

THE SAN JOAQUIN RIVER AGREEMENT
AND
THE VERNALIS ADAPTIVE MANAGEMENT PLAN

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ABSTRACT

This paper describes a unique negotiated settlement, The San Joaquin River Agreement (SJRA), which has been developed by a group San Joaquin River Basin water rights holders as a voluntary effort to provide water to meet flow objectives of the California State Water Resources Control Board's (SWRCB), San Francisco Bay/Sacramento-San Joaquin Delta Estuary Water Quality Control Plan (WQCP) for the protection of San Joaquin Basin chinook salmon. The SJRA includes a study called the Vernalis Adaptive Management Plan (VAMP), which is a proposed 12 year evaluation of San Joaquin River flows, Delta export pumping rates and San Joaquin Basin salmon smolt survival. This agreement is an important effort to resolve a difficult issue regarding the sharing of the flow of the San Joaquin River between irrigators, municipal users, fishery and other environmental uses and to avoid a protracted controversial water right hearing and potential subsequent litigation. Also explained in this paper is the SJRA, the VAMP, how each was developed, why they are necessary, how they will work, whether or not the fish resources will be protected, where the water will come from to meet the target flows and the proposed operation details.

INTRODUCTION AND BACKGROUND

On May 22, 1995, the SWRCB adopted controversial San Joaquin River "Vernalis Flow Standards" in it's Bay-Delta WQCP for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (WQCP 95-1, 1995). In response to the adopted flow standards, a group of San Joaquin River Basin water right holders (five irrigation districts) filed litigation challenging the scientific basis for the standards, the environmental documentation supporting the standards and the fact that the WQCP did not require a fish protection barrier at the head of Old River. The litigants, and other interested parties recognized that extended litigation would frustrate rational and timely improvement of the salmon fishery, which is one of the stated goals of the WQCP standards. Consequently, the parties agreed to settle the litigation with certain conditions and assembled a group of experts to develop an implementable, scientifically based program to increase knowledge concerning the salmon resources of the San Joaquin River

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Basin which will aid in resolving difficult regulatory issues involving river flows, export pumping rates, and physical facilities which affect salmon survival.

DISCUSSION

The San Joaquin River Basin

The San Joaquin River flows north through the southern portion of the great Central Valley of California. It has three major tributaries; the Merced River, the Tuolumne River and the Stanislaus River. The headwaters of each of these streams originate from the western slope of the Sierra Nevada Mountain Range which is on the eastern side of the San Joaquin Valley. Each of the tributaries has a major reservoir constructed at the edge of the Valley to control flooding from the spring runoff of melting winter snow pack, to generate electrical energy and to store water for use by irrigators during the long hot summers in the Valley. The City and County of Also, San Francisco diverts municipal water to the San Francisco Bay Area from its Hetch Hetchy Project on the Tuolumne River. Water from the upper San Joaquin River, which is owned and controlled by the U.S. Bureau of Reclamation's (USBR) Friant Dam, only reaches Vernalis during floods, as normally all of the runoff is diverted for use in the Valley for irrigation and municipal use.

The Controversy

The majority of the San Joaquin River flow at Vernalis (where the San Joaquin River joins the southern end of the Sacramento-San Joaquin Delta and the San Francisco Bay Estuary, which is the monitoring point for the SWRCB salinity and flow standards) consists of water originating from the three major tributaries to the San Joaquin River. The remainder of the flow in the San Joaquin River at Vernalis is from agricultural return flows, ground water accretions and other minor tributary flow. The water from the three main tributaries is controlled by the five irrigation districts and the City and County of San Francisco all which hold senior water rights, and the USBR which operates the major reservoir, New Melones Dam, on the Stanislaus River. Historically, permits and agreements have made the USBR responsible to provide the water necessary to comply with the SWRCB's Vernalis salinity standards. Prior to 1995 the SWRCB had not established any specific flow standards. The current controversy arose from the establishment of the new flow standards and the potential that the SWRCB would assign some of the responsibility for meeting these required flows to the irrigation districts holding the senior water rights on the San Joaquin River tributaries. In fact, the SWRCB is currently (summer and fall of 1998) holding a water right hearing to determine what water right holders should contribute water to meet the standards established in the 1995 WQCP.

