resources, the Project/Action has no potential to affect historic resources because there would be no construction of additional facilities and thus no ground disturbing activities.

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Chapter 6 Report Preparation

6.1 Report Authors

This report was prepared by the City of Turlock with assistance from RMC Water and Environment (RMC). Staff that were involved include:

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RMC Water and Environment

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6.2 References

Bureau of Reclamation and California Department of Water Resources (Reclamation and DWR). 2011. Draft Program Environmental Impact Statement/Environmental Impact Report for the San Joaquin River Restoration Program. SCH#2007081125. Issued April 2011.

Hanson Environmental Inc., 2013. Assessment of Potential Effects of the Reductions in Freshwater Discharges into the San Joaquin River on Fishery Habitat and Juvenile Salmon Survival

RMC Water and Environment, 2013. Final Technical Memorandum, North Valley Regional Recycled Water Program, San Joaquin River Flow Analysis, May 31, 2013

Patterson Irrigation District, 2006, Fish Screen Project Initial Study and Negative Declaration/ Environmental Assessment and Finding of No Significant Impact, prepared for Patterson Irrigation District by ESA, November 2006

U.S. Bureau of Reclamation (USBR), 2013, 2013 Delta-Mendota Canal Groundwater Pump-in Program Water Quality Monitoring Plan

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Appendix A - San Joaquin River Flow Analysis

FINAL Technical Memorandum

RMC Water and Environment

North Valley Regional Recycled Water Program

Subject: **San Joaquin River Flow Analysis**

Prepared For: Bill Harrison, Anthea Hansen (Del Puerto Water District);
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Date: May 31, 2013

Reference: 0453-002 Task 5.1

This Technical Memorandum (TM) presents the methodology and findings of the North Valley Regional Recycled Water Program (NVRRWP) San Joaquin River Flow Analysis. The TM is organized as follows:

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1 Summary of Findings

By evaluating observed and modeled flows at two locations in the San Joaquin River, there are no significant impacts to San Joaquin River flows from removing wastewater discharges from the Cities of Modesto and Turlock. From a high-level analysis of electrical conductivity in the San Joaquin River, there is a small but positive impact on river water quality from removing wastewater discharges.

2 Introduction and Background

2.1 Introduction

The goal of this analysis was to determine if the impacts of ceasing City of Modesto and City of Turlock Wastewater Treatment Plants (WWTP) discharges to the San Joaquin River (SJR) are significant from an environmental point of view. The primary objective was to determine the impacts of flow changes. A secondary objective was to determine, if possible, the impacts to salinity in the San Joaquin River. The results of this analysis will be used as input for the aquatic species impact assessment for the San Joaquin River.

2.2 Background

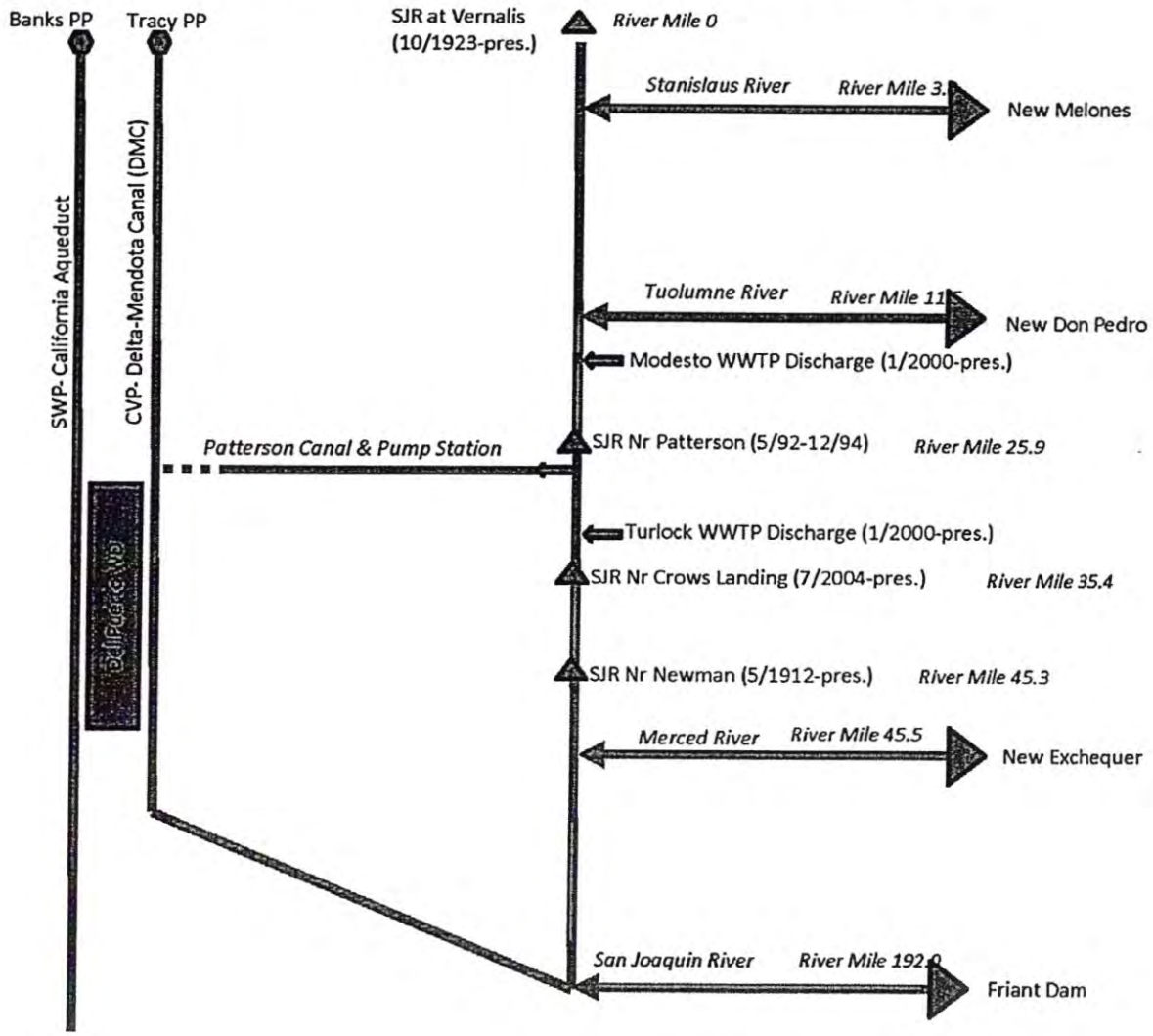
The San Joaquin River has a variety of inflows, outflows, and measuring points along its path to the California Delta. Figure 1-1 shows a schematic of the major components from Friant Dam to the Vernalis gaging station at river mile 0.

The Vernalis gaging station is an important monitoring point for the SJR. The Long-Term Central Valley Project Operational Criteria and Plan (OCAP) was developed in 2004 by the US Bureau of Reclamation (USBR) and summarized flow objectives at the Vernalis gage to both maintain minimum flows in the SJR and to maintain a specific salinity balance in the Delta. The flow objectives, shown in Table 1, include a higher and lower flow objective; the higher objective is used for more strict Delta salinity requirements.

Table 1: OCAP Requirements at Vernalis Gage

Year Type	All Years	Wet Year	Above Normal Year	Below Normal Year	Dry Year	Critical Year
Flow Standards for Feb – Apr 14 and May 16- Jun	N/A	2,130 or 3,420 cfs	2,130 or 3,420 cfs	1,420 or 2,280 cfs	1,420 or 2,280 cfs	710 or 1,140 cfs

Figure 1-1: Schematic of San Joaquin River Inflows and Monitoring Points



Note: Dates in parentheses indicate period of record for flow data at each monitoring location.

3 Methodology

The methodology was to evaluate available information from both a flow impacts and water quality perspective.

3.1 Flow Impacts Methodology

Both observed data and modeled data were evaluated to determine the impacts on flows in the San Joaquin River.

3.1.1 Observed Data Methodology

The first methodology was to analyze observed flow data records for patterns and compare to an established flow level at the Newman gage. This methodology follows the methodology used by the Patterson Irrigation District (PID) in the Initial Study/Mitigate Negative Declaration (ISMND) for the Fish Screen Project. The ISMND was completed in 2006. The ISMND included a flow analysis using Newman gage data. The methodology established a low flow month of October with an average monthly 90% exceedance flow of 160 cubic feet per second (cfs) that was deemed acceptable for use as a design flow for PID's Fish Screen Project.

3.1.2 Modeled Data Methodology

The second method was to analyze modeled flow data records and compare between modeled scenarios with and without the wastewater discharges. CalSim II is the Statewide operations model used by the Department of Water Resources and the Bureau of Reclamation to simulate the operations of the SWP and CVP systems. CalSim II data for several scenarios was developed as part of the Department of Water Resources 2009 Delivery Reliability Report[1] (DRR). The output from those modeled runs were processed to determine the modeled impacts of removing the wastewater flows from the San Joaquin River.

3.2 Water Quality Methodology

The methodology to determine the impacts on salinity in the San Joaquin River provides a high-level assessment of the impacts of removing the wastewater discharges on the salinity as measured at Vernalis. This method uses a simplified mass balance on the SJR using available flow and electrical conductivity (EC) data over the same period of record (June 2010-May 2012).

4 Assumptions

4.1 Wastewater Flows

The Cities of Modesto and Turlock provided wastewater flow discharge data from 2000 to 2012. The monthly averages of these discharges are summarized in Table 2. The analysis in this TM compares SJR flows to this historical record of wastewater discharges.

