

**TESTIMONY OF DR. RUSS T. BROWN, DR. PHILIP A. UNGER,
AND WARREN SHAUL
Jones & Stokes Associates**

**Bay-Delta Workshop
September 1, 1994**

**ALTERNATIVE BAY-DELTA WATER QUALITY
AND FISH AND WILDLIFE STANDARDS**

Jones & Stokes Associates (JSA) recommended in our testimony at the July 14, 1994 workshop that a comprehensive system of Delta standards to protect water quality, fish, and wildlife be adopted by the California State Water Resources Control Board (SWRCB). This memorandum describes how such a system could be simulated and initially implemented in an adaptive management framework. An initial framework of Delta standards would be generally consistent with the existing Delta regulatory environment consisting of D-1485 standards and Delta requirements in the proposed Clean Water Act criteria and existing Central Valley Project/State Water Project (CVP/SWP) biological opinions for Delta smelt and winter-run chinook salmon.

Delta standards should be adopted to comprehensively address in an integrated manner the three basic categories of beneficial uses: water supply, salinity control, and fisheries protection. A comprehensive system of Delta standards should achieve three basic purposes:

- provide daily information necessary to accurately describe and evaluate Delta conditions, resources, and responses to management actions;
- ensure minimum protection for Delta resources with allowances for extreme conditions; and
- encourage allocation of available Delta inflow to satisfy all beneficial uses of Delta water in an adaptive management framework.

Adaptive management of Delta water allocation would consist of incremental modification of Delta operations, careful monitoring of aquatic ecosystem responses, and rapid evaluation of needs for further modifications of Delta operations.

A matrix of Delta water resource use categories and purposes for a system of Delta standards is presented in Figure 1. The cells of the matrix indicate examples of information needs, minimum protection standards, and adaptive management objectives appropriate to each resource category.

Daily Information Needs

SWRCB should set standards for meeting daily information needs for Delta resource management. Daily information is required to allow Delta resources to be accurately described, evaluated, and monitored at comparable levels of detail and reliability. Daily information should serve as the basis for complying with minimum protection standards and for making adaptive allocation decisions. In our July 14, 1994 workshop testimony, JSA provided a list of daily information requirements that might be adopted by SWRCB. We will provide a more detailed description of these information requirements as part of a recommended Delta monitoring and reporting program.

Minimum Protection Standards

Minimum protection standards should be established to equitably ensure a minimum level of protection for all Delta water resource uses. The minimum protection standards would provide a foundation on which adaptive allocation objectives would be built. The minimum protection standards would be initially fixed, but would allow appropriate flexibility according to seasonal and water-year-type variability.

To be most effective, minimum protection standards may require compliance with relatively strict, short-term criteria (e.g., several days). Compliance with long-term average criteria might not achieve the purposes of minimum protection standards. If salinity effects of net daily tidal outflow can be reliably estimated, it may not be necessary to use 14-day averaging of salinity variations resulting from net tidal outflow effects. Thus, a shorter averaging period could be used for compliance with minimum protection standards.

Salinity Protection. Because the Delta is the upstream portion of the San Francisco Estuary, various salinity criteria are needed to protect beneficial uses. The basic purpose of the minimum protection standard for salinity control is to protect the Delta from excessive salinity intrusion that would threaten water supply and estuarine habitat uses.

Recommended minimum protection standards for salinity control are given in Table 1 as a matrix of monthly minimum Delta outflow requirements for each water-year type. The required outflows are estimated as the combined Sacramento and San Joaquin River flows at their confluence near Collinsville. These minimum Delta outflows have been determined to maintain salinity for protection of municipal and industrial water supply, agricultural water supply, and Suisun Marsh fish and wildlife water supply at levels equivalent to those provided for under current D-1485 salinity standards. These salinity control standards for minimum outflow would require a water allocation of about 4.25 million acre-feet (MAF) in wet years and 3.5 MAF in dry years.

Table 1 shows the correspondence between these recommended Delta outflows and specific D-1485 salinity standards at various Delta locations, for periods of relatively constant outflow.

Compliance with minimum protective salinity standards could be documented using daily records from the electrical conductivity (EC) monitoring stations at Mallard Island (Chipps Island), Collinsville, Emmaton, Antioch, and Jersey Point. Delta EC monitoring stations in this portion of the estuary provide the most sensitive measurements of the magnitude of salinity intrusion effects during periods with relatively low Delta outflow.

Water Supply Protection. Riparian diversions from the Delta and Suisun Marsh are used for agricultural and wildlife habitat purposes. These existing uses are indirectly protected by the minimum outflow standards for salinity control described above. The DAYFLOW estimate of the annual Delta net consumptive riparian diversion for agricultural use is about 750 thousand acre-feet per year (TAF/yr); Suisun Marsh consumptive use is not included in DAYFLOW estimates.

A minimum protection standard for Delta export pumping should be established to provide a predictable water supply for those uses that require Delta exports. The recommended minimum export pumping rate of 2,000 cubic feet per second (cfs) would provide a minimum export water supply allocation of about 1.5 MAF/yr.

Fishery Protection. Minimum standards for fish protection from entrainment in the central and southern Delta should specify minimum flows in the lower San Joaquin River channels. These minimum flows should be specified for the San Joaquin River downstream from the mouth of the Mokelumne River where Georgiana Slough and Delta Cross Channel (DCC) diversions enter the central Delta. These lower San Joaquin River flows are estimated by the QWEST variable in DAYFLOW.

The purpose of recommended QWEST minimum flow standards (Table 2) is to prevent the transport of vulnerable life stages of fish (eggs, larvae, or juveniles) from the lower San Joaquin River upstream into the "zone of influence" of the export pumps and agricultural diversions. The QWEST flow standards would be most protective during the February-July period when the greatest densities of vulnerable fish life stages are generally observed in the Delta. The QWEST standards would also prevent reverse flows in the vicinity of Antioch during the remainder of the year.

The QWEST standards would be initially consistent with the biological opinion for the effects of CVP and SWP operations on winter-run salmon and would incorporate some of the draft D-1630 fishery recommendations. The recommended standards, however, should be sufficiently flexible to allow adaptive management to maximize fish benefits and other beneficial uses.

The water allocation required for compliance with these QWEST standards would depend on Delta inflows and the operation of DCC and must be estimated with a water supply simulation model such as DWRSIM or DeltaSOS. A daily simulation model, such as DailySOS, may provide a more accurate estimate of the potential water allocation requirements because DCC and export operations depend on daily hydrology. The compliance rules for QWEST would also affect the required water allocation. Longer compliance periods would allow greater fluctuations in QWEST and might allow more export pumping following storms.

Fish in vulnerable life stages may be transported into the zone of influence of export pumping during periods of large negative QWEST flows. Daily monitoring of larval and juvenile fish density in the vicinity of Jersey Point and Franks Tract would provide additional information needed for developing flexible compliance requirements for the QWEST standards to allow greater water supply without reducing entrainment protection.

Threemile Slough is thought to divert a significant portion of the Sacramento River flow at Rio Vista to the San Joaquin River during periods of low QWEST flows. Therefore, flows in the lower San Joaquin River in the vicinity of Antioch are indirectly controlled by the combination of QWEST and Delta outflow standards. The relationships between QWEST flows; Delta outflow; and flows in the Sacramento River at Rio Vista, Threemile Slough, and the San Joaquin River at Antioch are given in the lower part of Table 2.

Adaptive Allocation Objectives

A framework for adaptive allocation of Delta inflows should be established to ensure equitable management of all Delta water resources in a manner that is both effective and efficient. Annual or monthly allocation of available Delta water supply should be managed using daily operational rules that respond to actual Delta conditions of flow, habitat, and fish life-stage abundance. Adaptive management based on daily decisions will only be workable if decisions are made by an informed Delta Master team.

Adaptive management consists of obtaining current information, establishing explicit management objectives, implementing management actions on an incremental basis, and monitoring system responses to the management actions as a basis for further actions to better achieve management objectives (Figure 2).

Adaptive management objectives and initial water allocation and operational rules for meeting management objectives are described below. They would provide a comprehensive management approach for Delta water resources.

Initial water allocations to achieve adaptive management objectives would be decided daily based on actual Delta conditions and responses. Therefore, the water allocations needed to achieve adaptive management objectives can only be roughly estimated with existing water supply simulation models. The water allocation for individual adaptive management objectives cannot be easily determined because each adaptive management objective interacts with the others. Comparative analyses of incremental changes in the assumed flow requirements necessary to satisfy management objectives can be made, however, with the DeltaSOS (monthly) and DailySOS (daily) models.

San Joaquin River Transport Flows

Adaptive Allocation Objective 1A. Provide sufficient San Joaquin River flows during the spring period (April-June) to transport at least 90% (or other adopted measurable goal) of all migrating salmon smolts and vulnerable life

stages of other anadromous or estuarine species downstream of the zone of influence of diversions and export pumping.

The initial water allocation rule would allow the Delta Master team to schedule a San Joaquin River fish transport flow of 5,000 cfs at Vernalis for a 3-week period. The minimum San Joaquin flow to meet water quality standards (500 milligrams per liter [mg/l] total dissolved solids [TDS]) is about 900 cfs. Therefore, the maximum extra required transport flow would be 4,100 cfs for 3 weeks, or 172 TAF. The required transport flow would be accompanied by export pumping limited to 2,000 cfs for the 3-week period to provide protection for San Joaquin River fish. The water allocation associated with the reduced export pumping would depend on Sacramento River flows. After an initial period, the schedule and pattern of transport flow would likely be modified from this initial rule, as more information on the success and importance of this transport flow management action is obtained.

The operation of a tidal gate or diversion control structure at the head of Old River may increase the effectiveness of the transport flow for salmon because the gate would prevent juveniles from moving directly to the export pumps.

The initial water allocation for this objective was simulated in DeltaSOS with a minimum San Joaquin flow of 4,000 cfs and maximum export pumping of 2,000 cfs in May of every year. The export pumping limitation would only be required for 3 weeks, so this simulation overestimates the water allocation for reduced pumping.

Adaptive Allocation Objective 1B. Release sufficient San Joaquin River flows during the fall migration period (October and November) to provide attraction benefits to at least 90% (or other adopted measurable goal) of all migrating San Joaquin River salmon adults.

The initial water allocation rule would allow the Delta Master team to schedule a San Joaquin River fish transport flow of 2,000 cfs at Vernalis for a 2-week period. This would require a maximum flow allocation of 1,100 cfs for 14 days, or 31 TAF. The schedule and pattern of this transport flow will likely change from this initial allocation rule, as more information on the success of the attraction flow management action is obtained.

The operation of a tidal gate or diversion control structure at the head of Old River would increase the effectiveness of the attraction flows because the gates would increase flows past Stockton.

The initial water allocation for this objective was simulated in DeltaSOS with a minimum San Joaquin flow of 1,500 cfs in October. No export reductions or higher QWEST flows were simulated for this management objective.

Sacramento River Fish Transport Flows

Adaptive Allocation Objective 2A. Provide sufficient Sacramento River flows during the spring period (April-June) to transport at least 90% (or other adopted measurable goal) of all migrating salmon juveniles and vulnerable life stages of other anadromous or estuarine species to a location downstream of the zone of influence of diversions and export pumping.

The initial water allocation rule would allow the Delta Master team to schedule a Sacramento River fish transport flow of 13,000 cfs at Freeport for a 4-week period. Because the minimum Sacramento River flow would be about 8,000 cfs (for a minimum Delta outflow of 7,000 cfs), the maximum extra required transport flow would be 5,000 cfs for 4 weeks, or 277 TAF. Transport flow would be accompanied by required DCC closure for the 4-week period to provide the maximum possible protection of Sacramento River fish.

The Delta Master team would decide whether a particular allocation of flow between the Sacramento, Feather, and American Rivers would improve the effectiveness of the transport flow. Reduced diversions along the Sacramento River would improve the effectiveness of these transport flows. The schedule and pattern of the transport flow will likely change from the initial allocation rule, as more information on the success of the transport flow management action is obtained.

The initial water allocation for this objective was simulated in DeltaSOS with a minimum Sacramento River flow of 13,000 cfs and DCC closure in May of every year.

Adaptive Allocation Objective 2B. Provide sufficient Sacramento River flows during the spring period (April-June) to minimize transport time for at least 90% (or other adopted measurable goal) of all juvenile salmon released from the Coleman fish hatchery to a location downstream of the diversions at DCC and Georgiana Slough.

The initial water allocation rule would allow the Delta Master team to schedule a Sacramento River fish transport flow of 14,000 cfs from Keswick (power plant capacity) for a 1-week period. Because the minimum Keswick flow would be about 5,000 cfs, the maximum extra required transport flow would be 9,000 cfs for 1 week, or 125 TAF. The schedule and pattern of this transport flow will likely change from this initial allocation rule as more information on the success of the transport flow management action is obtained.

The initial water allocation for this objective was simulated in DeltaSOS by increasing the minimum Sacramento River flow from 13,000 cfs to 15,000 cfs in May of every year.

Real-Time Operation of DCC Gates

Adaptive Allocation Objective 3. Operate the DCC gates to ensure that at least 90% (or other adopted measurable goal) of all migrating salmon juve-

niles and vulnerable life stages of other anadromous or estuarine species are transported to a location downstream of the diversions at DCC.

The initial Delta operations rule would allow the Delta Master team to close DCC gates whenever Sacramento River fish monitoring indicated vulnerable life stages were upstream of DCC and Georgiana Sloughs. Closing DCC reduces the diversion of Sacramento River water into the central Delta to about 20% (through Georgiana Slough). Therefore, about 80% of the fish should be protected whenever DCC is closed. The water allocation required for this management action, resulting from reduced pumping during periods of DCC closure to satisfy the minimum fish protection QWEST flows, would depend on Delta inflows.

The Delta Master team would decide, based on fish monitoring information, when the DCC gates should be closed and when they could be opened. The appropriateness of existing "standard operating procedure" to close the DCC whenever Sacramento River flow is greater than 25,000 cfs should be carefully investigated and verified as necessary. The possibility that diurnal salmon migration patterns may allow the DCC gates to remain open during the day and be closed at night should be investigated. Allowing the DCC gates to remain open to a higher flood control threshold or to remain open during daylight hours would provide greater QWEST flows, which may benefit salinity control, water supply, and fish transport management objectives.

The initial water allocation for this objective was simulated in DeltaSOS with DCC closure for February-June of every year. This simulated the maximum likely water allocation requirement for this management objective. Based on fish monitoring information, it is likely that DCC could be opened for many days during this period, which may benefit salinity control, water supply, and fish transport management objectives.

Estuarine Habitat Management

Adaptive Allocation Objective 4. Increase Delta outflow to control the upstream location of the salinity gradient boundary (defined as 3 millisiemens per centimeter [mS/cm] EC at the surface) to provide sufficient useable habitat area for life stages of Delta fish species that require estuarine habitat (i.e., Delta smelt, longfin smelt, and striped bass).

The requirements for useable estuarine habitat must be determined from estimates of life-stage habitat requirements for each fish species. Estimates of useable estuarine habitat for natural flows (unimpaired outflows) during each year might be used as a reference for judging the effectiveness of this management objective.

Effectiveness of this management objective will be difficult to quantify because detailed habitat preference information is not yet available, although general estimates of salinity preference can be obtained from historical samples from the estuarine habitat. An initial management goal might be established to maintain 50% of the useable estuarine habitat area that would have existed with natural Delta outflows.

The Delta Master team would schedule Delta outflow to control the upstream location of the salinity gradient (3 mS/cm EC) in February-June, when greatest densities of estuarine larval fish life stages are generally observed. The minimum protection salinity control outflow standards will maintain the salinity gradient downstream of the confluence EC monitoring station at Collinsville (81 kilometers from the Golden Gate Bridge). Storm runoff will control the salinity gradient location on many days during February-June. The Delta Master team must determine the need for additional Delta outflow for controlling the location of the estuarine salinity gradient during periods between storms.

The initial water allocation rule would allow the Delta Master team to maintain the salinity gradient location downstream of Chipps Island (Mallard Island) during February-June of all years, equivalent to a minimum Delta outflow of 12,000 cfs. This would require a maximum extra water allocation of 5,000 cfs for 4 months (assuming May outflow is already greater than 12,000 cfs), or about 1.2 MAF. However, storms are expected to provide sufficient habitat management flows for the majority of the days in the control period, without additional reservoir releases or reduced export pumping.

The initial water allocation for this objective was simulated in DeltaSOS with a required minimum Delta outflow of 12,000 cfs for February-June of every year.

QWEST Flows and Entrainment Losses

Adaptive Allocation Objective 5. Increase QWEST flows and reduce exports and agricultural diversions to protect vulnerable life stages of estuarine fish that may spawn within the zone of influence of export pumping and agricultural diversions in the central and southern Delta. As more fish information is collected and analyzed, it may be possible to assign a numerical protection goal to this management objective.

The initial water allocation rule would allow the Delta Master team to schedule QWEST flows (greater than the minimum protective standard of 0 cfs) during February-June to increase the transport of vulnerable life stages of estuarine species out of the zone of influence of the pumps. This might occur before or after the San Joaquin River transport flows. The schedule and pattern of this QWEST transport flow would be determined by the Delta Master team based on fish monitoring information.

The required QWEST flows could be provided through reductions in pumping (to the 2,000 cfs minimum), increases in San Joaquin River inflows, or increases in Sacramento River diversions at Georgiana Slough and DCC. If export pumping is reduced to supply the required QWEST flows, a larger fraction of the vulnerable fish life stages may be transported out of the zone of influence. Increasing QWEST flows may be a more effective fish protection management action than reducing exports with pumping or "take" limits because QWEST flows may transport some of the vulnerable fish life stages out of the zone of influence while pumping limits or take limits alone may simply delay the inevitable entrainment of vulnerable fish life stages.

The initial water allocation for this objective was simulated in DeltaSOS with a minimum QWEST flow of 4,000 cfs in June of every year. Because DeltaSOS does not simulate increased inflows if export reductions (to 2,000 cfs) are not sufficient to produce the required QWEST flows, the simulated June QWEST flows must be examined to determine additional flows that would have been necessary to satisfy the QWEST requirement. If fish monitoring indicated that there were no vulnerable Sacramento River fish in June, the DCC could be opened to increase QWEST flow to minimize the need for pumping reductions or increased Delta inflows.

PRELIMINARY WATER ALLOCATION ESTIMATES

DeltaSOS has been used to provide preliminary estimates of the overall water allocation requirements for the six alternatives that were developed by SWRCB based on testimony at previous Bay-Delta workshops and subsequent submittals to SWRCB. The August 18, 1994 memorandum from Tom Howard to George Barnes provided the set of standards to be included in each alternative.

DeltaSOS requires an initial Delta water budget for evaluation of the effects of specified Delta standards. The DWRSIM base case results for the December 1993 study of EPA-proposed standards (called Study 1) were used. DWRSIM modeling for this study simulated D-1485 standards with a south-of-Delta demand of 6 MAF/yr but used the Sacramento Index 40-30-30 year-type classification scheme. For the 1922-1991 period, the DWRSIM-calculated average annual export was 5,632 TAF/yr. The corresponding average Delta outflow was 14,810 TAF/yr.

DeltaSOS-specified control matrices (month- x year-type) for approximating D-1485 standards were tested against the DWRSIM results. The DeltaSOS calculations indicate that the D-1485 standards were satisfied in the DWRSIM base case. DeltaSOS estimates of outflow requirements in critical years were 145 TAF/yr higher than DWRSIM estimates (DWRSIM simulates some relaxation conditions not included in DeltaSOS). DeltaSOS calculations indicate that the average annual DCC flow was 2,306 TAF/yr, and that allowable exports averaged 5,606 TAF/yr (26 TAF/yr less than DWRSIM). The annual average QWEST flow was 1,789 TAF/yr. These were the base case conditions used to evaluate the six SWRCB alternatives.

Summary of Alternatives

Table 3 summarizes the proposed limits on various Delta water operations for the six alternative Delta standards. Some of the alternatives include required Sacramento and San Joaquin River fish transport flows; the San Joaquin River inflows may be accompanied by export limits. Each of the alternatives includes periods of DCC closure, in addition to the assumed flood control closure for Sacramento River flows above 25,000 cfs. Some of the alternatives include QWEST controls. Each of the alternatives includes Delta outflow

requirements, and some alternatives include Rio Vista minimum flows. Some alternatives include fixed export limits, and some alternatives limit exports as a fraction of total Delta inflow.

Table 4 summarizes the DeltaSOS results for each alternative, and presents the D-1485 base case results for comparison. The extra inflow requirements for Sacramento and San Joaquin River transport flows were assumed to come from modified reservoir releases, but DeltaSOS did not adjust subsequent inflows to account for these required transport flows.

