



San Joaquin River Restoration Program

Water Management Goal
Recirculation, Recapture of Restoration Flows
And
Mitigation of Water Supply Reductions

Potential Programs & Projects

Background

On September 13, 2006, the Parties to Natural Resources Defense Council, et al., v. Rodgers, et al., No. CIV-S-88-1658-LKK/GGH executed a Stipulation of Settlement that resolved 18 years of litigation regarding releases of water from Friant Dam on the San Joaquin River for the purpose of restoring the River below the Dam and a salmon fishery therein. The Settlement calls for enactment of Federal legislation to authorize the Department of Interior to undertake certain provisions of the Settlement.

The Settlement includes two principal and equal goals. The Restoration Goal includes a number of physical improvements within and along the River channel, water releases based upon hydrographs that vary by water year type, and reintroduction. The Water Management Goal includes provisions for development of a plan to recirculate, recapture or reuse water released for restoration purposes and implementation of a Recovered Water Account to make water available at a significantly reduced price to Friant Contractors that have provided water to meet Restoration Flows. One purpose of the Recovered Water Account is to foster expanded groundwater recharge and banking programs during wet hydrologic conditions that will have the effect of offsetting losses resulting from Restoration Flows.

Senator Feinstein has asked the Friant Water Users Authority to provide her a list of the types of projects the Authority and its members intend to implement to take advantage of the provisions of the Water Management Goal. This report is a preliminary attempt to identify a range of projects that could facilitate recirculation, recapture and reuse of Restoration Flows and a list of potential projects Authority member Districts intend to undertake to take advantage of the Recovered Water Account or to otherwise mitigate the impacts of Restoration Flow releases.

It is very important to note that the quantities of water that can be developed by the individual projects identified in this preliminary report cannot simply be added to determine the total quantity of offset water. The quantities are maximums and the aggregate quantity of water that will be developed by implementation of some or all of these projects will be limited by available water from the rivers, capacity in conveyance facilities and appropriate proration of such supplies and capacities. More detailed operations studies will be required to determine a total supply that can be generated to offset water delivery reductions resulting from implementation of the Restoration Flows.

Limited San Joaquin River Restoration Program fishery flows are to start in 2009 and sustained full fishery flows are envisioned to begin in 2013. Water users plan to use this time wisely to work expeditiously with the Secretary of the Interior in developing and implementing the water management program called for in the Settlement. The Settling Parties agree this is necessary to reduce or fully avoid water supply impacts that might otherwise occur.

Fully implementing the Water Management Goal of the Settlement is essential to maintain the vibrant economy and healthy communities supported by Friant water supplies.

I

Water Supply Recirculation Concepts

INTRODUCTION

The Settlement requires the Secretary of Interior to develop a plan to recirculate, recapture and re-use Water released for Restoration Flows. NRDC and Friant previously prepared a Water Supply Report that considered various options to achieve this objective. While these options are conceptual in nature, Friant believes they, at a minimum, should be carefully evaluated in the plan prepared by the Secretary. These concepts envision pumping water released as Restoration Flows into the California Aqueduct (or a portion of the Delta-Mendota Canal) after it has achieved its Restoration purpose. Water would then be conveyed via the California Aqueduct for redistribution to the Friant service area directly or via exchange or transfer.

There are at least two ways by which water could reach the California Aqueduct:

- Construction of San Joaquin River Interceptor Pumps and intertie facilities between the San Joaquin River and California Aqueduct near Patterson to intercept restoration flows and divert them into either the California Aqueduct or Delta-Mendota Canal.
- Use of the Delta to convey San Joaquin River restoration flows to the Banks Pumping Plant near Tracy to be lifted into the California Aqueduct.

In the southern San Joaquin Valley, recovered and re-circulated San Joaquin River water would be conveyed to the Friant-Kern Canal (FKC) through one or more of the following: 1) the existing or enlarged Cross Valley Canal (CVC) and a new CVC-FKC intertie near Bakersfield; 2) an all-new Trans Valley Canal (TVC), several miles north of the CVC; 3) the Multi-District Conveyance Project several miles north of the CVC; 4) the Arvin-Edison Intertie and/or 5) via exchanges with State Water Contractors with entitlements to Eastside water.

All of these concepts are dependant upon the availability of conveyance capacity within the California Aqueduct and/or a portion of the Delta-Mendota Canal and CVC. Further, those involving Delta conveyance and pumping are subject to existing priorities and regulatory limitations.

PROJECT LIMITATIONS AND FUTURE WORK REQUIREMENTS

The recirculation and re-use projects summarized on the following pages include cost estimates based upon the best information readily available to the Friant. They are intended to provide a general overview of potential that, as a minimum, should be included in the plan to be prepared by the Secretary. Additional modeling, engineering, environmental, institutional and water rights analysis may be required before any alternative can be implemented. These estimates and project descriptions are intended to describe the initial foundation for technical work necessary to achieve investigation and further understanding of these potential projects.

A

DELTA RECIRCULATION

Under this concept, Friant Restoration Flows reaching the Delta through the San Joaquin River would be recaptured at the State export facilities near Tracy for conveyance in the California Aqueduct. Some new facilities will be required to permit conveyance into the Friant service area. Following is a description of some options.

CVC Intertie and Friant-Kern Canal Reverse Flow

PROJECT: This program envisions developing means of transporting CVP water via the California Aqueduct, directly from the Banks Pumping Plant in the Delta, to and through the Cross Valley Canal (CVC) in Kern County. A short segment of the intertie facility would link the CVC at Pumping Plant No. 6 with the Friant Kern Canal (FKC). Three pumping plants would be constructed along the FKC in order to lift water upstream in the FKC as far north as the Delano-Earlimart Irrigation District. This reverse-flow operation would reach approximately 40 miles, gaining approximately 20 feet in elevation, to reach upstream water users.

CAPACITY: The intertie would have a capacity of 500 cubic feet per second (cfs). The FKC pumping plants would have decreasing capacities from the south – 500 cfs at Shafter Check, 250 cfs at Poso Check and 125 cfs at Lake Woolomes Check. . In addition, various Friant Division contractors have capacity in the CVC. Arvin-Edison is participating in enlargement of the Canal and will secure 100 cfs of additional capacity at a cost of \$15 million, funding for which has not yet been secured.

OPERATIONAL GOAL: The project seeks to gain conveyance and transfer ability to offset a portion of the Friant Division's San Joaquin River restoration water requirements with water re-circulated through the Delta and California Aqueduct and delivered to Friant contractors either directly or through exchanges.

COSTS: The project is estimated to cost approximately \$12,000,000.

State Water Project / Kings River Pump-In Facility and Exchange

PROJECT: This program would transport CVP and/or State Water Project water via the California Aqueduct, directly from the Banks Pumping Plant in the Delta, to the Friant Division through a Kings River water exchange. San Joaquin River water reaching the Delta would be pumped into the Aqueduct for delivery to a State Water Project contractor.

The program could also be considered in conjunction with development of smaller San Joaquin River Interceptor Pumps with conveyance through the Delta-Mendota Canal.

Pumping facilities would be developed near the Kings River to move water available from the Kings River and Pine Flat Reservoir into the FKC as part of water exchanges and transfers covered by appropriate agreement, involving Tulare Lake bed interests and, possibly, other willing-to-participate Kings River units.

CAPACITY: 300 cfs.

OPERATIONAL GOAL: Such a Delta recirculation program would offset a portion of the Friant Division's San Joaquin River restoration water requirements and would make recaptured water available for delivery to Friant contractors for re-use.

COSTS: The Kings River Pump-In Facility project is projected to cost about \$1.5 million.

Trans Valley Canal Development

PROJECT: This facility would cross southern Kings and Tulare counties, approximately paralleling the Tule River. The Trans Valley Canal (TVC) would avoid the Tulare Lake bed. It would deliver re-circulated San Joaquin River water into the Friant-Kern Canal near Tule River check (FKC milepost 95.59).

The TVC would include 18,000 feet of 144-inch penstock between the California Aqueduct and the main San Joaquin Valley floor, 32,000 feet of canal operating by gravity on the valley floor and 238,500 feet of lift canal located on the eastern valley's slope ascending toward the Sierra foothills. A re-lift pumping plant would be required on the lift portion of the TVC.

CAPACITY: 1,000 cfs.

OPERATIONAL GOAL: The project seeks to enhance conveyance and transfer ability to offset a significantly greater portion of the Friant Division's San Joaquin River restoration water requirements by providing means to more simply facilitate water re-use within the Friant Division.

This new conveyance facility would be available to re-circulate water captured through the Delta by the Banks Pumping Plant near Tracy.

It could also be used to transport re-circulated water from the larger San Joaquin River Interceptor Pumps and intertie project proposal near Patterson in Stanislaus County.

COSTS: The TVC project alone is estimated to cost \$359 million.

Multi-District Conveyance Project

- PROJECT:** This program envisions developing means of transporting CVP water via the California Aqueduct, directly from the Banks Pumping Plant in the Delta, to and through a turnout at mile post 206.99 of the California Aqueduct and into the Project through Semitropic Water Storage District and Shafter-Wasco Irrigation District to the Friant-Kern Canal at mile post 134 in Kern County. A portion of the project, including the California Aqueduct turnout, is under construction by Semitropic. It is envisioned this project will be part of an Integrated Regional Water Management Plan being carried out by various districts in northern Kern County, including Friant Division contractors Shafter-Wasco and Delano-Earlimart Irrigation Districts.
- CAPACITY:** The Project would have a capacity of 300 cubic feet per second (cfs) in both directions from the California Aqueduct to the Friant-Kern Canal.
- OPERATIONAL GOAL:** The project seeks to gain conveyance and transfer ability to offset a portion of the Friant Division's San Joaquin River restoration water requirements with water re-circulated through the Delta and California Aqueduct and delivered to Friant contractors either directly or through exchanges.
- COSTS:** The project is estimated to cost approximately \$55 to \$85 million, depending on alternative.

Arvin-Edison—California Aqueduct Intertie

- PROJECT:** Arvin-Edison Water Storage District, a Friant Division contractor, has an existing Intertie connecting its distribution system with the California Aqueduct, which can be operated bidirectional. The existing capacity of the Intertie is limited and additional improvements are needed within Arvin-Edison's system to fully realize that capacity in a west to east operational mode.
- CAPACITY:** The Project of additional improvements to Arvin-Edison's system would increase the west to east capacity of the Intertie by approximately 35,000 af/yr.
- OPERATIONAL GOAL:** The project seeks to gain additional conveyance and transfer ability to offset a portion of the Friant Division's San Joaquin River restoration water requirements with water re-circulated through the Delta and California Aqueduct and delivered to Friant contractors either directly or through exchanges. In addition, because of Arvin-Edison's unique physical location, tied directly to the California Aqueduct via the Cross Valley Canal and its Intertie, and to the Friant-Kern Canal, there may be additional opportunities for exchanges to facilitate Delta Recirculation.

COSTS: The project to provide additional capacity to transfer water from west to east is estimated to be \$5 million in capital costs.

B

SAN JOAQUIN RIVER RECIRCULATION

Under this concept, Restoration Flows would be intercepted in the lower river by new San Joaquin River Interceptor Pumps near Patterson in Stanislaus County and diverted into a pipeline for conveyance to the California Aqueduct or Delta-Mendota Canal. The size of this recirculation project would vary depending upon whether water were to be sent south through the Delta-Mendota Canal to San Luis Reservoir's O'Neill Forebay, California Aqueduct and Cross Valley Canal, or directly to the California Aqueduct. These are major projects for which only preliminary analysis has been completed.