Table 2: Wastewater Discharges to the San Joaquin River (2000-2012)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Modesto	31.4	38..2	35.2	10.1	7.0	0.0	0.0	0.0	0.0	0.1	5.1	17.7
Turlock	13.1	13.2	12.9	13.0	12.7	12.9	12.9	13.4	13.3	13.8	13.3	13.4
Total	**44.6**	**51.4**	**48.2**	**23.2**	**19.8**	**12.9**	**12.9**	**13.4**	**13.3**	**13.9**	**18.5**	**31.1**

Flows are shown in cubic feet per second (cfs)

[1] Department of Water Resources (2010)

4.2 Observed Data

Both the Newman and Vernalis stream gages have long-term flow data records extending back to the early part of the 20th century. The last major operational component of the State and Federal management systems, the Lower San Joaquin River Flood Control Project, came online in 1965, resulting in a significant change in river operations pre and post-1965[2]. To represent results related to the managed SJR in this analysis, only flow records after 1965 were used.

4.3 Modeled Data

Modeled data was taken from the Department of Water Resources 2009 DRR. The DRR contained several CalSimII modeling scenarios; three of these modeling scenarios were used in this TM as summarized in Table 2. The complete original assumptions associated with the modeled data are included in Appendix A.

The Freeport Regional Water Project is a cooperative effort of the Sacramento County Water Agency and East Bay Municipal Utility District to supply surface water from the Sacramento River to customers in central Sacramento County and the East Bay area of California. The Freeport Project did not become operational until 2011 but was included in the modeled scenarios in the 2009 DRR.

The climate change scenario used by the Department of Water Resources in the DRR is described in detail in the Appendix, but generally is from MPI-ECHAM5 using the A2 emissions scenario with a 2050 level of emissions. MPI-ECHAM5 is a global climate change model that was used by United Nations (UN) Intergovernmental Panel on Climate Change (IPCC) in the Fourth Assessment Report: Climate Change 2007, which is the most current climate change report published by the UN[3].

Table 3: Modeled Scenarios Summary

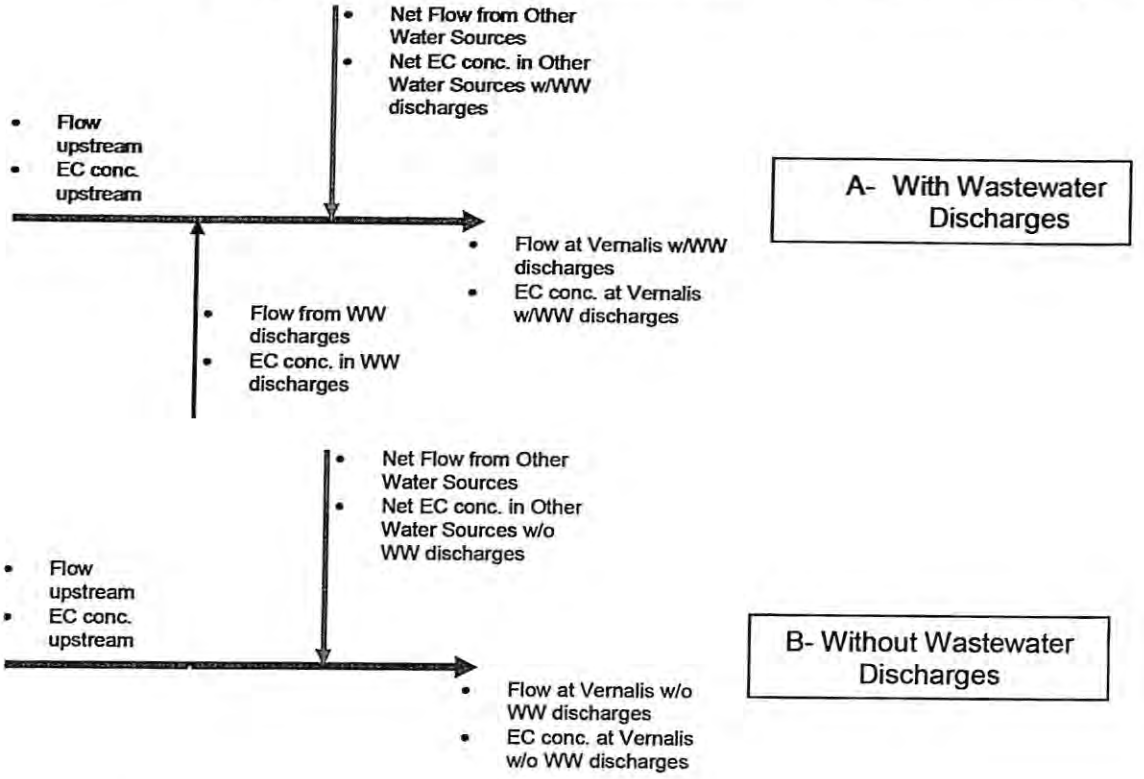
CalsimII Scenario	Description of Scenario	Level of Development Assumed	Freeport Included	Climate Change Included
1	2009 DRR Existing Conditions	2009	X	
3A	2009 DRR Future Conditions without Climate Change	2020	X	
3B	2009 DRR Future Conditions with Climate Change	2020	X	X

4.4 Water Quality Data

The simplified mass balance assumes that the net difference of inflows and outflows to the SJR (including losses due to seepage into the groundwater system) can be represented by a "net other water sources" value, which possesses two primary parameters: a combined flow amount and combined electrical conductivity value. A portion of the net other water sources comes from reservoir releases with the specific purpose of meeting flow and salinity targets at Vernalis. Net other water sources flows are modeled with an electrical conductivity value of 60 umhos/com[4]. Figure 3-1 shows schematics of the simplified salinity balances with and without wastewater discharges.

[2] Hill (Unknown)
[3] IPCC (2007)
[4] USBR (2011)

Figure 3-1: Simplified Salinity Mass Balance with and without Wastewater Discharges



5 Results

5.1 Observed Data Analysis

5.1.1 Newman Gage Data

The Newman gage is located upstream of the Cities of Modesto and Turlock's wastewater discharges. Therefore comparing the Newman gage data to the wastewater discharges is a 'worst case' condition and the flow analysis results are relatively more conservative and reasonable for this study.

On a monthly average basis over the available flow records, the wastewater discharges are small in comparison to the average monthly flows observed at the Newman gage (see Figure 4-1).

In evaluating the flow exceedance chart for the Newman gage over the period of record, the annual 90% exceedance flow is 286 cfs (see Figure 4-2). However, in assessing the flow exceedance by month, the low flow month for the period of record is September with an average monthly 90% exceedance flow of 186 cfs. This is 16 cfs higher than the low flow 90% exceedance flow identified in the Patterson Fish Screen ISMND indicating that minimum flows at Newman are being met even more frequently than at the time of preparation of the PID ISMND.

In evaluating the range of flows by month over the near-term period of record (2000-2012) at the Newman gage (see Figure 4-3), there is consistently a ten-fold difference between the lowest observed SJR flows and the wastewater discharges.

Figure 4-1: Comparison of Monthly Average Flows at Newman Gage and Wastewater Discharges