The simulated DCC flows indicate the magnitude of the effect of specified DCC closure periods for each alternative. The base case DCC flow averaged 2,306 TAF/yr, and the alternatives reduced DCC flows to as little as 1,061 TAF/yr (Alternatives 2 and 3). Most alternatives increased the average QWEST flow, from the base case value of 1,789 TAF/yr to as much as 3,519 TAF/yr (Alternative 4). Each of the alternatives required a reduction in exports, from the base case value of 5,606 TAF/yr to as little as 3,317 TAF/yr (Alternative 4). The average annual reduction in exports varied from 409 TAF/yr (Alternative 5) to 2,315 TAF/yr (Alternative 4).

The annual average required Delta outflow (including the average annual DWRSIM carriage water estimate of 345 TAF/yr for the D-1485 base case) ranged from 4,920 TAF/yr for the base case to as much as 10,021 TAF/yr (Alternative 4). DeltaSOS-calculated annual average outflow deficit (outflow that could not be satisfied by reducing export to 1,500 cfs) varied from about 35 TAF/yr (Alternatives 2 and 5) to about 620 TAF/yr (Alternative 4). The annual average Delta outflow was increased for each of the alternatives from the base case value of 14,859 TAF/yr.

This summary comparison does not describe the variation in annual and monthly values that may be important for evaluating the fish protection benefits provided by each alternative. Three tables are provided for each alternative to show the annual and monthly variations. One table shows the DeltaSOS monthly matrices that were determined to represent applicable standards for each alternative. A second table shows DeltaSOS-calculated annual values (1922-1991) of several important variables for each alternative. A third table shows the monthly percentiles of DeltaSOS-calculated values of several important variables for each alternative.

Monthly Water Supply Model Results

DeltaSOS results for the six alternatives indicate that water supply impacts can be estimated for a specified set of fixed monthly standards (translated into equivalent flow requirements). However, calculated water supply impacts provide little useful information about the fish protection or estuarine habitat benefits that can be anticipated from these alternative sets of standards. Determination of the most effective or efficient water management controls for obtaining fish benefits cannot be based on water supply modeling alone.

Monthly water supply models are inappropriate analytical tools for evaluating likely fish protection or estuarine habitat benefits that would result from alternative Delta standards. Water supply models only provide a portion of the necessary information, as shown in Figure 2, which illustrates parallel management of Delta water and fish resources.

Effects of Water Supply Model Assumptions

Several water supply model assumptions have important effects on simulations of water supply impacts. One major assumption is the monthly pattern of south-of-Delta demands and available monthly San Luis Reservoir storage. These assumptions may limit the monthly Delta exports and increase the simulated water supply impacts in some years of the 1922-1991 hydrologic record.

Another important assumption is the year-type classification scheme (or sliding-scale index) used to determine the fixed monthly standards for each year of the hydrologic record. The sequence of years is important for simulating reservoir carryover storage. The historical sequence is normally used in water supply models although it is recognized that this sequence will likely not occur in the future.

Assumptions regarding monthly export pumping capacity, allowable exports of "excess" San Joaquin River inflow, and minimum allowed pumping also will effect the water supply model results.

There are a number of assumptions related to compliance with standards that may also be important. Monthly models implicitly simulate compliance corresponding to monthly average flows; shorter averaging periods may give different results. The location of required Delta outflow and the need for "carriage water" during periods of relatively low Delta outflow may also have important effects on estimated water supply impacts.

Daily Models Required

Presently, monthly Delta water supply models are the only analytical tools being used to evaluate alternative Delta standards. As described in previous JSA testimony, Delta hydrology and operations are poorly described by monthly average flows. Daily simulations would provide a more adequate description of Delta operations for water supply planning purposes.

The available fish and habitat data also indicate substantial daily variation in outmigration timing, rate of fish movement, spawn timing, spawn distribution, geographical distribution of sensitive life stages, and entrainment vulnerability. Real-time monitoring and daily evaluation of fish data are necessary for development of effective water management strategies. Daily models to simulate the likely effects of daily operations on fish must be developed for fish protection management.

The DailySOS model described in JSA testimony at the June Bay-Delta workshop provides the first "layer" of information for such a daily simulation model of fish effects. DailySOS allows estimation of the effects of daily hydrology and Delta operations on Delta channel flow conditions.

A second "layer" of information can be provided by a daily fish transport and entrainment model called DailyMOVE (Daily Movement of Organisms Vulnerable to Entrainment). The movement of passive organisms in the Delta are tracked following a specified spawning event at a selected river inflow or Delta region. The model calculates the number of organisms that are transported to other Delta segments or entrained by agricultural diversions or export pumps. The primary model variable is fish density (fish/AF). The relative number of fish remaining in each region of the Delta (or cumulative entrainment) following the specified spawning event can be quickly simulated.

The DailyMOVE results should be tested and confirmed with historical fish distribution data for as many different Delta conditions as possible. The modeled fish transport and entrainment estimates should be made as reliable as water supply simulations, if possible.

Adaptive Delta Management

Daily variability in both hydrology and biology must be considered in Delta management for maximizing beneficial uses of water. The alternative standards for the Bay-Delta estuary should be more comprehensive than fixed monthly requirements that have been the primary focus of previous SWRCB decisions. SWRCB should identify alternative management strategies that will develop and use daily information, standards, and evaluation tools appropriate for effective management of the Bay-Delta estuary.

The objective of the adaptive management alternative recommended by JSA is to maximize beneficial uses of water in the Delta (i.e., water supply, salinity control, and fish protection). Adaptive management consists of obtaining current system information, implementing management actions on an incremental basis to achieve explicit management objectives, and monitoring system responses to the management actions as the basis for further actions to better achieve management objectives (Figure 3). Adaptive management actions will respond to daily fish protection needs (based on historical data and real-time monitoring), daily flow availability (including natural hydrology and reservoir releases), and daily operations capabilities (i.e., gates, barriers, and pumps).

Daily Simulations of Fish Transport and Entrainment

DailySOS and DailyMOVE models were used to simulate daily Delta conditions for historical April-June 1975 hydrology with existing Delta facilities and existing Delta standards. A representative fish spawning event was specified in the lower San Joaquin River portion of the Delta and the resulting daily transport and entrainment patterns were

simulated. The effects of possible adaptive management of DCC gates were demonstrated with the models.

Delta Channel Flows. DCC was simulated closed and open to illustrate the effects on flow and fish distribution patterns. DCC gate closure is currently required from February through April to protect winter-run chinook salmon. Closure is recommended through June to protect fall-run chinook salmon. The effects of DCC gate closure depend on the life history and distribution of each species. DCC closure may reduce the number of fish diverted from the Sacramento River, but DCC closure may reduce the transport and flushing of fish that spawn in the lower San Joaquin River portion of the Delta.

Figure 4 shows daily estimated Delta flow conditions with DCC gates closed and with DCC gates opened during April, May, and June of 1975. Exports were adjusted from historical values to satisfy current operational requirements with DCC closed. Exports were not changed but the DCC gates were opened, providing greater QWEST flows in the lower San Joaquin River portion of the Delta.

Transport. DCC closure during spawning in the lower San Joaquin River portion of the Delta may increase entrainment in agricultural diversions and export pumps and reduce transport to optimum downstream habitat. Figure 5 shows daily estimated transport flows from the lower San Joaquin River portion of the Delta with DCC gates closed and with DCC gates open.

The two transport pathways are through the confluence of the Sacramento and San Joaquin Rivers to Suisun Bay and through the South Delta to the export pumps. The relative magnitude of the transport rates will govern the proportion of spawned fish that are either entrained or transported to downstream habitat. Opening the DCC increases the transport from the lower San Joaquin River portion of the Delta and reduces the relative magnitude of transport to the South Delta.

Entrainment. Figure 6 shows the simulated fish transport patterns in the lower San Joaquin River portion of the Delta with DCC gates closed and with DCC gates open. Spawning was specified for the first 10 days of April at 10 million eggs per day, for a total of 100 million eggs. The total number of organisms in the lower San Joaquin River increased during the spawning period, reaching a total of about 30 million. The transport rates to the confluence and to the South Delta were sufficiently high to reduce the number of fish remaining in the spawning area to less than 2 million by the end of April. The majority of fish were transported during the 10-day spawning period (70%). The relative magnitude of transport to the confluence was increased with DCC open, so that entrainment in agricultural diversions and export pumps by the end of April was reduced from 31.6% to 23.4%.

Conclusions

The daily transport and entrainment simulation example demonstrates that short periods of intensive management of Delta flows may be an efficient approach for achieving

fish protection objectives. Adaptive management of DCC gate operation on a daily basis will provide the most effective management for all beneficial uses of Delta water. We recommend that SWRCB sponsor the development of daily models for evaluating the effects of Delta operations on fish distribution and habitat conditions that can be used to support daily adaptive management of Delta water and fish resources.

Protection along migration pathways, transport following spawning, and avoidance of entrainment require intensive management actions for periods of generally less than a month. Effectively fixed monthly fish protection standards require more flow and operations restrictions than would be needed through adaptive management based on daily information.

JSA appreciates this opportunity to participate in the development and evaluation of potential Delta standards based on adaptive management principles. The evaluation of potential fish protection and estuarine habitat benefits cannot be calculated by DWRSIM; therefore, we would like to demonstrate how results from daily simulation models of water supply, salinity control and estuarine habitat, and fish spawning and transport can be used to evaluate fish protection and habitat benefits. We are convinced that these analytical tools can provide the integrated quantitative evaluation that SWRCB will need to select and adopt comprehensive Delta standards.

RB:flw

**Table 1. Minimum Required Delta Outflow (cfs)
for Salinity Control**

Month	Wet	Above Normal	Below Normal	Dry	Critically Dry
October	4,500	4,500	4,500	3,500	3,500
November	4,500	4,500	4,500	3,500	3,500
December	4,500	4,500	4,500	3,500	3,500
January	4,500	4,500	4,500	3,500	3,500
February	7,000	7,000	7,000	7,000	7,000
March	7,000	7,000	7,000	7,000	7,000
April	7,000	7,000	7,000	7,000	7,000
May	7,000	7,000	7,000	7,000	7,000
June	7,000	7,000	7,000	7,000	7,000
July	7,000	7,000	4,500	3,500	3,500
August	7,000	7,000	4,500	3,500	3,500
September	3,500	3,500	3,500	3,500	3,500

Approximate Salinity and Outflow Equivalents

Salinity	Outflow (cfs)
250 mg/l chloride at CCWD	3,500
15.6 mS/cm EC at Chipps Island	3,500
150 µg/l chloride at CCWD	4,500
12.5 mS/cm EC at Chipps Island	4,500
2.78 mS/cm EC at Emmaton	3,850
1.67 mS/cm EC at Emmaton	4,650
0.63 mS/cm EC at Emmaton	6,700
1.5 mS/cm EC at Antioch	6,700
3.0 mS/cm EC at Collinsville	7,000
0.45 mS/cm EC at Emmaton	7,600

**Table 2. Minimum Required QWEST Flows (cfs) for
Fish Protection from Entrainment**

Month	Flow (cfs)
October	-2,000
November	-2,000
December	-2,000
January	-2,000
February	0
March	0
April	0
May	0
June	0
July	0
August	-2,000
September	-2,000

**Flow Relationships between QWEST, Delta Outflow, Sacramento River at
Rio Vista, Threemile Slough, and San Joaquin River at Antioch**

Sacramento at Rio Vista	=	Outflow - QWEST		
Threemile Slough	=	0.23 * Rio Vista - 0.31 * QWEST		
San Joaquin at Antioch	=	QWEST + Threemile Slough		

QWEST	Outflow	Rio Vista	Threemile	Antioch
-2,000	3,500	5,500	1,885	-115
-2,000	4,500	6,500	2,120	120
0	3,500	3,500	805	805
0	4,500	4,500	1,035	1,035
0	7,000	7,000	1,610	1,610

Table 3. Summary of Alternative Delta Standards

Delta Standards	Base Case D-1485	SWRCB Alternatives					
		1	2	3	4	5	6
Sacramento flow	No	No	No	No	No	Yes	Yes
DCC closure	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rio Vista flow	Yes	Yes	Yes	Yes	Yes	Yes	No
QWEST flow	No	Yes	No	No	Yes	No	Yes
San Joaquin flow	No	Yes	Yes	Yes	Yes	Yes	Yes
Delta outflow:							
Fixed	Yes	Yes	Yes	Yes	Yes	Yes	Yes
EPA Type	No	Yes	No	Yes	No	No	No
Export limits:							
Fixed	Yes	Yes	Yes	Yes	Yes	No	No
Percent of inflow	No	No	Yes	Yes	No	Yes	No

Table 4. Summary of DeltaSOS Preliminary Water Allocation Requirements for SWRCB Alternatives

1922-1991 Average (TAF/yr)	Base Case D-1485	SWRCB Alternatives					
		1	2	3	4	5	6
Sacramento transport	0	0	0	0	0	48	72
San Joaquin transport	2	136	139	139	136	207	113
DCC flow	2,306	1,586	1,061	1,061	1,637	1,880	1,637
QWEST flow	1,789	2,095	1,433	1,523	3,519	1,825	2,187
Exports	5,606	4,698	4,923	4,834	3,317	5,223	4,657
Export reductions	26	933	707	798	2,315	409	975
Required outflow	4,920	7,716	5,357	7,395	10,021	5,581	5,796
Outflow deficit	0	531	31	327	621	35	112
Total outflow	14,859	16,102	15,541	15,631	17,802	15,290	16,505

Delta Standards Matrices for SWRCB-1 No Extra Exports

Minimum required Sacramento River flow at Freeport (cfs)

	Wet	Above Normal	Normal	Dry	Critical
Oct	0	0	0	0	0
Nov	0	0	0	0	0
Dec	0	0	0	0	0
Jan	0	0	0	0	0
Feb	0	0	0	0	0
Mar	0	0	0	0	0
Apr	0	0	0	0	0
May	0	0	0	0	0
Jun	0	0	0	0	0
Jul	0	0	0	0	0
Aug	0	0	0	0	0
Sep	0	0	0	0	0

Sacramento River trigger for Delta Cross Channel (cfs) (Closed if Sac flow below Hood > value)

	Wet	Above Normal	Below Normal	Dry	Critical
Oct	25,000	25,000	25,000	25,000	25,000
Nov	25,000	25,000	25,000	25,000	25,000
Dec	25,000	25,000	25,000	25,000	25,000
Jan	25,000	25,000	25,000	25,000	25,000
Feb	0	0	0	0	0
Mar	0	0	0	0	0
Apr	0	0	0	0	0
May	0	0	0	0	0
Jun	0	0	0	0	0
Jul	25,000	25,000	25,000	25,000	25,000
Aug	25,000	25,000	25,000	25,000	25,000
Sep	25,000	25,000	25,000	25,000	25,000

Minimum Rio Vista flow (cfs)

	Wet	Above Normal	Below Normal	Dry	Critical
Oct	5,000	2,500	2,500	1,500	1,500
Nov	5,000	2,500	2,500	1,500	1,500
Dec	5,000	2,500	2,500	1,500	1,500
Jan	2,500	2,500	2,500	1,500	1,500
Feb	3,000	2,000	2,000	1,000	1,000
Mar	4,000	2,500	2,500	1,500	1,500
Apr	4,000	4,000	4,000	4,000	4,000
May	4,000	4,000	4,000	4,000	4,000
Jun	4,000	4,000	4,000	4,000	4,000
Jul	3,000	2,000	2,000	1,000	1,000
Aug	1,000	1,000	1,000	1,000	1,000
Sep	5,000	2,500	2,500	1,500	1,500

Minimum QWEST flow (cfs)

	Wet	Above Normal	Below Normal	Dry	Critical
Oct	-15,000	-15,000	-15,000	-15,000	-15,000
Nov	-2,000	-2,000	-2,000	-2,000	-2,000
Dec	-2,000	-2,000	-2,000	-2,000	-2,000
Jan	-2,000	-2,000	-2,000	-2,000	-2,000
Feb	0	0	0	0	0
Mar	0	0	0	0	0
Apr	0	0	0	0	0
May	-15,000	-15,000	-15,000	-15,000	-15,000
Jun	-15,000	-15,000	-15,000	-15,000	-15,000
Jul	-15,000	-15,000	-15,000	-15,000	-15,000
Aug	-15,000	-15,000	-15,000	-15,000	-15,000
Sep	-15,000	-15,000	-15,000	-15,000	-15,000

Delta Standards Matrices for SWRCB-1 No Extra Exports

Minimum San Joaquin River flow at Vernalis (cfs)

	Wet	Above Normal	Below Normal	Dry	Critical
Oct	900	900	900	900	900
Nov	900	900	900	900	900
Dec	900	900	900	900	900
Jan	900	900	900	900	900
Feb	900	900	900	900	900
Mar	900	900	900	900	900
Apr	5,500	4,500	3,500	2,500	1,500
May	5,500	4,500	3,500	2,500	1,500
Jun	900	900	900	900	900
Jul	900	900	900	900	900
Aug	900	900	900	900	900
Sep	900	900	900	900	900

Minimum Delta outflow (cfs)

	Wet	Above Normal	Below Normal	Dry	Critical
Oct	4,500	4,500	4,500	3,400	3,400
Nov	4,500	4,500	4,500	3,400	3,400
Dec	4,500	4,500	4,500	3,400	3,400
Jan	4,500	4,500	4,500	4,500	4,500
Feb	10,000	4,500	4,500	4,500	4,500
Mar	10,000	6,910	6,910	6,910	4,500
Apr	10,000	7,580	7,580	7,580	6,700
May	13,350	12,960	10,780	7,580	4,850
Jun	14,000	10,700	9,500	6,120	3,850
Jul	10,000	7,700	6,500	4,650	3,850
Aug	4,960	4,530	3,890	3,540	3,150
Sep	2,500	2,500	2,500	2,500	2,500

Outflow Threshold:

7000	5	5	5	5	5	1.00	
12000	5	5	4	4	3	0.75	
29000	4	4	3	1	0	0.75	1.00

Maximum Delta export (cfs)

	Wet	Above Normal	Below Normal	Dry	Critical	DW Exemption	Assumed Capacity
Oct	11,280	11,280	11,280	11,280	11,280	11,280	11,280
Nov	11,280	11,280	11,280	11,280	11,280	11,280	11,280
Dec	10,880	10,880	10,880	10,880	10,880	10,880	12,700
Jan	10,880	10,880	10,880	10,880	10,880	10,880	12,700
Feb	10,880	10,880	10,880	10,880	10,880	10,880	12,700
Mar	10,880	10,880	10,880	10,880	10,880	10,880	12,700
Apr	2,750	2,750	2,750	2,750	2,750	2,750	11,280
May	2,750	2,750	2,750	2,750	2,750	2,750	11,280
Jun	4,000	4,000	4,000	4,000	4,000	4,000	11,280
Jul	11,280	11,280	11,280	11,280	11,280	11,280	11,280
Aug	11,280	11,280	11,280	11,280	11,280	11,280	11,280
Sep	11,280	11,280	11,280	11,280	11,280	11,280	11,280

Maximum Percent of Inflow Exported (fraction)

	Wet	Above Normal	Below Normal	Dry	Critical
Oct	1.00	1.00	1.00	1.00	1.00
Nov	1.00	1.00	1.00	1.00	1.00
Dec	1.00	1.00	1.00	1.00	1.00
Jan	1.00	1.00	1.00	1.00	1.00
Feb	1.00	1.00	1.00	1.00	1.00
Mar	1.00	1.00	1.00	1.00	1.00
Apr	1.00	1.00	1.00	1.00	1.00
May	1.00	1.00	1.00	1.00	1.00
Jun	1.00	1.00	1.00	1.00	1.00
Jul	1.00	1.00	1.00	1.00	1.00
Aug	1.00	1.00	1.00	1.00	1.00
Sep	1.00	1.00	1.00	1.00	1.00

Monthly Cumulative Distributions for SWRCB-1 No Extra Exports

Additional Sacramento River Flow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0	0	0	0
Mean	0	0	0	0	0	0	0	0	0	0	0	0

Additional San Joaquin River Flow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	69	295	0	0	0	0
40	0	0	0	0	0	0	413	887	0	0	0	0
50	0	0	0	0	0	0	783	1,089	0	0	0	0
60	0	0	0	0	0	0	1,278	1,248	0	0	0	0
70	0	0	0	0	0	0	1,480	1,812	0	0	0	0
80	0	0	0	0	0	0	1,999	1,975	0	0	0	0
90	0	0	0	0	0	0	2,386	2,488	0	0	0	0
100	509	0	0	85	341	0	3,446	3,474	176	0	37	129
Mean	15	0	0	2	14	0	1,019	1,190	4	0	1	3