Smaller San Joaquin River Interceptor Pumps & Pipeline Intertie to the Delta Mendota Canal

PROJECT: This program envisions developing new San Joaquin River Interceptor Pumps and an intertie facility linking the San Joaquin River and California Aqueduct near Patterson in Stanislaus County. It would include a pumping plant on the San Joaquin River, appropriate fish screening and a pressurized pipeline of just over four miles in length.

It would include the new intertie facility linking the Cross Valley Canal with the Friant-Kern Canal at Bakersfield in Kern County as well as development of the Friant-Kern Canal reverse flow program and/or the Kings River Pump-In Facility and Exchange discussed above.

CAPACITY: 500 cfs.

OPERATIONAL GOAL: The project seeks to gain conveyance and transfer ability to offset a portion of the Friant Division's San Joaquin River restoration water requirements with water obtained through recirculation and recapture to permit re-use within the Friant Division. Water would be diverted through the San Joaquin River Interceptor Pumps to the Delta Mendota Canal (DMC). It would then be conveyed to O'Neill Forebay and San Luis Reservoir where the water being re-circulated would be transferred to the California Aqueduct for delivery to the CVC and, ultimately, the FKC. Alternatively, the program could make use of a Kings River Pump-In Facility and Exchange.

COSTS: The project is estimated to cost \$116 million, including the CVC-FKC intertie and FKC reverse flow features.

Larger San Joaquin River Interceptor Pumps & Intertie to the California Aqueduct

- PROJECT:** This program would develop larger San Joaquin River Interceptor Pumps and an intertie facility near Patterson in Stanislaus County. It would be 4.7 miles long and would link the San Joaquin River and California Aqueduct and would also include fish screening and a pressurized 144-inch penstock.
- CAPACITY:** 1,000 cfs.
- OPERATIONAL GOAL:** The project seeks to gain conveyance and transfer ability to offset a significantly greater portion of the Friant Division's San Joaquin River restoration water requirements with water obtained through recirculation and recapture to permit re-use within the Friant Division by utilizing a new conveyance facility to the FKC in Tulare County, the Trans Valley Canal. Water would be delivered directly from the San Joaquin River Interceptor Pumps pipeline to the TVC. The water being re-circulated would be delivered into the FKC for re-use, directly or through exchange, by Friant contractors.
- COSTS:** The project is estimated to cost nearly \$600 million, including development of the TVC.

Larger San Joaquin River Interceptor Pumps & Intertie to California Aqueduct for Kings River Exchange

- PROJECT:** This program would utilize larger San Joaquin River Interceptor Pumps and an intertie facility near Patterson in Stanislaus County that would be 4.7 miles long. It would link the San Joaquin River and California Aqueduct and would also include fish screening and a pressurized 144-inch penstock. In addition, the program would make use of a Kings River Pump-In Facility and Exchange.
- CAPACITY:** 1,000 cfs.
- OPERATIONAL GOAL:** Such a Delta recirculation program would offset a portion of the Friant Division's San Joaquin River restoration water requirements and would make recaptured water available for delivery to Friant contractors for re-use.
- COSTS:** The Kings River Pump-In Facility project is projected to cost about \$5.5 million. The San Joaquin Interceptor Pumping Stations is projected to cost \$236 million.

II

Other Friant Division Concepts

In addition to the recirculation concepts discussed above, there are a number of other Friant Division projects and programs that could create additional capacity to mitigate or avoid water delivery reductions caused by Restoration Flows. In many cases, these projects and programs will also facilitate the Integrated Regional and District specific projects and programs discussed later.

A

IN-CANAL SOLUTIONS

Along with recirculation, these concepts have been identified as ways to accomplish capacity increases within the Friant-Kern Canal.

Friant-Kern Canal Capacity Correction

- PROJECT:** This program seeks to correct capacity constraints that have developed within 19.25 miles of the Friant-Kern Canal (FKC) as a result of land subsidence. It would consist of raising the FKC's concrete liner two feet and modifying all structures and appurtenances (such as turnouts and bridges).
- CAPACITY:** Restoration of approximately 500 cfs of capacity that has been lost in these canal "bottleneck" reaches.
- OPERATIONAL GOAL:** By restoring conveyance capacity within affected areas, the FKC would be able to convey and transfer greater amounts of water than would otherwise be possible. Maximizing FKC capacity in order to accommodate the largest possible diversions during flood events would help offset a portion of the Friant Division's San Joaquin River restoration water requirements by making excess San Joaquin River water available for groundwater banking or recharge, as well as optimizing canal delivery efficiencies.
- COSTS:** The project is projected to cost \$23 million.

Friant-Kern Canal Capacity Enlargement

- PROJECT:** The project would consist of significantly enlarging the Friant-Kern Canal (FKC) and increasing its conveyance capacity in its entire 152-mile length between Friant Dam and the Kern River. Current capacities are inadequate for taking full advantage of flood events for groundwater recharge and banking, as well as seasonal water demands.

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- CAPACITY:** Capacity would be increased by 2,000 cfs in the 71.29 miles from Friant Dam to the Kaweah River, 1,500 cfs in the 24.3 miles from the Kaweah River to the Tule River and 1,000 cfs in the 56.27 miles from the Tule River to the FKC terminus at Kern River. (Current design capacities in these reaches range from 5,200 cfs at Friant to 2,500 cfs at the terminus in Bakersfield.)
- OPERATIONAL GOAL:** By significantly increasing conveyance capacity for its entire length, the FKC would be able to convey and transfer much greater amounts of water than would otherwise be accommodated. This concept would maximize the canal's ability to divert and deliver large quantities of water during flood events. That, in turn, would assist in offsetting and recovering a more significant portion of the Friant Division's San Joaquin River restoration water requirements by making excess San Joaquin River water available for groundwater banking or recharge and seasonal deliveries.
- COSTS:** The project is projected to cost \$440 million.

III

Integrated Regional Water Management Programs

A number of specific projects and programs and conceptual projects and programs have been identified and developed by members of the Friant Water Users Authority that integrate management of water supplies to achieve greater efficiency and water supply. Additional projects and programs continued to be developed but are not available for inclusion at this time. The specific programs and proposals that have been prepared are attached hereto as Attachment A. In most cases the attachments identify the schedule and cost for such projects and programs. As noted above, these programs and projects have not been analyzed with respect to limitations that may exist if all projects are fully implemented. There may well be water supply, conveyance capacity or other limitations that prevent maximum water supply development contemplated by individual programs and projects. The programs and projects are summarized below.

A

Interties Between Districts

The Chowchilla Water District and the Merced Irrigation District propose to construct an intertie that will link their water distribution systems. The intertie would have 100 cfs capacity and could provide 15,000 to 25,000 acre feet of water to Chowchilla in normal and wet years.

The Delano Earlimart Irrigation District and the North Kern Water Storage District propose to construct a joint groundwater banking facility, including extraction pumping facilities and intertie pipeline that will

enable Delano Earlimart to dramatically expand its groundwater banking capacity. This program is expected to generate 6,000 acre feet of water per year for Delano Earlimart.

Delano Earlimart and Pixley Irrigation Districts proposed to increase service water deliveries to Pixley and to convert Delano's available above average water year supplies to regulated irrigation supplies through a new inter district groundwater banking, extraction and intertie facility. It is expected that this program will develop up to 30,000 acre feet in a dry year and 12,000 acre feet in a normal year for Delano. Pixley will receive substantial benefits in normal and wet years.

The Shafter-Wasco Irrigation District is considering new facilities that will improve the interconnection between the District and the North Kern Water Storage District and the Semitropic Water Storage District. These facilities could develop up to an additional 15,000 acre feet annually.

The Terra Bella Irrigation District is proposing to undertake a feasibility study of the possible interconnection with a neighbor pre 1914 water rights holder on the Tule River. If feasible, the project would enable the District to provide year round domestic water users and expand its capability to use surplus River water supplies.

B

Multi Agency Projects and Programs

The Deer Creek and Tule River Authority (DCTRA) is a Joint Powers Authority, which is composed of several Friant Division and Cross Valley Canal contractors and other water right holders on the Tule River, proposes to study an expansion of the DCTRA's groundwater banking program in order to effectively manage Recovered Water Account supplies in an integrated manner. No estimates of yield have been developed at this time.

The Exeter Irrigation District is proposing to develop an integrated water management program with local mutual water company that will yield up to 1,000 acre feet of water annually.

The Lindsay Strathmore, Lindmore, Exeter, Lewis Creek, Ivanhoe, and Tulare Irrigation Districts and the Kaweah Delta Water Conservation District propose to develop a groundwater banking facility adjacent to the Kaweah River. They propose to jointly manage the facility to achieve integrated water management objectives. The facility will have a capacity of at least 18,000 acre feet per year.

The Orange Cove Irrigation District is investigating multi-institutional water management partnerships that will integrate management of Friant and non-Friant water supplies through long-term transfers and exchanges to provide dry year water reliability for Orange Cove. Orange Cove expects that it can generate up to 10,000 acre feet of water supply in dry years through this program.

The City of Orange Cove and the Orange Cove Irrigation District are evaluating a cooperative program to manage the City's waste water effluent by constructing facilities to enable the water to be delivered to the Irrigation District. The project should generate an additional 1,000 acre feet of irrigation water supply.

The Tulare and Lindsay-Strathmore Irrigation Districts are developing an exchange program that will enhance Tulare's conjunctive use program and improve dry year water reliability for Lindsay-Strathmore. It is expected that this program will develop 2,500 acre feet of dry year supply for Lindsay-Strathmore.

IV

Individual District Programs And Projects

A number of specific individual district projects and programs and conceptual projects and programs have been identified and developed by members of the Friant Water Users Authority. Additional projects and programs continued to be developed, but are not available for inclusion at this time. The specific programs and proposals that have been prepared are attached hereto as Attachment B. In most cases the attachments identify the schedule and cost for such projects and programs. As noted above, these programs and projects have not been analyzed with respect to limitations that may exist if all projects are fully implemented. There may well be water supply, conveyance capacity or other limitations that prevent maximum water supply development contemplated by individual programs and projects. The programs and projects are summarized below.

A

Groundwater Banking and Recharge

The Arvin-Edison Water Storage District operates and plans to expand a number of water banking programs. They are both direct and in lieu recharge facilities as well as cooperative programs with other Kern County water agencies.

The Delano Earlimart Irrigation District is proposing a project to develop a groundwater banking facility by converting and expanding an existing recharge facility on the White River into a banking facility with extraction wells and delivery facilities. It is expected that the project will develop up to 5,500 acre feet in phase 1 and up to 13,000 acre feet in phase 2.

The Fresno Irrigation District and the City of Clovis are considering a joint groundwater banking facility that will enable Fresno's Class 2 and section 215 supplies to be converted into a reliable supply. It is estimated that the project could generate between 8,000 and 20,000 acre feet depending on water year type.

The Madera Irrigation District is developing a groundwater bank that has up to 250,000 acre feet of capacity. It is expected that the bank could deliver up to 55,000 acre feet of banked water in dry years. The project is optimally located within four miles of the San Joaquin River with existing conveyances that connect directly to the River. This is significant for projects that could directly benefit River restoration efforts.