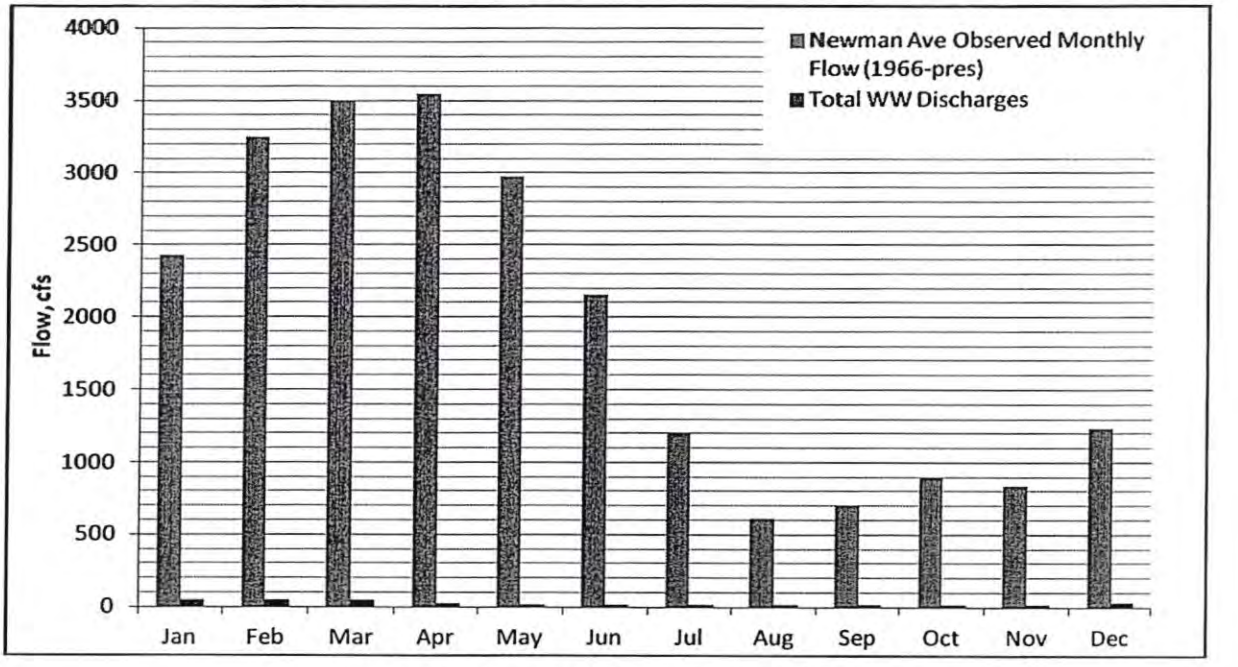


Figure 4-2: Exceedance Plot Newman Gage 1966-Present

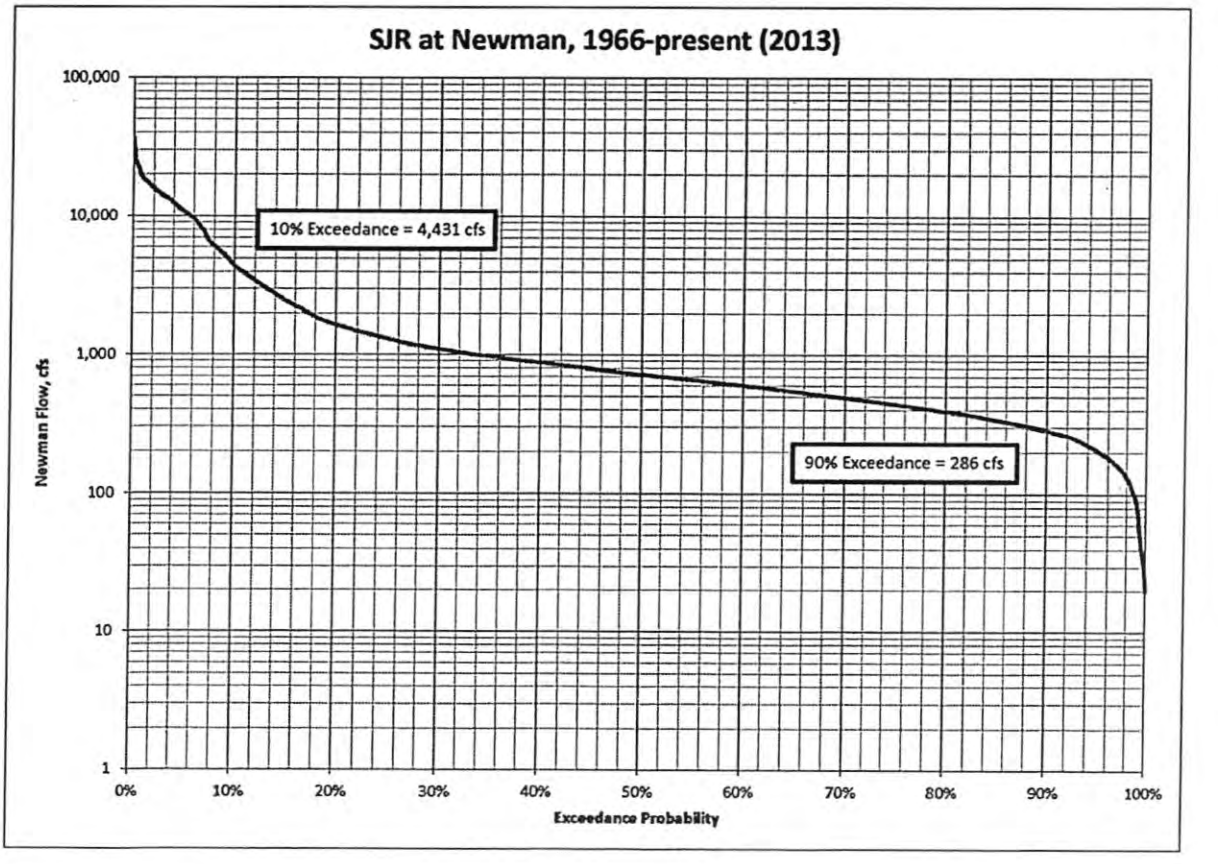
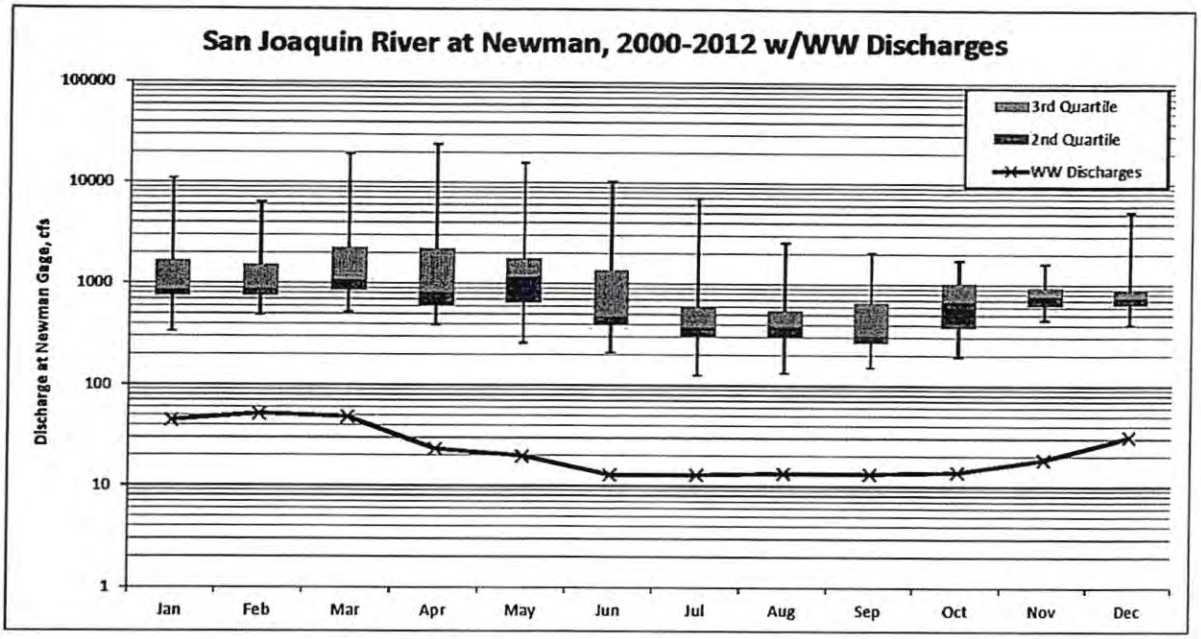


Figure 4-3: Box-Whisker Plot Newman Gage 2000-2012



5.1.2 Vernalis Gage Data

The Vernalis gage is the next available data source downstream from the Turlock and Modesto discharges, with long-term flow records. There are several inflows and outflows in the San Joaquin River between the Cities' discharges and the Vernalis gage (see Figure 1-1) but this is the only major downstream location where the impacts of removing the Turlock and Modesto discharges can be observed, which also helps evaluate the impacts as a point of inflow to the Delta.

Flows at Vernalis are higher than at Newman with the 90% exceedance flow at Vernalis equaling 932 cfs (see Figure 4-4).

In assessing the range of flows by month over the near-term period of record (2000-2012) (see Figure 4-5), there is more than a ten-fold difference between the wastewater discharges and the SJR flow at Vernalis. This difference in flow indicates that removing the wastewater discharges would have no significant impacts on the flows at Vernalis.

