| | |
|---|---|
| COMMITTEE AGENDA ITEM: | “E” for 11 January 2011 |
| ACTION NEEDED: | *Consider Whether the LSJR Committee is Capable of Preparing an Adequate Section of the Basin Plan Amendment Describing the Existing Basin Problem that Prompted the Basin Plan Amendment for Salinity and Boron on the San Joaquin River* |
| BACKGROUND: | The LSJR Committee will be requested to provide input on several issues during the development of the Substitute Environmental Document (SED) or staff report for CEQA compliance. One of the sections that will be requested will be a “Basin Description and Problem Statement (Why We Are Doing This)”. The LSJR Committee needs to be clear in this section on why we are doing this effort and the reasons for it. Two Committee Members have started a write-up for this section (Attachment 1 ) but need input from the other LSJR Committee members as to whether this is the way they want to go or should this be left to a contractor. |
| ISSUES: | Does the LSJR Committee feel there is adequate information available to prepare such a description and problem statement?<br><br>What issues would the LSJR Committee like to see covered in such a document (irrigation, urban, and agricultural development, wildlife protection needs, changes in water quality and why, and drainage development, etc)?<br><br>Is the LSJR Committee capable of preparing the baseline description of the basin and the existing water quality problems for salinity and boron that is needed for the SED or staff Report?<br><br>Is the LSJR Committee capable of managing the preparation of the baseline description of the basin and the existing water quality problems for salinity and boron that is needed for the SED or staff Report?<br><br>What sources of information would the LSJR Committee feel comfortable in using for such a write-up?<br><br>Do the LSJR Committee members see any controversy that is likely to arise during the preparation of such a document? How would the LSJR Committee settle differences?<br><br>How do the LSJR Committee members want to proceed? |

## SAN JOAQUIN RIVER BASIN

Water supply and irrigation development in the San Joaquin Valley and the Valley hydrologic and geologic characteristics are the principal reasons the Valley struggles with salinity management. The San Joaquin Valley is actually made up of two distinct and different hydrologic basins; the San Joaquin River Basin and the Tulare Lake Basin (Figure 1). The Tulare Lake Basin is a closed basin south of the San Joaquin River Basin and water only flows into the San Joaquin River Basin during high flood events. The San Joaquin River Basin on the other hand has an outlet to the Ocean. The San Joaquin River Basin (Basin) includes the entire area drained by the San Joaquin River. The San Joaquin River Basin drains 13,513 $mi^2$ (35,000 $km^3$) before it flows into the Sacramento-San Joaquin Delta near the town of Vernalis. The Merced, Tuolumne and Stanislaus rivers are the three major tributaries that join the mainstream San Joaquin from the east before it flows into the Delta.

The San Joaquin River Basin is made up of three primary geologic zones; the western flank of the Sierra Nevada, the eastern flank of the Coast Range and the valley floor. The Sierra Nevada Mountains ring the eastern side of the valley floor and rise in elevation to over 4,000 m (13,000 ft). The Coast Range that lines the western edge of the Basin is much lower in elevation up to 1,830 m (6,000 ft). The valley floor lies between these two mountain ranges.

The San Joaquin River flows from the Sierra Nevada Mountains onto the valley floor near Fresno in an east to west direction. Near the valley trough, the River makes an abrupt turn north and flows 160 km (100 mi) to the Sacramento-San Joaquin Delta. At the point where it turns north, the San Joaquin River essentially divides the valley floor into an east and west side. There are only intermittent flows from the eastern flank of the Coast Range.

The Sierra Nevada Mountains are the primary source of both the valley's water supply and the alluvial material that forms the eastern side of the valley floor and along the San

Joaquin River as it moves through the valley trough. The Coast Range provides the alluvial material for a major portion of the western side of the River. The geology of each of these mountain ranges has had a marked influence on the valley floor sediments and salinity. The granitic deposits from the drainage of the western slope of the Sierra Nevada Mountains have created large alluvial fans of low salinity well sorted gravels and sands on the eastern side of the Basin. This has resulted in coarse-textured alluvial material on the eastside of the valley floor that is low in natural salinity. This coarse-textured material becomes finer as these alluvial deposits move toward the valley trough. In contrast, the Coast Range is made up of Jurassic and Cretaceous sandstones and shales of marine origin. These are known to be high in salt. The lower rainfall on the western side of the San Joaquin River Basin has resulted in poorly sorted sediments that, as a general rule, are of lower permeability and higher salinity when compared to those on the eastside.

