# CHAPTER 4. PROBLEMS, NEEDS, AND OPPORTUNITIES

This chapter describes major identified water resources problems, needs, and opportunities in the study area. Water resource problems, needs, and opportunities provide a framework for plan formulation and help establish objectives that a project would attempt to meet. Water resources problems in the San Joaquin Valley are associated with changing water needs, hydrologic variations in water availability, and the capacity of current water storage and conveyance facilities.

## PROBLEMS AND NEEDS

Problems and needs to be addressed by the Investigation were identified in the CALFED ROD and from stakeholder input. The primary purposes for developing and managing additional water supplies from the upper San Joaquin River basin identified in the CALFED ROD include contributing to restoration of the San Joaquin River; improving water quality in the San Joaquin River; and facilitating conjunctive water management and water exchanges that improve the quality of water deliveries to urban communities. These problems form the basis for initial plan formulation. All three problems could be addressed by increasing water supply reliability in the upper San Joaquin River basin through the development and management of additional water supply. This section describes water resources problems and needs for the Investigation in greater detail.

**Problems and Needs**

- San Joaquin River ecosystem
- San Joaquin River water quality
- Water supply reliability

**Opportunities**

- Flood control
- Long-term EWA water supply
- Hydropower generation
- Recreation

### San Joaquin River Ecosystem

The reach of the San Joaquin River from Friant Dam to the Merced River confluence does not currently support a continuous natural riparian and aquatic ecosystem. Friant Dam was authorized and is operated to support two primary purposes: irrigation and M&I water supplies, and flood protection. Since completion of Friant Dam, most of the water in the river has been diverted for agricultural and M&I uses, with the exceptions of releases to satisfy riparian water rights upstream of Gravelly Ford and flood releases. Consequently, the reach from Gravelly Ford to Mendota Pool is often dry.

Flow in the San Joaquin River from Mendota Pool to Sack Dam contains Delta water for delivery to the San Luis Canal Company and wildlife refuges. Between Sack Dam and the confluence with Salt Slough, the primary source of flow in the San Joaquin River is groundwater seepage from adjacent agricultural lands. The reach from Sack Dam to Bear Creek is operationally dry, but it benefits from managed wetland development, whereas marshes have been drained between Bear Creek and the Merced River. Lack of reliable flows and poor water quality in the San Joaquin River result in generally unhealthy ecosystem conditions.

During the past few decades, societal views toward the ecosystem health of rivers in the Central Valley and elsewhere in the nation have changed. This shift in viewpoint is evident in the numerous programs addressing ecosystem restoration in the Central Valley and along the San Joaquin River as well as in ongoing litigation between a coalition of environmental interests represented by NRDC, and Reclamation and FWUA *(NRDC v. Rodgers)*. For several years, NRDC and FWUA considered various river restoration ideas that could be used as part of a settlement of *NRDC v. Rodgers*. On August 27, 2004, the U.S. District Court, Eastern District of California, found that Friant Dam has been operated in violation of California Fish and Game Code Section 5937, which requires that water be released from a dam to maintain downstream fish in good condition. The ruling specified that a remedy to the violation will be determined at a later date.

As indicated in **Chapter 2**, several ongoing studies are considering flow and water quality requirements and river channel modifications that would be needed to support a variety of river restoration objectives. Specific water quantity and temperature requirements to support San Joaquin River restoration have not been finalized. In all cases, however, restoration of the San Joaquin River would require the release of additional water supplies from Friant Dam. For some potential restoration plans, water released from Friant Dam would need to be at or below specified temperatures to support fishery requirements and not adversely affect anadromous fishery conditions in the lower San Joaquin River downstream of the confluence of the Merced River.

## San Joaquin River Water Quality

As described in **Chapter 3**, water quality in various segments of the San Joaquin River has been a problem for several decades due to low flow and discharges from agricultural areas, wildlife refuges, and M&I treatment plants. **Table 3-5** summarizes the types of pollutant stresssors that have been identified in each reach of the San Joaquin River from Mendota Pool to the Delta.

Regulatory requirements for water quality in the San Joaquin River have been developed for downstream areas and are under development for upstream areas. Initial locations of concern for water quality include areas near Stockton and at Vernalis, downstream of the Stanislaus River as the San Joaquin River enters the Delta. Over time, requirements for water quality in the river have become more stringent and the number of locations along the river at which specific water quality objectives are identified has increased.