The Orange Cove Irrigation District is developing a program to provide incentives to landowners in the District that have available groundwater supplies to utilize such supplies in dry years. In wet years, such landowners would be provided with surface water. This in lieu groundwater banking program is expect to generate up to 15,000 acre feet of dry year supplies.

C

Facility Improvements

The Arvin-Edison Water Storage District has undertaken and is undertaking and number of facility improvements that will enable it to receive greater quantities of water in certain conditions and more efficiently manage and distribute such supplies within its boundaries.

The Lower Tule River Irrigation District proposes to construct an additional canal and rehabilitate and existing one that will enable it to distribute Tule River flood flows to a larger portion of the District. These facilities are expected to provide up to 23,900 acre feet of additional supplies to the District depending upon water year type.

The Pixley Irrigation District is not a Friant contractor. It is a Cross Valley Canal contractor. Its groundwater supplies are affected by Friant operations and its groundwater usage can affect neighboring Friant Districts. It proposes facility enhancements that will provide capacity for greater surface water deliveries within the District. These facilities will enhance its in lieu groundwater banking capacity and facilitate the joint program with Delano Earlimart discussed above.

The Saucelito Irrigation District is undertaking a feasibility study regarding potential distribution system improvements that would increase the District's capacity to utilize its share of surplus River water supplies. The potential yield of this program has not yet been determined.

The Tulare Irrigation District proposes to undertake a study of capacity limitation in its main intake canal and review possible expansion of the canal capacity. By improving canal capacity, the District could improve its ability to divert its share of surplus River water and increase diversion by up to 10,000 acre feet per year, depending upon hydrology.

The Tulare Irrigation District also proposes to undertake and study and install facilities to monitor and regulate water distribution within the District. These facilities will make the distribution system more efficient and reduce spills outside of the District boundaries. These facilities could generate up to 1,000 acre feet of water annually.

D

District Consolidation

The Orange Cove Irrigation District and the Tri-Valley Water District (a Cross Valley Canal contractor) are evaluating consolidation of the Districts to achieve greater administrative and water efficiency. It is expected that integration of their water management operations could yield up to 4,000 acre feet of water in dry years.

E

Transfers

The Orange Cove Irrigation District has acquired rights to Northern California water to supplement its Friant supplies. The District is seeking to use the water to restore stream flow for fish augmentation

purposes in the Sacramento Valley prior to transport for exchange to generate supplemental water supplies for the District.

It should be noted that many districts within the Friant service area have routinely engaged in transfers to enhance their water management efficiency. It is expected that these efforts will continue and be enhanced in the future.

F

Other Programs

The Tulare Irrigation District proposes to conduct on-farm efficiency studies to determine if there are ways to improve on-farm efficiency and improve water management operations. This program could generate up to 1,500 acre feet of water annually.

V

Conclusion

This report is preliminary. It is not exhaustive of all the programs and projects that have or should be considered to reduce, avoid or mitigate the water supply reductions created by the Restoration Flows. It is intended to provide examples of real projects that have been designed or are presently undergoing serious review by the Authority and its members. It is not presently possible to determine the aggregate amount of water supply yield that could be developed by implementation of these programs and projects, but it is safe to say that collectively these programs and projects will substantially offset the water supply impacts of the Restoration Flows.

With respect to the recapture and recirculation sections of the report, it is intended to identify the types of programs that should be evaluated by the Secretary of the Interior when developing the program required by Paragraph 16 of the Settlement.

Attachment A

PROJECT DESCRIPTION AND DETAILS
WATER SUPPLY GOAL
SAN JOAQUIN RIVER LITIGATION SETTLEMENT

A. Project Title: Chowchilla - Merced Intertie Canal

B. Project Type: _____

- | | | | |
|------------------------|----------|--------------|----------|
| 1. Division wide | _____ | 1. Near-term | _____ |
| 2. Integrated Regional | <u>X</u> | 2. Long-term | <u>X</u> |
| 3. Local | _____ | | |

C. Project Sponsor(s): Chowchilla Water District, Merced Irrigation District

D. Project Description: _____

Construct 100 cfs intertie canal to transport water from Merced ID to Chowchilla WD

Increase capacity of Merced ID canals and construct 5 to 7 mile earth canal

E. Goals and Objectives: _____

Supply 15,000 to 25,000 acre-feet water to Chowchilla Water District

Reduce groundwater overdraft & mitigate loss of Friant water supply

F. Project's Consistency with Settlement Objectives and Directives: _____

Project is consistent with Settlement

G. Estimated Water Recovery Capability:

- | | | |
|----------------|-------|-------------------|
| 1. Dry Year | _____ | 0 af |
| 2. Normal Year | _____ | 15,000 - 25,000af |
| 3. Wet Year | _____ | 15,000 - 25,000af |

H. Project Cost Estimate: \$ 5 - 15 million

Year basis: 2005

I. Implementation Schedule (Mo/Yr)

1. Planning	<u>Feasibility Study 2007</u>
2. Agreement(s)	<u>2007</u>
3. Design	<u>2009</u>
4. Property (inc. R/W)	<u>2010</u>
5. Construction	<u>2012</u>
6. Operational	<u>2014</u>

J. Legal/Regulatory Issues to be Addressed: _____

SWRCB Place of Use

K. Legislative Issues to be Addressed: _____

L. Environmental Issues to be Addressed: _____

Impact on Merced River ecosystem

Facility and Operation Detail

Poso Creek IRWMP Management Group

Friant Kern Recharge and Recovery Improvements to North Kern Recharge Facilities East of the Friant Kern Canal

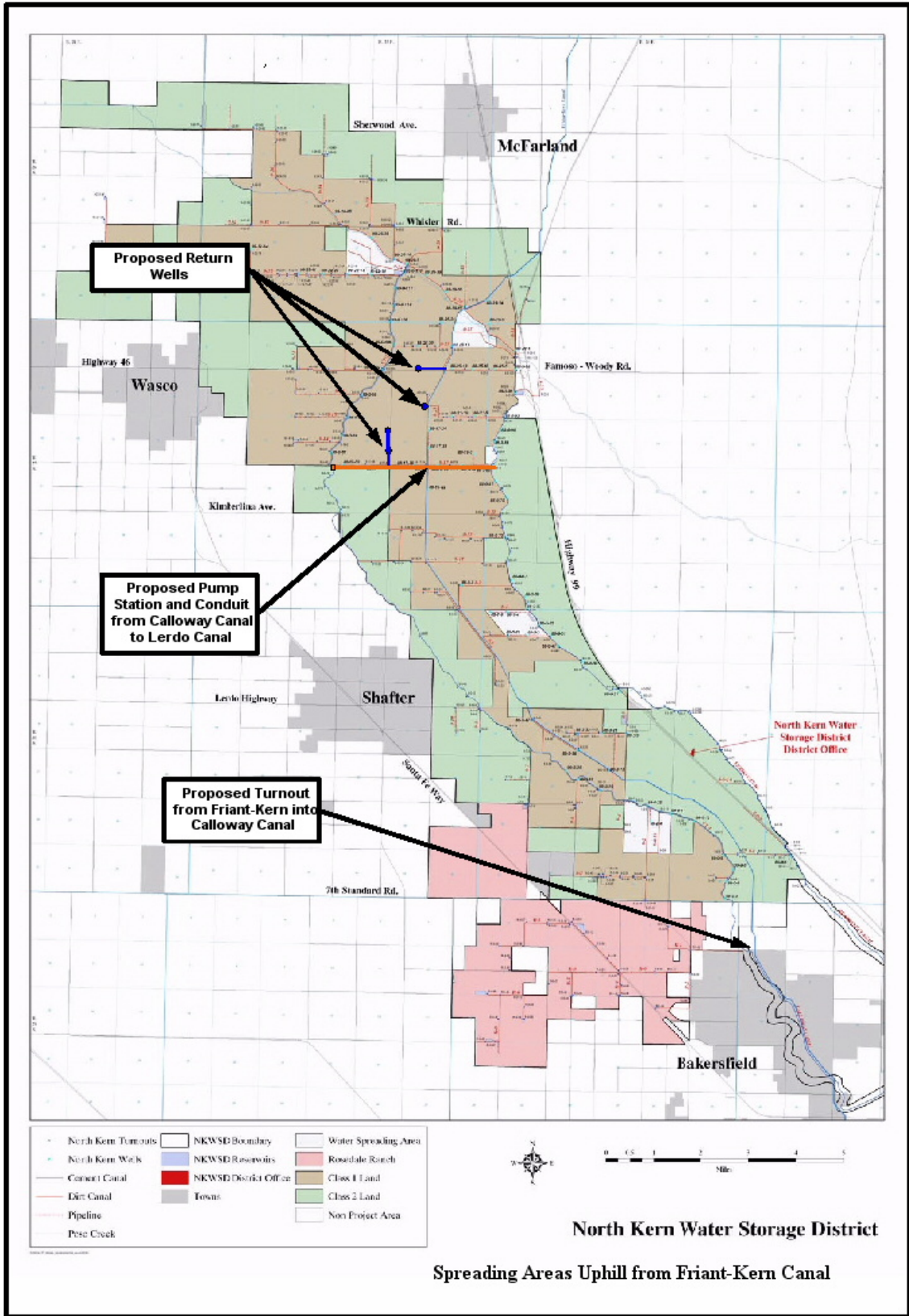
1.0 Summary

Project Type	Water Supply Reliability
Facility Sponsors	North Kern Water Storage District and Delano Earlimart Irrigation District
Location	Turnout at Snow Road and Pumpstation and Conduit with 4 Deepwells west of Friant-Kern Canal between Kimberlina and Highway 46
Estimated Facility Conveyance Capacity	150 CFS Turnout, 150 CFS Pumpstation and Conduit and 24 CFS Deepwells
Project Descriptor	Increased water reliability by providing increased groundwater banking of DEID supplies.
Estimated Cost (2006 dollars)	\$3,000,000

2.0 Facility Description

If a new pumstation and conduit are built to facilitate pumping water from the Calloway Canal into the Lerdo Canal the easterly recharge facilities of the North Kern Water Storage District become available for recharge opportunities with Friant –Kern supplies. The existing turnout from the Friant-Kern Canal does not have enough capacity to simultaneously serve both the westerly and easterly recharge facilities of North Kern. This project envisions duplicating the existing North Kern Water Storage District banking project with Kern-Tulare and Rag Gulch Water Districts with Delano Irrigation District as the partner. A new turnout would be built to deliver water into the Calloway Canal at Snow Road to serve the westerly demands of North Kern allowing the existing turnout to be used to supply the new pump station and conduit to the easterly recharge facilities of North Kern. Similar to the North Kern Water Storage District banking project with Kern-Tulare and Rag Gulch Water Districts four deepwells would be built to deliver water into the Friant Kern canal.

Figure 1B shows the location and extent of the



facility.

Background

Introduction

North Kern and Delano Earlimart in 2006 entered into a pilot water banking program in the fall of 2006. It is anticipated that 30,000 acre feet of water will be brought into North Kern Water Storage District. This will result in a 27,000 Acre foot supply to be returned to Delano Earlimart under mutually agreeable conditions. North Kern and Delano Earlimart desire to firm up the ability to bring in and return water by the addition of input and output capacities.