Delta Cross Channel Flow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	0	0	0	0	0	0	0	0	0	2,833	2,770	2,315
10	2,753	0	0	0	0	0	0	0	0	4,073	3,381	3,160
20	3,430	2,853	0	0	0	0	0	0	0	4,931	4,035	3,675
30	3,733	3,656	0	0	0	0	0	0	0	5,117	4,100	3,765
40	3,851	3,804	3,654	0	0	0	0	0	0	5,316	4,160	3,821
50	3,953	3,948	4,085	0	0	0	0	0	0	5,376	4,240	3,906
60	4,023	4,620	4,308	0	0	0	0	0	0	5,390	4,267	3,989
70	4,678	5,038	4,693	4,204	0	0	0	0	0	5,436	4,428	4,116
80	5,409	5,444	4,934	4,488	0	0	0	0	0	5,567	4,493	4,679
90	5,970	5,718	5,135	4,908	0	0	0	0	0	5,712	4,768	5,371
100	6,328	6,398	6,255	5,250	0	0	0	0	0	6,308	5,439	6,328
Mean	4,145	3,852	3,052	1,802	0	0	0	0	0	5,150	4,218	4,102

Sacramento River at Rio Vista Flow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	2,080	2,326	3,548	3,956	8,087	3,952	5,215	5,443	4,949	2,349	2,204	2,142
10	3,273	3,921	4,964	6,110	10,022	9,446	9,158	6,962	6,886	4,425	3,131	3,261
20	4,119	4,570	5,536	6,981	12,737	12,338	11,250	9,663	9,333	7,531	4,809	4,140
30	4,678	4,817	6,420	8,377	15,366	17,207	11,720	10,054	9,542	8,183	4,932	4,338
40	4,838	5,327	8,228	10,479	22,714	21,292	13,025	11,908	10,489	9,181	5,088	4,584
50	4,998	8,060	8,548	19,642	29,417	25,086	14,510	12,701	11,779	9,284	5,570	4,967
60	5,871	9,639	9,799	24,490	40,657	27,876	16,822	13,598	12,584	9,417	5,769	5,089
70	8,743	11,323	21,999	31,385	50,945	37,832	20,425	14,884	14,977	9,933	5,948	5,381
80	10,636	12,542	39,247	63,450	68,021	49,401	37,244	25,259	16,908	10,376	6,393	6,963
90	13,753	25,439	60,830	89,110	102,411	79,244	55,812	35,584	21,649	11,050	7,450	10,014
100	32,595	62,385	117,336	168,365	188,452	187,148	104,484	51,555	43,946	13,583	9,923	14,326
Mean	7,617	11,656	21,938	33,390	43,652	35,871	23,731	16,831	13,769	8,704	5,541	5,750

Required Delta Outflow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	3,400	3,400	3,400	4,500	7,000	7,000	7,000	12,000	7,000	3,850	3,150	2,500
10	3,400	3,400	3,400	4,500	7,000	7,000	7,580	12,000	12,000	3,948	3,150	3,123
20	3,400	3,400	4,410	4,500	12,000	12,000	12,000	12,000	12,000	6,360	4,436	3,796
30	3,400	4,181	4,500	4,500	12,000	12,000	12,000	12,000	12,000	6,393	4,693	3,931
40	4,500	4,500	4,500	4,500	12,000	12,000	12,000	12,000	12,000	6,500	4,833	4,015
50	4,500	4,500	4,500	4,500	12,000	29,000	12,000	12,000	14,000	7,103	4,976	4,133
60	4,500	4,955	4,589	4,500	29,000	29,000	12,000	13,350	14,000	7,700	5,153	4,352
70	4,500	5,291	4,964	5,380	29,000	29,000	12,000	29,000	29,000	8,710	5,351	4,604
80	5,038	5,577	5,360	5,836	29,000	29,000	29,000	29,000	29,000	10,000	5,507	5,395
90	5,803	5,786	5,657	6,227	29,000	29,000	29,000	29,000	29,000	10,000	6,003	5,951
100	6,439	6,082	6,080	6,536	29,000	29,000	29,000	29,000	29,000	10,000	6,925	6,574
Mean	4,405	4,640	4,668	4,994	19,571	19,820	16,360	18,656	18,121	7,484	4,954	4,393

Monthly Cumulative Distributions for SWRCB-1 No Extra Exports

Remaining Delta Outflow Deficits (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	2,287	0	0	0
50	0	0	0	0	0	0	0	0	2,304	0	0	0
60	0	0	0	0	0	0	0	848	5,115	0	0	0
70	0	0	0	0	0	0	0	3,666	7,874	0	0	0
80	0	0	0	0	0	0	0	5,018	14,658	0	0	0
90	0	0	0	0	0	0	0	10,305	15,904	0	0	0
100	0	0	0	0	0	1,292	7,169	14,639	16,308	0	0	0
Mean	0	0	0	0	0	23	340	2,651	5,800	0	0	0

Net Change in Exports (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	-14	-2,057	-2,808	-2,516	-6,596	-6,387	-8,478	-4,495	-4,526	0	-25	-1
10	-14	-18	-233	-351	-5,369	-5,059	-8,461	-4,495	-3,518	0	0	0
20	0	-1	-8	0	-3,837	-4,282	-7,350	-4,349	-3,516	0	0	0
30	0	0	0	0	-2,057	-3,057	-6,222	-3,501	-3,516	0	0	0
40	0	0	0	0	0	-1,400	-5,919	-3,501	-3,516	0	0	0
50	0	0	0	0	0	-204	-5,818	-3,245	-3,096	0	0	0
60	0	0	0	0	0	0	-5,599	-3,245	-2,420	0	0	0
70	0	0	0	0	0	0	-5,482	-3,245	-2,028	0	0	0
80	0	0	0	0	0	0	-5,183	-3,212	-2,026	0	0	0
90	0	0	0	0	0	0	-3,849	-2,524	-1,016	0	0	0
100	0	0	0	0	0	0	-2,170	-1,351	-284	0	0	0
Mean	-1	-80	-168	-171	-1,324	-1,671	-5,925	-3,420	-2,733	0	-0	-0

Final Exports (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	2,330	3,148	4,561	3,177	3,376	1,500	1,500	1,500	1,500	766	2,232	3,131
10	4,594	5,808	6,940	6,093	4,274	4,108	1,500	1,500	1,500	4,219	4,203	4,966
20	5,734	6,868	7,827	7,542	5,377	4,707	2,750	1,500	1,500	5,522	5,490	5,875
30	6,255	7,289	8,455	8,324	5,759	5,474	2,750	1,500	1,500	7,494	5,789	6,111
40	6,551	8,181	8,963	9,367	6,890	6,272	2,750	1,500	1,500	7,836	5,881	6,363
50	6,826	8,971	10,045	9,872	7,467	6,830	2,750	1,597	1,500	8,194	6,011	6,464
60	8,196	10,959	10,546	10,697	8,044	6,923	2,750	2,750	1,500	9,220	6,109	6,832
70	11,045	10,959	11,224	11,439	9,144	7,249	2,750	2,750	2,898	9,220	6,744	6,902
80	11,045	10,959	11,273	11,550	11,338	7,754	2,750	2,750	4,000	9,220	6,809	9,275
90	11,045	10,959	11,273	11,550	11,633	8,618	2,750	2,750	4,000	9,220	8,031	11,262
100	11,045	10,959	11,273	11,550	11,833	11,159	2,750	2,750	4,000	9,220	11,280	11,262
Mean	7,907	8,989	9,579	9,456	7,833	6,370	2,625	2,072	2,281	7,517	6,175	7,177

Final QWEST Flow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	-4,431	-2,000	-2,000	-2,000	0	0	706	671	-1,998	-2,571	-3,201	-2,536
10	-1,819	-1,818	-2,000	-2,000	0	0	1,527	1,012	-835	-2,449	-1,341	-1,597
20	-748	-1,249	-1,383	-1,358	0	0	1,827	1,428	191	-2,368	-638	-749
30	-370	-851	-1,053	-839	0	0	2,142	1,676	458	-2,191	-436	-555
40	-215	-436	-756	-544	657	0	2,455	1,943	560	-1,779	-189	-489
50	-60	-324	-390	201	3,026	1,844	3,189	2,301	778	-1,277	-18	-314
60	317	-94	5	1,147	4,978	3,423	4,525	3,424	1,358	-589	44	-221
70	634	25	297	3,811	9,892	6,347	5,495	4,016	2,045	126	203	-155
80	1,559	578	2,709	9,042	13,678	11,849	8,259	5,753	3,018	1,338	373	-50
90	5,502	1,055	4,746	15,442	17,820	17,087	14,854	9,900	7,188	2,026	504	187
100	14,294	23,706	40,897	38,919	60,681	75,348	45,710	36,877	35,444	18,277	1,601	10,772
Mean	765	237	1,597	4,472	7,619	6,787	6,568	4,890	2,665	-358	-181	-290

Final Delta Outflow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	3,492	3,489	3,498	4,527	11,559	5,708	7,211	5,939	4,208	3,939	3,204	2,533
10	3,509	4,163	4,500	5,440	13,419	12,380	14,176	8,073	6,885	4,037	3,237	3,206
20	4,500	4,499	4,671	6,401	17,292	15,856	16,684	11,152	8,736	6,431	4,475	3,880
30	4,502	4,500	5,387	8,564	19,610	19,630	17,175	12,000	9,713	6,480	4,752	3,964
40	4,502	4,516	6,570	11,809	25,057	22,823	18,765	13,111	10,896	6,578	4,980	4,048
50	4,502	6,469	7,701	19,953	33,236	29,000	21,544	14,427	13,079	7,164	5,045	4,183
60	5,056	8,388	11,366	28,894	47,123	32,165	24,152	16,809	14,308	7,767	5,208	4,385
70	7,630	10,896	22,203	35,251	57,900	43,389	29,165	18,829	15,343	8,777	5,404	4,637
80	12,305	12,950	42,953	78,836	79,362	61,276	48,305	28,604	17,834	10,080	5,550	5,681
90	18,821	24,950	70,744	103,980	124,921	96,349	68,421	45,301	25,721	10,097	6,202	7,381
100	36,610	79,963	158,435	202,113	231,494	262,950	150,181	87,526	79,007	31,437	9,371	24,938
Mean	8,265	11,907	23,692	38,184	52,689	44,048	32,642	21,499	16,057	7,925	5,064	5,275

Delta Standards Matrices for SWRCB-2 No Extra Exports

Minimum required Sacramento River flow at Freeport (cfs)

	Wet	Above Normal	Normal	Dry	Critical
Oct	0	0	0	0	0
Nov	0	0	0	0	0
Dec	0	0	0	0	0
Jan	0	0	0	0	0
Feb	0	0	0	0	0
Mar	0	0	0	0	0
Apr	0	0	0	0	0
May	0	0	0	0	0
Jun	0	0	0	0	0
Jul	0	0	0	0	0
Aug	0	0	0	0	0
Sep	0	0	0	0	0

Sacramento River trigger for Delta Cross Channel (cfs) (Closed if Sac flow below Hood > value)

	Wet	Above Normal	Below Normal	Dry	Critical
Oct	25,000	25,000	25,000	25,000	25,000
Nov	0	0	0	0	0
Dec	0	0	0	0	0
Jan	0	0	0	0	0
Feb	0	0	0	0	0
Mar	0	0	0	0	0
Apr	0	0	0	0	0
May	0	0	0	0	0
Jun	0	0	0	0	0
Jul	25,000	25,000	25,000	25,000	25,000
Aug	25,000	25,000	25,000	25,000	25,000
Sep	25,000	25,000	25,000	25,000	25,000

Minimum Rio Vista flow (cfs)

	Wet	Above Normal	Below Normal	Dry	Critical
Oct	5,000	2,500	2,500	1,500	1,500
Nov	5,000	2,500	2,500	1,500	1,500
Dec	5,000	2,500	2,500	1,500	1,500
Jan	2,500	2,500	2,500	1,500	1,500
Feb	3,000	2,000	2,000	1,000	1,000
Mar	4,000	2,500	2,500	1,500	1,500
Apr	4,000	4,000	4,000	4,000	4,000
May	4,000	4,000	4,000	4,000	4,000
Jun	4,000	4,000	4,000	4,000	4,000
Jul	3,000	2,000	2,000	1,000	1,000
Aug	1,000	1,000	1,000	1,000	1,000
Sep	5,000	2,500	2,500	1,500	1,500

Minimum QWEST flow (cfs)

	Wet	Above Normal	Below Normal	Dry	Critical
Oct	-15,000	-15,000	-15,000	-15,000	-15,000
Nov	-15,000	-15,000	-15,000	-15,000	-15,000
Dec	-15,000	-15,000	-15,000	-15,000	-15,000
Jan	-15,000	-15,000	-15,000	-15,000	-15,000
Feb	-15,000	-15,000	-15,000	-15,000	-15,000
Mar	-15,000	-15,000	-15,000	-15,000	-15,000
Apr	-15,000	-15,000	-15,000	-15,000	-15,000
May	-15,000	-15,000	-15,000	-15,000	-15,000
Jun	-15,000	-15,000	-15,000	-15,000	-15,000
Jul	-15,000	-15,000	-15,000	-15,000	-15,000
Aug	-15,000	-15,000	-15,000	-15,000	-15,000
Sep	-15,000	-15,000	-15,000	-15,000	-15,000

Delta Standards Matrices for SWRCB-2 No Extra Exports

Minimum San Joaquin River flow at Vernalis (cfs)

	Wet	Above Normal	Below Normal	Dry	Critical
Oct	1,450	1,450	1,450	1,450	1,450
Nov	900	900	900	900	900
Dec	900	900	900	900	900
Jan	900	900	900	900	900
Feb	900	900	900	900	900
Mar	900	900	900	900	900
Apr	4,450	3,950	3,450	2,950	2,450
May	4,450	3,950	3,450	2,950	2,450
Jun	900	900	900	900	900
Jul	900	900	900	900	900
Aug	900	900	900	900	900
Sep	900	900	900	900	900

Minimum Delta outflow (cfs)

	Wet	Above Normal	Below Normal	Dry	Critical		
Oct	4,500	4,500	4,500	3,400	3,400		
Nov	4,500	4,500	4,500	3,400	3,400		
Dec	4,500	4,500	4,500	3,400	3,400		
Jan	4,500	4,500	4,500	4,500	4,500		
Feb	12,000	12,000	4,500	4,500	4,500		
Mar	12,000	12,000	9,500	7,000	5,750		
Apr	12,000	12,000	12,000	12,000	9,500		
May	12,000	12,960	12,000	12,000	9,500		
Jun	14,000	12,000	9,500	8,667	5,425		
Jul	10,000	7,700	6,500	4,650	3,850		
Aug	4,960	4,530	3,890	3,540	3,150		
Sep	2,500	2,500	2,500	2,500	2,500		
Outflow Threshold:							
6600	5	5	5	0	0	1.00	
12000	0	2	2	0	0	1.00	
28000	0	0	0	0	0	1.00	1.00

Maximum Delta export (cfs)

	Wet	Above Normal	Below Normal	Dry	Critical	DW Exemption	Assumed Capacity
Oct	11,280	11,280	11,280	11,280	11,280	11,280	11,280
Nov	11,280	11,280	11,280	11,280	11,280	11,280	11,280
Dec	10,880	10,880	10,880	10,880	10,880	10,880	12,700
Jan	10,880	10,880	10,880	10,880	10,880	10,880	12,700
Feb	10,880	10,880	10,880	10,880	10,880	10,880	12,700
Mar	10,880	10,880	10,880	10,880	10,880	10,880	12,700
Apr	3,750	3,750	3,750	3,250	2,750	10,880	11,280
May	3,750	3,750	3,750	3,250	2,750	6,000	11,280
Jun	6,000	6,000	6,000	5,000	4,000	6,000	11,280
Jul	9,200	9,200	9,200	9,200	9,200	9,200	11,280
Aug	11,280	11,280	11,280	11,280	11,280	11,280	11,280
Sep	11,280	11,280	11,280	11,280	11,280	11,280	11,280

Maximum Percent of Inflow Exported (fraction)

	Wet	Above Normal	Below Normal	Dry	Critical
Oct	0.60	0.60	0.60	0.60	0.60
Nov	0.60	0.60	0.60	0.60	0.60
Dec	0.60	0.60	0.60	0.60	0.60
Jan	0.60	0.60	0.60	0.60	0.60
Feb	0.30	0.30	0.30	0.30	0.30
Mar	0.30	0.30	0.30	0.30	0.30
Apr	0.30	0.30	0.30	0.30	0.30
May	0.30	0.30	0.30	0.30	0.30
Jun	0.30	0.30	0.30	0.30	0.30
Jul	0.60	0.60	0.60	0.60	0.60
Aug	0.60	0.60	0.60	0.60	0.60
Sep	0.60	0.60	0.60	0.60	0.60

Mean Annual Output Data for SWRCB-2 No Extra Exports

Water Year	Sac Basin Year Type	Added Sac Flow (TAF)	Added SJR Flow (TAF)	Revised DCC Flow (TAF)	Revised Rio Vista Flow (TAF)	Required Delta Outflow (TAF)	Outflow Deficit (TAF)	Net Export Change (TAF)	Direct Export (TAF)	Final Total Export (TAF)	Final QWEST Flow (TAF)	Final Delta Outflow (TAF)
1922	2	0	110	950	11,932	5,866	0	-528	5,414	5,414	1,307	13,152
1923	3	0	180	1,112	9,904	5,448	0	-810	5,257	5,257	665	10,483
1924	5	0	125	821	5,560	4,129	86	-1,448	3,622	3,622	-564	4,668
1925	4	0	205	1,050	9,431	4,631	0	-1,126	4,712	4,712	-296	9,055
1926	4	0	188	1,060	8,684	4,706	51	-1,207	4,786	4,786	-706	7,880
1927	1	0	171	1,012	19,389	5,933	0	-456	5,491	5,491	459	19,766
1928	2	0	117	1,117	14,590	6,006	0	-462	5,510	5,510	161	14,682
1929	5	0	95	866	5,155	4,022	143	-1,279	3,705	3,705	-387	4,655
1930	4	0	82	1,014	8,174	4,974	0	-1,323	4,670	4,670	-841	7,231
1931	5	0	93	757	4,453	3,771	250	-963	3,085	3,085	-146	4,161
1932	4	0	304	876	6,109	4,637	48	-1,178	3,901	3,901	-89	5,932
1933	5	0	122	843	4,580	3,731	190	-1,123	3,337	3,337	-151	4,314
1934	5	0	101	753	4,928	3,790	157	-996	3,191	3,191	-130	4,687
1935	3	0	109	1,013	9,645	5,395	0	-772	4,423	4,423	387	9,947
1936	3	0	199	1,028	13,369	5,475	0	-668	5,287	5,287	637	13,927
1937	3	0	118	990	9,365	5,544	0	-690	5,054	5,054	1,210	10,501
1938	1	0	0	1,102	31,589	6,147	0	-332	5,607	5,607	7,717	39,250
1939	4	0	137	1,181	7,224	4,717	51	-813	4,590	4,590	-8	7,096
1940	2	0	110	1,109	18,024	5,721	0	-652	5,343	5,343	461	18,421
1941	1	0	50	1,056	28,515	6,078	0	-438	5,479	5,479	3,878	32,344
1942	1	0	205	1,185	25,268	6,131	0	-483	5,444	5,444	3,326	28,520
1943	1	0	107	1,096	18,115	6,017	0	-433	5,086	5,086	3,587	21,615
1944	4	0	218	1,044	7,766	4,801	0	-902	5,074	5,074	-704	6,958
1945	3	0	184	1,040	9,654	5,443	0	-487	5,565	5,565	-226	9,332
1946	3	0	210	1,010	13,214	5,491	0	-455	5,303	5,303	387	13,494
1947	4	0	188	1,064	7,475	4,897	51	-1,119	4,858	4,858	-919	6,439
1948	3	0	304	1,075	9,056	5,142	0	-1,259	4,801	4,801	-897	8,051
1949	4	0	219	1,132	8,649	4,980	0	-1,171	4,801	4,801	-677	7,861
1950	3	0	149	1,075	9,112	5,366	0	-812	5,243	5,243	-870	8,131
1951	2	0	227	1,117	20,123	5,911	0	-513	5,443	5,443	3,459	23,502
1952	1	0	13	1,156	25,560	6,157	0	-303	5,747	5,747	4,923	30,418
1953	1	0	153	1,269	16,969	6,193	0	-433	5,041	5,041	1,290	18,157
1954	2	0	138	1,154	15,228	6,070	0	-561	5,256	5,256	-110	15,003
1955	4	0	186	1,071	7,930	4,899	0	-1,187	4,786	4,786	-742	7,086
1956	1	0	131	1,112	26,334	5,943	0	-470	5,628	5,628	3,609	29,776
1957	2	0	181	1,205	10,898	5,928	0	-537	5,123	5,123	188	10,888
1958	1	0	25	1,298	30,570	6,399	0	-397	5,886	5,886	4,815	35,343
1959	3	0	162	1,193	11,245	5,663	0	-420	5,001	5,001	268	11,402
1960	4	0	132	1,082	7,984	4,952	0	-1,256	4,732	4,732	-1,009	6,862
1961	4	0	111	1,031	8,094	4,807	28	-1,093	4,856	4,856	-1,202	6,782
1962	3	0	213	1,087	10,016	5,580	0	-753	5,170	5,170	-873	9,046
1963	1	0	341	850	19,542	6,371	0	-432	5,536	5,536	19	19,488
1964	4	0	206	1,152	8,548	4,904	51	-1,065	4,817	4,817	-876	7,554
1965	1	0	285	1,046	19,710	5,850	0	-552	5,407	5,407	1,383	21,001
1966	3	0	190	1,118	10,483	5,526	0	-382	5,459	5,459	-109	10,264
1967	1	0	0	1,136	20,574	6,226	0	-348	5,709	5,709	3,808	24,322
1968	3	0	133	1,196	12,724	5,632	0	-382	4,808	4,808	695	13,311
1969	1	0	11	1,133	24,420	6,222	0	-353	5,484	5,484	6,768	31,122
1970	1	0	189	1,200	25,356	6,082	0	-347	4,947	4,947	3,388	28,656
1971	1	0	129	1,133	16,781	6,187	0	-553	5,729	5,729	318	17,004
1972	3	0	170	1,151	9,868	5,730	0	-387	5,358	5,358	-1,031	8,713
1973	2	0	240	1,066	18,521	5,953	0	-516	5,348	5,348	1,615	20,087
1974	1	0	233	1,292	31,003	6,305	0	-415	5,841	5,841	3,036	33,955
1975	1	0	184	1,285	16,588	6,184	0	-433	5,297	5,297	1,969	18,461
1976	5	0	146	1,044	7,120	3,984	86	-826	4,328	4,328	-656	6,337
1977	5	0	138	683	3,971	3,737	457	-570	2,671	2,671	-260	3,587
1978	2	0	4	910	16,115	5,816	0	-369	4,564	4,564	2,045	18,105
1979	3	0	166	1,112	10,145	5,548	0	-458	5,316	5,316	538	10,592
1980	2	0	0	1,087	20,104	6,025	0	-431	5,275	5,275	5,395	25,428
1981	4	0	132	1,135	9,253	4,705	51	-687	4,975	4,975	50	9,180
1982	1	0	22	1,175	30,915	6,010	0	-347	6,001	6,001	8,335	39,206
1983	1	0	0	1,064	42,572	5,908	0	-250	5,167	5,167	21,915	64,479
1984	1	0	14	872	22,697	6,037	0	-442	4,011	4,011	8,527	31,125
1985	4	0	102	1,134	9,080	4,746	50	-718	5,079	5,079	-131	8,850
1986	1	0	0	1,027	24,377	5,967	0	-407	5,307	5,307	6,037	30,361
1987	4	0	84	1,056	7,149	4,818	51	-1,078	4,768	4,768	-841	6,491
1988	5	0	169	867	6,559	4,046	85	-1,410	3,793	3,793	-661	5,790
1989	4	0	94	1,164	8,255	4,813	51	-1,082	4,716	4,716	-923	7,219
1990	5	0	171	1,005	5,929	4,078	70	-1,186	3,983	3,983	-878	4,840
1991	5	0	114	974	5,751	4,068	152	-989	3,710	3,710	-581	5,060
Average		0	139	1,061	14,200	5,357	31	-707	4,924	4,924	1,433	15,541

