

SYSTEM OPTIMIZATION REVIEW FOR THE POSO CREEK INTEGRATED REGIONAL WATER MANAGEMENT PLAN REGION

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ABSTRACT

This paper provides an overview of the Poso Creek Integrated Regional Water Management Plan (IRWMP or Plan) and the System Optimization Review (SOR) being conducted for the Plan's Region. SORs are a component within the U.S. Bureau of Reclamation's *Water for America* program.

The Region contains six agricultural water districts with about 350,000 of irrigated cropland out of a gross area over 500,000 acres. The managed water supplies for the districts include:

- ✓ Local: Kern River, Poso Creek, and the common groundwater basin
- ✓ State: State Water Project via the California Aqueduct
- ✓ Federal: Central Valley Project via the California Aqueduct and the Friant-Kern Canal

The recent regulatory and hydrologic droughts in California are causing a decrease in water reliability of the managed supplies available to the Region. The result is a projected average annual loss of supply to the Region, which has brought this group of districts together to leverage their individual water supply and infrastructure assets as a *region*. Since the Region is located at the “crossroads” of the California Aqueduct, Friant-Kern Canal, and the Kern River, it is an ideal location for regional conjunctive management.

The SOR is to (1) prioritize the implementation of structural water management measures for the Region, and (2) identify and resolve institutional constraints to exchanges between districts and thereby enhance the use of available district groundwater banking capacity and facilities. Conducting the SOR enhances the districts' shared approach to Plan implementation and sound stewardship of the Region's surface water and groundwater resources.

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INTRODUCTION AND BACKGROUND

The Poso Creek Region is located in north Kern County and southern Tulare County of the Southern San Joaquin Valley, California as shown in Figure 1. It is a rich agricultural area with a crop value in 2009 expected to be on the order of \$2 billion. The rich soils, climate, and irrigation water make it possible to grow a variety of crops, with the largest value crops being almonds, pistachios, vegetables, alfalfa, and grapes, which are sold worldwide.

The Regional Water Management Group (RWMG) was formed in March, 2005, and includes six special districts and one resource conservation district. The RWMG is an experienced group of water managers.

- Semitropic Water Storage District – Lead Agency
- Cawelo Water District
- Delano-Earlimart Irrigation District
- Kern-Tulare Water District
- North Kern Water Storage District
- Shafter-Wasco Irrigation District
- North West Kern Resource Conservation District

The RWMG completed and adopted an Integrated Regional Water Management Plan in July 2007. The RWMG, Stakeholders, and Plan Participants continue to meet monthly to coordinate Plan implementation activities.

The purpose of the Plan is to provide a framework for (1) coordinating groundwater and surface water management activities through regional objectives, and (2) implementing the measures necessary to meet those objectives.

The RWMG districts overlie a common groundwater basin identified by the California Water Resources Control Board as the Poso Creek Hydrologic Unit of the Tulare Lake Basin Hydrologic Area located in the northerly portion of Kern County and southerly portion of Tulare County. All communities within the Region rely on the common groundwater basin for their drinking water supply. Environmental water users rely on the same common groundwater and surface water supplied from the same sources as the districts who deliver water for irrigation.

The Region has a very unique location regarding water supply and this is a very valuable asset, not only to the Region but to California. The assets include a very large groundwater basin, with surface water from several sources, including Poso Creek, Kern River, the Federal Central Valley Project (CVP), and the State Water Project (SWP).