## SAN JOAQUIN RIVER BASIN HYDROLOGIC CHARACTERISTICS

Typical of a Mediterranean climate, precipitation in the watershed varies annually, seasonally as well as by watershed elevation. Precipitation in the Basin ranges from as little as 5 inches/year on the valley floor to over 80 inches/year at the higher elevations of the Sierra Nevada (USGS, 1998). Most of the precipitation falls in the late fall, winter and early spring periods with a prolonged dry period in the remainder of the year. Precipitation is predominately snow above 4 -5,000 feet elevation with rain in the middle and lower elevations of the Sierra Nevada and Coast Range. As a result, natural hydrology reflects a mixed runoff regime, dominated by winter-spring rainfall runoff and spring-summer snowmelt runoff (McBain and Trush, 2002). Snowmelt runoff generates a majority of the flow volume from the watershed with little runoff contributed from the western side of the Basin in the rain shadow of the Coast Range.

Winter or spring rain-on-snow events likely contributed the largest instantaneous flow events and played a major role in channel forming processes while the snow melt period was probably the longest prolonged flow periods and contributed to overbank inundation and high water tables thus creating vast floodplain and wetland habitat that supported large populations of fish and wildlife.

**EARLY WATER DEVELOPMENT**

The San Joaquin River Basin prior to 1850 was devoted largely to rain-fed grain and cattle production. Irrigation development began sporadically in the decade following the 1850s when individual farmers made diversions to lands lying immediately adjacent to the perennial eastside streams. Most of these areas were already natural overflow lands that had been used for pasture prior to that time (DWR, 1965). Most diversions during this period were made as water was available in the river for diversion.

Construction of the railroad through the San Joaquin Valley from 1869-1875 increased the demand for more intensive cultivation, as markets in the larger coastal cities were thus accessible to valley farmers. Large-scale irrigation began in the valley around 1870 and by 1880 almost 81,000 ha (200,000 ac) were planted to cereals and alfalfa in the San Joaquin Valley (both the San Joaquin River and Tulare Lake Basins) (DWR, 1931). Development proceeded generally from east to west across the valley, although some lands along the valley trough were irrigated during this period. The most significant water diversions to the western side of the valley occurred in 1872 when the San Joaquin River was diverted through the Miller and Lux canal system west of Fresno near where the San Joaquin River turns north when it reaches the valley trough (DWR, 1965).

By the 1890s and early 1900s sizeable areas in the trough of the Basin were being forced out of production by salt accumulation and shallow water tables. Early irrigation practices involved the intentional over-irrigation of fields to raise the local water table so that subsurface water would be available to crops during a portion of the dry summer season when river flows were too low for efficient diversions. Much of this land lay idle until the 1920s when development of reliable electric pumps and the energy to power them accelerated the expansion of irrigated agriculture by making available vast ground water resources under the valley floor. This ground water pumping lowered the water table in many areas (SWRCB, 1977 and Ogden, 1988) and allowed for adequate leaching of salts, especially near the valley trough and the western side of the San Joaquin River Basin.

**SURFACE WATER DEVELOPMENT**

Present day hydrology is dominated by irrigation storage, irrigation delivery, and flood control releases. Water resources development in the San Joaquin River Basin began shortly after the discovery of gold and consisted of small-scale diversions to mining districts followed by diversions to riparian users adjacent to the perennial streams for agricultural uses. Few large scale storage and diversions projects were considered prior to 1915 as the valley was focused on groundwater development. By 1915 there were 11 storage reservoirs developed on the mainstream San Joaquin River and the three large eastside tributaries (Stanislaus, Tuolumne and Merced). These facilities however only captured 1-2% of the total runoff and likely did not have the capacity to significantly reduce the volume of spring snowmelt run-off. It is not clear whether they were large enough to reduce instream flows in the late summer and early fall, a period when very low flows occurred in the mainstream San Joaquin River and the three eastside tributaries.