Monthly Cumulative Distributions for SWRCB-2 No Extra Exports

Additional Sacramento River Flow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0	0	0	0
Mean	0	0	0	0	0	0	0	0	0	0	0	0

Additional San Joaquin River Flow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	127	697	0	0	0	0
30	0	0	0	0	0	0	577	834	0	0	0	0
40	0	0	0	0	0	0	868	1,065	0	0	0	0
50	0	0	0	0	0	0	976	1,213	0	0	0	0
60	49	0	0	0	0	0	1,228	1,376	0	0	0	0
70	114	0	0	0	0	0	1,380	1,468	0	0	0	0
80	245	0	0	0	0	0	1,430	1,647	0	0	0	0
90	375	0	0	0	0	0	1,767	1,886	0	0	0	0
100	1,059	0	0	85	341	0	2,671	2,924	176	0	37	126
Mean	127	0	0	2	14	0	981	1,171	4	0	1	3

Delta Cross Channel Flow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	0	0	0	0	0	0	0	0	0	2,833	2,770	2,315
10	2,753	0	0	0	0	0	0	0	0	4,073	3,381	3,160
20	3,430	0	0	0	0	0	0	0	0	4,831	4,035	3,675
30	3,733	0	0	0	0	0	0	0	0	5,117	4,100	3,765
40	3,851	0	0	0	0	0	0	0	0	5,316	4,160	3,821
50	3,953	0	0	0	0	0	0	0	0	5,376	4,240	3,906
60	4,023	0	0	0	0	0	0	0	0	5,390	4,297	3,989
70	4,678	0	0	0	0	0	0	0	0	5,436	4,426	4,116
80	5,409	0	0	0	0	0	0	0	0	5,567	4,493	4,679
90	5,970	0	0	0	0	0	0	0	0	5,712	4,768	5,371
100	6,328	0	0	0	0	0	0	0	0	6,306	5,439	6,326
Mean	4,145	0	0	0	0	0	0	0	0	5,150	4,218	4,102

Sacramento River at Rio Vista Flow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	2,080	3,667	5,935	6,698	8,087	3,952	5,215	5,443	4,949	2,349	2,204	2,142
10	3,273	6,699	7,994	9,668	10,022	9,446	9,158	6,962	6,866	4,425	3,131	3,261
20	4,119	7,623	8,922	10,675	12,737	12,338	11,250	9,653	9,333	7,531	4,809	4,140
30	4,678	7,834	10,060	12,509	15,366	17,207	11,720	10,054	9,542	8,183	4,932	4,338
40	4,838	8,682	12,396	14,518	22,714	21,292	13,025	11,908	10,489	9,181	5,088	4,584
50	4,996	12,185	12,600	19,642	29,417	25,086	14,510	12,701	11,779	9,284	5,570	4,967
60	5,871	14,085	14,211	24,490	40,657	27,875	16,822	13,598	12,584	9,417	5,769	5,089
70	9,743	18,053	21,899	31,385	50,845	37,832	20,425	14,884	14,977	9,933	5,848	5,361
80	10,636	17,336	39,247	63,450	68,021	49,401	37,244	25,259	16,808	10,376	6,393	6,963
90	13,753	25,439	60,830	89,110	102,411	79,244	55,812	35,584	21,849	11,050	7,450	10,014
100	32,595	62,365	117,336	168,365	188,452	187,148	104,484	51,555	43,946	13,583	9,823	14,326
Mean	7,617	14,841	24,481	34,893	43,652	35,871	23,731	16,831	13,769	8,704	5,541	5,750

Required Delta Outflow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	3,400	3,400	3,400	4,500	4,500	5,750	9,500	9,500	5,425	3,850	3,150	2,500
10	3,400	3,400	3,400	4,500	4,500	6,418	9,500	9,500	5,425	3,948	3,150	3,123
20	3,400	3,400	4,410	4,500	4,825	7,000	12,000	12,000	8,667	6,360	4,436	3,796
30	3,400	4,181	4,500	4,500	6,177	7,081	12,000	12,000	8,667	6,393	4,693	3,931
40	4,500	4,500	4,500	4,500	12,000	12,000	12,000	12,000	9,500	6,500	4,933	4,015
50	4,500	4,500	4,500	4,500	12,000	12,000	12,000	12,000	9,500	7,103	4,976	4,133
60	4,500	4,955	4,589	4,500	12,000	12,000	12,000	12,000	12,000	7,700	5,153	4,352
70	4,500	5,291	4,964	5,380	12,000	12,000	12,000	12,000	12,000	8,710	5,351	4,604
80	5,038	5,577	5,380	5,836	12,000	12,000	12,000	12,000	14,000	10,000	5,507	5,395
90	6,803	5,796	5,657	6,227	12,000	12,000	12,337	12,960	14,000	10,000	6,003	5,951
100	6,439	6,082	6,080	6,536	12,000	12,000	13,178	12,960	14,000	10,000	6,925	6,574
Mean	4,405	4,640	4,668	4,694	9,395	10,032	11,780	11,766	10,400	7,484	4,854	4,393

Monthly Cumulative Distributions for SWRCB-2 No Extra Exports

Remaining Delta Outflow Deficits (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	848	0	0	0	0
90	0	0	0	0	0	0	0	1,410	0	0	0	0
100	0	0	0	0	0	42	2,769	3,561	1,217	0	0	0
Mean	0	0	0	0	0	1	84	410	17	0	0	0

Net Change in Exports (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	-1,222	-882	-1,013	-704	-6,260	-5,830	-7,961	-4,366	-2,488	-20	-313	-825
10	-206	-468	-599	-515	-5,225	-4,314	-7,478	-3,550	-2,488	-20	0	-185
20	0	-310	-420	-319	-3,568	-2,983	-6,631	-3,501	-2,471	-20	0	-47
30	0	-91	-319	-52	-1,163	-1,756	-5,285	-2,745	-1,788	-20	0	-1
40	0	-18	0	0	-69	-624	-5,037	-2,245	-1,208	-20	0	0
50	0	0	0	0	0	0	-4,982	-2,245	-593	0	0	0
60	0	0	0	0	0	0	-4,919	-2,245	-560	0	0	0
70	0	0	0	0	0	0	-4,599	-2,245	-26	0	0	0
80	0	0	0	0	0	0	-4,482	-2,212	-26	0	0	0
90	0	0	0	0	0	0	-3,146	-1,351	-26	0	0	0
100	0	0	0	0	0	0	-2,170	-1,251	0	0	0	0
Mean	-63	-129	-177	-110	-1,283	-1,193	-5,134	-2,545	-1,038	-9	-5	-57

Final Exports (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	2,330	3,148	4,561	3,177	3,516	1,500	1,500	1,500	1,500	766	2,232	3,131
10	4,894	5,790	6,840	6,093	4,274	4,061	2,750	1,500	2,505	4,219	4,203	4,966
20	5,734	6,834	7,604	7,542	5,345	4,643	3,250	1,500	2,546	5,522	5,490	5,875
30	6,255	7,130	8,132	8,318	5,627	6,174	3,250	1,597	2,546	7,494	5,789	6,111
40	6,551	7,767	9,305	9,569	6,890	6,630	3,750	3,750	3,253	7,836	5,881	6,363
50	6,828	10,120	10,048	10,165	7,395	6,900	3,750	3,750	4,217	8,194	6,011	6,423
60	7,995	10,959	10,762	10,915	8,044	7,169	3,750	3,750	4,424	9,200	6,109	6,632
70	11,045	10,959	11,257	11,396	9,301	7,640	3,750	3,750	4,478	9,200	6,744	6,878
80	11,045	10,959	11,273	11,550	11,543	8,308	3,750	3,750	6,000	9,200	6,809	9,165
90	11,045	10,959	11,273	11,550	11,833	8,500	3,750	3,750	6,000	9,200	8,031	11,160
100	11,045	10,959	11,273	11,550	11,633	11,208	3,750	3,750	6,000	9,200	11,280	11,262
Mean	7,846	8,941	9,570	9,516	7,873	6,849	3,416	2,947	3,976	7,509	6,171	7,121

Final QWEST Flow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	-4,431	-6,228	-6,474	-6,044	-3,383	-2,039	527	-407	-2,688	-2,551	-2,888	-2,536
10	-1,819	-5,547	-6,778	-4,455	-817	-1,396	1,025	387	-2,015	-2,428	-1,341	-1,597
20	-647	-5,174	-4,923	-4,092	-140	-616	1,229	1,139	-1,204	-2,348	-638	-628
30	-333	-4,239	-4,393	-3,697	715	-118	1,407	1,377	-972	-2,170	-436	-527
40	-192	-3,995	-4,052	-2,882	1,158	409	1,955	1,529	-613	-1,759	-199	-407
50	29	-3,508	-3,756	-1,384	3,546	984	2,409	1,749	-477	-1,256	-18	-275
60	512	-3,108	-3,065	433	4,978	2,418	3,525	1,949	-397	-589	44	-181
70	776	-2,928	-2,099	1,749	8,992	4,124	4,495	2,424	-226	126	203	-122
80	1,562	-2,539	2,709	8,042	13,678	11,849	7,259	4,738	613	1,338	373	-38
90	5,502	-1,251	4,746	15,442	17,820	17,087	13,854	8,900	4,950	2,026	504	187
100	14,294	23,706	40,897	38,919	60,681	75,348	44,710	35,877	33,444	18,298	1,601	10,772
Mean	826	-2,899	-637	2,909	7,578	6,309	5,778	4,014	970	-349	-177	-233

Final Delta Outflow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	3,492	3,489	3,814	4,527	7,906	5,708	6,731	5,939	4,208	3,939	3,204	2,533
10	3,509	4,382	4,854	5,860	11,346	8,386	10,009	8,073	5,828	4,037	3,237	3,206
20	4,500	4,500	5,136	6,981	12,924	11,484	12,140	11,152	8,667	6,452	4,475	3,880
30	4,502	4,617	5,697	8,564	16,256	16,310	12,927	12,000	8,667	6,501	4,752	3,998
40	4,502	5,021	6,635	11,809	23,090	19,799	14,548	12,111	9,884	6,578	4,980	4,062
50	4,519	6,873	7,587	15,800	28,249	24,971	16,920	13,073	10,167	7,185	5,045	4,237
60	5,217	8,388	11,366	26,894	47,123	32,165	19,912	15,451	12,000	7,767	5,208	4,418
70	7,830	10,896	18,012	35,251	57,900	43,389	25,624	16,624	14,074	8,798	5,404	4,637
80	12,305	12,950	42,953	78,836	79,362	61,276	47,305	27,490	15,834	10,080	5,550	5,892
90	18,821	22,881	70,744	103,980	124,921	96,349	67,421	44,301	22,989	10,097	6,202	7,381
100	36,610	79,963	158,435	202,113	231,494	262,950	149,181	86,528	77,007	31,457	9,371	24,938
Mean	8,326	11,877	23,534	37,956	51,340	42,189	29,395	20,624	14,362	7,933	5,069	5,332

Delta Standards Matrices for SWRCB-3 No Extra Exports

Minimum required Sacramento River flow at Freeport (cfs)

	Wet	Above Normal	Normal	Dry	Critical
Oct	0	0	0	0	0
Nov	0	0	0	0	0
Dec	0	0	0	0	0
Jan	0	0	0	0	0
Feb	0	0	0	0	0
Mar	0	0	0	0	0
Apr	0	0	0	0	0
May	0	0	0	0	0
Jun	0	0	0	0	0
Jul	0	0	0	0	0
Aug	0	0	0	0	0
Sep	0	0	0	0	0

Sacramento River trigger for Delta Cross Channel (cfs) (Closed if Sac flow below Hood>value)

	Wet	Above Normal	Below Normal	Dry	Critical
Oct	25,000	25,000	25,000	25,000	25,000
Nov	0	0	0	0	0
Dec	0	0	0	0	0
Jan	0	0	0	0	0
Feb	0	0	0	0	0
Mar	0	0	0	0	0
Apr	0	0	0	0	0
May	0	0	0	0	0
Jun	0	0	0	0	0
Jul	25,000	25,000	25,000	25,000	25,000
Aug	25,000	25,000	25,000	25,000	25,000
Sep	25,000	25,000	25,000	25,000	25,000

Minimum Rio Vista flow (cfs)

	Wet	Above Normal	Below Normal	Dry	Critical
Oct	5,000	2,500	2,500	1,500	1,500
Nov	5,000	2,500	2,500	1,500	1,500
Dec	5,000	2,500	2,500	1,500	1,500
Jan	2,500	2,500	2,500	1,500	1,500
Feb	3,000	2,000	2,000	1,000	1,000
Mar	4,000	2,500	2,500	1,500	1,500
Apr	4,000	4,000	4,000	4,000	4,000
May	4,000	4,000	4,000	4,000	4,000
Jun	4,000	4,000	4,000	4,000	4,000
Jul	3,000	2,000	2,000	1,000	1,000
Aug	1,000	1,000	1,000	1,000	1,000
Sep	5,000	2,500	2,500	1,500	1,500

Minimum QWEST flow (cfs)

	Wet	Above Normal	Below Normal	Dry	Critical
Oct	-15,000	-15,000	-15,000	-15,000	-15,000
Nov	-15,000	-15,000	-15,000	-15,000	-15,000
Dec	-15,000	-15,000	-15,000	-15,000	-15,000
Jan	-15,000	-15,000	-15,000	-15,000	-15,000
Feb	-15,000	-15,000	-15,000	-15,000	-15,000
Mar	-15,000	-15,000	-15,000	-15,000	-15,000
Apr	-15,000	-15,000	-15,000	-15,000	-15,000
May	-15,000	-15,000	-15,000	-15,000	-15,000
Jun	-15,000	-15,000	-15,000	-15,000	-15,000
Jul	-15,000	-15,000	-15,000	-15,000	-15,000
Aug	-15,000	-15,000	-15,000	-15,000	-15,000
Sep	-15,000	-15,000	-15,000	-15,000	-15,000

Delta Standards Matrices for SWRCB-3 No Extra Exports

Minimum San Joaquin River flow at Vernalis (cfs)

	Wet	Above Normal	Below Normal	Dry	Critical
Oct	1,450	1,450	1,450	1,450	1,450
Nov	900	900	900	900	900
Dec	900	900	900	900	900
Jan	900	900	900	900	900
Feb	900	900	900	900	900
Mar	900	900	900	900	900
Apr	4,450	3,950	3,450	2,950	2,450
May	4,450	3,950	3,450	2,950	2,450
Jun	900	900	900	900	900
Jul	900	900	900	900	900
Aug	900	900	900	900	900
Sep	900	900	900	900	900

Minimum Delta outflow (cfs)

	Wet	Above Normal	Below Normal	Dry	Critical
Oct	4,500	4,500	4,500	3,400	3,400
Nov	4,500	4,500	4,500	3,400	3,400
Dec	4,500	4,500	4,500	3,400	3,400
Jan	4,500	4,500	4,500	4,500	4,500
Feb	12,000	12,000	4,500	4,500	4,500
Mar	12,000	12,000	9,500	7,000	5,750
Apr	12,000	12,000	12,000	12,000	9,500
May	12,000	12,960	12,000	12,000	9,500
Jun	14,000	12,000	9,500	8,667	5,425
Jul	10,000	7,700	6,500	4,650	3,850
Aug	4,960	4,530	3,890	3,540	3,150
Sep	2,500	2,500	2,500	2,500	2,500

Outflow Threshold:

6870	5	5	5	5	5	1.00	
12000	5	5	4	4	3	0.75	
28000	4	3	2	1	0	0.75	1.10

Maximum Delta export (cfs)

	Wet	Above Normal	Below Normal	Dry	Critical	DW Exemption	Assumed Capacity
Oct	11,280	11,280	11,280	11,280	11,280	11,280	11,280
Nov	11,280	11,280	11,280	11,280	11,280	11,280	11,280
Dec	10,880	10,880	10,880	10,880	10,880	10,880	12,700
Jan	10,880	10,880	10,880	10,880	10,880	10,880	12,700
Feb	10,880	10,880	10,880	10,880	10,880	10,880	12,700
Mar	10,880	10,880	10,880	10,880	10,880	10,880	12,700
Apr	3,750	3,750	3,750	3,250	2,750	10,880	11,280
May	3,750	3,750	3,750	3,250	2,750	6,000	11,280
Jun	6,000	6,000	6,000	5,000	4,000	6,000	11,280
Jul	9,200	9,200	9,200	9,200	9,200	9,200	11,280
Aug	11,280	11,280	11,280	11,280	11,280	11,280	11,280
Sep	11,280	11,280	11,280	11,280	11,280	11,280	11,280

Maximum Percent of Inflow Exported (fraction)

	Wet	Above Normal	Below Normal	Dry	Critical
Oct	0.60	0.60	0.60	0.60	0.60
Nov	0.60	0.60	0.60	0.60	0.60
Dec	0.60	0.60	0.60	0.60	0.60
Jan	0.60	0.60	0.60	0.60	0.60
Feb	0.30	0.30	0.30	0.30	0.30
Mar	0.30	0.30	0.30	0.30	0.30
Apr	0.30	0.30	0.30	0.30	0.30
May	0.30	0.30	0.30	0.30	0.30
Jun	0.30	0.30	0.30	0.30	0.30
Jul	0.60	0.60	0.60	0.60	0.60
Aug	0.60	0.60	0.60	0.60	0.60
Sep	0.60	0.60	0.60	0.60	0.60