Land Use

The North Kern is situated in the San Joaquin Valley portion of Kern County and encompasses about 60,000 acres. North Kern is shown on **Figure 1-1**, along with other water agencies in the San Joaquin Valley portion of Kern County. **Figure 1-1** also shows the major water conveyance facilities within Kern County. North Kern is fully developed to irrigate agriculture, with almonds and grapes accounting for over one-half of the cropped area.

Water Supply

SWP Water

CVP Water

While North Kern is not a permanent CVP contractor, it has entered into temporary contracts for diversion and use of CVP-Friant water, typically available during very “wet” periods. Currently, diversions are limited to the Calloway Canal; however, the proposed improvements would allow a portion of this water to be lifted into the Lerdo Canal at a location which provides the maximum utility to North Kern, i.e., it is the high point of North Kern’s gravity distribution system. In addition, North Kern has an arrangement with Kern-Tulare and Rag Gulch water districts whereby they will deliver, from time to time, a portion of the supplies available to them in the Friant-Kern Canal. The efficiency of this arrangement will also be improved for the same reason as just described, i.e., the utility of this supply will be improved.

Groundwater

North Kern owns and operates more than 70 wells which are distributed throughout its area. When North Kern is not fully utilizing its wells for in-District purposes, they are available for other purposes. In this regard, North Kern has used its wells from time to time to provide water to neighboring water agencies (Shafter-Wasco Irrigation District and Cawelo Water District)

under exchange arrangements. The proposed improvements in the Project would enhance North Kern's flexibility in this regard, by allowing pumped groundwater to be delivered into the Friant-Kern Canal from time to time under exchange arrangements. The new pumpstation conduit from the Calloway to the Lerdo Canal would also allow deepwells further west that discharge into the northwest Calloway Canal to be pumped into the Friant-Kern Canal.

Conjunctive Management

Historical surface water supplies of North Kern have ranged from less than 10,000 acre-feet in a "dry" year to nearly 400,000 acre-feet in a very "wet" year. Owing to the highly variable Kern River supply, North Kern has been "forced" to regulate available surface water supplies from times of surplus ("wet" years) to times of need ("dry" years). This regulation has been accomplished, to a large extent, through use of the underlying groundwater reservoir. During "wet" years on the Kern River, significant deliveries of surface water are made to irrigation and spreading (for groundwater recharge). For the purpose of groundwater recharge, North Kern principally makes use of about 1,500 acres of recharge basins (water spreading areas). In "wet" years, more than 200,000 acre-feet of water has been directed into recharge basins for replenishment of the groundwater aquifer. During "dry" years, deliveries of surface water to irrigation are greatly reduced and groundwater pumping is significant. Extraction of groundwater by means of District wells has ranged from zero to more than 80,000 acre-feet in one year. North Kern has successfully operated its conjunctive use for 50 years and, through the proposed improvements to existing facilities, seeks to enhance its existing conjunctive use operations. The underlying groundwater is part of the larger groundwater basin which underlies the southern San Joaquin Valley.

3.0 Facility Operation

3.1 Facility Operation in a Wet Year like 2006

This facility would have allowed water from the Friant Kern Canal which was available in 2006 to be used in the North Kern Water Storage District's and Cawelo Water District's direct and in-lieu recharge facilities served off of the Lerdo Canal

3.2 Facility Operation in a Dry Year like 2004

In 2004 the Kern River April-July runoff was 48% of average and deep wells were run to make up for the shortages to North Kern Water Storage District. The deepwells added as a part of this project will be plumbed as the North Kern Water Storage District banking project with Kern-Tulare and Rag Gulch Water Districts wells are plumbed to deliver water either into the Friant Kern Canal or to North Kern's canals.

4.0 Goals and Objectives

The primary goal of this facility to provide additionally groundwater banking regulation of Friant Kern and Kern River supplies. Associated facility benefits include:

- Water supply reliability through system redundancy and flexibility
- Water conservation
- Energy savings
- Conjunctive management of surface and groundwater resources

5.0 Facility's Consistency with IRWMP Objectives and Strategies

The facility is an important element in implementation of the IRWMP Plan and in meeting the Plan's central objective of enhancing local and regional water supply reliability and in addressing the Plan's objectives of managing groundwater and surface water resources within the region.

6.0 Relationship with Other Facilities in the Poso Creek IRWMP Region

The facility, in an addition to the the 2006 System Operations Improvement Project, is being proposed in conjunction with the facility to interconnect between the Calloway and Lerdo Canals (NK-1) and the plan to improve six miles of the Calloway Canal lining (NK-3). NK-1 and NK-3 are also a part of the 2006 System Operations Improvement Project.

7.0 Priority within the IRWM Plan Region and within the Proposal

(to be determined by Management Group)

8.0 Cost Estimate

Costs include a new Friant-Kern Canal turnout, four deepwells and delivery pipelines. The estimated costs presented are preliminary pending additional facility development.

D

Estimated cost:	\$
Contingencies at 40%	\$
Subtotal	\$
Eng., Adm. Etc. at 15%	\$
Total	\$ _____

9.0 Schedule

(To be determined)

R

A

F

T

PROJECT DESCRIPTION AND DETAILS
WATER SUPPLY GOAL
SAN JOAQUIN RIVER LITIGATION SETTLEMENT

A. Project Title: DEID-Pixley ID Joint Groundwater Bank

B. Project Type:

- | | | |
|------------------------|-------------------------|-----------------------------------|
| 1. Division wide | _____ | 1. Near-term <u>X</u> |
| 2. Integrated Regional | <u>DCTRA/Poso Creek</u> | 2. Long-term <u>X¹</u> |
| 3. Local | <u>Tulare County</u> | |

C. Project Sponsor(s): Delano-Earlimart Irrigation District (DEID) and Pixley Irrigation District (Pixley ID).

D. Project Description: Groundwater banking project in Pixley ID that delivers regulated supply to DEID. Both in-lieu and direct recharge would be utilized through the banking program.

E. Goals and Objectives: 1) To increase surface water deliveries to Pixley ID and 2) to convert DEID's available above average water year supplies to regulated irrigation supply through a new groundwater bank and extraction\delivery facility between districts.

F. Project's Consistency with Settlement Objectives and Directives: This project attempts to take full advantage of DEID's available CVP contract supplies with Pixley ID (as a regional partner) through new yield from a new joint groundwater banking project\program.

G. Estimated Water Recovery Capability (Yield):

	DEID	Pixley ID
1. Dry Year	30,000 af ²	0 af ³
2. Normal Year	12,000 af ⁴	30,000 af ⁵
3. Wet Year	0 af	50,000 af ⁶

¹ Since implementable within roughly two years and sustainable, this project is viewed as both near and long term
² Estimated extraction capability of well field and six mile conveyance system (15 wells with 10S cfs capacity over roughly 4 months and ~10% redundancy)
³ Dry year benefits in depth to groundwater not quantified to Pixley ID
⁴ Approximately DEID's demand for non-reclamation law water
⁵ Rough Estimate of potential supply available for banking
⁶ Rough Estimate of Pixley ID existing annual irrigated demand and potential direct recharge capability beyond what can currently be supplied.

H. **Project Cost Estimate:** \$19,100,000⁷

Year basis: 2007

I. **Implementation Schedule (Mo/Yr):**

1. Planning	10/06 to 09/07
2. Agreement(s)	06/07 to 06/08
3. Design	06/07 to 02/08
4. Property (inc. R/W)	06/07 to 06/08
5. Construction	06/08 to 06/10
6. Operational	01/10 to 01/26

J. **Legal/Regulatory Issues to be Addressed:** CEQA/NEPA docs for new groundwater bank and exchange program.

K. **Legislative Issues to be Addressed:** None to date.

L. **Environmental Issues to be Addressed:** Conversion of ag land to direct recharge reservoirs. Permitting associated with use of Deer Creek as recharge facility. Avoidance\mitigation of potential impacts to landowners adjacent to groundwater extraction facilities.

⁷ Estimated breakdown of Costs as follows: Planning \$150,000, Agreements \$50,000, Design \$900,000, Property Acquisition \$4,000,000, and Construction \$14,000,000

H. Project Cost Estimate: Unknown

Year basis: 2007

I. Implementation Schedule (Mo/Yr)

1. Planning	<u>2007</u>
2. Agreement(s)	<u>2007</u>
3. Design	<u>2007-08</u>
4. Property (inc. R/W)	<u>2008</u>
5. Construction	<u>2008-09</u>
6. Operational	<u>2010</u>

J. Legal/Regulatory Issues to be Addressed: _____

Banking agreements _____

Delivery contracts _____

Groundwater Management Plan _____

K. Legislative Issues to be Addressed: _____

Unknown _____

L. Environmental Issues to be Addressed: _____

None foreseen. Property is presently farmed to row crops under a short-term lease. _____

PROJECT DESCRIPTION AND DETAILS
WATER SUPPLY GOAL
SAN JOAQUIN RIVER LITIGATION SETTLEMENT

A. Project Title: Deer Creek Basin Water Banking Evaluation

B. Project Type: Feasibility Study

1. Division wide	_____	1. Near-term <u>XXX</u>
2. Integrated Regional	<u>XXX</u>	2. Long-term _____
3. Local	_____	

C. Project Sponsor(s): Deer Creek and Tule River Authority (DCTRA)

D. Project Description: Study the feasibility of setting up a water bank using Authority owned and managed recharge basins for groundwater recharge and extraction of local district CVP supplies.

E. Goals and Objectives:

Goal: Develop dry year water supplies for use by DCTRA member districts and improve utilization of spring flood flows from San Joaquin River

Objective: Study the feasibility of utilizing existing basins for recharge and extraction.

Objective: Construct improvements to existing basins and install recharge facilities

F. Project's Consistency with Settlement Objectives and Directives: _____

Project may result in the opportunity for member districts to better utilize its Recovered Water Account water.

G. Estimated Water Recovery Capability:

- 1. Dry Year _____ Unknown
- 2. Normal Year _____ Unknown
- 3. Wet Year _____ Unknown

H. Project Cost Estimate: _____ \$300,000

Year basis: 2007

I. Implementation Schedule (Mo/Yr) NA

- 1. Planning _____
- 2. Agreement(s) _____
- 3. Design _____
- 4. Property (inc. R/W) _____
- 5. Construction _____
- 6. Operational _____

J. Legal/Regulatory Issues to be Addressed: _____

USBR guidelines for water banking

K. Legislative Issues to be Addressed: _____ Unknown

L. Environmental Issues to be Addressed:

Unknown

Authority would comply with statutory requirements of NEPA and CEQA.

PROJECT DESCRIPTION AND DETAILS
WATER SUPPLY GOAL
SAN JOAQUIN RIVER LITIGATION SETTLEMENT

A. Project Title: Potential OCID Conjunctive Use Partnership

B. Project Type: _____

- | | | | |
|------------------------|-------|--------------|-------|
| 1. Division wide | _____ | 1. Near-term | X |
| 2. Integrated Regional | X | 2. Long-term | _____ |
| 3. Local | _____ | | |

C. Project Sponsor(s): Orange Cove Irrigation District

D. Project Description: OCID has initiated discussions with conjunctive use CVP and non-CVP contractors to develop mutually beneficial water management partnerships that attempt to combine the differing demands and supplies of each district to provide synergistic benefits to each district's supply. The partnerships will require the use of long-term exchanges and transfers of CVP contract supplies and non-CVP water supplies. OCID will augment its partners' supplies during normal and wet years in return for dry year water.