The San Joaquin River Group and Participating Interests

Following the adoption of the WQCP by the SWRCB in 1995 the San Joaquin River Group (SJRG) was formed to protect the water interests of the participating entities: the Merced, Turlock, Modesto, Oakdale and South San Joaquin Irrigation Districts, the City and County of San Francisco, and the San Joaquin River Exchange Contractors (four districts receiving exchange water from USBR Central Valley Project (CVP) facilities), all holders of senior water rights; and The Friant Water Users Authority which consists of 29 districts receiving water from the USBR San Joaquin River Friant Dam. The three tributaries have required minimum in-stream flows established in licenses issued by the Federal Energy Regulatory Commission (FERC) or through other requirements of either the California Department of Fish and Game (CDFG) or the SWRCB. Also, interested in the outcome of issues involving the San Joaquin River are several environmental groups, two of which, the Natural Heritage Institute and the Bay Institute of San Francisco, joined the discussions, and the water users that contract for water which is pumped from the Delta and exported into the San Joaquin Valley and Southern California by either the USBR or the State of California Department of Water Resources (DWR).

Negotiations

Discussions on the responsibility for providing water to meet the SWRCB Vernalis flow standards began with the irrigation districts when they filed litigation against the SWRCB. During the initial discussions regarding settlement of the litigation, the export interests and the Friant Water Users Authority joined, as each of their water supplies could be impacted depending on the results of either the litigation or the SWRCB water right hearing process. In addition, several environmental groups joined the discussions as these groups have an interest in the protection of environmental resources in the San Joaquin Basin and the Bay-Delta Estuary through implementation of the SWRCB 1995 WQCP.

Many meetings were held between 1995 and 1998 to discuss various options to provide water to meet the SWRCB 1995 WQCP and to meet the other water needs of the water right holders, in addition to contributing to the state and federal goal of doubling anadromous fisheries including the production of San Joaquin Basin fall run salmon. Potential additional limits on export pumping brought the export water users into the discussions to protect their water supply. The Friant Water Users were interested in not having to provide water from Friant for Bay-Delta flows. Instead, the Friant Water Users' proposed to use money paid into the Central Valley Project Environmental Restoration Fund from their purchases of water from the CVP to purchase water from others to mitigate any obligation the Friant users may have for in-stream flows. The Central Valley Project

Improvement Act (CVPIA), passed by Congress (Public Law 102-575, 1992), authorized the USBR and the USFWS to purchase such water from willing sellers. After bringing interested environmental groups into the discussions, an agreement was finalized to accomplish most of the goals of most of the participants.

THE SAN JOAQUIN RIVER SETTLEMENT AGREEMENT

Structure of the SJRA

The SJRA is based on six principles:

- 1) That there be increased flows in the San Joaquin River above the level that would occur without the agreement, and decreased export limitations greater than currently exist,
- 2) That a Head of Old River (HOR) fish barrier be constructed at the Old River-San Joaquin River split,
- 3) That there be payment for the water offered by the water right holders,
- 4) That the agreement be developed around certain operating assumptions for the USBR's Stanislaus River New Melones Project,
- 5) That Monitoring be conducted to determine the effectiveness of the agreement, and
- 6) That there be assurances to all parties that the agreement will be operable, including dispute resolution procedures.

The SJRA is intended to achieve three primary objectives:

- 1) "Implement protective measures for San Joaquin River fall-run chinook salmon within the framework of a carefully designed management and study program which is designed to achieve, in conjunction with other non-VAMP measures, a doubling of natural salmon production by improving salmon smolt survival through the Delta. However, the parties recognize that future salmon production cannot be guaranteed."
- 2) "Gather scientific information on the relative effects of flows in the lower San Joaquin River, CVP and SWP export pumping rates, and operation of a fish barrier at the head of Old River on the survival and passage of salmon smolts through the Delta."
- 3) "Provide environmental benefits in the lower San Joaquin River and Delta at a level of protection equivalent to the San Joaquin River portion of the 1995 WQCP for the duration of the agreement."

The design of this investigation is based, in large part, on experience gained in earlier fisheries investigations and on expected opportunities for providing increased fisheries protection during the spring. As stated, the study requires the construction of an operable fish barrier at the head of the Old River. However, such construction may also require the construction of additional barriers in the south Delta to mitigate impacts of the HOR fish barrier, CVP/SWP export pumping, and other factors affecting water quality and water elevation in the Delta channels. Other non VAMP monitoring and studies may also take place within the San Joaquin Basin to evaluate other factors that affect the fisheries.

The Vernalis Adaptive Management Plan

The key question is: "What if any relationship is there between 1) flow in the San Joaquin River and water pumped from the southern Delta through the federal and state export facilities and 2) the survival of salmon smolts migrating from the San Joaquin River Basin to the Pacific Ocean through the Delta Estuary?" Data show that under flood or high uncontrolled flow conditions salmon smolts survive rather well. However, at lower controlled river flows, it is not clear whether or not incremental changes in flow or exports will enhance the survival of salmon smolts, particularly if many of the out migrating smolts swim to the export pumps. It is fairly well accepted that the installation of the fish protection barrier to keep the salmon smolts from swimming directly to the export pumps will significantly improve salmon smolt survival regardless of the flow or export pumping rates.