Beginning about 1920, large scale water storage and diversions were planned and developed by cooperative ventures of individual landowners and by local water agencies to extend water deliveries to additional land and provide hydroelectric power. Between 1923 and 1926, large scale storage projects were completed on all three of the eastside tributaries significantly altering seasonal flow patterns. Similar water storage projects were developed on the mainstream San Joaquin River upstream of the valley floor but these were done primarily for hydropower production rather than for irrigation.

By 1940, the San Joaquin Valley (both the San Joaquin River and Tulare Lake Basins) had over 1,420,000 ha (3,500,000 ac) under irrigation, largely using ground water. Declining ground water elevations and the desire of land owners to bring new land into production and the desire of the United States government to expand population settlement in the western part of the nation led to the formulation of federally sponsored and licensed flood control dams as well as plans for a large-scale water resource development project called the Central Valley Project (CVP). A major component of the CVP was to import water Northern California was into the San Joaquin Valley via the Sacramento-San Joaquin Delta. This lead to the construction of Friant Dam on the mainstream San Joaquin River in 1941 as part of the Federal CVP. Friant Dam diverted a major portion of the flow of the San Joaquin River south into the Tulare Lake Basin. Water users along the middle and lower San Joaquin River exchanged their existing water rights to divert San Joaquin River water for water supplied from the Delta via the Delta – Mendota Canal (DMC), a major component of the federal CVP.

A good discussion of the history of surface water development on the main stream San Joaquin River and the three eastside tributaries is presented in Chapter 5 (Water Resources Development) of Cain et al., 2003. Portions of this report are included as an appendix to this write-up.

**Development of Salinity Problems in the San Joaquin River Basin**

Two components led to the salinity issues in the San Joaquin River Basin. The first was the exchange of high quality snow melt water from the San Joaquin River for more reliable, but poorer quality (saltier) water imported from the Delta. The second component was the intensification of irrigation on the upslope salt laden soils on the western side of the San Joaquin River that were formed from the marine formations of the eastern flank of the Coast Range. This intensified irrigation quickly lead to high water tables in both the new lands being brought under irrigation and the lands previously supplied with San Joaquin River water.

Major salt and drainage problems began to develop along the San Joaquin River as the new lands were being supplied with surface water for the first time. These lands had previously been irrigated with groundwater. Pumping of groundwater for irrigation from 1920 to 1950 drew the water table down as much as 200 feet in areas along the westside of the San Joaquin River (Belitz and Heimes, 1990). Declining water tables were causing high pumping costs, land subsidence and farmers were finding poorer quality water as water tables continued to decline. These issues created a need for new surface water supplies. As soon as the surface water supplies arrived, ground water pumping was minimized or abandoned. The result was that the water table began to rise in the areas being provided with DMC surface water.

Many of these salinity and drainage issues should have been considered in the original CVP project designs. Salt management however was not included in any of these early plans. As late as 1949, the U. S. Bureau of Reclamation's (USBR) Comprehensive Report on Planned Water Resources (USBR, 1949) made no mention of salt management (SWRCB, 1977). The only official reference to the problem was contained in the following 1946 comment by the U. S. Department of Agriculture on the draft report, which stated:

> *"The plan does not discuss drainage or include costs relative to constructing or operating drainage systems. In the light of experience with lands that have been irrigated, we feel that properly integrated plans for drainage should be made a part of any proposed new irrigation development plans"* (SWRCB, 1977).