Mean Annual Output Data for SWRCB-3 No Extra Exports

Water Year	Sac Basin Year Type	Added Sac Flow (TAF)	Added SJR Flow (TAF)	Revised DCC Flow (TAF)	Revised Rio Vista Flow (TAF)	Required Delta Outflow (TAF)	Outflow Deficit (TAF)	Net Export Change (TAF)	Direct Export (TAF)	Final Total Export (TAF)	Final QWEST Flow (TAF)	Final Delta Outflow (TAF)
1922	2	0	110	950	11,932	8,700	0	-528	5,414	5,414	1,307	13,152
1923	3	0	180	1,112	9,904	5,599	0	-720	5,147	5,147	775	10,593
1924	5	0	125	821	5,560	4,789	511	-1,521	3,548	3,548	-480	4,942
1925	4	0	205	1,050	9,431	6,348	0	-1,128	4,712	4,712	-298	9,055
1926	4	0	188	1,090	8,684	6,322	189	-1,270	4,723	4,723	-643	7,943
1927	1	0	171	1,012	19,389	9,789	215	-591	5,356	5,356	595	19,902
1928	2	0	117	1,117	14,590	8,898	833	-737	5,235	5,235	468	14,957
1929	5	0	95	866	5,155	4,795	746	-1,374	3,611	3,611	-292	4,749
1930	4	0	82	1,014	8,174	5,806	197	-1,327	4,668	4,668	-837	7,235
1931	5	0	93	757	4,453	4,577	922	-1,020	3,028	3,028	-89	4,248
1932	4	0	304	876	6,109	5,290	143	-1,283	3,785	3,785	16	6,038
1933	8	0	122	843	4,580	4,606	842	-1,168	3,291	3,291	-105	4,360
1934	5	0	101	753	4,928	4,852	688	-1,012	3,175	3,175	-114	4,703
1935	3	0	109	1,013	9,645	7,474	899	-950	4,245	4,245	565	10,125
1936	3	0	199	1,028	13,369	7,403	0	-809	5,146	5,146	778	14,068
1937	3	0	118	990	9,365	7,472	0	-690	5,054	5,054	1,210	10,501
1938	1	0	0	1,102	31,589	10,003	0	-332	5,607	5,607	7,717	39,250
1939	4	0	137	1,181	7,224	5,370	189	-876	4,527	4,527	55	7,159
1940	2	0	110	1,109	18,024	8,612	0	-652	5,343	5,343	461	18,421
1941	1	0	50	1,056	28,515	9,934	0	-438	5,479	5,479	3,878	32,344
1942	1	0	205	1,185	25,268	9,987	0	-721	5,206	5,206	3,564	28,758
1943	1	0	107	1,096	18,115	9,752	672	-601	4,919	4,919	3,754	21,783
1944	4	0	218	1,044	7,766	5,554	0	-902	5,074	5,074	-704	6,958
1945	3	0	184	1,040	9,654	7,371	0	-687	5,365	5,365	-25	9,532
1946	3	0	210	1,010	13,214	5,641	0	-595	5,163	5,163	527	13,635
1947	4	0	188	1,064	7,475	5,580	51	-1,119	4,858	4,858	-919	6,439
1948	3	0	304	1,075	9,056	5,309	0	-1,259	4,801	4,801	-897	8,051
1949	4	0	219	1,132	8,649	6,527	139	-1,233	4,739	4,739	-615	7,923
1950	3	0	149	1,075	9,112	5,386	0	-812	5,243	5,243	-870	8,131
1951	2	0	227	1,117	20,123	8,803	825	-652	5,303	5,303	3,598	23,641
1952	1	0	13	1,156	25,560	10,013	0	-303	5,747	5,747	4,923	30,418
1953	1	0	153	1,269	16,969	6,193	0	-433	5,041	5,041	1,290	18,157
1954	2	0	138	1,154	15,228	8,962	0	-561	5,256	5,256	-110	15,003
1955	4	0	186	1,071	7,930	5,536	154	-1,398	4,575	4,575	-530	7,298
1956	1	0	131	1,112	26,334	9,679	179	-741	5,357	5,357	3,780	30,047
1957	2	0	181	1,205	10,898	8,820	825	-676	4,984	4,984	337	11,127
1958	1	0	25	1,298	30,570	10,255	0	-397	5,886	5,886	4,815	35,343
1959	3	0	162	1,193	11,245	7,742	899	-596	4,825	4,825	444	11,578
1960	4	0	132	1,082	7,984	5,906	139	-1,318	4,670	4,670	-847	6,924
1961	4	0	111	1,031	8,094	5,628	165	-1,156	4,793	4,793	-1,139	6,845
1962	3	0	213	1,087	10,016	7,659	899	-930	4,693	4,693	-697	9,222
1963	1	0	341	850	18,542	10,227	0	-462	5,506	5,506	50	19,519
1964	4	0	206	1,152	8,548	5,548	196	-1,279	4,603	4,603	-662	7,768
1965	1	0	285	1,046	19,710	8,621	1,229	-870	5,089	5,089	1,701	21,319
1966	3	0	190	1,118	10,483	5,526	0	-382	5,459	5,459	-109	10,264
1967	1	0	0	1,136	20,574	10,082	0	-348	5,709	5,709	3,808	24,322
1968	3	0	133	1,196	12,724	7,560	0	-382	4,808	4,808	695	13,311
1969	1	0	11	1,133	24,420	10,078	0	-353	5,484	5,484	6,768	31,122
1970	1	0	189	1,200	25,356	9,817	1,316	-694	4,599	4,599	3,736	29,003
1971	1	0	129	1,133	16,781	8,923	786	-960	5,323	5,323	724	17,411
1972	3	0	170	1,151	9,868	5,730	0	-387	5,358	5,358	-1,031	8,713
1973	2	0	240	1,066	18,521	8,845	890	-590	5,274	5,274	1,690	20,161
1974	1	0	233	1,282	31,003	10,161	157	-551	5,706	5,706	3,171	34,091
1975	1	0	194	1,285	16,588	9,919	137	-704	5,026	5,026	2,240	18,732
1976	5	0	146	1,044	7,120	5,048	509	-900	4,254	4,254	-582	6,411
1977	5	0	138	683	3,971	4,613	1,222	-570	2,671	2,671	-260	3,587
1978	2	0	4	910	16,115	8,708	0	-369	4,564	4,564	2,045	18,105
1979	3	0	166	1,112	10,145	7,476	0	-458	5,316	5,316	538	10,592
1980	2	0	0	1,087	20,104	8,917	823	-572	5,134	5,134	5,536	25,569
1981	4	0	132	1,135	9,253	6,422	51	-687	4,975	4,975	50	9,190
1982	1	0	22	1,175	30,815	9,868	0	-347	6,001	6,001	8,335	39,206
1983	1	0	0	1,064	42,572	9,764	0	-250	5,167	5,167	21,915	64,479
1984	1	0	14	872	22,697	9,772	1,259	-790	3,663	3,663	8,875	31,472
1985	4	0	102	1,134	9,080	5,700	188	-781	5,016	5,016	-68	8,913
1986	1	0	0	1,027	24,377	9,703	759	-487	5,227	5,227	6,117	30,441
1987	4	0	54	1,058	7,149	5,674	189	-1,141	4,703	4,703	-478	6,554
1988	5	0	169	867	6,559	4,774	554	-1,471	3,733	3,733	-800	5,851
1989	4	0	94	1,164	8,255	6,381	189	-1,145	4,653	4,653	-860	7,282
1990	5	0	171	1,005	5,929	4,827	537	-1,336	3,833	3,833	-728	5,090
1991	5	0	114	974	5,751	5,025	611	-1,052	3,646	3,646	-518	5,123
Average		0	139	1,061	14,200	7,395	327	-798	4,834	4,834	1,523	15,931

Monthly Cumulative Distributions for SWRCB-3 No Extra Exports

Additional Sacramento River Flow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0	0	0	0
Mean	0	0	0	0	0	0	0	0	0	0	0	0

Additional San Joaquin River Flow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	127	697	0	0	0	0
30	0	0	0	0	0	0	577	834	0	0	0	0
40	0	0	0	0	0	0	868	1,065	0	0	0	0
50	0	0	0	0	0	0	976	1,213	0	0	0	0
60	49	0	0	0	0	0	1,228	1,376	0	0	0	0
70	114	0	0	0	0	0	1,380	1,468	0	0	0	0
80	245	0	0	0	0	0	1,430	1,647	0	0	0	0
90	375	0	0	0	0	0	1,767	1,886	0	0	0	0
100	1,059	0	0	85	341	0	2,671	2,924	176	0	37	126
Mean	127	0	0	2	14	0	981	1,171	4	0	1	3

Delta Cross Channel Flow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	0	0	0	0	0	0	0	0	0	2,833	2,770	2,315
10	2,753	0	0	0	0	0	0	0	0	4,073	3,381	3,160
20	3,430	0	0	0	0	0	0	0	0	4,931	4,035	3,675
30	3,733	0	0	0	0	0	0	0	0	5,117	4,100	3,765
40	3,851	0	0	0	0	0	0	0	0	5,316	4,160	3,821
50	3,953	0	0	0	0	0	0	0	0	5,376	4,240	3,906
60	4,023	0	0	0	0	0	0	0	0	5,390	4,297	3,989
70	4,678	0	0	0	0	0	0	0	0	5,436	4,428	4,118
80	5,409	0	0	0	0	0	0	0	0	5,567	4,493	4,679
90	5,970	0	0	0	0	0	0	0	0	5,712	4,768	5,371
100	6,328	0	0	0	0	0	0	0	0	6,306	5,439	6,326
Mean	4,145	0	0	0	0	0	0	0	0	5,150	4,218	4,102

Sacramento River at Rio Vista Flow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	2,080	3,667	5,935	6,698	8,087	3,952	5,215	5,443	4,949	2,349	2,204	2,142
10	3,273	6,699	7,994	9,668	10,022	9,446	9,159	6,962	6,896	4,425	3,131	3,261
20	4,119	7,623	8,922	10,675	12,737	12,338	11,250	9,653	9,333	7,531	4,809	4,140
30	4,678	7,834	10,060	12,509	15,366	17,207	11,720	10,054	9,542	8,183	4,932	4,338
40	4,838	8,682	12,396	14,518	22,714	21,292	13,025	11,908	10,489	9,181	5,088	4,584
50	4,996	12,185	12,600	19,642	29,417	25,086	14,510	12,701	11,779	9,284	5,570	4,967
60	5,871	14,085	14,211	24,490	40,657	27,875	16,822	13,698	12,584	9,417	5,769	5,089
70	9,743	16,053	21,899	31,385	50,845	37,832	20,425	14,884	14,977	9,933	5,948	5,381
80	10,636	17,336	39,247	63,450	68,021	49,401	37,244	25,259	16,908	10,376	6,393	6,963
90	13,753	25,439	60,830	89,110	102,411	79,244	55,812	35,584	21,649	11,050	7,450	10,014
100	32,595	62,385	117,336	169,365	188,452	187,148	104,484	51,555	43,946	13,583	9,823	14,326
Mean	7,617	14,841	24,481	34,893	43,652	35,871	23,731	16,831	13,769	8,704	5,541	5,750

Required Delta Outflow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	3,400	3,400	3,400	4,500	6,870	6,870	9,500	12,000	8,667	3,850	3,150	2,500
10	3,400	3,400	3,400	4,500	6,870	6,870	12,000	12,000	9,500	3,948	3,150	3,123
20	3,400	3,400	4,410	4,500	12,000	12,000	12,000	12,000	12,000	6,360	4,436	3,786
30	3,400	4,191	4,500	4,500	12,000	12,000	12,000	12,000	12,000	6,393	4,693	3,931
40	4,500	4,500	4,500	4,500	12,000	12,000	12,000	12,000	12,000	6,500	4,933	4,015
50	4,500	4,500	4,500	4,500	12,000	28,000	12,000	12,000	12,000	7,103	4,976	4,133
60	4,500	4,955	4,589	4,500	28,000	28,000	12,337	12,000	14,000	7,700	5,153	4,352
70	4,500	5,291	4,964	5,380	28,000	28,000	13,178	12,960	14,000	8,710	5,351	4,604
80	5,038	5,577	5,380	5,838	28,000	28,000	28,000	28,000	28,000	10,000	5,807	5,395
90	5,803	5,796	5,657	6,227	28,000	28,000	28,000	28,000	28,000	10,000	6,003	5,951
100	6,439	6,082	6,080	6,536	28,000	28,000	28,000	28,000	28,000	10,000	6,925	6,574
Mean	4,405	4,640	4,668	4,994	19,047	19,336	16,812	16,453	15,552	7,484	4,954	4,393

Monthly Cumulative Distributions for SWRCB-3 No Extra Exports

Remaining Delta Outflow Deficits (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	2,287	0	0	0
60	0	0	0	0	0	0	0	0	2,304	0	0	0
70	0	0	0	0	0	0	0	848	4,560	0	0	0
80	0	0	0	0	0	0	0	2,610	6,874	0	0	0
90	0	0	0	0	0	0	42	4,871	13,658	0	0	0
100	0	0	0	0	0	1,162	6,169	11,458	14,921	0	0	0
Mean	0	0	0	0	0	22	312	1,305	3,796	0	0	0

Net Change in Exports (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	-1,222	-882	-1,013	-704	-6,260	-5,830	-7,961	-4,495	-4,528	-20	-313	-825
10	-206	-468	-599	-515	-5,225	-4,589	-7,478	-4,349	-3,516	-20	0	-185
20	0	-310	-420	-319	-3,568	-3,948	-7,287	-3,501	-3,516	-20	0	-47
30	0	-91	-319	-52	-1,163	-2,379	-5,739	-3,501	-3,516	-20	0	-1
40	0	-18	0	0	-89	-1,123	-5,183	-2,524	-2,944	-20	0	0
50	0	0	0	0	0	0	-4,998	-2,245	-2,471	0	0	0
60	0	0	0	0	0	0	-4,919	-2,245	-1,749	0	0	0
70	0	0	0	0	0	0	-4,618	-2,245	-588	0	0	0
80	0	0	0	0	0	0	-4,482	-2,212	-173	0	0	0
90	0	0	0	0	0	0	-3,146	-1,561	-26	0	0	0
100	0	0	0	0	0	0	-2,170	-1,251	0	0	0	0
Mean	-63	-129	-177	-110	-1,283	-1,409	-5,232	-2,713	-2,053	-9	-5	-57

Final Exports (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	2,330	3,148	4,561	3,177	3,516	1,500	1,500	1,500	1,500	766	2,232	3,131
10	4,594	5,790	6,940	6,093	4,274	3,993	1,500	1,500	1,500	4,219	4,203	4,966
20	5,734	6,834	7,904	7,842	5,345	4,520	3,250	1,500	1,500	5,522	5,480	5,875
30	6,255	7,130	8,132	8,318	5,827	5,913	3,250	1,500	1,500	7,494	5,799	6,111
40	6,551	7,767	9,305	9,569	6,890	6,402	3,250	1,613	1,500	7,936	5,881	6,363
50	6,826	10,120	10,048	10,165	7,385	6,900	3,750	3,750	1,500	8,184	6,011	6,423
60	7,995	10,959	10,762	10,915	8,044	7,054	3,750	3,750	2,546	9,200	6,109	6,632
70	11,045	10,959	11,257	11,396	9,301	7,575	3,750	3,750	4,424	9,200	6,744	6,878
80	11,045	10,959	11,273	11,550	11,543	8,308	3,750	3,750	5,016	9,200	6,809	9,165
90	11,045	10,959	11,273	11,550	11,833	9,237	3,750	3,750	6,000	9,200	8,031	11,150
100	11,045	10,959	11,273	11,550	11,833	11,208	3,750	3,750	6,000	9,200	11,280	11,282
Mean	7,846	8,941	9,570	9,516	7,873	6,632	3,318	2,779	2,961	7,509	6,171	7,121

Final QWEST Flow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	-4,431	-6,228	-6,474	-6,044	-3,383	-2,039	527	-407	-2,888	-2,551	-2,888	-2,536
10	-1,819	-5,547	-5,778	-4,455	-917	-1,368	1,057	387	-1,204	-2,428	-1,341	-1,597
20	-647	-5,174	-4,923	-4,092	-140	-597	1,269	1,149	-526	-2,348	-638	-628
30	-333	-4,239	-4,393	-3,897	715	1	1,559	1,386	154	-2,170	-436	-527
40	-192	-3,995	-4,052	-2,882	1,158	694	2,001	1,535	425	-1,759	-199	-407
50	29	-3,508	-3,756	-1,384	3,546	1,794	2,409	1,766	524	-1,256	-18	-275
60	512	-3,108	-3,065	433	4,978	3,423	3,579	2,076	607	-589	44	-181
70	776	-2,926	-2,099	1,749	9,992	5,347	4,938	3,185	1,345	126	203	-122
80	1,562	-2,539	2,709	9,042	13,978	11,849	7,259	4,773	2,294	1,338	373	-38
90	5,502	-1,251	4,748	15,442	17,820	17,087	13,854	8,900	5,386	2,026	504	187
100	14,284	23,706	40,897	38,919	60,681	75,348	44,710	35,877	33,444	18,298	1,601	10,772
Mean	826	-2,899	-937	2,909	7,578	6,525	5,875	4,182	1,985	-349	-177	-233

Final Delta Outflow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	3,492	3,489	3,814	4,527	7,906	5,708	6,731	5,939	4,208	3,939	3,204	2,533
10	3,509	4,382	4,654	5,860	11,348	9,945	11,259	8,073	6,885	4,037	3,237	3,206
20	4,500	4,500	5,136	6,981	12,924	11,898	12,140	11,152	8,667	6,452	4,475	3,880
30	4,502	4,617	5,897	8,564	18,256	18,310	12,927	12,000	9,713	6,501	4,752	3,998
40	4,502	5,021	6,635	11,809	23,090	19,799	14,548	12,111	10,155	6,578	4,980	4,062
50	4,519	6,873	7,587	15,800	28,249	28,000	16,820	13,073	12,000	7,185	5,045	4,237
60	5,217	8,388	11,366	26,894	47,123	32,165	20,439	15,809	13,079	7,767	5,208	4,418
70	7,630	10,896	18,012	35,251	57,900	43,389	26,398	17,829	14,308	8,798	5,404	4,637
80	12,305	12,950	42,953	78,836	79,362	61,276	47,305	27,804	17,607	10,080	5,550	5,892
90	18,821	22,881	70,744	103,880	124,921	96,349	67,421	44,301	25,721	10,097	6,202	7,381
100	36,810	79,963	158,435	202,113	231,494	262,950	149,181	86,526	77,007	31,457	9,371	24,936
Mean	8,326	11,877	23,534	37,956	51,340	42,405	29,493	20,792	15,377	7,933	5,069	5,332

Delta Standards Matrices for SWRCB-4 No Extra Exports

Minimum required Sacramento River flow at Freeport (cfs)

	Wet	Above Normal	Normal	Dry	Critical
Oct	0	0	0	0	0
Nov	0	0	0	0	0
Dec	0	0	0	0	0
Jan	0	0	0	0	0
Feb	0	0	0	0	0
Mar	0	0	0	0	0
Apr	0	0	0	0	0
May	0	0	0	0	0
Jun	0	0	0	0	0
Jul	0	0	0	0	0
Aug	0	0	0	0	0
Sep	0	0	0	0	0

Sacramento River trigger for Delta Cross Channel (cfs) (Closed if Sac flow below Hood>value)

	Wet	Above Normal	Below Normal	Dry	Critical
Oct	25,000	25,000	25,000	25,000	25,000
Nov	25,000	25,000	25,000	25,000	25,000
Dec	25,000	25,000	25,000	25,000	25,000
Jan	25,000	25,000	25,000	25,000	25,000
Feb	0	0	0	0	0
Mar	0	0	0	0	0
Apr	0	0	0	0	0
May	0	0	0	0	0
Jun	0	0	0	0	0
Jul	25,000	25,000	25,000	25,000	25,000
Aug	25,000	25,000	25,000	25,000	25,000
Sep	25,000	25,000	25,000	25,000	25,000

Minimum Rio Vista flow (cfs)

	Wet	Above Normal	Below Normal	Dry	Critical
Oct	0	0	0	0	0
Nov	0	0	0	0	0
Dec	0	0	0	0	0
Jan	0	0	0	0	0
Feb	0	0	0	0	0
Mar	0	0	0	0	0
Apr	4,000	4,000	4,000	4,000	4,000
May	4,000	4,000	4,000	4,000	4,000
Jun	4,000	4,000	4,000	4,000	4,000
Jul	0	0	0	0	0
Aug	0	0	0	0	0
Sep	0	0	0	0	0

Minimum QWEST flow (cfs)