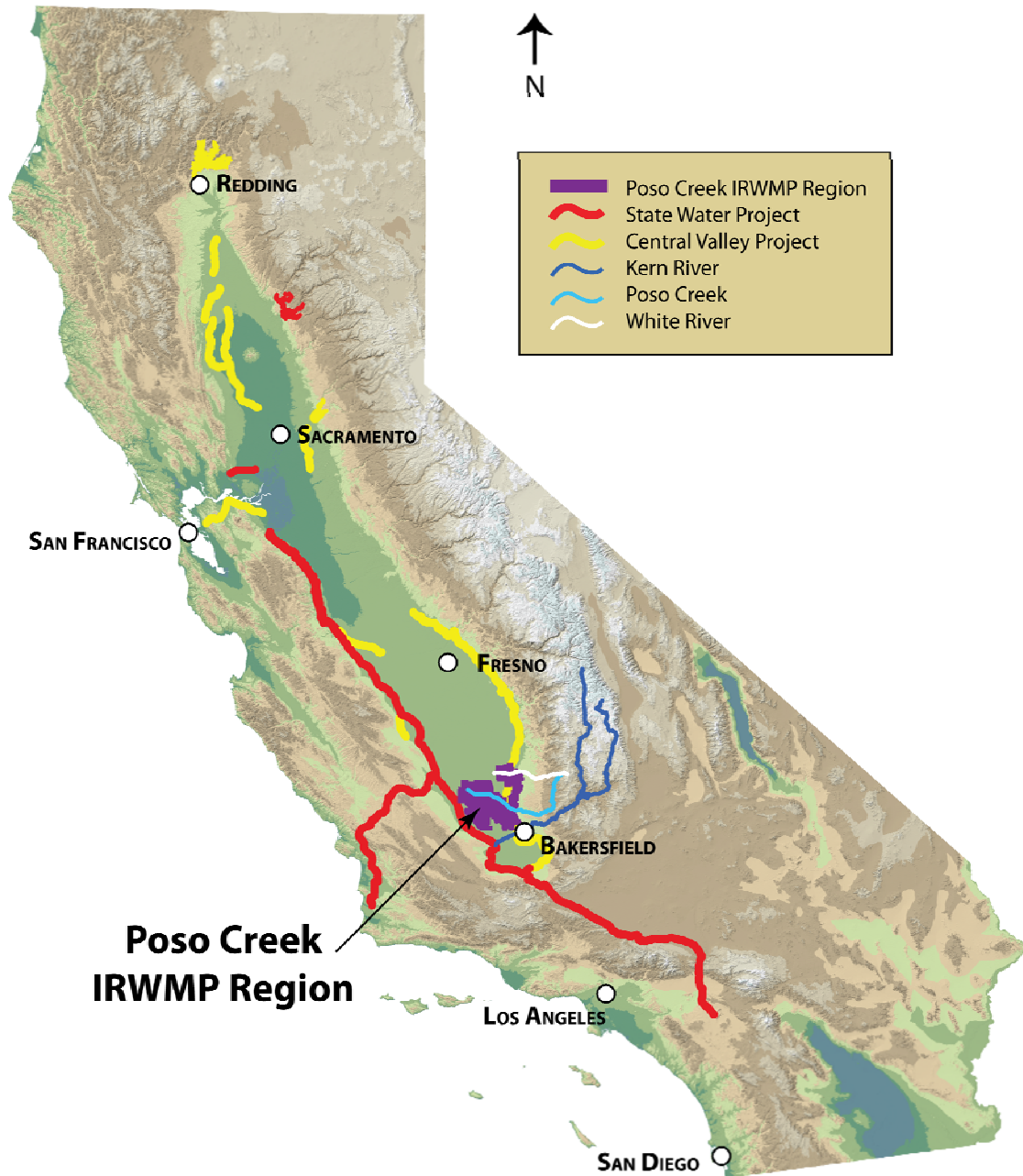


Figure 1. Location of Poso Creek IRWMP Region

The reliability of the surface water supplies available to the Region are under attack. Water reliability of the managed supplies available to the Region has or will decrease due to (1) the court-ordered reduced pumping south of the Sacramento-San Joaquin Delta, (2) implementation of the San Joaquin River Settlement, which affects the timing for delivery of CVP supplies, (3) storage restrictions imposed by the Corps of Engineers on Isabella Reservoir to address dam safety issues that will reduce the capacity to regulate Kern River supplies during wet years, and (4) the expiration of long-term Kern River water supply contracts.

Upon meeting as a group, it became apparent that the reliability of water supply can be increased by operating cooperative programs among the districts. The primary goal is to increase the sharing of facilities and sources of supply so that when water is available, the maximum quantity of surface water can be absorbed in the area to replenish the groundwater. With the three principal surface water sources, this can be accomplished by cooperation, joint use of facilities, added interconnections, and institutional agreements.

Because the RWMG members share the common features and interests, water management programs can be accomplished which help to meet their overarching goal of making water supplies to the Region more reliable. Several water banking and exchange agreements have been accomplished as a result of the interconnections and communications afforded by the Plan feasibility studies and forums. Specific examples include moving wet-year water into areas that have extra absorptive capacity in order to get water back in future dry years.

PLAN FINDINGS AND CONCLUSIONS

While the Plan includes a number of findings, the overriding conclusion is that surface water supplies available to the Region will be significantly reduced in the future (relative to historical conditions) and that there will be a corresponding decline in groundwater levels as groundwater is used to make up the reduction in surface water supplies if actions are not taken. This decline will result in an increase in the use of power and energy resources to pump groundwater, creating both an environmental and economic burden. This economic burden will be felt by all uses that rely in whole or in part on pumped groundwater — whether agricultural, environmental, municipal, or industrial. While the *common groundwater basin* is the reason that all overlying uses will feel the impact, it is also the reason that anything that is done to offset declines in water levels, such as projects identified in the Plan, will benefit all uses. As a generalization, the Plan contemplates projects, both structural and non-structural, that will allow the agencies within the Region to maximize the use of their contract water supplies and other supplies that may be available from time to time. In particular, these projects provide the means for coordinating the assets, needs, and operations of the agencies within the Region, with the end result being improved *water supply reliability*.