Figure 4-4: Exceedance Plot Vernalis Gage 1966-Present

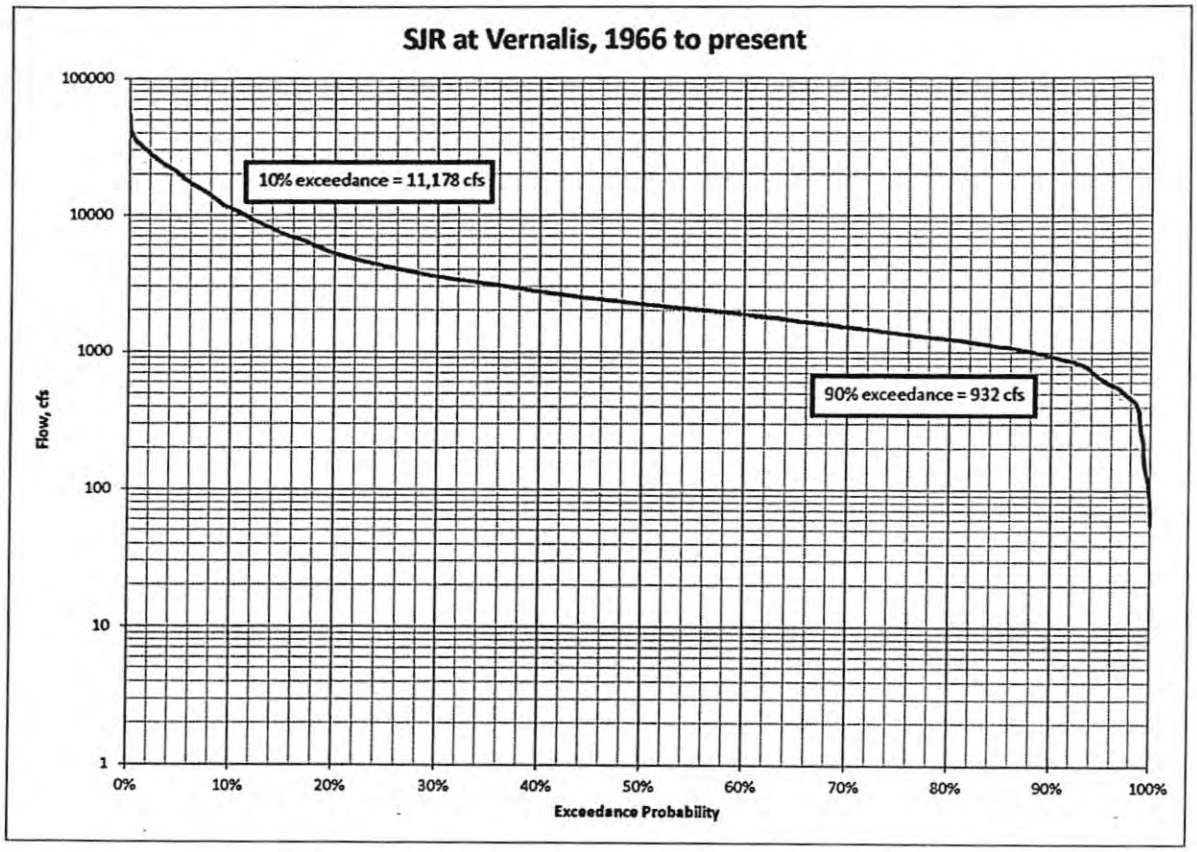
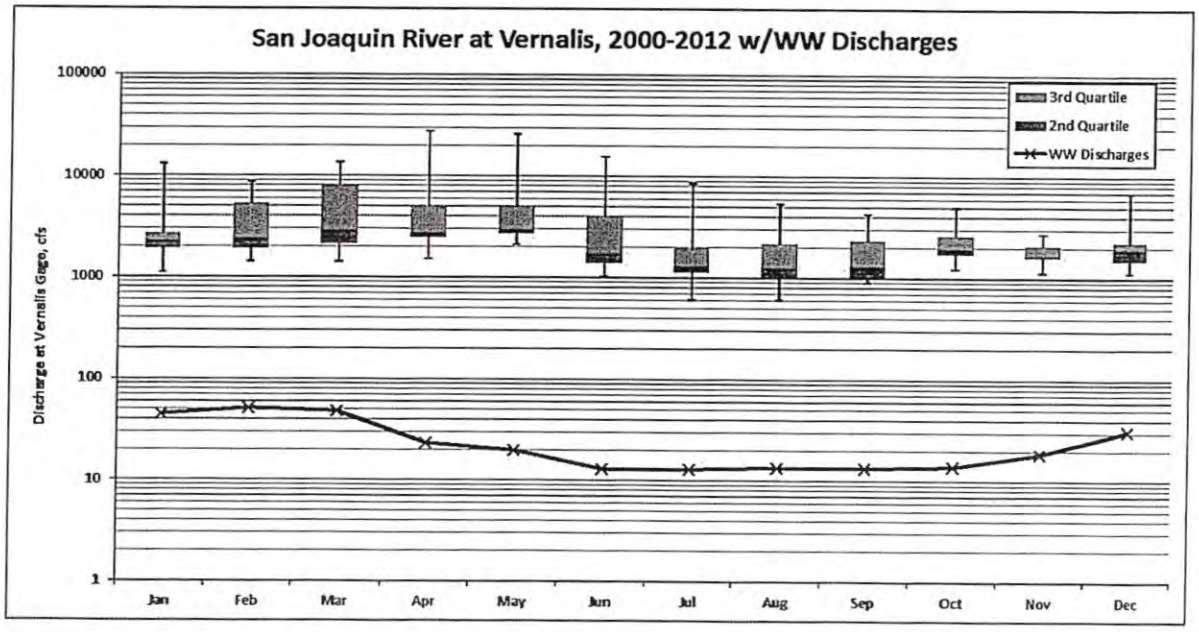


Figure 4-5: Box-Whisker Plot Vernalis 2000-2012



5.2 Modeled Data Analysis

As observed on the exceedance plots of modeled flows at Newman and Vernalis locations (see Figure 4-6 and Figure 4-7), there is little to no discernible difference within each scenario when considering with and without wastewater (WW) discharges. Changes are primarily due to assumptions in the base scenarios and not from changes due to wastewater discharges. It is important to note that the modeled data for the Newman gage includes several time periods where the flow at the Newman gage is anticipated to be zero. These years of zero flow are anticipated to occur, based on the simulated data, with or without the wastewater discharges.

The minor impact of wastewater discharge during the low flow regime can be observed in the flow exceedance charts. Table 4 and Table 5 show the difference in 90% exceedance flows for the baseline scenario and no wastewater discharge scenario at Newman and Vernalis. Note that the flow difference is consistently 13.9 cfs which is approximately 7-9% of the baseline flows at Newman and 1% of the baseline flows at Vernalis. For Newman, this range is within the margin of accuracy of the modeling results, specifically at the low flow range which the model is not calibrated for, and no significant impacts are expected. For Vernalis, 1% is within the margin of accuracy of the modeling results, and is considered to be no significant impact.

Table 4: Newman Flow Changes for the 90% Exceedance With and Without Wastewater Discharges

	With WW Discharges (Baseline) (cfs)	Without WW Discharges (cfs)	Flow Difference (cfs)	Percent Flow Difference
Scenario 1	204	190	13.9	7%
Scenario 3A	171	157	13.9	8%
Scenario 3B	148	134	13.9	9%

Table 5: Vernalis Flow Changes for the 90% Exceedance With and Without Wastewater Discharges

	With WW Discharges (Baseline) (cfs)	Without WW Discharges (cfs)	Flow Difference (cfs)	Percent Flow Difference
Scenario 1	1,413	1,400	13.9	1%
Scenario 3A	1,395	1,381	13.9	1%
Scenario 3B	1,307	1,293	13.9	1%

Figure 4-6: Exceedance Plot for Modeled Newman Location Flows

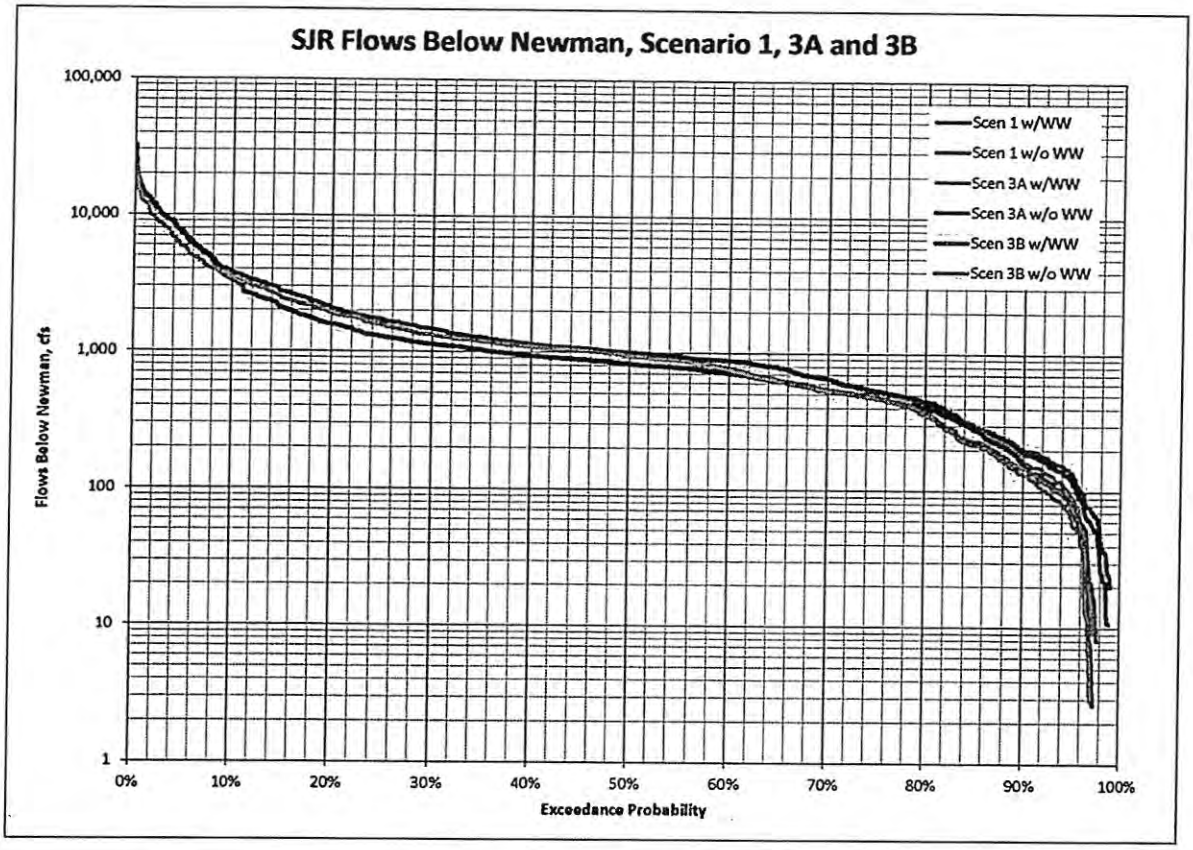
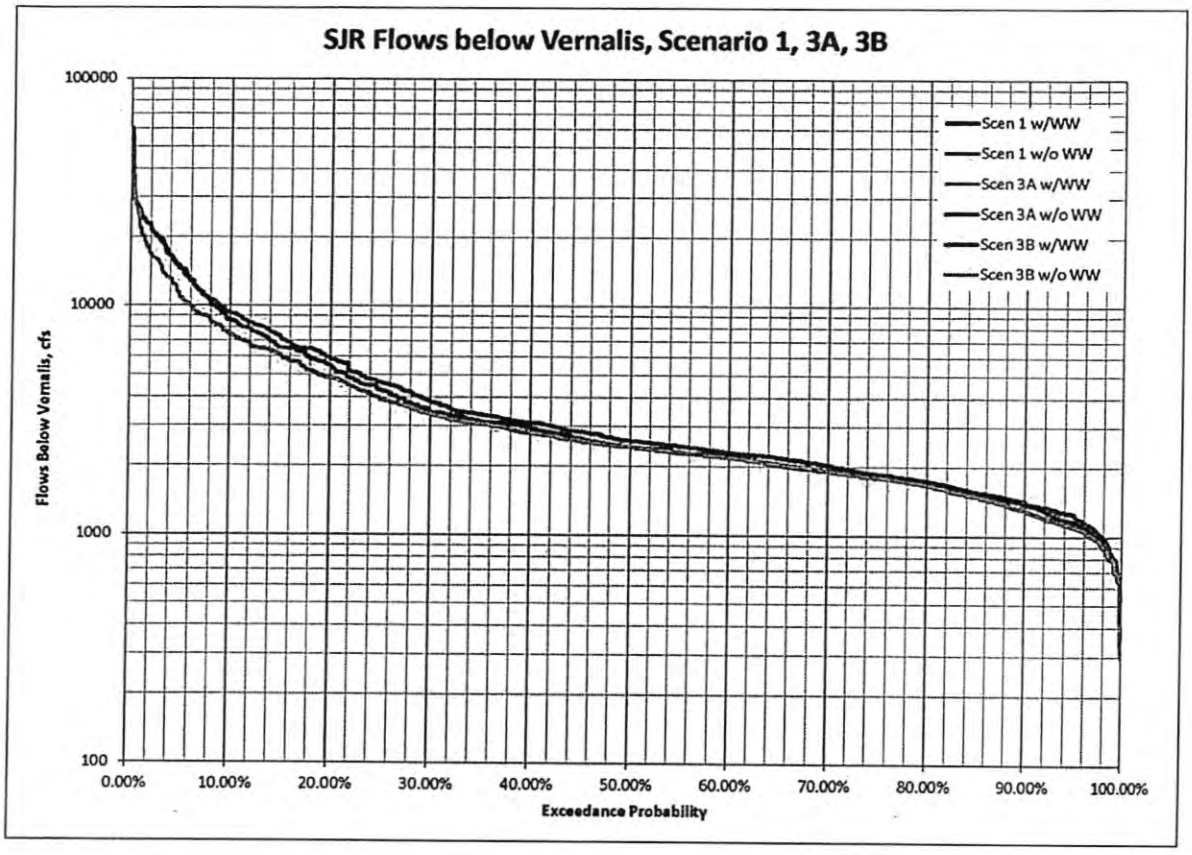