In 1998, the Central Valley RWQCB adopted a WQCP for the Sacramento and San Joaquin river basins (Basin Plan) as the regulatory reference for meeting Federal and State requirements. The Basin Plan lists existing and potential beneficial uses of the lower San Joaquin River, including agricultural uses, M&I uses, recreation, fishery migration and spawning, and wildlife habitat. Specific water quality standards associated with the lower San Joaquin River apply to boron, molybdenum, selenium, dissolved oxygen, pH, pesticides, and salinity as measured at Vernalis and other locations along the San Joaquin River as it enters the Delta. The Basin Plan is undergoing a triennial review for beneficial use and water quality standard updates.

One of the high priority issues of the Basin Plan review is the regulatory guidance for TMDL standards at locations along the San Joaquin River. Section 303(d) of the Federal Clean Water Act requires the identification of waterbodies that do not meet, or are not expected to meet, water quality standards, or are considered impaired. The current 303(d) list (1998) identifies Mud and Salt sloughs and the San Joaquin River from Mendota Pool downstream to Vernalis as impaired waterbodies.

The Clean Water Act further requires developing a TMDL for each listing. The Basin Plan (including TMDL allocation) is subject to future review and revision. Although it is likely that future versions will address more restrictive water quality objectives than the current version, existing water quality objectives will be used in the Investigation. Additional water supplies and other land and water use management practices are needed to address water quality problems in the San Joaquin River.

## Water Supply Reliability

The Friant Division of the CVP provides surface water supplies to many areas that also rely on groundwater. As described in **Chapter 3**, the Friant Division was designed and is operated to support conjunctive water management to reduce groundwater use in the eastern San Joaquin Valley. Although the surface water deliveries from Friant Dam help reduce groundwater pumping and contribute to groundwater recharge, the groundwater basins in the eastern San Joaquin Valley remain in a state of overdraft in most years (i.e., more groundwater is pumped out than is replenished either naturally or artificially).

As discussed in **Chapter 3**, surface water supply reliability problems are associated with large hydrologic variations in water availability from year to year and the limited capacity of current water storage and conveyance facilities. As a result, the continued general downward trend of groundwater levels reveals that significant water supply reliability problems remain.

In an effort to reduce groundwater overdraft in the eastern San Joaquin Valley, FWA and MWD are exploring opportunities to increase water supply reliability to the Friant Division and improve the quality of water deliveries to urban areas through water exchanges involving Friant and Delta water supplies. Preliminary findings by FWA and MWD suggest that limited opportunities exist to increase water supply reliability with these exchanges without the development and management of additional water from the San Joaquin River. These findings are consistent with the recommendation in the CALFED ROD to consider how additional storage could facilitate additional conjunctive management and exchanges to increase the delivery of high quality water to urban areas.

Future operations of the Friant Division are anticipated to be similar to recent historic operations. Water supply reliability in some areas of the Central Valley will continue to be lower than historical levels and future long-term average water deliveries will likely be less than full contract amounts.

## OPPORTUNITIES

CALFED documents also indicate that opportunities to address other regional water resources needs should be considered in the evaluation of potential projects. **Table 3-1** of the CALFED EIS Implementation Plan states that local participation is desired in the Upper San Joaquin River Basin Storage Investigation to identify how additional storage would improve flood protection and improve the conjunctive management of surface water and groundwater resources. Local input provided prior to and during scoping suggested the Investigation should consider opportunities for flood damage reduction, power generation, and recreation, to the extent possible. This section describes other potential water resources opportunities that could be addressed through development and management of San Joaquin River supplies.

### Flood Control

Flood operations at Friant Dam are based on anticipated precipitation and snowmelt runoff and the operations of upstream reservoirs. Flood releases from Friant Dam are maintained, when possible, at levels that could be safely conveyed through the San Joaquin River and Eastside Bypass. Generally, flood operations target releases at or below 8,000 cfs downstream from Friant Dam. Major storms during the past two decades have demonstrated that Friant Dam, among many other Central Valley dams, may not provide the level of flood protection that was intended at the time the flood management system was designed. January 1997 flood flows of nearly 60,000 cfs from Friant Dam resulted in levee failures and extensive downstream flooding.

As part of the Comprehensive Study for the Sacramento and San Joaquin River Basins (Comprehensive Study), the United States Army Corps of Engineers (Corps) prepared a post-flood assessment of system performance during four major floods in the last two decades. The study found that Friant Dam was effective in reducing damages during floods, but that significant damages were still experienced (Corps, 2002) during recent flood events, as summarized in **Table 4-1**. The Comprehensive Study also developed a set of system-wide tools to simulate flood system performance for the entire San Joaquin River Basin. As described in the **Flood Damage Reduction TA** to this report, without-project conditions for the study area include expected annual damages from flooding of $29.0 million in the San Joaquin River basin.