As part of the SJRA, a 12 year Vernalis Adaptive Management Plan (VAMP) study was designed to evaluate the relationship between river flows, the rate of state and federal water exports from the southern Delta and salmon smolt survival.

The SJRG members have agree to provide up to 110,000 acre-feet per year or the amount needed to meet established target flows, whichever is less, during a 31-day pulse flow in the months of April and May each year, which is the main out migration period of the San Joaquin Basin salmon smolts. This will be done for the 12 years of the agreement except during years when extraordinary events such as facility failures, floods or droughts make the providing of such water impossible.

A San Joaquin River Technical Committee (SJRTC) will be appointed to successfully implement the VAMP. A Management Committee will be appointed to review reports and recommendations of the Technical Committee and to resolve all issues and disputes that the cannot be resolved by the SJRTC. The Management Committee will consist of one representative from each signatory to the agreement and the Management Committee will make its decisions by a

unanimous vote, which allows any representative to veto any Management Committee decision.

The duties of the San Joaquin River Technical Committee will be as follows:

- 1) Annually coordinate flow releases, export and Old River fish barrier operations, and use of hatchery fish to implement the VAMP study,
- 2) Determine best management of flow releases during the pulse flow period to achieve target flows,
- 3) Plan and oversee monitoring activities, in coordination with the Interagency Ecological Program and existing monitoring programs on the San Joaquin tributaries, and
- 4) Develop annually the VAMP flow calculation protocols.

The SJRTC has no authority to adjust any export limitations imposed pursuant to the SJRA or to adjust target flows below those set pursuant to the SJRA, but the SJRTC may recommend such changes to the Management Committee.

Biological Experiment

The VAMP focuses on water years when the existing flow at Vernalis is expected to be less than 7,000 cubic feet per second (cfs). The upper edge of test flow conditions resulted from the need to have flow rates in the San Joaquin River within a range that accommodates the installation and operation of the HOR fish barrier. The following matrix of flow and export is intended to assess impacts of flow at three levels of export and impacts of export at four levels of flow. The 2,000 cfs flow rate is used to determine supplemental water to be provided by the SJRG. The VAMP test flow target is 3,200 cfs.

Table 1. Vernalis target flows and export rates to achieve the experimental goals

	Target Flows (cfs)				
Exports (cfs)	2,000	3,200	4,450	5,700	7,000
1,500	X	X	X		X
2,250				X	
3,000					X

The goal is to maintain, as much as possible, a constant flow during the 31-day pulse flow period. It is recognized that there will be years during the term of the agreement

when the existing flows will be greater than 7,000 cfs during the pulse flow period and that in such years the HOR fish barrier will not be in place and that it may not be able to maintain a constant flow rate at Vernalis. The USBR and the CDWR agree that in non VAMP years or when the limits shown in Table 1 do not apply, their pumping plants will be operated in compliance with any other requirements then in effect. It is agreed that during high flow years it will also be advantageous to monitor salmon smolt survival.

Operations Plan

A Hydrology Group (HG) of the (SJRTC) is charged with the responsibility to develop and exchange information concerning forecasted hydrologic conditions, execute the protocols that establish the Test Flow Target and determine the SJRG Supplemental Water, establish the operations plan for the coordination of flows, and provide a post-analysis and report of operations. The makeup of the HG will be determined by the SJRTC with all signatories to the SJRA having the right to participate on an equal basis in the HG. Beginning in February each year, the USBR and CDWR will develop, in cooperation with the SJRTC, an operations plan that will describe how the VAMP will be implemented during that year. The USBR and the SJRG are lead Co-coordinators and will be responsible for tracking and periodic updating of forecasted/actual hydrologic conditions, initially on a bi-weekly frequency and later on a weekly basis as the test period approaches.

The flow target for the 31-day Test Period will be established as the Test Flow Target immediately greater (Single-step Criteria) than the average flow that is forecasted to occur during the Test Period at Vernalis. The test flow targets are shown in Table 2.