No consideration of drainage was taken during the development and implementation of the Delta Mendota Canal and the lands it serves. The first consideration of salt management occurred in the 1950s and 1960s, as larger – scale water development projects began for other lands on the western sides of the San Joaquin River and Tulare Lake Basins. The 1955 Feasibility Report for the San Luis Unit of the CVP, which was to be in the western side of the Valley in both the San Joaquin River and Tulare Lake Basins, it recognized the need for drainage and proposed an interceptor drain for the Unit (USBR, 1955). In addition, a California Department of Water Resources (DWR) report to the California Legislature recommended the State study a "*comprehensive master* *drainage works system*" for the valley. The California State Water Plan prepared by DWR included the concept of a Valley Master Drain (DWR, 1957).

## USE OF THE SAN JOAQUIIN RIVER FOR DRAINAGE AND SALINITY CONTROL

Neither of these drainage efforts ever moved to full completion but final planning and implementation of the surface water supply portion of the federal San Luis Unit of the CVP and the State Water Project moved forward to completion. Each was authorized in 1960 and began delivering Northern California water to agricultural lands on the western side of the San Joaquin River Basin and the Tulare Lake Basin in 1968. A portion of the water supply went to new lands not presently irrigated by the Delta Mendota Canal (DMC) or it intensified irrigation on lands already being served by the DMC.

As soon as the first water arrived from the DMC, farmers on the Westside of the San Joaquin River Basin began to experience rising water tables and related salinity problems. Farmers began to install on-farm subsurface drainage systems and renovate existing open drainage ditches in the early to mid 1950s, soon after the initial deliveries of water from the DMC. Development of the on-farm drainage systems and collector drains was essentially complete by the mid to late 1970s (Johnston et al., 2010). Total drained area was about 25,000 ha (60,000 acres).

The only outlet for the drainage water was the San Joaquin River through Mud and Salt Sloughs in the Grassland Basin on the Westside of the San Joaquin River. Drainage flows to the San Joaquin River increased as implementation of on-farm drainage systems increased. This increase occurred just as the flow in the River upstream of Mud and Salt Sloughs was decreasing as diversions were increasing at Friant Dam for irrigation on the eastern side of the Tulare Lake Basin. These two actions occurring simultaneously resulted in a significant degradation of the River and prompted a declaration by the California Legislature in 1961 that the River was impaired and that no further impairment shall occur and this declaration was made part of the California Water Code (CWC § 12230 – 12232).

**PLANNING FOR WATER QUALITY CONTROL ON THE SAN JOAQUIN RIVER**

During the late 1960s, the Central Valley Regional Water Quality Control Board developed several provisional water quality control policies for the San Joaquin River which included water quality objectives for the three tributaries and the main stream San Joaquin River. These provisional policies were never adopted by the Board as the Porter Cologne Water Quality Control Act and the Clean Water Act were eminent and required a broader Basin Planning effort that would supersede these provisional policies. During the Basin Planning effort in 1972-1974, the salinity problem on the San Joaquin River was noted as significant. The Basin Plan for the San Joaquin River watershed recommends the construction of a separate collection and discharge drain for the subsurface drainage water to isolate it from the River system as the only feasible way to improve San Joaquin River water quality.

The federal government began to move forward on construction of a drainage facility and by 1975 had completed 192 km (120 mi) of collector drains and the first 136 km (85 mi) of what was to have been a valley wide drain. It was completed from a point near the Tulare Lake in the Tulare Lake Basin to Kesterson Reservoir in the Grassland watershed in the San Joaquin River Basin.

Even though portions of the main valley wide drain were being completed, the farmers on the westside of the San Joaquin River Basin were faced with a dilemma. Even though the Basin Plan called for an isolated facility, the farmers on the westside of the San Joaquin River Basin would need to continue to use the San Joaquin River as the outlet for its drainage water and salt as there was no planned capacity for these drainers in the federal facility which was for the San Luis Unit which was primarily in the western portion of the Tulare Lake Basin.

Beginning in the early 1950s and continuing for almost three decades, farmers in the Grassland watershed on the Westside of the San Joaquin River Basin discharged their surface and subsurface drainage water into channels that led to the San Joaquin River. A large percentage of this water was captured by down slope wildlife refuge managers, prior to the drainage water entering the river. The captured drainage water was combined with other water supplies and used to maintain portions of a 40,500 ha (100,000 acre) wetland area within the Grassland watershed. This wetland area represented one of the largest remaining contiguous wintering waterfowl habitats on the Pacific Flyway.