The *findings and conclusions* include ...

- ✓ The Region has a water supply problem (with the long-term average annual reduction in surface water supplies projected to be on the order of 100,000 acre-feet).
- ✓ By working together, the problem can be reduced but not eliminated, at least with currently available supplies.
- ✓ The Regional Water Management Group is the right forum for working together.
- ✓ Priority should be given to enhancing conveyance between and within districts.
- ✓ Both structural and non-structural measures are required.
- ✓ Non-structural measures include ...
 - An organizational structure and environmental compliance framework that allows for exchange and banking approvals to be in place to take advantage of unregulated and unscheduled water supplies that are available from time to time, often on short notice.
 - The necessary environmental and institutional approvals to move water from different sources within the Region; these approvals are required to maximize the utility of the Region's assets and thereby maximize water supply and reliability to the Region.
 - A means of maintaining equity between districts within the Region, in terms of water and/or dollars.
- ✓ Structural measures include one or more connections between ...
 - The Calloway and Lerdo canals.
 - North Kern Water Storage District and Shafter-Wasco Irrigation District.
 - Shafter-Wasco Irrigation District and Semitropic Water Storage District.
 - The Calloway and Cross Valley canals.
- ✓ Need to maximize use of available surface water supplies through the use of existing absorptive capability by coordinating mismatches between supply and demand with the Region, i.e. matching supply that exceeds demand in one district with demand that exceeds supply in another district. This applies to both irrigation absorptive capability as well as spreading absorptive capability.

- ✓ Consider development of additional third-party water-banking arrangements that bring more water into the Region than the Region is obligated to return (such as is the case with an unbalanced banking program) and/or bring dollars into the Region that can be used to help purchase waters of opportunity and/or build new distribution and recharge capability.
- ✓ Support improving water supply reliability from the Sacramento-San Joaquin Delta.
- ✓ Support implementation of the *water management goal* of the San Joaquin River Settlement.
- ✓ Support the restoration of lost capacity in the Friant-Kern Canal as well as expanded capacity, in order to maximize the use of contract supplies.

PLAN IMPLEMENTATION AND SYSTEM OPTIMIZATION REVIEW

The RWMG formulated and prioritized projects to implement within the Region, consisting of both non-structural and structural water management measures. Locations of the structural measures and the status of each proposed water management measure are indicated on Figure 2.

The purpose of the System Optimization Review (SOR) is to further evaluate the water management measures identified in the Plan. The SOR builds on the initial assessment of the water management improvements presented in the Plan, which included both non-structural and structural measures.

Through the following tasks, the SOR is designed to move Plan implementation forward.

- working to resolve the non-structural, institutional constraints that now hinder long-term water exchanges and banking of state and federal water supplies available to the Region,
- improving the quantification of benefits, in terms of the amount of water that non-structural measures and individual structural projects can provide to the Region, and
- evaluating the cost of each individual project.

SUMMARY

- Water supply reliability and potential for conflict within the Region have worsened due to recent events, such as the federal court order restricting pumping south of the Sacramento-San Joaquin Delta. The RWMG is faced with re-regulating their local, state, and federal water supplies in an effort to reduce the