**TABLE 4-1.**
**RECENT FLOOD DAMAGES IN THE SAN JOAQUIN RIVER BASIN**

| County | 1983 ($1,000)[1] | 1986 ($1,000)[1] | 1995 ($1,000)[1] | 1997 ($1,000)[1] |
|---|---|---|---|---|
| Fresno | 13,424 | 1,290 | 21,236 | 5,414 |
| Kern | 11,934 | ----- | 22,966 | ----- |
| Kings | 97,968 | ----- | 2,484 | 38,857 |
| Madera | 40,300 | 248 | 2,299 | 4,187 |
| Merced | 614 | 70 | 38,854 | 8,180 |
| San Joaquin | 122,772 | 13,738 | 4,499 | 79,455 |
| Stanislaus | 12,887 | ----- | 52,447 | 78,362 |
| Tulare | 24,731 | 20 | 48,515 | 8,836 |
| **Total** | **$324,630** | **$15,366** | **$193,300** | **$223,291** |

Notes:
[1] Damages reported in thousands of dollars for year of flood (1983, 1986, 1995, 1997); Source: Corps, 2002

## Water Supply for Long-Term EWA

The Bay-Delta is the largest estuary on the West Coast and provides essential habitat for a diverse array of fish and wildlife. A variety of factors have contributed to the decline of fish species in the Delta, including loss of habitat and water resources development, resulting in the listing of these species as threatened or endangered. Because the Delta is unlikely to return to known historic conditions, Delta fisheries recovery will depend on continued legal mandates as well as operational mechanisms to ensure success in the face of continually changing conditions.

Several programs and practices to address Delta fisheries have been developed in response to ESA listings, the CVPIA, and other regulatory requirements. These programs, which include CVPIA (b)(2), SWQCB D1641, VAMP and EWA, allow water managers to meet and/or exceed regulatory requirements contained in the biological opinions.

Water deliveries from the Delta have been curtailed in recent years to help protect threatened and endangered fish populations and their habitat. However, while pumping curtailments and other actions in the Delta have been beneficial to fish, they often have adverse impacts on cities, farms, and businesses that depend on water supplies pumped from or through the Delta. As described in **Chapter 2**, the EWA was developed to provide water managers with additional flexibility in meeting or exceeding regulatory requirements in the Delta without uncompensated losses to water users.

It is expected that, under without-project future conditions, CVP and SWP pumping at Banks and Tracy will increase to meet south of Delta demands, resulting in greater impacts to Delta fisheries and the potential for more frequent pumping curtailments. Consequently, it is also likely that the long-term EWA, or a similar program, will continue to operate in the future to allow fisheries actions in the Delta without adverse impacts to urban and agricultural water users.

Currently, the short-term EWA Program relies primarily on water acquisitions to obtain water supplies. However, there is a great deal of uncertainty associated with the future of the California water market in the face of ever-growing demands in the state. Increased competition for limited water supplies will likely drive up the cost of water on the open market in the future. For an acquisitions-based program such as the EWA, the increasing cost of water would be compounded by future budget constraints.

As described in **Chapter 3**, the Friant Division generally operates independently from the South-of-Delta export area. Because potential restoration or water quality flows in the San Joaquin River could provide a water supply to Mendota Pool, there is an opportunity to evaluate if the development and management of additional water supplies from the upper San Joaquin River could provide less costly water to the EWA or a similar long-term program.

## Hydropower

Hydropower long has been an important element of power supply in California. On average, hydropower generation constitutes between 10 to 27 percent of California's annual energy supply, depending on the type of water year. The United States receives between 7 and 12 percent of its electricity from hydropower. Due to its ability to rapidly increase and decrease power generation rates, hydropower often has been used to support peak power loads in addition to base power loads.

As population, industry, and associated infrastructure growth occurs in the future, demands for power will also increase. Although some new power generation capacity likely will be developed in California during the next few decades, it is expected that additional new generation capacity will still be required. The Investigation will consider opportunities for additional hydropower generation capacity in association with the development and management of San Joaquin River water supplies.

## Recreation

Demands for water-oriented recreational opportunities in the San Joaquin River basin are high. Some of these demands are served by reservoirs on the western slope of the Sierra Nevada Mountains. As population increases in the San Joaquin Valley, demands for water-based and land-based recreation are expected to increase.