## FOCUS ON SALINITY MANAGEMENT CHANGES

The central focus of water management in the Grassland watershed and in the San Joaquin River through the early 1980s had been on salt and salinity management. The discovery of selenium impacts at Kesterson Reservoir in the early 1980s changed this focus entirely. Findings at Kesterson Reservoir showed that subsurface drainage water containing elevated levels of the trace element selenium impaired sensitive waterfowl. A check of the drainage water entering the Grassland wetlands and the San Joaquin River also showed elevated levels of selenium. Based on this information, the Grassland refuge managers discontinued the use of blended selenium-laden drainage water and bypassed the subsurface and surface drainage flows directly to the San Joaquin River. As a result of the bypass, selenium and salt loads likely increased as well as changed in the time that the salt loads entered the river. As a result of these diversions, the selenium loads to the San Joaquin River between 1984 and 1985 likely increased from about 1,180 kg (2,600 lbs) to 4,180 kg (9,200 lbs) per year, an increase of over 300 percent.

This dramatic change in the discharge pattern into the river prompted the regulatory agencies to begin the process of establishing water quality objectives for the River to protect downstream beneficial uses and to develop a regulatory program to limit the selenium loads in the drainage water discharges.

In February 1985, the State Water Resources Control Board adopted Order WQ 85-1 to deal with the selenium problems in the San Joaquin River Basin. This Order addressed the waterfowl problems at Kesterson Reservoir arising from selenium laden subsurface agricultural drainage water being discharged into this facility. In the Order, the State Water Resources Control Board also expressed concern over the discharge of similar type of water into the Grassland wetlands and the San Joaquin River. Of particular concern to the State Water Resources Control Board was the serious lack of data on the quality and quantity of agricultural return flows being discharged to the Grassland wetlands and the San Joaquin River. The State Water Resource Control Board directed the formation of the San Joaquin River Basin Technical Committee, made up of State Board and Central Valley Regional Water Quality Control Board staffs. The Technical Committee was tasked to investigate water quality concerns in the San Joaquin River Basin related to agricultural drainage and to report back to the State Water Resources Control Board on specific components of a Basin Plan Amendment including:

1. Proposed water quality objectives for the San Joaquin River Basin,
2. Proposed effluent limitations for agricultural drainage discharges in the Basin to achieve these objectives, and
3. A proposal to regulate these discharges including developing an estimate of the total cost of the proposed regulatory program and identify potential sources of financing.

## ERA OF REGULATORY CONTROL

The San Joaquin River Technical Committee report was accepted by the State Water Resources Control Board in August 1987. The Technical Committee Report focused on selenium although recognizing that salt and salinity control on the San Joaquin River were the longer-term issues. The Technical Committee’s report formed the basis for the first of two Basin Plan Amendments related to regulation of agricultural drainage.

In 1988, the Central Valley Regional Water Quality Control Board adopted the first of two Basin Plan Amendments regulate agricultural subsurface drainage from the Grassland watershed. In addition to water quality objectives for selenium and boron, the amendment established several policy actions including:

- The control of selenium in the drainage water was set as the first priority;
- The San Joaquin River could continue to be used to remove salts from the basin provided water quality objectives for selenium were met;
- Any further increase in drainage water discharges to the San Joaquin River from the Grassland watershed were prohibited until load levels were shown to be within the water quality objectives;
- Regulation of discharges would be pursued on a regional basis rather than at individual farms;
- Reuse of drainage water would be encouraged; and
- A separate and isolated valley wide facility to take drainage water out of the basin would continue to be promoted as the best long-term alternative.