	Wet	Above Normal	Below Normal	Dry	Critical
Oct	-15,000	-15,000	-15,000	-15,000	-15,000
Nov	-15,000	-15,000	-15,000	-15,000	-15,000
Dec	-15,000	-15,000	-15,000	-15,000	-15,000
Jan	-15,000	-15,000	-15,000	-15,000	-15,000
Feb	0	0	0	0	0
Mar	0	0	0	0	0
Apr	2,000	1,750	1,500	1,250	1,000
May	3,000	2,500	2,000	1,500	1,000
Jun	1,000	1,000	1,000	1,000	1,000
Jul	-15,000	-15,000	-15,000	-15,000	-15,000
Aug	-15,000	-15,000	-15,000	-15,000	-15,000
Sep	-15,000	-15,000	-15,000	-15,000	-15,000

Delta Standards Matrices for SWRCB-4 No Extra Exports

Minimum San Joaquin River flow at Vernalis (cfs)

	Wet	Above Normal	Below Normal	Dry	Critical
Oct	900	900	900	900	900
Nov	900	900	900	900	900
Dec	900	900	900	900	900
Jan	900	900	900	900	900
Feb	900	900	900	900	900
Mar	900	900	900	900	900
Apr	5,500	4,500	3,500	2,500	1,500
May	5,500	4,500	3,500	2,500	1,500
Jun	900	900	900	900	900
Jul	900	900	900	900	900
Aug	900	900	900	900	900
Sep	900	900	900	900	900

Minimum Delta outflow (cfs)

	Wet	Above Normal	Below Normal	Dry	Critical		
Oct	14,200	4,500	4,500	4,500	3,600		
Nov	16,300	12,900	9,500	4,500	3,600		
Dec	28,000	27,000	26,000	20,000	4,700		
Jan	4,500	4,500	4,500	4,500	4,500		
Feb	50,000	50,000	22,200	19,200	8,700		
Mar	45,000	50,000	15,400	15,000	7,800		
Apr	18,000	13,600	9,500	9,500	7,000		
May	24,400	15,000	9,500	9,500	6,200		
Jun	17,500	12,000	8,600	7,900	5,600		
Jul	12,500	9,900	8,300	7,600	5,000		
Aug	5,800	5,600	5,300	5,000	3,300		
Sep	7,300	4,200	4,200	4,000	3,000		
Outflow Threshold:							
6600	5	5	5	0	0	1.00	
12000	0	2	2	0	0	1.00	
28000	0	0	0	0	0	1.00	1.00

Maximum Delta export (cfs)

	Wet	Above Normal	Below Normal	Dry	Critical	DW Exemption	Assumed Capacity
Oct	7,900	7,100	6,500	6,000	5,000	7,900	7,900
Nov	7,900	7,100	6,500	6,000	5,000	7,900	7,900
Dec	7,900	7,100	6,500	6,000	5,000	7,900	7,900
Jan	7,900	7,100	6,500	6,000	5,000	7,900	7,900
Feb	7,900	7,100	6,500	6,000	5,000	7,900	7,900
Mar	7,900	7,100	6,500	6,000	5,000	7,900	7,900
Apr	6,400	5,400	4,400	3,400	1,600	6,400	6,400
May	6,400	5,400	4,400	3,400	1,600	6,400	6,400
Jun	6,400	5,400	4,400	3,400	1,600	6,400	6,400
Jul	6,400	5,400	4,400	3,400	1,600	6,400	6,400
Aug	7,900	7,100	6,500	6,000	5,000	7,900	7,900
Sep	7,900	7,100	6,500	6,000	5,000	7,900	7,900

Maximum Percent of Inflow Exported (fraction)

	Wet	Above Normal	Below Normal	Dry	Critical
Oct	1.00	1.00	1.00	1.00	1.00
Nov	1.00	1.00	1.00	1.00	1.00
Dec	1.00	1.00	1.00	1.00	1.00
Jan	1.00	1.00	1.00	1.00	1.00
Feb	1.00	1.00	1.00	1.00	1.00
Mar	1.00	1.00	1.00	1.00	1.00
Apr	1.00	1.00	1.00	1.00	1.00
May	1.00	1.00	1.00	1.00	1.00
Jun	1.00	1.00	1.00	1.00	1.00
Jul	1.00	1.00	1.00	1.00	1.00
Aug	1.00	1.00	1.00	1.00	1.00
Sep	1.00	1.00	1.00	1.00	1.00

Monthly Cumulative Distributions for SWRCB-4 No Extra Exports

Additional Sacramento River Flow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0	0	0	0
Mean	0	0	0	0	0	0	0	0	0	0	0	0

Additional San Joaquin River Flow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	69	295	0	0	0	0
40	0	0	0	0	0	0	413	887	0	0	0	0
50	0	0	0	0	0	0	783	1,089	0	0	0	0
60	0	0	0	0	0	0	1,278	1,246	0	0	0	0
70	0	0	0	0	0	0	1,480	1,812	0	0	0	0
80	0	0	0	0	0	0	1,999	1,975	0	0	0	0
90	0	0	0	0	0	0	2,386	2,486	0	0	0	0
100	509	0	0	85	341	0	3,446	3,474	176	0	37	126
Mean	15	0	0	2	14	0	1,019	1,180	4	0	1	3

Delta Cross Channel Flow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	0	0	0	0	0	0	0	0	0	2,833	2,770	2,315
10	2,995	0	0	0	0	0	0	0	0	4,073	3,381	3,275
20	3,563	3,380	0	0	0	0	0	0	0	4,931	4,035	3,711
30	3,742	3,661	0	0	0	0	0	0	0	5,117	4,100	3,804
40	3,855	3,804	3,724	0	0	0	0	0	0	5,316	4,160	3,826
50	3,953	3,948	4,085	3,549	0	0	0	0	0	5,376	4,240	3,919
60	4,023	4,620	4,308	4,276	0	0	0	0	0	5,390	4,297	3,989
70	4,678	5,038	4,693	4,606	0	0	0	0	0	5,436	4,426	4,116
80	5,409	5,444	4,934	4,982	0	0	0	0	0	5,567	4,493	4,679
90	5,970	5,718	5,135	5,368	0	0	0	0	0	5,712	4,768	5,371
100	6,328	6,398	6,255	6,348	0	0	0	0	0	6,306	5,439	6,326
Mean	4,163	3,878	3,071	2,552	0	0	0	0	0	5,150	4,216	4,185

Sacramento River at Rio Vista Flow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	2,080	2,328	3,548	3,956	8,087	3,952	5,215	5,443	4,949	2,349	2,204	2,142
10	3,273	3,921	4,828	6,110	10,022	9,446	9,158	6,962	6,886	4,425	3,131	3,261
20	4,119	4,555	5,536	6,981	12,737	12,338	11,250	9,653	9,333	7,531	4,809	4,140
30	4,629	4,692	6,420	8,377	15,366	17,207	11,720	10,054	9,542	8,183	4,932	4,338
40	4,811	5,327	8,228	10,200	22,714	21,292	13,025	11,908	10,489	9,181	5,088	4,517
50	4,963	8,060	8,548	14,534	29,417	25,086	14,510	12,701	11,779	9,284	5,570	4,692
60	5,871	9,839	9,789	24,490	40,857	27,875	16,822	13,698	12,584	9,417	5,769	5,089
70	9,743	11,323	21,899	31,365	50,845	37,832	20,425	14,884	14,977	9,933	5,948	5,381
80	10,636	12,542	39,247	63,450	68,021	49,401	37,244	25,259	16,808	10,376	6,393	6,963
90	13,753	25,439	60,830	89,110	102,411	79,244	55,812	35,684	21,649	11,050	7,450	10,014
100	32,595	62,365	117,336	168,365	188,452	187,148	104,484	51,555	43,946	13,583	9,823	14,326
Mean	7,603	11,836	21,923	32,760	43,652	35,871	23,731	16,831	13,769	8,704	5,541	5,725

Required Delta Outflow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	3,600	3,600	4,700	4,500	8,700	7,800	7,000	6,200	5,600	5,000	3,300	3,000
10	3,600	3,869	7,209	4,500	10,377	8,468	7,000	6,200	5,600	5,098	3,300	3,673
20	4,500	4,500	20,000	4,500	19,200	15,000	9,500	9,500	7,900	8,300	5,800	5,296
30	4,500	4,938	21,189	4,500	19,795	15,000	9,500	9,500	7,900	8,919	5,849	5,532
40	4,500	9,500	28,000	4,500	22,200	15,400	9,517	9,500	8,600	9,294	5,963	5,715
50	4,500	10,577	28,961	4,500	22,200	15,400	10,426	9,500	8,600	9,343	6,191	5,852
60	5,233	12,900	27,173	4,500	50,000	45,000	13,600	15,000	12,000	9,900	6,343	6,254
70	14,200	16,300	28,000	5,380	50,000	45,000	13,617	15,000	12,000	10,910	6,434	7,348
80	14,200	16,603	28,000	5,836	50,000	45,000	18,000	24,400	17,500	12,500	6,652	9,488
90	14,200	17,394	28,000	6,227	50,000	50,000	18,000	24,400	17,500	12,500	7,087	10,431
100	16,139	17,781	29,157	6,536	50,000	50,000	18,000	24,400	17,500	12,500	7,995	11,374
Mean	7,731	10,706	23,208	4,994	31,780	27,655	12,428	14,206	11,120	9,715	5,981	6,806

Monthly Cumulative Distributions for SWRCB-4 No Extra Exports

Remaining Delta Outflow Deficits (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	2,874	0	0	0	0	0	0	0	0	0
60	0	0	6,861	0	0	0	0	0	0	0	0	0
70	0	0	10,069	0	0	0	0	0	0	0	0	0
80	0	0	11,993	0	573	1,080	0	0	0	0	0	0
90	0	255	14,625	0	8,094	3,248	0	0	0	0	0	0
100	5,398	6,433	17,872	0	20,816	22,611	1,202	7,856	2,098	1,287	0	0
Mean	203	298	5,603	0	1,826	1,714	21	485	71	78	0	0

Net Change in Exports (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	-8,671	-9,459	-9,773	-5,941	-10,133	-9,219	-8,668	-4,495	-4,223	-7,620	-4,605	-4,801
10	-5,413	-8,333	-9,773	-4,931	-8,914	-5,831	-7,423	-3,954	-3,516	-5,820	-1,990	-4,767
20	-3,845	-5,707	-9,317	-4,356	-6,138	-5,342	-6,811	-3,556	-3,516	-5,820	-1,405	-3,825
30	-3,145	-5,001	-8,307	-3,756	-4,978	-5,059	-5,811	-3,501	-3,516	-4,820	-1,379	-3,362
40	-3,145	-4,459	-7,199	-3,650	-4,166	-4,283	-5,163	-3,354	-3,409	-3,820	-1,363	-1,684
50	-1,028	-4,291	-6,352	-3,459	-3,733	-3,337	-4,900	-3,175	-2,820	-3,370	-1,027	-1,684
60	-343	-3,059	-5,407	-2,335	-3,715	-2,057	-4,540	-2,826	-2,491	-2,820	-804	-1,667
70	-108	-2,541	-4,622	-1,857	-2,053	-447	-3,394	-2,333	-2,137	-2,420	-787	-1,484
80	-75	-1,743	-3,373	-229	-577	0	-2,269	-1,351	-1,328	-2,420	-771	-1,467
90	0	-430	-3,004	0	0	0	-896	0	0	-2,133	-96	-484
100	0	0	0	0	0	0	0	0	0	0	-63	-467
Mean	-2,106	-3,989	-6,118	-2,739	-3,870	-3,031	-4,494	-2,610	-2,425	-3,625	-1,151	-2,261

Final Exports (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	1,500	1,500	1,500	3,177	1,500	1,500	1,500	1,500	1,500	768	2,152	1,579
10	2,536	1,500	1,500	5,344	1,500	1,500	1,600	1,500	1,500	1,600	4,078	3,034
20	4,502	2,137	1,500	5,882	1,500	1,500	2,777	1,529	1,500	2,575	4,368	4,044
30	5,571	4,427	1,500	6,457	3,829	4,108	3,275	1,600	1,500	3,400	4,492	4,427
40	6,000	5,000	1,500	6,687	4,940	4,709	3,400	1,749	1,500	3,400	4,800	4,559
50	6,000	5,807	1,500	7,193	5,627	5,848	3,563	2,046	1,500	3,618	5,110	4,730
60	6,500	6,000	3,713	7,542	6,780	6,402	4,400	2,545	1,818	4,400	5,240	4,913
70	6,500	6,000	5,457	7,900	7,558	6,630	5,275	3,136	2,543	4,589	5,388	5,000
80	7,100	6,500	6,650	7,900	7,900	7,054	5,993	4,400	3,842	5,400	5,517	5,535
90	7,900	7,100	7,900	7,900	7,900	7,900	6,400	5,995	6,025	5,548	6,022	7,900
100	7,900	7,900	7,900	7,900	7,900	7,900	6,400	5,995	6,025	6,400	7,900	7,900
Mean	5,803	5,071	3,629	6,887	5,286	5,010	4,056	2,882	2,589	3,892	5,025	4,916

Final QWEST Flow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	-231	-999	1,175	-12	0	0	1,250	685	-357	1,218	22	490
10	-70	697	2,917	1,182	289	0	1,250	1,277	267	1,798	360	685
20	285	1,248	4,138	2,229	1,973	0	1,500	1,500	502	2,038	621	1,055
30	415	1,708	5,483	2,512	3,877	1,185	1,750	1,500	589	2,255	767	1,156
40	523	2,512	5,943	3,402	4,737	2,465	2,000	2,000	778	2,508	817	1,286
50	977	3,584	6,670	3,998	6,895	3,423	2,270	2,000	1,000	2,838	928	1,370
60	1,968	4,698	7,046	5,041	8,917	6,785	2,618	2,500	1,000	3,258	1,050	1,436
70	4,666	5,434	8,388	6,341	11,595	8,890	3,625	3,000	1,000	3,393	1,116	1,647
80	5,786	6,529	8,790	12,691	15,351	13,277	5,140	4,159	2,108	3,476	1,242	2,996
90	8,692	7,763	9,929	19,092	18,916	18,770	11,204	7,250	4,924	4,362	1,404	4,162
100	14,294	23,706	40,897	38,919	60,681	75,348	42,060	34,040	33,418	21,098	4,981	12,232
Mean	2,883	4,175	7,562	7,670	10,165	8,147	5,138	4,079	2,357	3,267	969	1,996

Final Delta Outflow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	3,600	3,600	4,700	5,066	12,213	5,708	8,211	7,290	4,492	3,955	3,300	3,000
10	3,600	4,500	8,873	7,199	15,820	13,819	15,757	10,994	9,829	7,210	3,300	3,673
20	4,502	5,812	10,931	10,148	19,200	16,197	17,828	14,254	13,017	9,932	5,800	5,347
30	4,551	7,320	11,919	11,213	22,200	21,699	18,357	15,056	13,229	11,490	5,863	5,564
40	4,829	9,867	14,883	15,041	28,564	24,732	19,717	16,512	13,229	12,017	5,991	5,715
50	5,556	11,966	16,643	20,862	36,382	29,394	22,731	17,861	15,203	12,268	6,240	5,667
60	9,291	15,203	19,966	27,790	50,000	35,715	23,691	18,494	16,596	12,301	6,343	6,254
70	13,464	17,192	27,173	35,251	58,926	48,542	27,967	21,229	17,913	12,500	6,468	8,315
80	16,250	17,714	42,954	82,558	81,111	81,276	46,103	28,833	20,505	12,800	6,652	9,775
90	21,968	25,940	74,117	107,830	128,654	98,060	68,353	42,056	25,221	12,565	7,364	11,256
100	36,610	79,963	158,435	202,113	235,227	262,950	149,831	84,688	76,980	34,257	12,751	26,398
Mean	10,370	15,747	29,475	40,585	85,236	45,408	32,278	23,059	18,017	11,550	6,214	7,536

Delta Standards Matrices for SWRCB-5 No Extra Exports

Minimum required Sacramento River flow at Freeport (cfs)

	Wet	Above Normal	Normal	Dry	Critical
Oct	12,000	12,000	12,000	8,000	8,000
Nov	0	0	0	0	0
Dec	0	0	0	0	0
Jan	0	0	0	0	0
Feb	0	0	0	0	0
Mar	0	0	0	0	0
Apr	0	0	0	0	0
May	0	0	0	0	0
Jun	0	0	0	0	0
Jul	0	0	0	0	0
Aug	0	0	0	0	0
Sep	12,000	12,000	12,000	8,000	8,000

Sacramento River trigger for Delta Cross Channel (cfs) (Closed if Sac flow below Hood>value)

	Wet	Above Normal	Below Normal	Dry	Critical
Oct	25,000	25,000	25,000	25,000	25,000
Nov	25,000	25,000	25,000	25,000	25,000
Dec	25,000	25,000	25,000	25,000	25,000
Jan	25,000	25,000	25,000	25,000	25,000
Feb	0	0	0	0	0
Mar	0	0	0	0	0
Apr	0	0	0	0	0
May	0	0	0	0	0
Jun	25,000	25,000	25,000	25,000	25,000
Jul	25,000	25,000	25,000	25,000	25,000
Aug	25,000	25,000	25,000	25,000	25,000
Sep	25,000	25,000	25,000	25,000	25,000

Minimum Rio Vista flow (cfs)

	Wet	Above Normal	Below Normal	Dry	Critical
Oct	0	0	0	0	0
Nov	0	0	0	0	0
Dec	0	0	0	0	0
Jan	0	0	0	0	0
Feb	0	0	0	0	0
Mar	7,000	7,000	7,000	5,000	5,000
Apr	7,000	7,000	7,000	5,000	5,000
May	7,000	7,000	7,000	5,000	5,000
Jun	7,000	7,000	7,000	5,000	5,000
Jul	0	0	0	0	0
Aug	0	0	0	0	0
Sep	0	0	0	0	0

Minimum QWEST flow (cfs)

	Wet	Above Normal	Below Normal	Dry	Critical
Oct	-15,000	-15,000	-15,000	-15,000	-15,000
Nov	-15,000	-15,000	-15,000	-15,000	-15,000
Dec	-15,000	-15,000	-15,000	-15,000	-15,000
Jan	-15,000	-15,000	-15,000	-15,000	-15,000
Feb	-15,000	-15,000	-15,000	-15,000	-15,000
Mar	-15,000	-15,000	-15,000	-15,000	-15,000
Apr	-15,000	-15,000	-15,000	-15,000	-15,000
May	-15,000	-15,000	-15,000	-15,000	-15,000
Jun	-15,000	-15,000	-15,000	-15,000	-15,000
Jul	-15,000	-15,000	-15,000	-15,000	-15,000
Aug	-15,000	-15,000	-15,000	-15,000	-15,000
Sep	-15,000	-15,000	-15,000	-15,000	-15,000

Delta Standards Matrices for SWRCB-5 No Extra Exports

Minimum San Joaquin River flow at Vernalis (cfs)

	Wet	Above Normal	Below Normal	Dry	Critical
Oct	2,000	2,000	2,000	1,000	1,000
Nov	900	900	900	900	900
Dec	900	900	900	900	900
Jan	900	900	900	900	900
Feb	900	900	900	900	900
Mar	1,000	1,000	1,000	1,000	1,000
Apr	6,000	6,000	6,000	3,000	3,000
May	3,500	3,500	3,500	2,000	2,000
Jun	1,000	1,000	1,000	1,000	1,000
Jul	900	900	900	900	900
Aug	900	900	900	900	900
Sep	2,000	2,000	2,000	1,000	1,000

Minimum Delta outflow (cfs)

	Wet	Above Normal	Below Normal	Dry	Critical		
Oct	4,500	4,500	4,500	3,400	3,400		
Nov	4,500	4,500	4,500	3,400	3,400		
Dec	4,500	4,500	4,500	3,400	3,400		
Jan	4,500	4,500	4,500	4,500	4,500		
Feb	12,000	12,000	12,000	7,000	7,000		
Mar	12,000	12,000	12,000	7,000	7,000		
Apr	15,000	15,000	12,000	8,250	8,250		
May	15,000	15,000	15,000	8,250	8,250		
Jun	15,000	15,000	12,000	8,250	8,250		
Jul	10,000	7,700	6,500	4,650	3,850		
Aug	4,960	4,530	3,890	3,540	3,150		
Sep	2,500	2,500	2,500	2,500	2,500		
Outflow Threshold:							
6600	5	5	5	0	0	1.00	
12000	0	2	2	0	0	1.00	
28000	0	0	0	0	0	1.00	1.00

Maximum Delta export (cfs)

	Wet	Above Normal	Below Normal	Dry	Critical	DW Exemption	Assumed Capacity
Oct	11,280	11,280	11,280	11,280	11,280	11,280	11,280
Nov	11,280	11,280	11,280	11,280	11,280	11,280	11,280
Dec	10,880	10,880	10,880	10,880	10,880	10,880	12,700
Jan	10,880	10,880	10,880	10,880	10,880	10,880	12,700
Feb	10,880	10,880	10,880	10,880	10,880	10,880	12,700
Mar	10,880	10,880	10,880	10,880	10,880	10,880	12,700
Apr	10,880	10,880	10,880	10,880	10,880	10,880	11,280
May	11,280	11,280	11,280	11,280	11,280	11,280	11,280
Jun	11,280	11,280	11,280	11,280	11,280	11,280	11,280
Jul	11,280	11,280	11,280	11,280	11,280	11,280	11,280
Aug	11,280	11,280	11,280	11,280	11,280	11,280	11,280
Sep	11,280	11,280	11,280	11,280	11,280	11,280	11,280