Table 2. Forecasted Flows and Target Flows

Forecasted Average Flow at Vernalis (cfs)	Test Flow Target (cfs)
0-1,999	2,000
2,000-3,199	3,200
3,200-4,449	4,450
4,450-5,699	5,700
5,700-6,999	7,000
7,000 or greater	Existing Flow

In any year, when the sum of the current year's forecasted and previous year's 60-20-20 Indicators is seven (7) or greater, the flow target for the Test Period will be established one level higher (Double-step Criteria) than that established by the Single-step Criteria. The 60-20-20 Indicator for the VAMP is related to the San Joaquin Valley Water Year Hydrologic Classification as described in the SWRCB 1995 WQCP. The 90 per cent probability of exceedence forecast will be used to calculate the current year's hydrologic classification as shown in Table 3. When the flows exceed 7,000 cfs, the SJRG will exert its best efforts to maintain a stable flow rate during the Test Period to the extent reasonably possible. Also, in consideration of multi-year drought sequences, when the summation of the current years and two previous years' indicator is less than 4, the SJRG's responsibility to provide supplemental water to achieve the target flow becomes discretionary.

The Biology Group (BG) will provide its initial estimate of the preferred period of the VAMP beginning in February, coincident with the HG's first report and with each subsequent report. The BG and the HG will jointly identify the tentative Test Period. One consideration for the scheduling of the VAMP is to coincide the Test Period with the peak out migration period for the naturally spawned San Joaquin Basin salmon smolts.

Table 3. San Joaquin Valley Water Year Hydrologic Classification and the 60-20-20 Indicator

San Joaquin Valley Water Year Hydrologic Classification	60-20-20 Indicator
Wet	5
Above Normal	4
Below Normal	3
Dry	2
Critical	1

Division of Responsibility

Each year, after the HG of the SJRTC determines the volume of water required to meet the VAMP flows, allocation of responsibility to the individual SJRG members will be determined in the order specified in the SJRG Division Agreement which is shown in Table 4.

Table 4. Allocation of volume of water to be provided by individual SJRG members.

Provision of Water In Descending Order	First 50,000 AF	Next 23,000 AF	Next 17,000 AF	Next 20,000 AF	Total AF
Merced ID	25,000	11,500	8,500	10,000	55,000
Oakdale & South San Joaquin IDs	10,000	4,600	3,400	4,000	22,000
Exchange Contractors	5,000	2,300	1,700	2,000	11,000
Modesto & Turlock IDs	10,000	4,600	3,400	4,000	22,000

PROSPECTS FOR IMPLEMENTATION

During 1998, in an extensive Bay-Delta Water Right Hearing, the SWRCB is receiving testimony from any interested parties on the SJRA and a number of other alternatives that have been reviewed in a draft Environmental Impact Statement issued by the SWRCB (DEIR, 1997). The fate of the proposed SJRA will not be finally determined until the SWRCB completes its hearing on the allocation of responsibility for meeting the flow-dependent objectives in the 1995 Bay-Delta WQCP.

As of August 1, 1998, all participants in the negotiations on the SJRA, with the exception of the environmental organizations, have signed a letter of support indicating that, upon completion of the environmental documentation and acceptance of the SJRA by the SWRCB, each will sign the agreement and participate in its implementation. The environmental organizations have expressed concern regarding the use of the CVPIA funds to pay for the water and that the SJRA does not, in their words, "completely meet all of the flow standards specified in the 1995 Bay-Delta WQCP." Others have objected to the fact that the agreement does not solve all of the controversial issues related to the San Joaquin River.

The SJRG is offering the agreement as a settlement package which biologists have stated provides equivalent protection to the fisheries of the San Joaquin River and the Delta as the 1995 Bay-Delta WQCP. The SJRG is requesting that the SWRCB approve the SJRA, accepting the agreement as a binding contract without changes to the water rights of the SJRG members. The SJRG also expects the SWRCB to issue a water right order placing the responsibility to meet the SWRCB established water quality standards on the USBR and CDWR. If the package is not approved and implemented, as negotiated, there will then, more

than likely, be a contested water right hearing to establish the responsibility of all San Joaquin Basin water right holders to provide water to meet the water quality standards established by the SWRCB in the 1995 Bay-Delta WQCP. Any contested water right hearing will undoubtedly be followed by extended litigation.

REFERENCES

Draft Environmental Impact Report for Implementation of the 1995 Bay/Delta Water Quality Control Plan. California State Water Resources Control Board, California Environmental Protection Agency. Sacramento, CA. November 1997.

Public Law 102-575, Reclamation Projects Authorization and Adjustment Act of 1992 Title XXXIV, The Central Valley Project Improvement Act (CVPIA). October 30, 1992.

San Joaquin River Agreement (Draft). San Joaquin River Group Authority, Modesto, CA. April 6, 1998

Water Quality Control Plan 95-1. California State Water Resources Control Board, California Environmental Protection Agency. San Francisco Bay/Sacramento-San Joaquin Delta Estuary. May 1995.