Figure 4-7: Exceedance Plot for Modeled Vernalis Location Flows



5.3 Water Quality Analysis

Using the available data for the wastewater flows, the Vernalis gage, and the SJR near Patterson, the salinity (as EC) was calculated to balance flow and then subsequently to balance salinity. The salinity difference between the with and without wastewater discharges scenarios is calculated as the change in EC of "net other water sources". In other words, to maintain the same EC levels at Vernalis as the observed record, what concentration of salinity would be needed from the net other water sources under the with and without wastewater discharges scenarios? As seen in Table 6, every month of the without wastewater discharges scenario results in a higher calculated salinity level in the net other water sources. A higher salinity level in the net other water sources infers that less dilution water would be required if the wastewater was not discharged to the SJR. Using less dilution water is a positive impact to water quality of removing the wastewater discharges from the SJR. The percentage differences shown in Table 6 are small indicating a neutral or positive impact of removing the wastewater discharges from the SJR.

Table 6: Electrical Conductivity in Net Other Water Sources With and Without Wastewater Discharges

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EC w/WW	379	306	280	79	108	149	263	343	385	247	449	493
EC w/o WW	384	314	285	82	111	152	266	347	390	251	454	499
Difference	5	7	5	3	3	2	4	4	5	5	5	5
%	1%	2%	2%	3%	3%	2%	1%	1%	1%	2%	1%	1%

All electrical conductivity (EC) values are shown in umhos/com.

6 Conclusions

1- Observed data analysis:

- The Newman Gage observed flow is upstream of the discharge points, and the flow analysis results are relatively more conservative and reasonable for this study
- The Patterson Irrigation District ISMND study found that the 90% exceedance flow (160 cfs, 32.57 ft, mean sea level stage) is an acceptable flow criterion; the updated flow records find the 90% exceedance flow is approx 180 cfs (33.19 ft, mean sea level stage); discharge flows are approximately less than 8% of the 90% flow
- Cessation of discharge flows does not have a significant impact on the SJR flows, based on the Newman and Vernalis gage records

2- Modeled data analysis:

- 90% exceedance probability simulated flow at Newman is approximately 200 cfs under existing conditions (Scenario 1) and 170 cfs under future conditions (Scenario 3A)
- Same flows at Newman with no wastewater discharge drops down by 7-8%. This is within the range of accuracy of gage and/or simulation and is not considered to be a significant impact
- The WWTP discharge flows are less than 1% of the 90% exceedance flows at Vernalis and thus not significant for any impacts

3- Water quality analysis:

- Removing wastewater flows has a positive impact on water quality in the SJR since less dilution water would be needed to meet salinity goals at the Vernalis gage.

7 Data Sources and References

Data

Newman Daily Flow Data – USGS Gage #11274000, taken from California Data Exchange Center cdec.water.ca.gov

Vernalis Daily Flow Data – USGS Gage #11303500, taken from California Data Exchange Center cdec.water.ca.gov

City of Modesto Monthly Average Wastewater Discharges to San Joaquin River, provided by City of Modesto

City of Turlock Monthly Average Wastewater Discharges to San Joaquin River, provided by City of Turlock

City of Modesto Electrical Conductivity in Wastewater Discharges, provided by City of Modesto

City of Turlock Electrical Conductivity in Wastewater Discharges, taken from City of Turlock reports to California Integrated Water Quality System Project (CIWQS) for monitoring point EFF-001 http://ciwqs.waterboards.ca.gov

San Joaquin River Monthly Flow Data, taken from City of Turlock reports to California Integrated Water Quality System Project (CIWQS) for monitoring point RSW-003 http://ciwqs.waterboards.ca.gov

San Joaquin River Electrical Conductivity, taken from City of Turlock reports to California Integrated Water Quality System Project (CIWQS) for monitoring point RSW-003 http://ciwqs.waterboards.ca.gov

Vernalis Electrical Conductivity, taken from California Data Exchange Center cdec.water.ca.gov

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Department of Water Resources (2010). The State Water Project Delivery Reliability Report 2009. Sacramento, CA.

Hill. (Unknown). Lower San Joaquin Flood Control Project. Retrieved May 28, 2013, from www.watereducation.org

IPCC (2007). Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. IPCC, Geneva, Switzerland.

US Bureau of Reclamation. (2004). Long-Term Central Valley Project Operations Criteria and Plan. Sacramento, CA.

US Bureau of Reclamation. (2011). Special Study: Evaluation of Dilution Flows to Meet Interior South Delta Water Quality Objectives. Sacramento, CA.

Appendix A – Summary of Modeling Assumptions by Scenario

CalSIM Calculated Flows		
No.	CalSIM parameters	Description
1	C18F	Millerton Releases
2	D18A_16B	Millerton Diversions - FK Canal
3	D18A_215	Millerton Diversions - FK Canal
4	D18B_16B	Millerton Diversions - Madera Canal
5	D18B_215	Millerton Diversions - Madera Canal
6	D18F	Millerton Diversions
7	C620	SJR flows below Newman
8	C630	SJR flows below Tuolumne
9	C636	SJR flows below Maze
10	C639	SJR flows below Vernalis

CalSIM Scenarios				Assumptions							
No.	CalSIM Scenarios/Studies	Description	Level of Develop-ment	SJRR Flow-Interim- WY 2010	SJRR Flow-Full	NMFS BO (Articles III.1.2 & III.1.3)	Vernalis Min Flow	Goodwin Dam	Freeport	Fremont and Sacramento Weir	Climate Change
1	Scen 1	2009 DRR Existing Conditions	2009				60-Day min flow btwn Apr-May for BO Art IV.2.1 & New Melones Stg is obligated as a supply source	Flows bl Goodwin Dam is simulated to meet min flow per BO Article III.1.2 and III.1.3	X	Spills calculated on monthly Basis	
2	Scen 2	2011 DRR Existing Conditions	2011	X		X+ Revised Ops Plan	New Melones is obligated to commit a volume per Plan of Operations.	Goodwin Dam is simulated to meet Rev Ops Plan in addition to the BO		Spills calculated on daily Basis	
3	Scen 3A	2009 DRR Future Conditions w/o CC	2020		X	X	New Melones is obligated to commit a volume per Plan of Operations.	Goodwin Dam is simulated to meet Rev Ops Plan in addition to the BO	X	Spills calculated on monthly Basis	
4	Scen 3B	2009 DRR Future Conditions w CC	2020		X	X	New Melones is obligated to commit a volume per Plan of Operations.	Goodwin Dam is simulated to meet Rev Ops Plan in addition to the BO	X	Spills calculated on monthly Basis	X
5	Scen 4A	2011 DRR Future Conditions w/o CC	2020	X		X+ Revised Ops Plan	New Melones is obligated to commit a volume per Plan of Operations.	Goodwin Dam is simulated to meet Rev Ops Plan in addition to the BO		Spills calculated on daily Basis	
6	Scen 4B	2011 DRR Future Conditions w CC	2020	X		X+ Revised Ops Plan	New Melones is obligated to commit a volume per Plan of Operations.	Goodwin Dam is simulated to meet Rev Ops Plan in addition to the BO		Spills calculated on daily Basis	X