Maximum Percent of Inflow Exported (fraction)

	Wet	Above Normal	Below Normal	Dry	Critical
Oct	0.65	0.65	0.65	0.65	0.65
Nov	0.65	0.65	0.65	0.65	0.65
Dec	0.65	0.65	0.65	0.65	0.65
Jan	0.65	0.65	0.65	0.65	0.65
Feb	0.65	0.65	0.65	0.65	0.65
Mar	0.35	0.35	0.35	0.35	0.35
Apr	0.35	0.35	0.35	0.35	0.35
May	0.35	0.35	0.35	0.35	0.35
Jun	0.35	0.35	0.35	0.35	0.35
Jul	0.55	0.55	0.55	0.55	0.55
Aug	0.55	0.55	0.55	0.55	0.55
Sep	0.55	0.55	0.55	0.55	0.55

Mean Annual Output Data for SWRCB-5 No Extra Exports

Water Year	Sac Basin Year Type	Added Sac Flow (TAF)	Added SJR Flow (TAF)	Revised DCC Flow (TAF)	Revised Rio Vista Flow (TAF)	Required Delta Outflow (TAF)	Outflow Deficit (TAF)	Net Export Change (TAF)	Direct Export (TAF)	Final Total Export (TAF)	Final QWEST Flow (TAF)	Final Delta Outflow (TAF)
1922	2	175	190	1,869	11,322	6,350	0	-37	5,905	5,905	1,602	12,836
1923	3	115	310	1,768	9,451	5,930	0	-618	5,249	5,249	1,242	10,606
1924	5	95	140	1,784	4,841	4,375	59	-1,001	4,069	4,069	-197	4,516
1925	4	0	379	1,973	8,679	4,305	0	-394	5,444	5,444	-277	8,323
1926	4	0	166	2,119	7,833	4,379	0	-608	5,385	5,385	-454	7,280
1927	1	81	283	2,128	18,524	6,355	0	-58	5,889	5,889	1,008	19,450
1928	2	67	346	2,111	13,812	6,480	42	-331	5,642	5,642	905	14,617
1929	5	124	129	1,709	4,580	4,288	207	-812	4,173	4,173	-135	4,311
1930	4	0	83	2,164	7,215	4,648	0	-477	5,515	5,515	-727	6,386
1931	5	19	99	1,586	3,779	4,016	244	-757	3,291	3,291	340	4,004
1932	4	77	443	1,922	5,313	4,311	0	-455	4,623	4,623	61	5,287
1933	5	0	95	1,646	3,917	3,976	164	-947	3,513	3,513	336	4,138
1934	5	15	97	1,588	4,252	4,035	234	-694	3,493	3,493	259	4,400
1935	3	138	191	2,158	8,820	5,726	0	-211	4,984	4,984	789	9,524
1936	3	131	355	1,833	12,812	5,807	0	-512	5,444	5,444	1,168	13,901
1937	3	161	249	2,021	8,643	5,876	0	-252	5,492	5,492	1,655	10,224
1938	1	0	0	1,102	31,589	6,569	0	-63	5,876	5,876	7,448	38,981
1939	4	0	82	2,323	6,266	4,391	0	-443	4,960	4,960	581	6,726
1940	2	72	223	1,898	17,433	6,205	43	-366	5,629	5,629	838	18,207
1941	1	138	0	1,671	28,119	6,500	0	-58	5,858	5,858	4,033	32,103
1942	1	0	241	1,536	24,973	6,552	0	-99	5,828	5,828	3,237	28,136
1943	1	86	167	1,877	17,536	6,439	0	-142	5,377	5,377	3,961	21,410
1944	4	33	407	2,127	6,891	4,475	0	-290	5,687	5,687	-408	6,379
1945	3	95	324	2,240	8,725	5,775	0	-673	5,379	5,379	984	8,613
1946	3	200	331	1,729	12,780	5,822	19	-623	5,136	5,136	1,188	13,862
1947	4	56	166	2,171	6,596	4,671	0	-362	5,615	5,615	-741	5,738
1948	3	3	488	2,232	8,092	5,893	0	-644	5,416	5,416	-545	7,439
1949	4	0	464	2,204	7,754	4,654	0	-433	5,539	5,539	-519	7,124
1950	3	62	381	2,227	8,206	5,717	0	-548	5,506	5,506	-165	7,930
1951	2	22	395	1,434	19,875	6,395	42	-509	5,447	5,447	3,725	23,520
1952	1	83	83	1,515	25,328	6,579	0	0	6,050	6,050	4,834	30,197
1953	1	0	348	1,585	16,703	6,614	0	-149	5,325	5,325	1,272	17,873
1954	2	41	365	2,160	14,419	6,554	42	-339	5,478	5,478	519	14,823
1955	4	0	164	2,015	7,138	4,573	0	-537	5,436	5,436	-599	6,436
1956	1	0	203	1,730	25,819	6,365	0	-78	6,020	6,020	3,633	29,384
1957	2	117	376	2,388	10,004	6,413	79	-666	4,994	4,994	1,338	11,234
1958	1	0	49	1,644	30,278	6,821	0	-18	6,265	6,265	4,727	34,964
1959	3	49	114	2,081	10,541	5,995	38	-628	4,793	4,793	1,228	11,658
1960	4	76	138	2,145	7,166	4,626	0	-619	5,369	5,369	-751	6,301
1961	4	0	117	2,115	7,189	4,480	0	-586	5,363	5,363	-804	6,275
1962	3	27	426	2,171	9,137	5,911	35	-721	5,202	5,202	1	9,041
1963	1	0	530	1,854	18,698	6,793	0	-55	5,913	5,913	487	19,111
1964	4	0	185	1,697	8,092	4,577	0	-496	5,386	5,386	-989	6,986
1965	1	60	314	1,677	19,231	6,271	0	-116	5,843	5,843	1,488	20,625
1966	3	49	392	1,749	9,993	5,858	38	-624	5,217	5,217	671	10,555
1967	1	74	97	1,453	20,371	6,647	0	0	6,057	6,057	3,738	24,049
1968	3	50	78	2,134	11,976	5,963	38	-628	4,563	4,563	1,738	13,606
1969	1	62	0	1,770	23,943	6,643	0	-0	5,836	5,836	8,954	30,831
1970	1	80	323	1,904	24,833	6,503	0	-470	4,823	4,823	4,114	28,859
1971	1	69	356	1,867	16,226	6,609	0	-70	6,213	6,213	460	16,590
1972	3	108	142	2,488	8,835	6,062	38	-626	5,119	5,119	349	9,060
1973	2	17	359	1,714	17,990	6,437	107	-497	5,367	5,367	2,145	20,085
1974	1	0	338	1,641	30,701	6,727	0	0	6,256	6,256	2,922	33,540
1975	1	0	235	2,222	15,799	6,605	0	-52	5,679	5,679	2,377	18,079
1976	5	0	158	2,143	6,198	4,230	59	-712	4,442	4,442	153	6,223
1977	5	115	134	1,460	3,423	3,982	552	-446	2,796	2,796	278	3,577
1978	2	132	98	1,671	15,608	6,301	0	-188	4,745	4,745	2,502	18,055
1979	3	70	294	1,941	9,514	5,879	0	-432	5,343	5,343	1,212	10,636
1980	2	0	0	1,995	19,338	6,510	40	-344	5,362	5,362	6,074	25,342
1981	4	0	78	2,345	8,239	4,378	0	-368	5,293	5,293	745	8,871
1982	1	0	0	1,549	30,602	6,432	0	0	6,348	6,348	8,301	38,859
1983	1	0	0	1,064	42,572	6,330	0	-2	5,415	5,415	21,667	64,231
1984	1	0	84	1,208	22,414	6,458	0	-413	4,040	4,040	8,781	31,095
1985	4	0	47	1,683	8,620	4,420	0	-375	5,421	5,421	-14	8,508
1986	1	66	0	2,232	23,428	6,389	0	-198	5,516	5,516	6,842	30,218
1987	4	44	60	2,041	6,376	4,491	0	-389	5,456	5,456	-415	5,845
1988	5	0	161	1,508	6,027	4,291	102	-1,009	4,194	4,194	-530	5,389
1989	4	0	106	2,149	7,443	4,487	0	-622	5,176	5,176	-571	6,759
1990	5	0	160	1,974	5,126	4,324	48	-968	4,201	4,201	-293	4,722
1991	5	1	120	1,765	5,109	4,314	159	-772	3,927	3,927	-156	4,843
Average		48	207	1,880	13,558	5,581	35	-409	5,223	5,223	1,825	15,290

Monthly Cumulative Distributions for SWRCB-5 No Extra Exports

Additional Sacramento River Flow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0	0	48
70	0	0	0	0	0	0	0	0	0	0	0	806
80	727	0	0	0	0	0	0	0	0	0	0	1,109
90	1,285	0	0	0	0	0	0	0	0	0	0	1,486
100	2,281	0	0	0	0	0	0	0	0	0	0	1,834
Mean	333	0	0	0	0	0	0	0	0	0	0	462

Additional San Joaquin River Flow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	930	0	0	0	0	0
30	0	0	0	0	0	0	1,219	371	0	0	0	0
40	0	0	0	0	0	0	1,401	486	0	0	0	0
50	0	0	0	0	0	0	1,569	648	0	0	0	24
60	0	0	0	0	0	0	2,667	763	0	0	0	226
70	436	0	0	0	0	0	3,408	957	0	0	0	401
80	583	0	0	0	0	0	3,778	1,089	0	0	0	603
90	811	0	0	0	0	0	3,980	1,822	0	0	0	721
100	1,448	0	0	85	341	55	4,855	2,474	276	0	37	906
Mean	243	0	0	2	14	1	2,152	753	8	0	1	254

Delta Cross Channel Flow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	0	0	0	0	0	0	0	0	0	2,833	2,770	3,081
10	3,081	0	0	0	0	0	0	0	0	4,073	3,381	3,275
20	3,563	3,380	0	0	0	0	0	0	1,239	4,931	4,035	3,765
30	3,826	3,661	0	0	0	0	0	0	3,858	5,117	4,100	3,826
40	3,988	3,804	3,724	0	0	0	0	0	4,440	5,316	4,160	4,181
50	4,181	3,948	4,085	3,549	0	0	0	0	4,481	5,376	4,240	4,181
60	4,181	4,620	4,308	4,276	0	0	0	0	4,889	5,390	4,297	4,181
70	4,678	5,038	4,693	4,506	0	0	0	0	5,050	5,436	4,426	4,181
80	5,409	5,444	4,934	4,982	0	0	0	0	5,185	5,667	4,493	4,679
90	5,970	5,718	5,135	5,368	0	0	0	0	5,683	5,712	4,768	5,371
100	6,328	6,398	6,255	6,348	0	0	0	0	6,204	6,306	5,439	6,326
Mean	4,283	3,878	3,071	2,552	0	0	0	0	3,827	5,160	4,218	4,282

Sacramento River at Rio Vista Flow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	3,033	2,326	3,548	3,956	8,087	3,952	5,215	5,443	4,927	2,349	2,204	2,884
10	3,273	3,921	4,828	6,110	10,022	9,446	9,158	6,962	4,992	4,425	3,131	3,261
20	4,357	4,555	5,536	6,981	12,737	12,338	11,250	9,653	5,642	7,531	4,809	4,197
30	4,811	4,692	6,420	8,377	15,366	17,207	11,720	10,054	5,792	8,183	4,932	4,730
40	5,471	5,327	8,228	10,200	22,714	21,292	13,025	11,908	7,011	9,181	5,088	5,310
50	5,573	8,060	8,548	14,534	29,417	25,086	14,510	12,701	7,637	9,284	5,970	5,361
60	5,871	9,639	9,799	24,490	40,657	27,875	16,822	13,598	8,330	9,417	5,769	5,630
70	9,743	11,323	21,899	31,385	60,845	37,832	20,425	14,884	10,286	9,933	5,948	5,740
80	10,636	12,542	39,247	63,450	68,021	49,401	37,244	25,259	11,975	10,376	6,393	6,963
90	13,753	25,439	60,830	89,110	102,411	79,244	55,812	35,584	21,649	11,050	7,450	10,014
100	32,598	62,385	117,336	168,365	188,452	187,148	104,484	51,555	43,946	13,583	9,823	14,326
Mean	7,807	11,636	21,923	32,760	43,652	35,871	23,731	16,831	10,553	8,704	5,541	6,018

Required Delta Outflow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	3,400	3,400	3,400	4,500	7,000	7,000	8,250	8,250	8,250	3,850	3,150	2,500
10	3,400	3,400	3,400	4,500	7,000	7,000	8,250	8,250	8,250	3,948	3,150	3,123
20	3,400	3,400	4,410	4,500	7,325	7,000	8,250	8,250	8,250	6,360	4,436	3,796
30	3,400	4,191	4,500	4,500	8,677	7,472	9,075	8,250	8,250	6,393	4,693	3,931
40	4,500	4,500	4,500	4,500	12,000	12,000	12,000	15,000	12,000	6,500	4,933	4,015
50	4,500	4,500	4,500	4,500	12,000	12,000	12,000	15,000	12,000	7,103	4,976	4,133
60	4,500	4,855	4,589	4,500	12,000	12,000	15,000	15,000	15,000	7,700	5,153	4,352
70	4,500	5,291	4,964	5,380	12,000	12,000	15,000	15,000	15,000	8,710	6,351	4,604
80	5,038	5,577	5,380	5,838	12,000	12,000	15,000	15,000	15,000	10,000	5,507	5,395
90	5,803	5,796	5,657	6,227	12,000	12,000	15,000	15,000	15,000	10,000	6,003	5,981
100	6,439	6,082	6,080	6,536	13,569	12,000	15,017	15,000	15,000	10,000	6,925	6,574
Mean	4,405	4,640	4,668	4,984	10,423	10,247	12,030	12,493	11,894	7,484	4,954	4,393

Monthly Cumulative Distributions for SWRCB-5 No Extra Exports

Remaining Delta Outflow Deficits (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	128	692	0	0	0
90	0	0	0	0	0	0	0	639	1,365	0	0	0
100	0	0	0	0	0	1,292	1,519	2,311	4,042	0	0	0
Mean	0	0	0	0	0	18	39	167	352	0	0	0

Net Change in Exports (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	-129	-57	-196	-62	-7,306	-4,953	-6,732	-4,156	-3,550	-520	-1,170	-1,650
10	0	-1	-25	-50	-2,450	-3,554	-4,358	-3,550	-3,516	-494	-239	-857
20	0	0	0	0	-98	-2,657	-3,698	-3,417	-2,437	-458	-81	-461
30	0	0	0	0	0	-1,070	-3,148	-1,957	-2,437	-90	-36	-338
40	0	0	0	0	0	0	-2,350	-1,435	-2,071	0	0	-291
50	0	0	0	0	0	0	-2,159	-784	-2,054	0	0	-14
60	0	0	0	0	0	0	-567	-599	-2,054	0	0	0
70	0	0	0	0	0	0	0	0	-928	0	0	0
80	0	0	0	0	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0	0	0	0
Mean	-2	-2	-8	-7	-435	-877	-1,884	-1,384	-1,741	-120	-73	-254

Final Exports (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	2,330	3,148	4,561	3,177	3,407	1,500	1,500	1,500	1,500	768	2,232	3,131
10	4,594	5,808	6,940	6,093	5,360	4,658	3,786	1,500	1,500	4,219	4,184	4,583
20	5,734	6,868	7,827	7,542	6,640	5,348	4,509	1,500	1,500	5,522	5,490	5,481
30	6,255	7,289	8,504	8,324	7,377	6,272	5,793	2,881	2,192	7,494	5,788	5,976
40	6,565	8,181	9,725	9,839	7,665	6,830	6,252	4,282	2,596	7,936	5,881	6,342
50	6,826	10,777	10,442	10,410	8,477	7,021	6,599	4,402	2,946	7,974	6,011	6,430
60	8,196	10,959	11,191	11,348	8,234	7,321	7,238	5,022	2,963	8,709	6,076	6,618
70	11,045	10,959	11,257	11,509	10,984	8,031	8,331	5,588	3,569	8,736	6,576	6,902
80	11,045	10,959	11,273	11,550	11,615	8,618	8,669	5,995	6,028	9,031	6,774	8,456
90	11,045	10,959	11,273	11,550	11,633	10,468	9,305	5,995	6,028	9,220	7,687	10,221
100	11,045	10,959	11,273	11,550	11,633	11,401	10,880	5,995	6,028	9,220	11,280	11,262
Mean	7,908	9,067	9,739	9,619	8,722	7,164	6,666	4,108	3,274	7,397	6,102	6,923

Final QWEST Flow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	-4,431	-4,057	-4,808	-4,204	-5,280	-3,395	-4,039	-1,914	-1,148	-2,303	-2,030	-2,536
10	-1,819	-1,818	-2,233	-1,416	-3,971	-2,205	-2,722	-1,422	1,580	-2,113	-1,093	-976
20	-748	-1,249	-1,363	-925	-2,255	-1,434	-1,974	-1,076	2,767	-1,934	-517	-407
30	-233	-851	-1,005	-607	-1,046	-647	-1,461	180	2,862	-1,870	-382	-181
40	-31	-436	-756	201	732	-60	-1,045	799	2,973	-1,779	-199	23
50	230	-268	-253	820	3,026	984	-330	1,266	3,850	-1,277	-17	110
60	569	-31	58	2,433	4,978	2,418	929	1,751	4,670	-589	44	263
70	953	260	428	4,474	9,992	4,124	1,957	2,284	5,187	126	203	325
80	1,564	578	2,709	9,042	13,678	11,849	2,855	3,114	5,839	1,338	373	394
90	5,502	1,055	4,746	15,442	17,820	17,087	10,904	6,656	8,078	2,026	504	613
100	14,294	23,706	40,897	38,919	60,681	75,348	41,222	34,040	33,418	18,277	1,601	10,772
Mean	609	179	1,452	4,938	6,730	5,993	2,528	2,853	4,889	-237	-108	158

Final Delta Outflow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	3,492	3,489	3,498	4,527	7,000	5,708	6,731	5,939	4,208	3,939	3,204	3,177
10	4,470	4,163	4,500	5,440	8,836	7,709	8,553	8,073	6,885	4,037	3,256	3,797
20	4,502	4,499	4,671	6,401	9,943	11,396	9,951	8,250	8,250	6,578	4,519	4,274
30	4,519	4,500	5,584	8,564	13,569	15,144	10,481	8,250	8,250	6,843	4,752	4,457
40	5,163	4,516	6,088	11,809	23,090	18,384	12,186	14,361	12,000	6,965	5,013	4,935
50	5,523	6,469	7,587	15,800	28,249	24,671	14,701	15,000	12,000	7,251	5,135	5,274
60	6,256	8,388	11,366	26,894	47,123	32,165	15,000	15,000	14,291	7,767	5,257	5,426
70	7,630	10,896	18,012	35,251	57,900	43,389	19,268	15,000	15,000	8,777	5,404	5,813
80	12,305	12,950	42,953	78,836	79,362	61,276	40,175	25,245	15,808	10,080	5,697	6,601
90	18,821	22,881	70,744	103,980	124,921	96,349	64,656	42,056	22,962	10,097	6,299	8,238
100	36,610	79,663	158,435	202,113	231,494	262,950	145,692	84,688	76,980	31,437	9,371	24,938
Mean	8,599	11,750	23,365	37,853	50,491	41,873	26,145	19,463	15,064	8,045	5,137	5,991

Delta Standards Matrices for SWRCB-6 No Extra Exports

Minimum required Sacramento River flow at Freeport (cfs)

	Wet	Above Normal	Normal	Dry	Critical
Oct	0	0	0	0	0
Nov	0	0	0	0	0
Dec	0	0	0	0	0
Jan	0	0	0	0	0
Feb	0	0	0	0	0
Mar	0	0	0	0	0
Apr	0	0	0	0	0
May	15,000	15,000	15,000	15,000	15,000
Jun	0	0	0	0	0
Jul	0	0	0	0	0
Aug	0	0	0	0	0
Sep	0	0	0	0	0

Sacramento River trigger for Delta Cross Channel (cfs) (Closed if Sac flow below Hood > value)