This regulatory action in 1988 focused implementation on improved on-farm efficiency to reduce deep percolation thus reducing selenium and salt mobilization into the drainage water. This action was consistent with the recommendations of the San Joaquin River Technical Committee report. Immediately following the Basin Plan Amendment, extended drought conditions led to significant improvements in irrigation efficiencies within the Grassland watershed. The result was that discharges of selenium to the San Joaquin River were cut in half and the amount of selenium in the river water improved significantly (Karkoski, 1994; CVRWQCB, 1996). However, the selenium concentration of the internal channels in the Grassland watershed that were dominated by these drainage flows did not improve and in fact water quality in the channels deteriorated as a result of water conservation and improved irrigation efficiency. The end result was a significant reduction in drainage flows but concentrations of selenium in the drainage water increased although total load was reduced.

Recognizing how effective the program was toward reducing selenium, the SWRCB in adopting the 1991 Bay-Delta Water Quality Control Plan for Salinity (Report 91-15WR) by Resolution 91-34, directed the Regional Board to undertake a similar reduction for salt. Specifically the plan called for:

> "*Upon Adoption of this Plan, the State Board will request the Central Valley Regional Board to develop and adopt a salt-load reduction program. The goal of this initial program will be to reduce annual salt-loads discharged to the San Joaquin River by at least 10 percent and to adjust the timing of salt discharges from low flow to high flow periods. During the Water Rights Phase of these proceedings, the Regional Board should discuss how it intends to implement this program (for example, drainage operations plans and best management practices).*
>
> *The goal of this program shall be to reduce the salt load discharged to the San Joaquin River by at least 10 percent. This amount should be achieved by increasing the irrigation efficiency on the west side of the San Joaquin River Basin to a target level of 73 percent with a five percent leaching fraction as recommended by the Agricultural Water Conservation Workgroup. This should reduce the annual subsurface drainage from tile drained portions of the west side by about 40 percent as envisioned by the State Board's Technical Committee and the San Joaquin Valley Drainage Program (see EDF, 11, V-13-20 and San Joaquin Valley Drainage Program, 1990). Since about 25 percent of the annual San Joaquin River salt load is from the west side subsurface drainage, this drainage reduction amount to a 10 percent reduction in annual San Joaquin River salt load (0.40 x 0.25 = 0.10) based on State Board staff modeling results (see EDF, 11, Appendix C). Annual salt loads could be further decreased by reducing and recycling tailwater discharges to the San Joaquin River from the west side.*
>
> *In addition to annual reduction in salt load, it would also be possible to adjust the timing of salt load discharge from the west side of the San Joaquin River Basin*

*through storage of drainage flows (see Pickett and Kratzer, 1988). The need for dilution flows from the east side of the San Joaquin River Basin to meet seasonal water quality standards in the southern Delta would be reduced.*

*The salt load reduction policy, which would help to protect beneficial uses in the southern Delta, should be achieved through development of best management practices and waste discharge requirements for non-point source dischargers. The Central Valley Regional Board should present the policy to the State Board no later than the Water Right Phase of the proceedings. If adequate progress is not being made, the State Board will proceed under its authorities*."

It was thought that the drainage operations plan and best management practices that were being implemented in the Grassland watershed would accomplish the selenium reduction envisioned by the Regional Board's 1988 Basin Plan Amendment and the State Board 1991 Bay-Delta Water Quality Control Plan (91-15WR). With the return of the wetter cycles after 1993 and a full water supply to each farm, the total load of selenium discharged returned to the 1988 levels, indicating that the irrigation efficiency improvements alone would not provide a long term solution. One of the major problems with the approach taken by the regulatory agencies was that the farmer had no control or knowledge over how their actions impacted water quality downstream of their individual farming operation.

It was found that, like the Imperial Valley, as irrigation efficiency improved, there was a significant reduction in the subsurface drainage flows, but also a significant reduction in the high quality surface runoff (irrigation tailwater) and operational spills from individual farms that previously diluted the agricultural subsurface drainage flows. The result was that the discharge from the individual farms was smaller, the total load of selenium was reduced but flow was now dominated by the poor quality subsurface drainage. At the district or larger level, improvements in how water is distributed and managed were also being made. However, the result of these actions was that operation spills and on-farm losses that previously had been available for dilution of the subsurface drainage water discharges were also no longer available. There did not appear to be any connection between the two operations, one at the farm level and one at the district level, nor was there any connection between these operations, flows in the collection channels, and River flows available for dilution. A more coordinated effort would be required.