E. Goals and Objectives: _____

Mitigate water losses to all districts involved by either augmenting normal and wet year supply to facilitate direct or in-lieu groundwater recharge, or augmenting dry year supply to provide water supply reliability for permanent crops.

F. Project's Consistency with Settlement Objectives and Directives: _____

The potential program is entirely consistent with the Settlement Objectives and Directives in that it strives to mitigate the loss of water from increased flows in the river.

G. Estimated Water Recovery Capability:

- | | | |
|----------------|-------|--------------|
| 1. Dry Year | _____ | Up to 10 TAF |
| 2. Normal Year | _____ | Up to 20 TAF |
| 3. Wet Year | _____ | Up to 30 TAF |

H. Project Cost Estimate: _____ \$100,000

Year basis: 2007

I. Implementation Schedule (Mo/Yr)

1. Planning	<u>12/06 - 12/07</u>
2. Agreement(s)	<u>12/07 - 2/08</u>
3. Design	<u>N/A</u>
4. Property (inc. R/W)	<u>N/A</u>
5. Construction	<u>N/A</u>
6. Operational	<u>3/08</u>

J. Legal/Regulatory Issues to be Addressed:

The program will require USBR approval of the exchange, transfer, and banking of Class 1, Class 2, 215, Recovered Water Account, and non-CVP supplies between long-term, short-term and non-CVP contractors on a long-term basis. The CVPIA transfer/exchange process adhered to by the USBR will need to be revised and/or streamlined.

K. Legislative Issues to be Addressed:

The program may require the modification of the place of use of pre-1914 water from local tributaries. Funding will be required for feasibility studies and environmental documentation.

L. Environmental Issues to be Addressed:

NEPA / CEQA analysis will be required.

PROJECT DESCRIPTION AND DETAILS
WATER SUPPLY GOAL
SAN JOAQUIN RIVER LITIGATION SETTLEMENT

A. Project Title: Potential OCID / City of Orange Cove Water Conservation Program

B. Project Type: _____

- | | | | |
|------------------------|----------|--------------|----------|
| 1. Division wide | _____ | 1. Near-term | <u>X</u> |
| 2. Integrated Regional | <u>X</u> | 2. Long-term | _____ |
| 3. Local | _____ | | |

C. Project Sponsor(s): OCID / City of Orange Cove

D. Project Description: _____

The City is evaluating alternatives to manage its wastewater effluent. One alternative that has been used in the recent past is the delivery of tertiary-treated effluent to growers within OCID. To meet the City's current needs, modifications must be made to City and District facilities to receive the quantity of water required.

E. Goals and Objectives: _____

The goal of the project is to manage the City of Orange Cove's wastewater effluent in a cost-effective and water efficient manner, while providing the District with a source of new water.

F. Project's Consistency with Settlement Objectives and Directives: _____

The potential program is entirely consistent with the Settlement Objectives and Directives in that it strives to mitigate the loss of water from increased flows in the river.

G. Estimated Water Recovery Capability:

- | | | |
|----------------|-------|--------------|
| 1. Dry Year | _____ | <u>1 TAF</u> |
| 2. Normal Year | _____ | <u>1 TAF</u> |
| 3. Wet Year | _____ | <u>1 TAF</u> |

H. Project Cost Estimate: _____ \$200,000 (District Improvements Only)

Year basis: 2006

I. Implementation Schedule (Mo/Yr)

1. Planning	<u>12/06 - 8/07</u>
2. Agreement(s)	<u>6/07 - 8/07</u>
3. Design	<u>9/07 - 12/07</u>
4. Property (inc. R/W)	<u>N/A</u>
5. Construction	<u>12/07 - 3/08</u>
6. Operational	<u>4/08</u>

J. Legal/Regulatory Issues to be Addressed:

The existing agreements between the Central Valley Regional Water Quality Control Board will need to be reviewed and potentially revised. It will be a priority for the OCID that the water quality criteria established by the CVRWQCB and OCID be strictly adhered to and monitored by a third-party testing laboratory on at least a daily basis. It will be crucial that funding is available for continuing O&M and monitoring costs to ensure the quality criteria are met on a long-term basis. These issues must be addressed to the satisfaction of the District for this project to move forward.

K. Legislative Issues to be Addressed: _____

None at this time.

L. Environmental Issues to be Addressed: _____

In light of the increasing public scrutiny of irrigation water quality, grower concerns will need to be addressed if this potential project is to move forward.

PROJECT DESCRIPTION AND DETAILS
WATER SUPPLY GOAL
SAN JOAQUIN RIVER LITIGATION SETTLEMENT

A. Project Title: Upgrade of Shafter-Wasco Irrigation District Interconnection Facilities

B. Project Type: _____

1. Division wide	_____	1. Near-term	<u>X</u>
2. Integrated Regional	<u>X</u>	2. Long-term	<u>X</u>
3. Local	_____		

C. Project Sponsor(s): Shafter-Wasco Irrigation District

D. Project Description: Installation of new facilities that provide for the interconnection of Shafter-Wasco Irrigation District(SWID) to neighboring Districts North Kern Water Storage District(NKWSD) and Semitropic Water Storage District(SWSD). Interconnections will connect the State Water Project with the Federal Central Valley Project. Project includes two locations that will connect SWID to NKWSD. The first proposal is a bidirectional connection with a pumped capacity of 75 cfs, which would connect the Calloway Canal to SWID Lateral 134.4. The connection consists of approximately 180 feet of 48 inch diameter pipe and 120 feet of 24 inch diameter pipe, three 100hp pumps and motors and a manifold to connect to an existing 48 inch tee in Lateral 134.4 The second interconnection would connect the NKWSD 8-5 ditch to SWID's Lateral 137.2. The interconnection would be a one way, 50 cfs gravity pipeline connection and a gated turn-out structure from the 8-5 ditch would be required. This project will also connect SWID's distribution system to SWSD's distribution at two new locations. The first project will be up to fc

E. Goals and Objectives: The Goals and Objectives of all these projects is to increase the capability of SWID increase its water supplies in normal or below normal water years. These facilities will allow SWID to bank water in high flow water years in neighboring districts and to have the water returned in normal or below normal water years. The reduction in the water supplies available to SWID as a result of the settlement will result in overdraft of the the groundwater supplies if the District does nothing. In order to replace this water the the District will need to find new ways to capture high flow water and also be in a position to capture recirculation of the environmenetal flows down the San Joaquin River.

F. Project's Consistency with Settlement Objectives and Directives:

These facilities will meeting the water management goals of replacing water that will be redirected down the San Joaquin River for environmenetal restoration benefits.

G. Estimated Water Recovery Capability:

1. Dry Year	<u>10-15,000af</u>
2. Normal Year	<u>5-10,000af</u>
3. Wet Year	<u>10-15,000af</u>

H. Project Cost Estimate: \$55 - 85M

Year basis: 2006

I. Implementation Schedule (Mo/Yr)

1. Planning	<u>2007</u>
2. Agreement(s)	<u>Unknown</u>
3. Design	<u>2007-2010</u>
4. Property (inc. R/W)	<u>2009-2010</u>
5. Construction	<u>2009-2015</u>

6. Operational

2008-2015

J. Legal/Regulatory Issues to be Add

Bureau of Reclamation Approvals, NEPA, Exchange Agreements, Transfer Agreements

K. Legislative Issues to be Addressed:

Legislature Authorities both Federal and State, Grant Funding

L. Environmental Issues to be Addressed:

CEQA and NEPA

H. Project Cost Estimate: _____ 400,000

Year basis: 2007

I. Implementation Schedule (Mo/Yr) NA

- 1. Planning _____
- 2. Agreement(s) _____
- 3. Design _____
- 4. Property (inc. R/W) _____
- 5. Construction _____
- 6. Operational _____

J. Legal/Regulatory Issues to be Addressed: _____

USBR guidelines for transfers and exchanges between Long Term contractors and Non-Long Term contractors.

K. Legislative Issues to be Addressed: _____

May have CVPIA and Reclamation Law transfer issues.

L. Environmental Issues to be Addressed: Unknown

H. Project Cost Estimate: _____ \$200,000

Year basis: 2007

I. Implementation Schedule (Mo/Yr)

1. Planning	_____	Jan-08
2. Agreement(s)	_____	Jan-09
3. Design	_____	N/A
4. Property (inc. R/W)	_____	N/A
5. Construction	_____	N/A
6. Operational	_____	Jan-10

J. Legal/Regulatory Issues to be Addressed: _____

The exchange will need to be approved by the USBR to ensure that is in conformance with water exchange/
transfer policies established by the USBR.

K. Legislative Issues to be Addressed: _____

No legislative issues will need to be addressed.

L. Environmental Issues to be Addressed: _____

There are no environmental issues that will need to be addressed.

Attachment B

San Joaquin River Restoration Program

Water Management Goals Arvin-Edison Water Storage District

This memo is to put forward some ideas, as perceived by Arvin-Edison Water Storage District, as to water management efforts, programs, and policies the District believes are integral to meeting the water management goal of the San Joaquin River Restoration Program. The following ideas are a combination of needed policy/regulation changes as well as water management concepts that may or may not involve construction.

Transfer/Exchange Provisions: The existing USBR transfer provisions are restrictive and a hindrance to effective water management and have been made even more difficult since the passage of CVPIA. Transfers need to be easier to obtain and more readily approved. Special recognition needs to be given to the lack of storage on the Friant system, the existence of un-storable Class II supplies, River Restoration goals, and the need to move water around among various agencies quickly. Perhaps a policy that Class II water can be transferred, period, and without further approval process, is appropriate.

Water Bank Provisions: The District has been operating a water bank since 1966 and the USBR is now considering water banking guidelines. The goal of the Bureau should be to remove existing hindrances to water banking rather than apply restrictive guidelines. Water banking is an especially critical water management tool for the Friant district due to the reasons listed above.

Friant Kern Canal: The canal is undersized and cannot move all the high flow short duration water supplies that are available to the contractors and needs to be expanded.

Carryover Policies: Millerton Lake has a measure of carryover capacity each and every year. It is essential that this reservoir capacity be maximized by the contractors to manage water from one year to the next. Currently the USBR policies are prohibitive and not consistently applied.

East/West Conveyance: The District can improve and enhance its water management capabilities, for itself and others by constructing additional conveyance to Intertie the California Aqueduct to the Friant Kern Canal and or to the District's facilities. This would allow flow to, from, and between the Ca Aqueduct and the F-K canal. This would facilitate deliveries of Westside CVP, SWP, and recirculation water to the District and/or other Friant contractors.

CVC Expansion: The District has embarked on a \$15M project to enlarge the CVC by 100 cfs. Agreements to the construction and operation allow

access to other existing and new capacity as well. Funding is not yet secured. The expanded canal is bidirectional.

CVC/F-K Intertie: Along with the CVC expansion the parties are also building a 500 cfs Intertie between the CVC and F-K canal, which will allow for additional programs between Kern County districts and F-K contractors.

AE Intertie: AE has recently completed a \$15M, 150 cfs, bi-direction Intertie pipeline between the AE canal and the Ca Aqueduct.

South Canal Improvement Project: A \$14.4 M canal expansion program that would facilitate additional utilization of the Intertie pipeline described above.