Notes:
DRR: Delivery Reliability Report
CC: Climate Change

Appendix B - Fishery Habitat Assessment

Assessment of Potential Effects of Reductions in Freshwater Discharges from the Turlock Wastewater Treatment Plant into the San Joaquin River on Fishery Habitat and Juvenile Salmon Survival

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446 GREEN VIEW COURT
WALNUT CREEK, CA

SEPTEMBER 2013

1. INTRODUCTION

The San Joaquin River provides habitat for a diverse assemblage of fish and aquatic macroinvertebrates. The river also serves as a migration corridor and juvenile rearing habitat for Chinook salmon. Results of previous studies have shown positive relationships between the flow in the San Joaquin River during the spring (e.g., March-May) and the survival of juvenile salmon as well as adult salmon escapement 2.5 years later. Currently the Turlock waste water treatment plant (WWTP) discharges treated waste water into the San Joaquin River where it augments existing flows and therefore provides potential biological benefits to improved habitat conditions for salmon and other fishery resources. As shown in Table 1, the Turlock WWTP releases an average of 13.2 cfs into the San Joaquin River with a range of average monthly flows of 12.7– 13.8 cfs. The City of Turlock is proposing that rather than discharging the treated and processed waste water into the San Joaquin River as is currently being done, the Turlock treatment plant would recycle the waste water for other inland uses such as irrigation of farmland. The curtailment in WWTP discharges from this plant into the river would result in an incremental reduction in river flows as shown in Table 1. For comparison, the average flow in the San Joaquin River during the spring months (March –May) of dry water years typically ranges from approximately 1,500 to 2,000 cfs while average flows in a normal water year typically range from approximately 3,000 to 4,000 cfs. Spring flows in a wet year

typically range from approximately 8,000 to 14,000 cfs. The actual flow in the San Joaquin River varies substantially within and among years.

Table 1. Average monthly Turlock WWTP discharges to San Joaquin River in cfs from 2000-2012.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Turlock	13.1	13.2	12.9	13.0	12.7	12.9	12.9	13.4	13.3	13.8	13.3	13.4

Although the amount of spring discharges is relatively small compared to total river flows (e.g., for example the April average discharge from the Turlock WWTP is 13.0 cfs and the San Joaquin River mean April flow at Vernalis is 3,095 cfs), the removal of these discharges into the San Joaquin River would contribute to an incremental reduction in the water levels and flows in the river downstream of the discharge location. This reduction in river flow could potentially adversely affect habitat conditions in the river for fish and the survival of juvenile salmon during their spring migration from the river to coastal marine waters. The objective of this analysis is to evaluate the potential for adverse effects of a reduction in freshwater discharges from the Turlock WWTP to the San Joaquin River as a result of the proposed City of Turlock water recycling project on instream flows, fishery habitat and juvenile Chinook salmon survival and abundance.

2. APPROACH/METHODS

To assess the potential effects of reducing San Joaquin River flows as a result of implementing the Turlock WWTP water recycle program and curtailing the discharge of treated waste water to the river, Chinook salmon were selected as the indicator species for use in these analyses. Quantitative data on the relationships between San Joaquin River flows and habitat quality and availability, survival, and abundance are not available for other fish species inhabiting the river and therefore the potential effects of the proposed Turlock WWTP recycle project could not be quantified for these other fish species. Fall-run Chinook salmon are a species sensitive to changes in instream flows and other environmental factors such as exposure to seasonally

elevated water temperature when compared to the greater tolerance of many of the resident and other migratory fish and therefore are considered to be a good indicator species for use in this assessment.

Fall-run Chinook salmon use the San Joaquin River tributaries for spawning and juvenile rearing. The juvenile salmon then migrate downstream through the lower river during the late winter and spring months. The greatest migration by juvenile salmon smolts occurs during March-May. The survival of juvenile salmon has also been shown to vary in response to changes in river flow during the spring migration period (SJRGA 2007). To assess the potential effects of changes in river flow four independent analyses were considered including (1) the predicted change in juvenile salmon survival as a function of river flow, (2) the predicted change in adult salmon escapement as a function of river flow during the spring outmigration period 2.5 years earlier, (3) changes in river habitat based on stage-discharge relationships developed for the river by the U.S. Geological Survey (USGS) and the location of the estuarine low salinity zone during biologically sensitive spring months, and (4) predicted changes in salmon abundance based on use of the California Department of Fish and Wildlife (CDFW) San Joaquin River fall-run salmon lifecycle simulation model (SalSim). By comparing historic flows to those flows without the addition of the Turlock WWTP discharge we are able to simulate the potential effect that the removal of the Turlock WWTP discharge will have on salmon from a variety of metrics.

2.1 Base *Vs* Adjusted Flow Conditions

To simulate the potential effects that the removal of the Turlock WWTP discharge from the San Joaquin river system would have on potential salmon survival and abundance, it was first necessary to establish baseflow conditions in the river with the existing Turlock discharge and simulated river flow conditions without the contribution of that discharge. For purposes of these biological analyses, river flow at the USGS Vernalis gage was selected to represent baseflow conditions. Although the discharge from Turlock WWTP occurs further upstream on the San Joaquin River, the flows at Vernalis were selected since the existing biological

relationships between river flow and juvenile salmon survival, river flow and subsequent adult escapement, and Vernalis flows are a key driver in the SalSim lifecycle model. Average daily flows were compiled for the Vernalis gage from the USGS website for March, April and May, 1923-2012. In order to account for yearly variation, 5, 25, 50(mean) and 75 percentile flow data was used to represent "critical", "dry", "normal" and "wet" flow conditions. The daily average flow was used to create a monthly average. These average months are used to represent the "base" flow conditions in the lower San Joaquin River under existing conditions with the Turlock WWTP discharge in operation.

Turlock WWTP discharge levels were calculated using the average monthly discharge from the Turlock plant for March, April and May for 2000-2012 (Table 1). These average monthly discharge rates were then subtracted from the corresponding average monthly river flow at the Vernalis gage to create the "adjusted" flow. The values for the base and adjusted flows were then entered into various survival models described below in order to predict how these changes in flow conditions may effect salmon survival and abundance.

Percent differences were calculated as:

$$\% = (1 - (\text{Adjusted flow}/\text{Base flow}))*100$$

2.2 Juvenile Salmon Survival-Flow Relationships

The San Joaquin River Agreement (SJRA) and Vernalis Adaptive Management Plan (VAMP) conducted a long-term scientific experiment to determine how juvenile salmon survival rates change in response to alterations in San Joaquin River flows and State Water Project (SWP)/Central Valley Project (CVP) exports with the installation of the Head of Old River Barrier (HORB). The survival studies were based on a mark-recapture experimental design in which juvenile fall-run Chinook salmon produced in the Merced River fish hatchery were coded wire tagged (CWT) and released into the San Joaquin River at Mossdale and Durham Ferry and subsequently recaptured downstream at Antioch and Chipps Island (SJRGA 2007). Additional

CWT salmon were released at Jersey Point to act as a control. The ratio of CWT salmon recaptured from the upstream and downstream release sites was then used to calculate an estimate of juvenile salmon survival. The resulting survival estimates were then correlated with river flows measured at the Vernalis gage during the period of juvenile migration when the HORB was installed and when it was not installed. The relationship between survival estimates for juvenile salmon based on recaptures at Antioch and Chipps Island were significantly related to corresponding estimates of survival based on adult salmon from the ocean fishery (SJRGA 2007), which improves the confidence in the use of the juvenile survival-flow relationship as the basis for this analysis. Regression analysis from these data was used as a predictive model to assess the potential change in juvenile salmon survival as a function of reducing river flow in response to the curtailment of the Turlock WWTP discharge. The flow-survival relationships with and without the HORB are shown in Figure 1. The regression equations used to predict the change in juvenile survival as a function of river flow during the spring migration period are:

With HORB

$$\text{Survival estimate} = 0.0001(\text{cfs})-0.2851$$

$$R^2 = 0.73$$

Without HORB

$$\text{Survival estimate} = 5e\text{-}6(\text{cfs}) + 0.1403$$

$$R^2 = 0.04$$

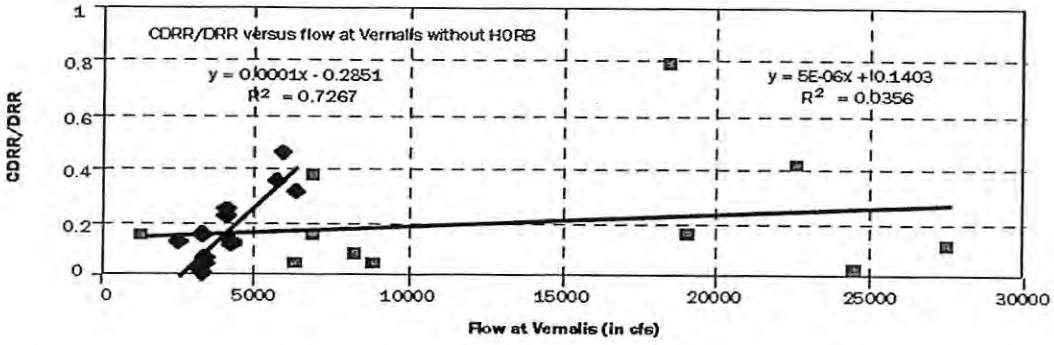

Figure 1. **Relationships between juvenile salmon survival and flow in the San Joaquin River at Vernalis with and without the Head of Old River Barrier (HORB). The blue dots reflect flow-survival estimates when the HORB was installed and the red dots reflect flow-survival estimates when the HORB was not installed based on juvenile fall-run Chinook salmon mark-recapture experiments with tagged salmon released at Mossdale and Durham Ferry and recaptured at Chipps Island. Source: SJRGA 2007.**