The lack of compliance with selenium water quality objectives prompted the regulatory agencies to reconsider the direction established in 1988. To be consistent with the State Water Resources Control Board direction in the 1991 Bay-Delta Water Quality Control Plan, the Regional Board focused on the three step process to manage selenium as outlined in the 1990 San Joaquin Valley Drainage Program (SJVDP, 1990). The first step was to minimize selenium mobilization from the irrigated area, the second was to capture and reuse the selenium laden drainage water to the maximum extent possible and the final step was to isolate, treat and/or dispose of the remaining selenium-laden water. The latter was to be done under Waste Discharge Requirements.

The regulatory agencies established a new approach for these nonpoint source selenium discharges in 1996. The new focus continued on source control efforts including improved distribution and delivery efficiency, improved on-farm efficiency and continued off-farm reuse of drainage water but expanded their efforts on controlling the final collected discharge runoff. The new focus would be done under a formal Waste Discharge Requirement (State equivalent of a permit) with monthly and annual load limits to specific water bodies. Because the mechanisms for controlling selenium were not well understood, the use of such a permit was not intended to be at each individual farm but rather at the final discharge point from the Grassland watershed. The permit would be issued to a responsible entity that would have the administrative power to implement the load limitations and control the discharge of the drainage water to the San Joaquin River.

**SHIFT OF FOCUS TO SALINITY CONTROL**

The Regional Board in 1988 established that they would regulate selenium as a first priority. The 1996 program again focused on selenium reduction but recognized that salinity was the long-term issue on the San Joaquin River. The State Water Resource Control Board adopted the first salinity objectives for the San Joaquin River at Vernalis in their 1991 Bay-Delta Water Quality Control Plan. As described above, they directed the Central Valley Regional Water Quality Control Board to establish a salt load reduction program.

In the 1995 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (1995 Bay-Delta Plan), the State Water Resource Control Board reaffirmed the salinity water quality objectives adopted in the 1991 Bay-Delta Plan for the San Joaquin River at the Airport Way Bridge near Vernalis. In the 1995 Bay-Delta Plan, the State Water Resources Control Board reaffirmed that the Central Valley Regional Water Quality Control Board should continue its salt load reduction program initiated in response to the adoption of the 1991 Bay-Delta Plan with the goal of reducing salt loads to the San Joaquin River by at least 10 percent and to adjust the timing of discharges from low flow to high flow periods.

The 1996 Basin Plan Amendment for selenium called for significant reduction in drainage water discharges through implementation of the Grassland Bypass Project. This Project was implemented in 1995 and continues today. It was also expected that the Grassland Bypass Project would also result in salt load reductions. Testimony to the State Water Resources Control Board during the implementation phase of the 1995 Bay-Delta Plan showed that between 1995 and 1997, the Grassland Bypass Project had decreased salt discharges by 100,000 ton per year. Recent information provided by the Regional Water Quality Control Board has shown that the Grassland Bypass Project has reduced salt loads to the San Joaquin River by 182,000 tons per year since its implementation in 1995.

In 1999, the State Water Resources Control Board adopted Water Right Decision 1641, which, in part, implements the salinity standards contained in the 1995 Bay-Delta Plan.

# ATTACHMENT 1

Decision 1641, directed the Central Valley Regional Water Quality Control Board to "*promptly develop and adopt salinity objectives and a program of implementation for the main stem of the San Joaquin River upstream of Vernalis. As part of its implementation plan for the salinity objectives, the Central Valley RWQCB should evaluate a program to regulate the timing of agricultural discharges to the San Joaquin River*."

Such an effort requires a Basin Plan revision. (NEED TO DISCUSS THE TMDL AND THE REQUIREMENT TO ESTABLISH A REAL-TIME MANAGEMENT SYSTEM FOR THE RIVER).