South Canal Improvement Project – Phase 2: Utilization of the Intertie Pipeline can be further enhanced by construction of a booster plant and other modifications for an additional \$5M.

Intake Canal Reverse flow Project – The potential exist to reverse flow the District’s 13 mile Intake Canal by adding a combination of check structures and pump-back pumps. This would allow the District to delivery substantial water bank supplies directly into the F-K canal. Estimated cost is \$10M.

Water Banking Facilities: AE has recently completed the construction of 500 acres of new spreading basins and approximately 20 new wells at a cost of \$16M

In-Lieu Water Bank Facilities: AE has a large area of lands relying 100% on groundwater supplies. The district could construct pipelines to these lands in order to deliver surplus water at certain times to offset pumping, and create a groundwater benefit. These same pipelines could be used to connect to farm wells and recover the supplies banked “in-lieu” and delivered them into the distribution facilities. This type of program avoids building new wells and spreading basins but requires distribution pipelines. Estimated cost is \$50M

Out-of-District Banking: AE has a program of banking AE water with RRBWSD under a variety of terms and conditions. Banking programs are expensive, and cost/benefits can be balance with money, water, or a combination of both. AE will be seeking a long term program approval for a “2 for 1” water banking program whereby AE leaves behind 1 AF of water in RRB for gw recharge for each af of water RRB returns to AE. RRB pays all the costs to convey, bank, and return the supplies.

Recirculation/ Contract Modification: AE is ideally suited, and has invested in the infrastructure, so as to be able to access East side or West side supplies. AE

can accept recirculation water directly either for itself or others. AE is also in a position to consider a permanent contract exchange of eastside supplies for Westside supplies thereby making a permanent contribution of F-K water to River Restoration. This type of contract modification would negate the need for one of the recirculation components, namely, conveying water from the SJR to the Ca Aqueduct.

Water Quality Exchange with MWD: AE and MWD have had a banking program partnership in place since 1997 whereby AE banks and returns MWD SWP supplies. The potential exists for MWD to cooperate with AE to regulate large amounts of unregulated F-K supplies via exchange in the Ca Aqueduct. Concerns regarding the change in place of use have prevented much progress to date.

PROJECT DESCRIPTION AND DETAILS
WATER SUPPLY GOAL
SAN JOAQUIN RIVER LITIGATION SETTLEMENT

A. Project Title: DEID Turnipseed Groundwater Banking Project

B. Project Type:

- | | | |
|------------------------|-------------------------|--------------------------------|
| 1. Division wide | _____ | 1. Near-term <u>X</u> (Ph. I) |
| 2. Integrated Regional | <u>DCTRA/Poso Creek</u> | 2. Long-term <u>X</u> (Ph. II) |
| 3. Local | <u>Tulare County</u> | |

C. Project Sponsor(s): Delano-Earlimart Irrigation District (DEID)

D. Project Description: Development of a Groundwater Banking Project in DEID that stores available surface waters in wet years, then pumped groundwater is delivered to downstream users during dry years. The first phase of the project is conversion of an existing 80 acre recharge basin and a portion of the White River into a banking facility by constructing extraction wells. The second phase includes expansion of the recharge and extraction facilities.

E. Goals and Objectives: The goal of this project is to increase to convert DEID's available above average water year supplies to regulated irrigation supply through a new groundwater bank, and to provide water supply to the District to meet demands of lands under Reclamation Law.

F. Project's Consistency with Settlement Objectives and Directives: This project attempts to take full advantage of DEID's available CVP contract supplies through new yield from a new joint groundwater banking project program.

G. Estimated Water Recovery Capability (Yield):

	Phase I	Phases I & II
1. Dry Year	5,500 af	13,000 af
2. Normal Year	5,500 af	13,000 af
3. Wet Year	5,500 af	13,000 af

H. Project Cost Estimate:
Phase I - \$5,100,000
Phase II - \$12,800,000
Year basis: 2007

I. Implementation Schedule (Mo/Yr):

	<u>Phase I</u>	<u>Phase II</u>
1. Planning	6/05 - 9/07	5/08 – 10/09
2. Agreement(s)	6/07 - 9/07	3/09 – 9/09
3. Design	3/07 - 10/07	3/09 – 10/09
4. Property (inc. R/W)	N/A for Ph. I	1/09 – 10/09
5. Construction	10/7 – 5/08	10/09 – 5/10
6. Operational	5/08 – ongoing	5/10 - ongoing

J. Legal/Regulatory Issues to be Addressed: CEQA/NEPA docs for new groundwater bank and use of White River for recharge.

K. Legislative Issues to be Addressed: None anticipated.

L. Environmental Issues to be Addressed: Conversion of ag land to direct recharge reservoirs. Permitting associated with use of White River as recharge facility. Avoidance\mitigation of potential impacts to landowners adjacent to groundwater extraction facilities.

PROJECT DESCRIPTION AND DETAILS
WATER SUPPLY GOAL
SAN JOAQUIN RIVER LITIGATION SETTLEMENT

A. Project Title: Exeter I. D. Lemon Cove Station

B. Project Type: _____

1. Division wide	_____	1. Near-term	<u>X</u>
2. Integrated Regional	_____	2. Long-term	_____
3. Local	<u>X</u>		

C. Project Sponsor(s): Exeter Irrigation District

D. Project Description: Integrating local water supply for supplemental source

E. Goals and Objectives: To augment the District's Friant Division water supply to compensate for the loss of water due to River restoration efforts.

F. Project's Consistency with Settlement Objectives and Directives: _____

The project objectives are consistent with settlement objectives and those of the District's adopted Water Management Plan.

G. Estimated Water Recovery Capability:

1. Dry Year	_____	<u>0af</u>
2. Normal Year	_____	<u>1,000af</u>
3. Wet Year	_____	<u>0af</u>

H. Project Cost Estimate: _____ 400,000

Year basis: 2006

I. Implementation Schedule (Mo/Yr)

1. Planning	_____	2007
2. Agreement(s)	_____	2007
3. Design	_____	2008
4. Property (inc. R/W)	_____	2008
5. Construction	_____	2009
6. Operational	_____	2010

J. Legal/Regulatory Issues to be Addressed: _____

Bureau of Reclamation Approvals, NEPA, Exchange Agreements, Transfer Agreements

K. Legislative Issues to be Addressed: _____

None

L. Environmental Issues to be Addressed: _____

CEQA and NEPA

H. Project Cost Estimate: _____ \$10,000,000

Year basis: 2007

I. Implementation Schedule (Mo/Yr)

1. Planning	_____	Mar-07
2. Agreement(s)	_____	Oct-07
3. Design	_____	Dec-07
4. Property (inc. R/W)	_____	Jun-07
5. Construction	_____	Jun-08
6. Operational	_____	Jan-10

J. Legal/Regulatory Issues to be Addressed: _____

Bureau of Reclamation Requirements

NEPA issues, Place of Use, Transfers and Exchanges authorization

K. Legislative Issues to be Addressed: _____

Possible Federal Grant Funding.

L. Environmental Issues to be Addressed: _____

CEQA / NEPA Requirements

H. Project Cost Estimate: \$ 80 million

Year basis: 2006

I. Implementation Schedule (Mo/Yr)

1. Planning	<u>Ongoing since 2005</u>
2. Agreement(s)	<u>Ongoing since 2005</u>
3. Design	<u>2005-2008</u>
4. Property (inc. R/W)	<u>Complete</u>
5. Construction	<u>2007 (phase I)</u>
6. Operational	<u>2007-2009</u>

J. Legal/Regulatory Issues to be Addressed: _____

NEPA, CEQA and contractual issues with USBR, USF&WS, California Department of Fish and Game

K. Legislative Issues to be Addressed: Unknown

L. Environmental Issues to be Addressed: _____

NEPA and CEQA issues currently being addressed

PROJECT DESCRIPTION AND DETAILS
WATER SUPPLY GOAL
SAN JOAQUIN RIVER LITIGATION SETTLEMENT

A. Project Title: OCID In-District Groundwater Recharge / Recovery Program

B. Project Type: _____

1. Division wide	_____	1. Near-term	X _____
2. Integrated Regional	_____	2. Long-term	_____
3. Local	X _____		

C. Project Sponsor(s): Orange Cove Irrigation District

D. Project Description: _____

The District has investigated an in-district, in-lieu groundwater recharge program with the aid of a DWR Prop.13 grant. The District would provide incentives to landowners with adequate groundwater to take more surface water in normal and wet years, and relinquish their surface water allocation in dry years to those landowners with little or no groundwater. Participating landowners would require improvements to their groundwater wells to ensure their return capacity.

E. Goals and Objectives: _____

The goal is to firm up the reliability of dry year water supplies to the District's landowners by cooperatively utilizing all of the water supplies within the District. This program will be entirely driven by the District with the cooperation of its landowners, thus eliminating most outside uncertainties.

F. Project's Consistency with Settlement Objectives and Directives: _____

The potential program is entirely consistent with the Settlement Objectives and Directives in that it strives to mitigate the loss of water from increased flows in the river.

G. Estimated Water Recovery Capability:

1. Dry Year	_____	15 TAF
2. Normal Year	_____	af
3. Wet Year	_____	af

H. Project Cost Estimate: _____ \$300,000 (feasibility study,pilot projects,env.docs.)
\$750,000 (cost of up front well improvements only)

Year basis: 2007

I. Implementation Schedule (Mo/Yr)

1. Planning	5/04 - 9/08
2. Agreement(s)	7/08 - 9/08
3. Design	10/08 - 12/08
4. Property (inc. R/W)	N/A
5. Construction	1/09 - 7/09
6. Operational	8/09

J. Legal/Regulatory Issues to be Addressed:

None at this time.

K. Legislative Issues to be Addressed:

Funding will be required for additional feasibility studies which will include pilot programs to directly assess the true value and cost of the program to the District and grower.

L. Environmental Issues to be Addressed:

CEQA analysis required. Environmental effect of more fully utilizing the groundwater aquifer beneath the District will need to be reviewed.

PROJECT DESCRIPTION AND DETAILS
WATER SUPPLY GOAL
SAN JOAQUIN RIVER LITIGATION SETTLEMENT

A. Project Title: Tule River Intertie

B. Project Type: New Canal Construction / System Improvement

1. Division wide	_____	1. Near-term <u>X</u>
2. Integrated Regional	<u>X</u>	2. Long-term _____
3. Local	<u>X</u>	

C. Project Sponsor(s): Lower Tule River Irrigation District
357 E. Olive Ave
Tipton, CA 93292

D. Project Description:

The Tule River Intertie involves the construction of 2.25 miles of new canal and rehabilitation of .65 miles of existing canal. The current alignment of the District's distribution system does not allow for diversion of Tule River flood flows to the Southern half of the District. In addition, controlled releases of the District's pre-1914 water from Success Dam can only be delivered to 75% of the lands within the District. The purpose of the Intertie Project is to allow diversion of flood and controlled releases of the pre-1914 supply into the entirety of the District's distribution system. The Intertie project is complimented by the Success Reservoir Enlargement Project which will add approximately 35,000 acre-feet of storage to the existing conservation space. The SREP is scheduled for completion in 2011.

Project Specifics

The Tule River Intertie would begin at the Tule River Weir, proceed to the west through the Wood Central Canal, and then flow south through a new earthen canal connecting to existing District facilities until it terminated at the Casa Blanca Canal. This facility would require the construction of several road crossings under state and county maintained roads.