2.2.2 Escapement

Adult fall-run Chinook salmon return (escape) from the ocean and migrate through the San Joaquin River to spawn in upstream tributaries. Surveys have routinely been conducted by CDFW within the tributaries during the fall spawning period to quantify the number of spawning adults each year. Salmon escapement estimates are available for the period from 1952 through 2010 from the CDFW GranTab Chinook salmon escapement summaries. For these analyses, annual adult escapement to the Stanislaus, Tuolumne, and Merced rivers were combined to generate an annual estimate of fall-run Chinook salmon escapement to the San Joaquin River basin. No salmon currently spawn in the San Joaquin River between the confluence with the Merced River and Friant Dam, although restoration of salmon populations in this reach of the river is underway. Although there are many factors effecting adult escapement and survival rates, studies have correlated San Joaquin River flows when juvenile salmon are migrating downstream in the spring with subsequent adult escapement in the fall 2.5 years later. For the analysis of changes in river flow presented in this assessment the average March-May flow in the San Joaquin River at the Vernalis gage from the USGS and DWR

DAYFLOW data summaries were compiled each year. Regression analyses were used to establish a relationship between average spring river flow and subsequent adult salmon escapement 2.5 years later.

Regression analysis was used to predict escapement under the baseflow and adjusted flow conditions based on the following equation:

$$\text{Escapement} = 1.5879\ (\text{cfs}) + 11{,}458$$
$$R^2 = 0.32$$

2.2.3 River and Delta Habitat

As flow through a channel increases the channel depth and/or wetted width increases, which may affect the area of usable habitat for juvenile salmon and other migrant and resident fish. As part of maintaining streamflow gages USGS periodically measures the stage-discharge relationship for each monitoring location. The shape of the stage-discharge curve is determined by the shape of the channel at the gage location. As the geomorphology of riverbeds change over time, regular stage-discharge surveys are necessary to insure accurate flow measurements at each gage. The most current stage-discharge relationship from the USGS gage at Vernalis (Figure 2) was used to simulate channel depths as an indicator of habitat conditions within the river with and without the Turlock WWTP discharge. Percent changes in the base versus adjusted flow conditions indicate predicted percent changes in salmon habitat with the removal of the Turlock WWTP discharge.

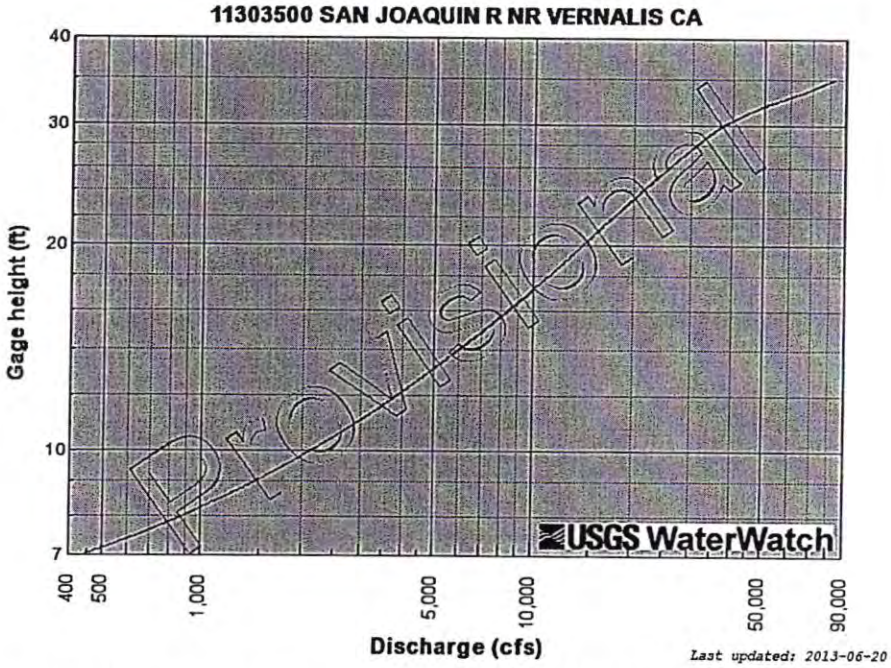

Figure 2. **USGS stage-discharge relationship for the San Joaquin gage at Vernalis.**

Habitat conditions for fish and other aquatic resources inhabiting the Delta and estuarine regions of the system have frequently been linked to the location of the low salinity zone. One indicator of the low salinity zone is the location, in kilometers upstream from the Golden Gate Bridge, where bottom salinity is 2 psu (referred to as X2 location). The location of the low salinity zone in the estuary is a function of the tides moving saltwater upstream from the ocean and bays and the magnitude of freshwater moving downstream from the Sacramento, San Joaquin, and other Central Valley rivers (referred to as Delta outflow). The relationship between Delta outflow and X2 location was used to assess the potential magnitude in changes of X2 location with and without the Turlock WWTP discharge. The analysis focused on X2 location during the biologically sensitive spring months of March-May. The change in X2 location was based on the following equation:

$$X2(t) = 10.16+0.945*X2(t-1)-1.487 \log(Qout)(t)$$

where t = current day Delta outflow and t-1 is the X2 location on the previous day.

The analysis was run over Delta outflows ranging from approximately 3,500 to 23,000 cfs and assuming the total monthly Turlock WWTP discharge rate during March-May shown in Table 1.

2.2.4 SalSim

The CDFW has developed a lifecycle simulation model for fall-run Chinook salmon produced in San Joaquin River tributaries. The SalSim model (http://www.salsim.com/) is based on a series of relationships between river flows, reservoir storage, water temperature, and a combination of other factors affecting survival and abundance in the upstream tributaries, within the lower San Joaquin River and Delta, and within the ocean. The SalSim model uses a variety of historic hydrological and biological data to simulate hypothetical flow conditions and the response of the Chinook salmon population. Although SalSim was not designed to be used as a "forecast model", altering the historic flows by known amounts generates alternative scenarios in which "what if" models can be used to simulate alternative salmon production through changes in historic water operations.

For this study, we simulated eight different flow conditions: critical, dry, normal and wet hydrologic conditions assuming baseline flows and adjusted flows at Vernalis without the Turlock WWTP discharge. The baseline conditions were generated by running the simulation without any changes to the flow conditions. The Turlock WWTP discharge reduction scenario (Adjusted) was simulated in the SalSim model by reflecting the percent change in river flow based on the Turlock WWTP discharge rates presented in Table 1. Because the simulation was run year round, rather than just during the spring, the WWTP discharge reduction was calculated monthly for an entire year. Total monthly discharge (Table 1) was subtracted from the monthly river flow at the USGS Vernalis gage under "Critical" (5 percentile), "Dry" (25 percentile), "Normal" (50 percentile or mean) and "Wet" (75 percentile) hydrologic conditions in the model. From these values, a percent change from the baseline flow was calculated.

SalSim was then used to simulate the changes in hydrologic conditions that would occur in the river with and without the Turlock WWTP discharge. SalSim produces a number of salmon population metrics for use in the analysis including ocean escapement, total spawners for all tributary spawning destinations, total spawning and egg production within the tributaries, total egg mortality, total juvenile salmon mortality and an estimate of the total number of juvenile salmon produced in the San Joaquin River tributaries entering the ocean assuming river flows with and without the Turlock WWTP discharge. The potential effect of changes in river flow on fall-run Chinook salmon population dynamics was assessed based on consideration of both the change in the abundance of various lifestages as well as the percentage change to account for variation in salmon abundance among years.

Results of the SalSim modeling produced a number of biological metrics for various lifestages of fall-run Chinook salmon under the baseline and proposed project hydrologic conditions. The model, however, does not allow changes to be made to instream flows in the San Joaquin River, but rather only allows flow changes in the model to occur in the upstream tributaries. By reducing flow in one of the tributaries to try to simulate the predicted flow reduction associated with the proposed Turlock WWTP project the model also changed upstream reservoir storage and associated seasonal water temperature conditions within the tributary that also affected the survival estimates for Chinook salmon (e.g., incubating eggs and juvenile rearing) within the tributary. Under these simulated conditions, results of the model became unstable and in some cases inconsistent with the general population dynamics of fall-run Chinook salmon. The initial results of the simulation model comparisons were not realistic or reliable. To help try to resolve these initial simulation model inconsistencies we met with Dale Stanton, an engineer with CDFW who is actively involved in development and evaluation of the SalSim model, to discuss how the model could be configured to simulate changes in San Joaquin River flows associated with the proposed Turlock WWTP project, while not altering upstream reservoir operations and other aspects of the model. Mr. Stanton reported that the SalSim model was not developed to address changes in San Joaquin River flows such as those that would occur under the proposed project operations, and therefore, the model could not be used to reliably predict changes in San Joaquin River fall-run Chinook salmon abundance or

population dynamics as an assessment tool for the proposed project evaluation. Based on these initial model results and consultation with CDFW the SalSim model was not subsequently used in these analyses.