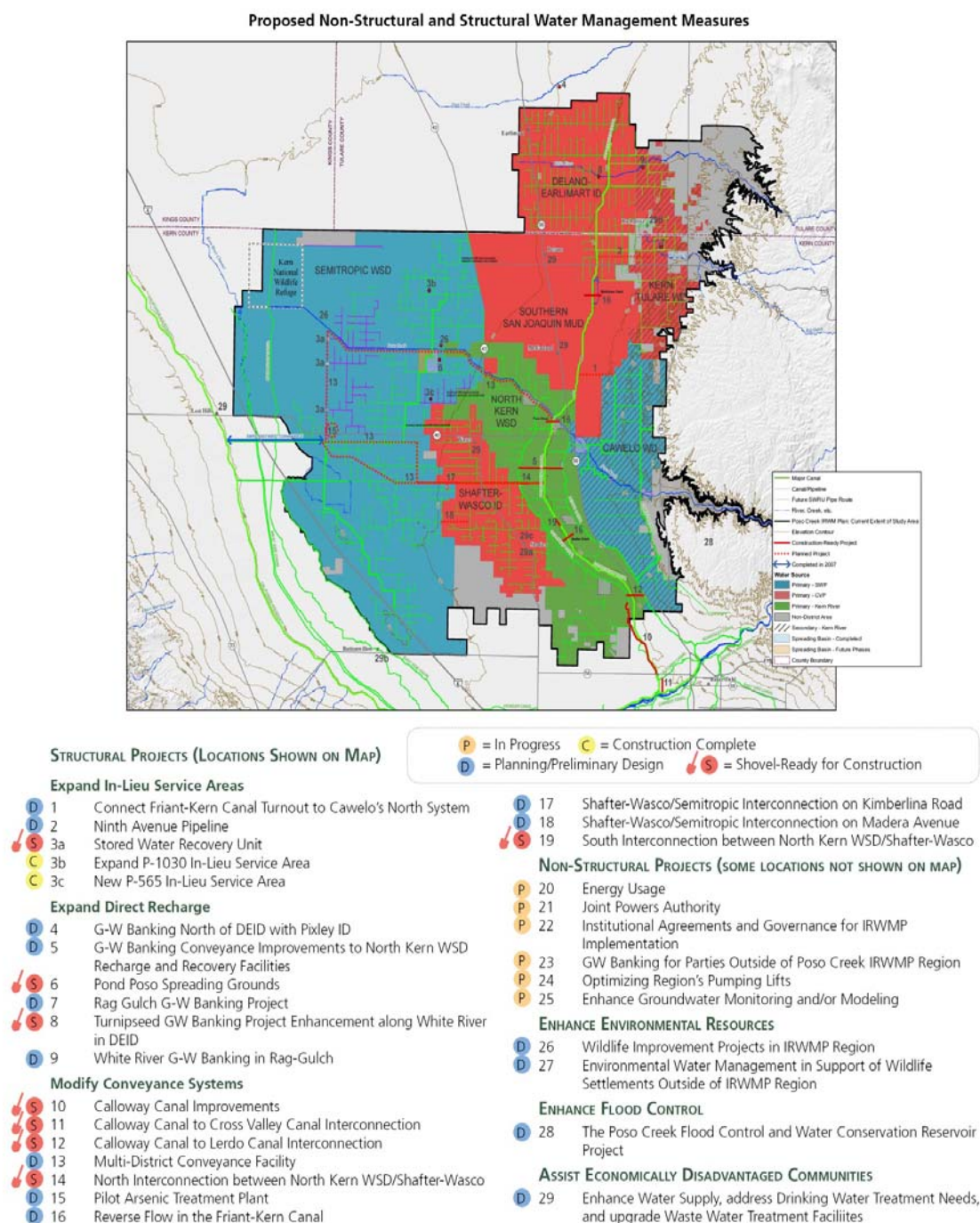


Figure 2. Proposed Water Management Measures

impacts of these events on the common groundwater basin. The RWMG is concerned with maintaining water supply reliability as they respond to the following issues:

- court-ordered reductions on pumping South of the Sacramento-San Joaquin Delta,

- San Joaquin River Settlement, and
- storage restrictions imposed by the Corps of Engineers on Isabella Reservoir (which regulates Kern River water) to address dam safety issues.

All of these concerns lead to a loss of surface water supply to the Region as compared to their historical use of supplies. These concerns also lead to an increased capital cost for additional infrastructure needed to manage wet-period water supplies and an increased operating cost due to increased energy use to lift groundwater to match the timing of the crop's water demand. The districts are faced with implementing water management measures to help offset the loss of their surface supplies. The loss of their surface supplies will lead to a lowering of the water table as the region goes out of "balance" in comparison to the historical, 25-year period of equilibrium between surface water supplies and groundwater elevations. Reductions in surface water inflow results in increased demand on and reduced recharge to the common groundwater basin.

The *Water 2025 SOR for the Poso Creek IRWM Plan Region* is building upon the water supply operations study conducted in the Plan. The Plan's operations study evaluated the existing absorptive capacity of each district – the capacity of each district to utilize or store available surface water. Based on the above-mentioned water supply issues, the operations study projected a loss of surface water supply to the Region of over 100,000 acre-feet per year in comparison to the previous 25-year period; this assessment was prior to Judge Wanger's decision of September 2007, that significantly, further reduced pumping south of the Sacramento-San Joaquin Delta.

During the Poso Creek Plan formulation and monthly discussions, two common themes emerged:

- a sense of shared responsibility on the part of the member districts and the RWMG for sound stewardship of the Region's surface water and groundwater resources, and
- recognition that water management conflicts can only be avoided through regional collaboration and cooperation with the larger Valley-Wide planning effort for the Southern San Joaquin Valley and with state and federal agencies.

The RWMG recognizes that water management improvements and institutional changes will take time. Offsetting the projected loss of surface water supply to the Region and avoiding future conflict is the driving force that has brought the RWMG together and is the shared focus as they implement their Plan. The planning and implementation efforts have succeeded in bringing the district managers together on a regular monthly basis to discuss water management operations under both wet-year and dry-year conditions. The result of this dedicated communication is a collection of water management strategies that are being implemented as funding permits.

Conducting the SOR allows the RWMG to work towards resolving the institutional constraints and to evaluate system operations in more detail as they implement the water management measures. It also allows the RWMG time to refine the quantities of water to be developed by each water management measure for use in more detailed economic evaluation of each project.