Due to state and county restrictions, construction contractors will most likely not be allowed to open cut the roads at Ave 152 and State Route 190 (Ave 144). Consequently the large diameter reinforced concrete pipe (RCP) that will be necessary for these crossings will likely be jacked and bored underneath these roads. Further, the District would be required to construct and/or modify several miles of large capacity canal, a road crossing on the Wood Central Canal, modifications to an existing weir structure, two large gated culverts (one for control of flows into the Wood Central Canal, and the other for control of flows into the Intertie) and headwalls for each culvert under a county

maintained road. Estimates of cost were generated for this alternative using unit prices provided by District staff using District equipment and manpower.

E. Goals and Objectives:

The goal of the project is to increase opportunities for the beneficial use of Tule River water by being able to divert flood and controlled releases into more of the geographic area of the District for both in-lieu and direct recharge

Objective: Reconstruct the Woods Central Diversion Structure (complete)

Objective: Construct the Tule River Intertie Canal

F. Project's Consistency with Settlement Objectives and Directives:

The Tule River Intertie is wholly consistent with the objectives and directives of the settlement. In order to accomplish the Water Supply Goal, the Friant Contractors must be given tools which increase their water management capabilities. The Intertie project allows the District to capture more water in wet years off the Tule River watershed. These efforts will allow for increased ability to meet water user needs in years when Lower Tule is required to forgo Friant Contract supply for restoration purposes.

G. Estimated Water Recovery Capability:

In a simulation of District operations, the Tule River Intertie over the period of consideration (WY 1994-2002) yielded an average annual amount of 11,850 acre-feet of Tule River water and a maximum amount of 23,900 acre-feet in simulated WY 1997. Both of these yield numbers reflect the combined total of recharge and irrigation demands. The average annual yield from the project, deliverable to irrigated agriculture, was approximately 7,090 acre-feet while the amount intentionally recharged was approximately 4,760 acre-feet.

1. Dry Year	<u>2,500</u> af
2. Normal Year	<u>11,850</u> af
3. Wet Year	<u>23,900</u> af

H. Project Cost Estimate: \$4,000,000

Diverting additional Tule River water would not cause the District any additional water costs. Conveyance costs are negligible due to this alternative's gravity conveyance system and the availability of existing District staff. The significant cost for this alternative is the annualized capital cost of constructing the Tule River Intertie and its road crossings. Construction costs totaling nearly \$4,000,000 would equate to an annualized capital cost of approximately \$330,000 at 6% interest over twenty years. This leads to a cost per acre-foot for this new yield of approximately \$46. This cost per acre-foot was calculated based on the average annual amount of water deliverable to irrigated agriculture, and excludes yield deliverable to intentional recharge

Year basis: 2003

I. Implementation Schedule (Mo/Yr)

1. Planning	90% Completed - July 2007
2. Agreement(s)	90% Completed – July 2007
3. Design	50% Completed – July 2007
4. Property (inc. R/W)	10% Completed – October 2007
5. Construction	0% Completed – July 2008 (with funding)
6. Operational	0% Project could be operational in 18 mos.

J. Legal/Regulatory Issues to be Addressed:

There are no anticipated legal or regulatory issues associated with the Tule River Intertie Project.

K. Legislative Issues to be Addressed:

The Tule River Intertie project does not have legislative issues to be addressed.

The Success Dam is currently undergoing a seismic remediation project. Complete utilization of the Intertie project cannot happen until the remediation project is completed, currently scheduled for 2011. The remediation project requires annual Army Corps of Engineers Appropriations.

L. Environmental Issues to be Addressed:

Construction of the canal will require the Lower Tule River Irrigation District to complete the CEQA process. CEQA is being done concurrently with the design phase of the project.

******NOTE******

The Tule River Intertie Cost and Feasibility Study was completed in 2003. The study provides additional information and supporting detail for the project. It can be made available upon request.

PROJECT DESCRIPTION AND DETAILS
WATER SUPPLY GOAL
SAN JOAQUIN RIVER LITIGATION SETTLEMENT

A. Project Title: Orange Cove Irrigation District/Tri-Valley Water District Consolidation

B. Project Type: _____

1. Division wide	_____	1. Near-term	X
2. Integrated Regional	X	2. Long-term	_____
3. Local	_____		

C. Project Sponsor(s): Orange Cove Irrigation District

D. Project Description: OCID and TVWD intend to merge into one district in order to share water supplies and reduce administrative costs. TVWD lands are already served by OCID's distribution system. OCID's Class 1 contract and TVWD's Cross Valley Canal Contract will be managed for the benefit of all lands. TVWD lands will gain the reliability of Class 1 water, while the OCID lands will gain access to CVC supplies during dry years. In addition, OCID will gain ownership in the Cross Valley Canal to facilitate the acquisition of CVP and non-CVP supplies from the west side and north of the Delta.

E. Goals and Objectives: _____

By commingling the districts' water supplies, the consolidated district will have more flexibility to meet the demands of all lands in all year types.

F. Project's Consistency with Settlement Objectives and Directives: _____

The potential program is entirely consistent with the Settlement Objectives and Directives in that it strives to mitigate the loss of water from increased flows in the river.

G. Estimated Water Recovery Capability:

1. Dry Year	_____	1-4 TAF
2. Normal Year	_____	af
3. Wet Year	_____	af

H. Project Cost Estimate: \$75,000 (Agreement/LAFCO / Validation Proceeding, etc.)

Year basis: 2007

I. Implementation Schedule (Mo/Yr)

1. Planning	<u>1/05 - 12/06</u>
2. Agreement(s)	<u>1/07 - 6/07</u>
3. Design	<u>N/A</u>
4. Property (inc. R/W)	<u>7/07 - 12/07</u>
5. Construction	<u>N/A</u>
6. Operational	<u>1/08</u>

J. Legal/Regulatory Issues to be Addressed:

The USBR will need to approve the transfer of TVWD's Cross Valley Contract to OCID as well as
the use of OCID's Class 1 contract supply on the TVWD land annexed into OCID. LAFCO
will also need to approve the annexation of TVWD land into OCID. In addition, the
regulatory/legal/environmental gauntlet surrounding the transportation of water through the Delta
must be run in order to significantly increase the amount of new water available to OCID.

K. Legislative Issues to be Addressed:

In order to increase the amount of Cross Valley water that can be brought into the Friant service
area, funding will be needed to assist in the construction of pump back facilities on the Friant-Kern
Canal to deliver Cross Valley water to Friant users at the bottom of the canal in exchange for supply
from Millerton Lake. In addition, funding for a Patterson recirculation facility will be required to fully
utilize the Cross Valley Canal capability being acquired by OCID. This will be essential to recapture
the water lost by OCID to river restoration.

L. Environmental Issues to be Addressed:

CEQA and NEPA analysis will be required.

PROJECT DESCRIPTION AND DETAILS
WATER SUPPLY GOAL
SAN JOAQUIN RIVER LITIGATION SETTLEMENT

A. Project Title: Orange Cove Irrigation District North of Delta Transfers

B. Project Type: _____

1. Division wide	_____	1. Near-term	X
2. Integrated Regional	X	2. Long-term	_____
3. Local	_____		

C. Project Sponsor(s): Orange Cove Irrigation District

D. Project Description: OCID intends to investigate the possibility of transferring water from north of the Delta in dry years to offset its losses from river restoration. The water will be acquired in the north, conveyed through the Delta, pumped into the California Aqueduct, conveyed to the Cross Valley Canal, conveyed in the Cross Valley Canal to the Friant-Kern Canal, and conveyed in the Friant-Kern Canal to districts in the lower reaches of the canal through a series of pump-back facilities. An agreement will be entered into with these districts to exchange the north of delta water for water in Millerton lake that can be delivered to OCID.

E. Goals and Objectives: _____

The goal is to bring in outside water from the northern portion of the state, which is historically wetter than the south, to mitigate the loss of OCID's water supplies to river restoration in dry years.

F. Project's Consistency with Settlement Objectives and Directives: _____

The potential program is entirely consistent with the Settlement Objectives and Directives in that it strives to mitigate the loss of water from increased flows in the river.

G. Estimated Water Recovery Capability:

1. Dry Year	up to 20 TAF
2. Normal Year	af
3. Wet Year	af

H. Project Cost Estimate: \$150,000 (Feasibility Study, _____ Env. Documentation)

Year basis: 2007

I. Implementation Schedule (Mo/Yr)

1. Planning	<u>1/07 - 12/08</u>
2. Agreement(s)	<u>1/09 - 6/09</u>
3. Design	<u>N/A</u>
4. Property (inc. R/W)	<u>N/A</u>
5. Construction	<u>N/A</u>
6. Operational	<u>7/09</u>

J. Legal/Regulatory Issues to be Addressed:

The USBR and DWR will need to facilitate the transfer of north of Delta water through their _____
facilities. Water rights issues will also need to be addressed.

K. Legislative Issues to be Addressed: _____

Funding will be required to assist in the feasibility study and environmental documentation. Issues _____
that will be identified in the feasibility study and may require legislative support include Delta _____
conveyance, water rights, pumping authority at Tracy and Banks, wheeling in the CA Aqueduct, _____
storage in the San Luis Reservoir, and power costs.

L. Environmental Issues to be Addressed: _____

CEQA and NEPA analysis will be required.

PROJECT DESCRIPTION AND DETAILS
WATER SUPPLY GOAL
SAN JOAQUIN RIVER LITIGATION SETTLEMENT

A. Project Title: Distribution System Expansion

B. Project Type: New Canal Construction / System Improvement

1. Division wide	_____	1. Near-term <u>X</u>
2. Integrated Regional	<u>X</u>	2. Long-term _____
3. Local	<u>X</u>	

C. Project Sponsor(s): Pixley Irrigation District
357 E. Olive Ave
Tipton, CA 93292

D. Project Description:

Pixley Irrigation District is not a Friant Contractor. The District depends on groundwater, transfers from Friant contractors, surplus wet year water and their Cross Valley Contract supply (31,102 a/f) to meet the consumptive irrigation demand of the lands within the District. Approximately 55% of the District's 70,000 acres can receive surface water. There are two large areas of the Pixley Irrigation District (District) that currently have no surface water distribution facilities. These areas include the area north of Ave 104 and east of Highway 99 within the District (northeastern area) and the area west of Highway 99 and north of Ave 112 (northwestern area). Feasibility studies prepared by the District identified potential ways to deliver surface water to areas within the District that currently aren't served and the challenges associated with each method of service. The total new service area to be served would exceed 12,000 acres. Delivery of water to these lands will reduce the outflow of groundwater from adjacent Friant contractors.

The options evaluated (alignments and facility types) were developed in conjunction with District staff. Design issues associated with these options were investigated at a reconnaissance level and feasibility level determinations of sizing and construction quantities were prepared for modifications to the District's existing distribution system as well as for new facilities.

The following options were selected as most feasible and constitute the project:

- **Eastside Improvement & Expansion** – Improvements to the Casa Blanca Canal (LTRID #1), the construction of a new Main Canal (flowing north to south) and a new distribution system with two new laterals that would serve approximately 8,030 additional acres. This option could also possibly tie the Casa Blanca Canal into the existing East Main Canal.