3. RESULTS

3.1 Flow Differences With and Without Turlock WWTP Discharge

Predicted changes to San Joaquin River flow when the Turlock WWTP discharge is removed (Adjusted flow) is less than 1% (ranges from 0.10 – 0.81%) of the total San Joaquin River flow (base flow) between March and May. Throughout the spring juvenile salmon migration season, the rate of the Turlock WWTP discharge is reduced from an average 12.9 cfs in March to an average 12.7 cfs in May (Table 1). Dry, normal and wet years, as modeled by analyzing the 25th, 50th (mean) and 75th flow percentages from the Vernalis gage, showed that in dry and normal years, the net flow did not widely vary. Wet years, however show a steep increase in river flow during the March-May period. As a result, the net change in river flow at Vernalis is reduced in proportion to the change in baseflows within the river (Table 2). Results of these flow analyses were used in the comparative assessment of predicted changes to salmon survival and abundance with and without the WWTP discharge.

Table 2. **Spring flow rates (cfs) for dry, normal and wet years, the average WWTP discharge rate (cfs) for their associated months and the percentage difference with and without the WWTP discharge.**

	March			April			May		
	25th %	Mean	75th %	25th %	Mean	75th %	25th %	Mean	75th %
Base Flow (cfs)	1,957.10	3,481.29	9,178.06	1,600.00	3,095.33	10,392.00	1,739.03	3,469.68	12,125.81
WWTP Discharge	12.90	12.90	12.90	13.00	13.00	13.00	12.70	12.70	12.70
Adjusted Flow (cfs)	1,944.20	3,468.39	9,165.16	1,587.00	3,082.33	10,379.00	1,726.33	3,456.98	12,113.11
% Change	**0.66%**	**0.37%**	**0.14%**	**0.81%**	**0.42%**	**0.13%**	**0.73%**	**0.37%**	**0.10%**

3.2 Juvenile Chinook Salmon Survival

Previous studies of juvenile salmon survival in the San Joaquin River clearly show that the presence of the HORB, used to keep juvenile salmon from migrating into Old River, greatly increases the likelihood of survival (Figure 1). As expected based on the regressions shown in Figure 1, the survival of juvenile salmon was extremely sensitive to increasing or decreasing river flows when the HORB was installed and survival rates were not sensitive to river flow when the HORB was not installed. When the base and adjusted flow conditions were compared using the juvenile salmon survival-flow regression models (Figure 1), the decrease in predicted survival with and without the Turlock WWTP discharge ranged from 0.000 to 0.001 for conditions with the HORB in place and were all 0.000 without the HORB (Table 3). Although changes in survival between the baseflow and adjusted flow conditions can be calculated using the regression models, the magnitude of these differences is so small that it could not be measured in field studies. The model predicts a moderately strong correlation between increased flow and increased survival ($R^2 = 0.73$) when the HORB is in place. Although there is still a positive relationship between survival and flow for conditions without the HORB, the statistical correlation is weak ($R^2 = 0.04$) and not statistically significant. The relatively high variability in the relationship between salmon survival and river flow, especially when the HORB is not installed, suggests that the predicted small change in survival shown in Table 3 is well within the observed variability in survival rates and would not be detectable in the river.

Table 3. **Estimated change in juvenile Chinook salmon survival as a function of San Joaquin River flow with and without the Head of River Barrier (HORB).**

	March			April			May		
	25th %	Mean	75th %	25th %	Mean	75th %	25th %	Mean	75th %
With HORB									
Baseflow Survival	0.000	0.063	0.633	0.000	0.024	0.754	0.000	0.062	0.927
Adjusted Flow Survival	0.000	0.062	0.631	0.000	0.023	0.753	0.000	0.061	0.926
Net Change	0.000	0.001	0.001	0.000	0.001	0.001	0.000	0.001	0.001
Without HORB									
Baseflow Survival	0.150	0.158	0.186	0.148	0.156	0.192	0.149	0.158	0.201
Adjusted flow Survival	0.150	0.158	0.186	0.148	0.156	0.192	0.149	0.158	0.201
Net Change	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

3.3 Adult Chinook Salmon Escapement

The correlation between the springtime flow measured at the USGS Vernalis gage and returning adult Chinook escapement 2.5 years later show a positive trend and predict that a reduction in river flow will contribute to a reduction in the number of adult salmon returning into the San Joaquin River tributaries to spawn. The predicted change in adult salmon escapement, as calculated by the regression for river flow conditions during the March-May juvenile outmigration period, was a reduction in average escapement of 0.41% assuming the Turlock WWTP discharge to the river is no longer occurring (Table 4). The regression model predicts a reduction in salmon returns of 20, 21 and 20 individuals for March, April and May respectively, assuming no WWTP discharge. The total predicted reduction in escapement from a reduction in river flow over the March-May juvenile migration period is 61 fish out of predicted escapement estimates ranging from approximately 14,000 to 31,000 adults (substantially less than 1%). The actual adult salmon escapement to the San Joaquin River basin varies substantially among years. The high variation in the escapement-flow relationship ($R^2 = 0.32$) suggests that the

predicted small change in escapement is well within the observed variability in the relationship and would not be detectable in the river.

Table 4. Predicted change in adult salmon escapement with and without the Turlock WWTP discharge.

	March			April			May		
	25th %	Mean	75th %	25th %	Mean	75th %	25th %	Mean	75th %
Base Flow Escapement	14,566	16,986	26,032	13,999	16,373	27,959	14,219	16,968	30,713
Adjusted Escapement	14,545	16,965	26,011	13,978	16,352	27,939	14,199	16,947	30,692
Difference	20	20	20	21	21	21	20	20	20
% Change	**0.14%**	**0.12%**	**0.08%**	**0.15%**	**0.13%**	**0.07%**	**0.14%**	**0.12%**	**0.07%**

3.4 Habitat in the River and Delta

Changes in water depth as a function of river flow were used as an indicator of potential changes in habitat conditions and availability for juvenile salmon and other resident and migratory fish species. As flow increased through the San Joaquin River the stage height, and associated useable habitat, increased as well. The ranges of changes in stage height for base and adjusted flow remained fairly consistent for each seasonal condition. The reduction in river stage height (a reflection of water depth in the river) associated with curtailment of the Turlock WWTP discharge was estimated to range from 0.00 to 0.08 feet (Table 5). Differences between base and adjusted flow river stages varied consistently by less than 0.46% with an average reduction of 0.17% (Table 5) which is consistent with results of previous analyses. Much of the San Joaquin River channel has been incised or contained by levees. Under these conditions the predicted change in river stage would not be expected to result in biologically meaningful reductions in the quantity or quality (e.g., wetted channel width) of habitat for fish within the river.

Table 5. Changes in stage height (feet) as a function of river flow.

	March			April			May		
	25th %	Mean	75th %	25th %	Mean	75th %	25th %	Mean	75th %
Base Gage Height (ft)	9.75	11.60	16.56	9.23	11.17	17.44	9.44	11.59	18.59
Adjusted Gage Height (ft)	9.73	11.59	16.56	9.21	11.16	17.36	9.41	11.58	18.58
Change in stage (ft)	0.02	0.01	0.00	0.02	0.01	0.08	0.03	0.01	0.01
% Change	**0.21%**	**0.09%**	**0.00%**	**0.22%**	**0.09%**	**0.46%**	**0.32%**	**0.09%**	**0.05%**

The predicted change in X2 location, a reflection of the low salinity zone habitat for estuarine fish and other organisms, moved upstream on average 0.02 km in March-May. The magnitude of these changes would not be detectable in the field given the natural variation in X2 location based on variation in tidal conditions. In other environmental analyses an upstream movement of X2 location by less than 0.25 km (and in some cases less than 0.5 km) has been found to be less than significant. The magnitude of upstream movement of X2 in this assessment is expected to have no effect on habitat quality or availability in the estuarine low salinity zone or on the aquatic species that inhabit the low salinity zone.

4. SUMMARY AND CONCLUSIONS

The two primary conclusions from this assessment are:

- Curtailment of treated waste water discharges from the Turlock WWTP into the San Joaquin River will result in an incremental reduction in river flow from the point of the existing discharge downstream. The reduction in San Joaquin River flow would contribute, based on the best scientific information available, to an incremental reduction in juvenile Chinook salmon survival during spring outmigration, a reduction in adult salmon escapement to the San Joaquin River tributaries, and an incremental reduction in habitat quality and availability in the lower river and estuary.

- **The magnitude of predicted changes in juvenile salmon survival, adult escapement, and habitat conditions in the lower river and estuary was small (consistently less than 1% when compared to current baseline conditions) and is well within the natural observed variation in the regression relationships used in these analyses. The magnitude of predicted changes in juvenile salmon survival and adult escapement, habitat quality and availability in the lower San Joaquin River, and the location of the estuarine low salinity zone (X2 location) would not be detectable in field studies and is considered to be less than significant.**

Based on results of this study, curtailment of the discharge of treated waste water from the Turlock WWTP into the San Joaquin River would not be expected to result in a measureable effect on the population dynamics of Chinook salmon. Since Chinook salmon are among the most sensitive fish species to changes in instream flows and other associated environmental factors (e.g., exposure to seasonally elevated water temperatures) the potential effects of the proposed curtailment of Turlock WWTP discharge to the river would be expected to be less for other resident and migratory fish inhabiting the San Joaquin River.

LITERATURE CITED

San Joaquin River Group Authority (SJRGA) 2007. San Joaquin River Agreement 2006 annual technical report. Prepared by San Joaquin River Group Authority. Prepared for State Water Resources Control Board. January 2007.