- **Westside Improvement & Expansion** – Improvements to the West Main Canal to improve deliveries up to Lateral #3, and the construction of a new distribution system with one new lateral (Lateral #4) that would serve approximately 4,500 additional acres.

The comparative seepage experienced prior to diversion into the District's conveyance system, the cost per acre over an assumed repayment period, and the total probable cost were determined for each option.

It appears that the construction of these facilities would help to reduce the groundwater overdraft experienced in the District, thereby slowing the outflow from adjacent Friant contractors. From recent groundwater readings (January and February 2004) it appears that in general, the further away from the District boundary you are in the District, the deeper the groundwater. All of the options considered would deliver surface water to a greater portion of the District and therefore help provide the opportunity to reduce groundwater overdraft if additional surface water supplies can be obtained.

E. Goals and Objectives:

The primary goal of the project is to provide additional opportunities for groundwater banking and recharge within the Friant service area. Further, the goal of the Expansion project is to increase groundwater recharge by delivering water to more of the lands in the District for both in-lieu and direct recharge. The project will also provide operational flexibility and further recharge opportunities by linking the distribution system of the Lower Tule River Irrigation District and the Pixley Irrigation District.

- Objective: Provide water service to an area of the District north of Avenue 104 and east of Highway 99 through new canal construction.
- Objective: Provide water service to an area of the District west of Highway 99 through connection to existing West Main Canal and construction of new canal system.
- Objective: Connect new service area to the southern and eastern section of the Lower Tule System through connection of expanded system to Lower Tule #1 Lateral.

F. Project's Consistency with Settlement Objectives and Directives:

The System Expansion Project is wholly consistent with the objectives and directives of the settlement. In order to accomplish the Water Supply Goal, the Friant Contractors must be given tools which increase their water management capabilities. The System Expansion project enables the District to deliver water to areas not currently able to receive surface water. Doing so will reduce groundwater pumping in the region thereby reducing the amount of groundwater overdraft within Pixley and the relative impacts to the surrounding Friant Contractors.

G. Estimated Water Recovery Capability:

The District is preparing a groundwater banking feasibility study to better identify storable quantities and recovery capabilities. The groundwater banking study is being submitted as a separate project in conjunction with the Delano-Earlimart Irrigation District.

H. Project Cost Estimate: \$14,000,000

Total probable costs were calculated for each option and include estimates for engineering, construction and contingencies. Construction costs for these options were prepared assuming that District forces would accomplish the work. No effort was made to separate out labor versus materials within these costs. Therefore, embedded in these construction costs are the regular salaries of District employees. These values were generated to provide an order of magnitude for construction costs per option, not to estimate the capital necessary for the District to expend in a construction effort.

The table below delineates cost for each portion of the project.

	Eastside Improvement – Including connection with LTRID system	Westside Improvement - Service from West Main Canal
Service Area	8,030 acres	4,500 acres
Total Probable Cost with Engineering and Contingencies	\$8.6 – \$8.7 million	\$5.1 – \$5.2 million
Projected Annual Capital Cost per Acre over 20 years at 6%	\$94 – \$95	\$100 – \$101

Year basis: 2006

I. Implementation Schedule (Mo/Yr)

- | | |
|------------------------|--|
| 1. Planning | 90% Completed - July 2007 |
| 2. Agreement(s) | 0% Completed – July 2008 |
| 3. Design | 10% Completed – July 2008 |
| 4. Property (inc. R/W) | 0% Completed – October 2008 |
| 5. Construction | 0% Completed – July 2009 (with funding) |
| 6. Operational | 0% Project could be operational in 36 mos. |

J. Legal/Regulatory Issues to be Addressed:

There are no anticipated legal or regulatory issues associated with the Pixley System Expansion Project

K. Legislative Issues to be Addressed:

The project does not have legislative issues to be addressed.

L. Environmental Issues to be Addressed:

Construction of the canal will require the Pixley Irrigation District to complete the CEQA process. CEQA will be done concurrently with the design phase of the project.

******NOTE******

The System Expansion Feasibility Study was completed in 2006. The study provides additional information and supporting detail for the project. It can be made available upon request.

H. Project Cost Estimate: _____ \$400,000

Year basis: 2007

I. Implementation Schedule (Mo/Yr)

1. Planning	Unknown
2. Agreement(s)	Unknown
3. Design	Unknown
4. Property (inc. R/W)	Unknown
5. Construction	Unknown
6. Operational	Unknown

J. Legal/Regulatory Issues to be Addressed: _____

None known at this time.

K. Legislative Issues to be Addressed: _____ None known at this time.

L. Environmental Issues to be Addressed: _____ None known at this time.

H. Project Cost Estimate: _____ \$2,000,000

Year basis: 2007

I. Implementation Schedule (Mo/Yr)

1. Planning	_____	Jan-08
2. Agreement(s)	_____	Jan-09
3. Design	_____	Jan-09
4. Property (inc. R/W)	_____	Jan-10
5. Construction	_____	Jan-10
6. Operational	_____	Jan-12

J. Legal/Regulatory Issues to be Addressed: _____

This project will have to address possible easement acquisition or any stream channel permits that will be required.

K. Legislative Issues to be Addressed: _____

No legislative issues will need to be addressed.

L. Environmental Issues to be Addressed: _____

Depending on the improvements to be made, the District may need to provide mitigation for site specific species of animals and/or plants. This will be addressed by following the necessary CEQA documentation for the project. The project will also have to address vegetation removal, river channel alterations and impacts to adjacent farm crops.

PROJECT DESCRIPTION AND DETAILS
WATER SUPPLY GOAL
SAN JOAQUIN RIVER LITIGATION SETTLEMENT

A. Project Title: Tulare Irrigation District SCADA Monitoring and Control Project

B. Project Type: Monitoring and Control Program

1. Division wide		1. Near-term		
2. Integrated Regional		2. Long-term	X	
3. Local	Tulare ID			

C. Project Sponsor(s): Tulare Irrigation District

D. Project Description: Tulare Irrigation District currently has a SCADA monitoring system located on a limited number of sites throughout the District. This project is intended to expand the system and identify strategic locations to install monitoring and control facilities to increase the flexibility of water delivery within the system. Once the locations have been identified the facilities will be designed and installed along with the necessary integration to link new monitoring and control to the existing SCADA system.

E. Goals and Objectives: _____

The goal of this project is to provide water users with the flexibility to receive water when required and apply water in the appropriate volume and flow rate. The District Watermaster can visually see in real-time what the system is doing and make adjustments to minimize the amount of water that is spilled outside of the District.

F. Project's Consistency with Settlement Objectives and Directives: _____

This project will increase the flexibility of water deliveries to water users in the District and hence provide the District with a means to reduce water that is spilled outside of the District. By conserving water that is typically lost, the District is creating a new water source to supplement water that will be diverted per the Settlement Restoration Objective.

G. Estimated Water Recovery Capability:

1. Dry Year		0 af
2. Normal Year		500 af
3. Wet Year		1,000 af

PROJECT DESCRIPTION AND DETAILS
WATER SUPPLY GOAL
SAN JOAQUIN RIVER LITIGATION SETTLEMENT

A. Project Title: Tulare Irrigation District Farm Efficiency Study

B. Project Type: Efficiency Study

1. Division wide		1. Near-term	X	
2. Integrated Regional		2. Long-term		
3. Local	Tulare ID			

C. Project Sponsor(s): Tulare Irrigation District

D. Project Description: Tulare Irrigation District encompasses approximately 62,000 of irrigable land. The District would conduct on-farm irrigation efficiency studies on selected properties to determine the efficiency of farming operations and find various ways to improve the efficiency of irrigation. The program will also help farmers identify and acquire funding assistance to improve farming operations that save water. Coordination with and assistance by the local NRCS Mobile Lab will be solicited.

E. Goals and Objectives: _____

The goal of this project is to analyze the farming operations within the district and determine ways to improve irrigation operations to conserve water.

F. Project's Consistency with Settlement Objectives and Directives: _____

As farmers improve irrigation applications the efficiency of water use will increase, and hence help reduce the amount of water that is wasted in excess of what crops or agricultural activities require. The water saved by improving operations will mean the District will see less water usage which will mean more water available.

G. Estimated Water Recovery Capability:

1. Dry Year	0 af
2. Normal Year	1,000 af
3. Wet Year	1,500 af

H. Project Cost Estimate: _____ \$400,000

Year basis: 2007

I. Implementation Schedule (Mo/Yr)

1. Planning	_____	Jan-08
2. Agreement(s)	_____	Jun-08
3. Design	_____	Jan-09
4. Property (inc. R/W)	_____	N/A
5. Construction	_____	N/A
6. Operational	_____	Jun-09

J. Legal/Regulatory Issues to be Addressed: _____

There are no foreseen legal or regulatory issues that will need to be addressed.

K. Legislative Issues to be Addressed: _____

No legislative issues will need to be addressed.

L. Environmental Issues to be Addressed: _____

There are no environmental issues that will need to be addressed.

PROJECT DESCRIPTION AND DETAILS
WATER SUPPLY GOAL
SAN JOAQUIN RIVER LITIGATION SETTLEMENT

A. Project Title: District Infrastructure Improvements

B. Project Type: Structure and System Rehabilitation Project

1. Division wide _____ 2. Integrated Regional _____ 3. Local <u>Tulare ID</u>	1. Near-term _____ 2. Long-term <u>X</u>
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C. Project Sponsor(s): Tulare Irrigation District

D. Project Description: Tulare Irrigation District has approximately 300 miles of canals within the District distribution system. The District would like to assess and identify structures and canal reaches that could be rehabilitated or improved to increase the efficiency of the system. System improvements can and will include automated gate installations, structure replacements, canal realignments, canal rehabilitation, etc.

E. Goals and Objectives: _____
The goal of this project is to identify locations within the District that can be improved to provide a more efficient system to deliver water to users. This improvements will help the District deliver water to farmers when water is requested and at the proper flow rate and volume. By increasing the efficiency the District will reduce the amount of water that is inefficiently applied to crops and reduce the amount of water spilled out of the District and unintentionally lost to seepage in regulation basins.

F. Project's Consistency with Settlement Objectives and Directives: By meeting the irrigation demand of farmers more efficiently the District hopes to reduce the occurrence of water that spills outside of the District. In this manner the program will help create a water savings that will substitute for the water diverted for the Settlement Restoration Objective.

G. Estimated Water Recovery Capability:

1. Dry Year	<u>0 af</u>
2. Normal Year	<u>500 af</u>
3. Wet Year	<u>1,000 af</u>

H. Project Cost Estimate: _____ \$2,500,000

Year basis: 2007

I. Implementation Schedule (Mo/Yr)

1. Planning	_____	Jan-08
2. Agreement(s)	_____	Jun-08
3. Design	_____	Jan-09
4. Property (inc. R/W)	_____	N/A
5. Construction	_____	Jan-10
6. Operational	_____	Jan-12

J. Legal/Regulatory Issues to be Addressed: _____

There are no foreseen legal or regulatory issues that will need to be addressed.

K. Legislative Issues to be Addressed: _____

No legislative issues will need to be addressed.

L. Environmental Issues to be Addressed: _____

Depending on the location of each of the improvements to be made, the District may need to provide mitigation for site specific species of animals and/or plants. This will be addressed by following the necessary CEQA and/or NEPA documentation for the project.