	Wet	Above Normal	Below Normal	Dry	Critical
Oct	25,000	25,000	25,000	25,000	25,000
Nov	25,000	25,000	25,000	25,000	25,000
Dec	25,000	25,000	25,000	25,000	25,000
Jan	25,000	25,000	25,000	25,000	25,000
Feb	0	0	0	0	0
Mar	0	0	0	0	0
Apr	0	0	0	0	0
May	0	0	0	0	0
Jun	0	0	0	0	0
Jul	25,000	25,000	25,000	25,000	25,000
Aug	25,000	25,000	25,000	25,000	25,000
Sep	25,000	25,000	25,000	25,000	25,000

Minimum Rio Vista flow (cfs)

	Wet	Above Normal	Below Normal	Dry	Critical
Oct	0	0	0	0	0
Nov	0	0	0	0	0
Dec	0	0	0	0	0
Jan	0	0	0	0	0
Feb	0	0	0	0	0
Mar	0	0	0	0	0
Apr	0	0	0	0	0
May	0	0	0	0	0
Jun	0	0	0	0	0
Jul	0	0	0	0	0
Aug	0	0	0	0	0
Sep	0	0	0	0	0

Minimum QWEST flow (cfs)

	Wet	Above Normal	Below Normal	Dry	Critical
Oct	-2,000	-2,000	-2,000	-2,000	-2,000
Nov	-2,000	-2,000	-2,000	-2,000	-2,000
Dec	-2,000	-2,000	-2,000	-2,000	-2,000
Jan	-2,000	-2,000	-2,000	-2,000	-2,000
Feb	0	0	0	0	0
Mar	0	0	0	0	0
Apr	0	0	0	0	0
May	0	0	0	0	0
Jun	4,000	4,000	4,000	4,000	4,000
Jul	0	0	0	0	0
Aug	-2,000	-2,000	-2,000	-2,000	-2,000
Sep	-2,000	-2,000	-2,000	-2,000	-2,000

Delta Standards Matrices for SWRCB-6 No Extra Exports

Minimum San Joaquin River flow at Vernalis (cfs)

	Wet	Above Normal	Below Normal	Dry	Critical
Oct	1,500	1,500	1,500	1,500	1,500
Nov	900	900	900	900	900
Dec	900	900	900	900	900
Jan	900	900	900	900	900
Feb	900	900	900	900	900
Mar	900	900	900	900	900
Apr	900	900	900	900	900
May	4,000	4,000	4,000	4,000	4,000
Jun	900	900	900	900	900
Jul	900	900	900	900	900
Aug	900	900	900	900	900
Sep	900	900	900	900	900

Minimum Delta outflow (cfs)

	Wet	Above Normal	Below Normal	Dry	Critical
Oct	4,500	4,500	4,500	3,500	3,500
Nov	4,500	4,500	4,500	3,500	3,500
Dec	4,500	4,500	4,500	3,500	3,500
Jan	4,500	4,500	4,500	3,500	3,500
Feb	12,000	12,000	12,000	12,000	12,000
Mar	12,000	12,000	12,000	12,000	12,000
Apr	12,000	12,000	12,000	12,000	12,000
May	12,000	12,000	12,000	12,000	12,000
Jun	12,000	12,000	12,000	12,000	12,000
Jul	7,000	7,000	4,500	3,500	3,500
Aug	7,000	7,000	4,500	3,500	3,500
Sep	3,500	3,500	3,500	3,500	3,500

Outflow Threshold:

6600	5	5	5	0	0	1.00	
12000	0	2	2	0	0	1.00	
28000	0	0	0	0	0	1.00	1.00

Maximum Delta export (cfs)

	Wet	Above Normal	Below Normal	Dry	Critical	DW Exemption	Assumed Capacity
Oct	11,280	11,280	11,280	11,280	11,280	11,280	11,280
Nov	11,280	11,280	11,280	11,280	11,280	11,280	11,280
Dec	10,880	10,880	10,880	10,880	10,880	10,880	12,700
Jan	10,880	10,880	10,880	10,880	10,880	10,880	12,700
Feb	10,880	10,880	10,880	10,880	10,880	10,880	12,700
Mar	10,880	10,880	10,880	10,880	10,880	10,880	12,700
Apr	10,880	10,880	10,880	10,880	10,880	10,880	11,280
May	2,000	2,000	2,000	2,000	2,000	11,280	11,280
Jun	11,280	11,280	11,280	11,280	11,280	11,280	11,280
Jul	11,280	11,280	11,280	11,280	11,280	11,280	11,280
Aug	11,280	11,280	11,280	11,280	11,280	11,280	11,280
Sep	11,280	11,280	11,280	11,280	11,280	11,280	11,280

Maximum Percent of Inflow Exported (fraction)

	Wet	Above Normal	Below Normal	Dry	Critical
Oct	1.00	1.00	1.00	1.00	1.00
Nov	1.00	1.00	1.00	1.00	1.00
Dec	1.00	1.00	1.00	1.00	1.00
Jan	1.00	1.00	1.00	1.00	1.00
Feb	1.00	1.00	1.00	1.00	1.00
Mar	1.00	1.00	1.00	1.00	1.00
Apr	1.00	1.00	1.00	1.00	1.00
May	1.00	1.00	1.00	1.00	1.00
Jun	1.00	1.00	1.00	1.00	1.00
Jul	1.00	1.00	1.00	1.00	1.00
Aug	1.00	1.00	1.00	1.00	1.00
Sep	1.00	1.00	1.00	1.00	1.00

Mean Annual Output Data for SWRCB-6 No Extra Exports

Water Year	Sac Basin Year Type	Added Sac Flow (TAF)	Added SJR Flow (TAF)	Revised DCC Flow (TAF)	Revised Rio Vista Flow (TAF)	Required Delta Outflow (TAF)	Outflow Deficit (TAF)	Net Export Change (TAF)	Direct Export (TAF)	Final Total Export (TAF)	Final QWEST Flow (TAF)	Final Delta Outflow (TAF)
1922	2	0	29	1,826	11,208	5,975	0	-565	5,377	5,377	2,069	13,308
1923	3	0	79	1,452	9,619	5,726	0	-844	4,923	4,923	1,285	11,367
1924	5	255	165	1,569	5,168	5,715	275	-1,797	3,273	3,273	432	6,825
1925	4	0	158	1,709	8,900	5,531	138	-1,158	4,680	4,680	266	9,956
1926	4	104	169	1,849	8,150	5,606	138	-1,257	4,736	4,736	-19	9,153
1927	1	0	92	1,772	18,755	5,773	0	-655	5,292	5,292	1,293	20,201
1928	2	0	85	1,774	14,039	6,115	0	-907	5,065	5,065	1,168	15,647
1929	5	363	136	1,618	4,853	5,608	452	-1,489	3,495	3,495	488	6,169
1930	4	70	151	1,908	7,490	5,874	197	-1,435	4,558	4,558	26	6,687
1931	5	390	160	1,505	4,180	5,314	865	-1,138	2,910	2,910	693	5,345
1932	4	115	187	1,613	5,613	5,537	107	-1,148	3,931	3,931	491	6,846
1933	5	322	149	1,588	4,268	5,275	624	-1,465	2,995	2,995	824	5,690
1934	5	351	166	1,521	4,608	5,334	590	-1,102	3,086	3,086	646	5,780
1935	3	0	115	1,804	9,004	5,480	0	-697	4,498	4,498	954	10,214
1936	3	0	124	1,509	12,973	5,602	0	-972	4,983	4,983	1,336	14,934
1937	3	0	36	1,736	8,748	5,671	0	-744	5,001	5,001	1,880	10,964
1938	1	0	0	1,102	31,589	6,029	0	-419	5,520	5,520	7,804	39,397
1939	4	112	144	2,053	6,590	5,659	138	-1,095	4,307	4,307	1,020	8,253
1940	2	0	62	1,574	17,644	5,788	0	-801	5,194	5,194	690	18,945
1941	1	0	23	1,293	28,320	5,990	0	-624	5,292	5,292	4,260	32,737
1942	1	0	110	1,536	24,973	6,012	0	-564	5,363	5,363	3,702	28,746
1943	1	0	59	1,514	17,768	5,899	0	-587	4,932	4,932	4,088	21,946
1944	4	98	147	1,854	7,178	5,744	138	-958	5,019	5,019	38	7,857
1945	3	0	95	1,924	8,910	5,528	0	-924	5,128	5,128	955	10,333
1946	3	0	159	1,377	12,906	5,618	0	-788	4,971	4,971	1,028	14,329
1947	4	91	171	1,890	6,863	5,840	139	-1,241	4,736	4,736	-95	7,759
1948	3	0	201	1,878	8,387	5,647	0	-1,714	4,346	4,346	227	9,808
1949	4	69	172	1,935	8,040	5,923	139	-1,427	4,544	4,544	259	9,228
1950	3	0	98	1,913	8,417	5,471	0	-1,328	4,726	4,726	342	9,698
1951	2	0	135	1,117	20,123	6,020	0	-949	5,006	5,006	3,896	24,469
1952	1	0	16	1,496	25,274	6,039	0	-359	5,691	5,691	5,265	30,474
1953	1	0	102	1,585	16,703	6,075	0	-918	4,556	4,556	2,041	19,142
1954	2	0	100	1,838	14,655	6,179	0	-822	4,995	4,995	724	15,711
1955	4	108	160	1,748	7,456	5,842	164	-1,699	4,274	4,274	352	8,934
1956	1	0	1	1,363	26,126	5,783	0	-600	5,497	5,497	3,848	30,127
1957	2	0	128	2,055	10,186	6,037	0	-1,033	4,627	4,627	1,407	12,059
1958	1	0	19	1,644	30,278	6,281	0	-503	5,779	5,779	5,213	35,592
1959	3	0	156	1,765	10,766	5,790	0	-962	4,459	4,459	1,289	12,708
1960	4	74	164	1,857	7,407	5,894	139	-1,527	4,462	4,462	-87	8,597
1961	4	93	160	1,846	7,496	5,707	138	-1,500	4,449	4,449	-104	8,649
1962	3	0	140	1,853	9,382	5,665	0	-1,277	4,646	4,646	285	10,645
1963	1	0	186	1,500	18,995	6,253	0	-985	4,983	4,983	1,119	20,607
1964	4	98	191	1,435	8,397	5,846	145	-1,534	4,348	4,348	-158	9,310
1965	1	0	116	1,324	19,477	5,689	0	-730	5,229	5,229	1,795	21,522
1966	3	0	137	1,433	10,217	5,654	0	-894	4,946	4,946	669	11,421
1967	1	0	0	1,435	20,323	6,108	0	-359	5,688	5,688	4,071	24,334
1968	3	0	144	1,818	12,199	5,759	0	-891	4,300	4,300	1,728	14,462
1969	1	0	14	1,755	23,902	6,104	0	-360	5,476	5,476	7,293	31,129
1970	1	0	94	1,547	25,066	5,963	0	-848	4,446	4,446	4,180	29,683
1971	1	0	101	1,477	16,493	6,069	0	-1,053	5,229	5,229	1,107	18,165
1972	3	0	159	2,159	9,019	5,857	0	-892	4,854	4,854	321	9,891
1973	2	0	127	1,410	18,232	6,062	0	-991	4,873	4,873	2,380	21,168
1974	1	0	124	1,282	31,003	6,187	0	-675	5,581	5,581	3,296	34,530
1975	1	0	55	2,222	15,799	6,066	0	-698	5,033	5,033	3,023	19,061
1976	5	251	175	1,956	6,576	5,570	363	-1,280	3,875	3,875	594	7,984
1977	5	454	190	1,414	3,775	5,281	1,235	-734	2,507	2,507	554	4,515
1978	2	0	7	1,320	15,800	5,883	0	-639	4,294	4,294	2,629	18,564
1979	3	0	159	1,630	9,717	5,675	0	-697	5,078	5,078	1,204	11,305
1980	2	0	0	1,763	19,535	6,135	0	-634	5,072	5,072	6,167	25,819
1981	4	123	137	2,077	8,572	5,647	139	-862	4,799	4,799	1,031	10,152
1982	1	0	25	1,175	30,915	5,850	0	-387	5,960	5,960	8,375	39,274
1983	1	0	0	1,064	42,572	5,790	0	-218	5,199	5,199	21,883	64,447
1984	1	0	17	872	22,697	5,919	0	-723	3,730	3,730	8,808	31,714
1985	4	132	130	1,415	8,960	5,689	138	-860	4,937	4,937	262	9,739
1986	1	155	0	1,922	23,770	5,807	0	-482	5,232	5,232	6,874	30,650
1987	4	105	140	1,761	6,665	5,760	138	-1,226	4,618	4,618	195	7,802
1988	5	289	201	1,373	6,397	5,590	318	-1,799	3,404	3,404	179	7,991
1989	4	112	166	1,877	7,768	5,713	227	-1,461	4,336	4,336	55	8,905
1990	5	316	216	1,786	5,592	5,622	350	-1,805	3,364	3,364	424	7,152
1991	5	380	159	1,639	5,551	5,612	449	-1,406	3,292	3,292	416	6,827
Average		72	113	1,637	13,785	5,796	112	-975	4,657	4,657	2,187	16,505

Monthly Cumulative Distributions for SWRCB-6 No Extra Exports

Additional Sacramento River Flow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	1,544	0	0	0	0
80	0	0	0	0	0	0	0	1,854	0	0	0	0
90	0	0	0	0	0	0	0	4,802	0	0	0	0
100	0	0	0	0	0	0	0	7,539	0	0	0	0
Mean	0	0	0	0	0	0	0	1,193	0	0	0	0

Additional San Joaquin River Flow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	384	0	0	0	0
30	0	0	0	0	0	0	0	1,263	0	0	0	0
40	0	0	0	0	0	0	0	1,540	0	0	0	0
50	18	0	0	0	0	0	0	1,850	0	0	0	0
60	89	0	0	0	0	0	0	2,322	0	0	0	0
70	164	0	0	0	0	0	0	2,469	0	0	0	0
80	295	0	0	0	0	0	0	2,632	0	0	0	0
90	425	0	0	0	0	0	0	2,746	0	0	0	0
100	1,109	0	0	85	341	0	0	2,674	176	0	37	126
Mean	152	0	0	2	14	0	0	1,697	4	0	1	3

Delta Cross Channel Flow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	0	0	0	0	0	0	0	0	0	2,833	2,770	2,315
10	2,995	0	0	0	0	0	0	0	0	4,073	3,381	3,275
20	3,583	3,380	0	0	0	0	0	0	0	4,931	4,035	3,711
30	3,742	3,681	0	0	0	0	0	0	0	5,117	4,100	3,804
40	3,855	3,804	3,724	0	0	0	0	0	0	5,316	4,160	3,826
50	3,953	3,848	4,085	3,549	0	0	0	0	0	5,376	4,240	3,919
60	4,023	4,620	4,308	4,276	0	0	0	0	0	5,390	4,297	3,989
70	4,678	5,038	4,693	4,508	0	0	0	0	0	5,436	4,426	4,116
80	5,409	5,444	4,934	4,982	0	0	0	0	0	5,567	4,493	4,679
90	5,970	5,718	5,135	5,368	0	0	0	0	0	5,712	4,768	5,371
100	6,328	6,398	6,255	6,348	0	0	0	0	0	6,306	5,439	6,326
Mean	4,163	3,878	3,071	2,552	0	0	0	0	0	5,150	4,218	4,135

Sacramento River at Rio Vista Flow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	2,080	2,326	3,548	3,956	8,087	3,952	5,215	11,234	4,949	2,349	2,204	2,142
10	3,273	3,921	4,828	6,110	10,022	9,446	9,158	11,316	6,886	4,425	3,131	3,261
20	4,119	4,555	5,536	6,981	12,737	12,338	11,250	11,360	9,333	7,531	4,809	4,140
30	4,629	4,692	6,420	8,377	15,366	17,207	11,720	11,487	9,542	8,183	4,932	4,338
40	4,811	5,327	8,228	10,200	22,714	21,292	13,025	12,103	10,489	9,181	5,088	4,617
50	4,963	6,060	8,548	14,534	29,417	25,086	14,510	12,701	11,779	9,284	5,570	4,662
60	5,871	9,639	9,789	24,490	40,657	27,875	16,822	13,598	12,584	9,417	5,769	5,089
70	9,743	11,323	21,899	31,385	50,845	37,832	20,425	14,884	14,977	9,933	5,948	5,381
80	10,636	12,542	39,247	63,450	68,021	49,401	37,244	25,259	16,608	10,376	6,393	6,963
90	13,753	25,439	60,830	89,110	102,411	79,244	55,812	35,584	21,649	11,050	7,450	10,014
100	32,595	62,385	117,336	168,365	188,452	187,148	104,484	51,555	43,946	13,583	9,923	14,326
Mean	7,603	11,636	21,923	32,760	43,652	35,871	23,731	17,885	13,769	8,704	5,541	5,725

Required Delta Outflow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	3,500	3,500	3,500	3,500	12,000	12,000	12,000	12,000	12,000	3,500	3,500	3,500
10	3,500	3,500	3,500	3,500	12,000	12,000	12,000	12,000	12,000	3,500	3,500	4,123
20	3,500	3,500	4,500	4,500	12,000	12,000	12,000	12,000	12,000	4,500	4,852	4,786
30	3,500	4,291	4,500	4,500	12,000	12,000	12,000	12,000	12,000	5,119	5,021	4,931
40	4,500	4,500	4,500	4,500	12,000	12,000	12,000	12,000	12,000	5,210	5,298	5,015
50	4,500	4,500	4,500	4,500	12,000	12,000	12,000	12,000	12,000	5,243	5,852	5,133
60	4,500	4,955	4,630	4,500	12,000	12,000	12,000	12,000	12,000	7,000	7,000	5,352
70	4,500	5,281	5,021	4,787	12,000	12,000	12,000	12,000	12,000	7,000	7,212	5,604
80	5,038	5,577	5,380	5,292	12,128	12,000	12,017	12,000	12,000	7,000	7,489	6,395
90	5,803	5,786	5,657	5,536	13,869	12,212	12,707	12,000	12,000	7,000	7,766	6,951
100	6,439	6,082	6,123	6,373	14,074	13,825	13,246	12,000	12,034	8,010	9,395	7,574
Mean	4,441	4,676	4,704	4,637	12,280	12,104	12,137	12,000	12,001	5,781	6,047	5,363

Monthly Cumulative Distributions for SWRCB-6 No Extra Exports

Remaining Delta Outflow Deficits (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	2,287	0	0	0
80	0	0	0	0	0	0	0	0	2,304	0	0	0
90	0	0	0	0	0	102	253	0	4,560	0	0	0
100	0	0	0	0	2,078	6,292	5,269	0	7,792	0	0	0
Mean	0	0	0	0	67	185	283	0	1,331	0	0	0

Net Change in Exports (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	-2,431	-2,057	-2,808	-2,254	-7,468	-7,415	-7,438	-3,995	-4,526	-2,571	-2,444	-1,001
10	-14	-18	-233	-52	-6,891	-6,387	-5,780	-3,995	-3,516	-2,449	-2,427	-984
20	-8	-1	-25	0	-4,746	-4,863	-4,682	-3,995	-3,516	-2,368	-1,987	-984
30	0	0	-8	0	-2,057	-3,185	-4,358	-3,995	-3,516	-2,191	-1,987	-984
40	0	0	0	0	0	-1,245	-4,341	-3,995	-3,516	-1,779	-1,971	-984
50	0	0	0	0	0	0	-3,651	-3,995	-3,516	-1,277	-863	-984
60	0	0	0	0	0	0	-2,349	-3,588	-3,163	-589	-546	-967
70	0	0	0	0	0	0	-1,149	-3,050	-2,944	0	-279	-967
80	0	0	0	0	0	0	0	-3,001	-2,271	0	0	-967
90	0	0	0	0	0	0	0	-3,001	0	0	0	-439
100	0	0	0	0	0	0	0	-851	0	0	0	0
Mean	-62	-80	-169	-50	-1,628	-1,851	-2,907	-3,498	-2,855	-1,163	-1,048	-864

Final Exports (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	2,330	3,137	4,561	3,177	1,500	1,500	1,500	1,740	1,500	768	1,952	2,164
10	4,594	5,808	6,940	6,093	3,407	1,500	1,500	2,000	1,500	4,219	2,981	3,989
20	5,734	6,868	7,827	7,542	4,274	3,467	3,874	2,000	1,500	5,408	3,600	4,891
30	6,255	7,289	8,455	8,324	5,627	5,839	4,157	2,000	1,500	6,506	3,958	5,127
40	6,551	8,181	8,963	9,590	6,890	6,324	4,698	2,000	1,500	6,694	4,040	5,396
50	6,828	9,971	10,045	10,165	7,467	6,630	5,760	2,000	1,500	6,783	4,878	5,497
60	8,196	10,959	10,546	10,963	8,044	6,978	6,599	2,000	1,500	6,858	5,376	5,949
70	10,443	10,959	11,224	11,509	9,144	7,249	7,171	2,000	1,500	7,037	5,881	5,918
80	11,045	10,959	11,273	11,550	11,338	7,841	7,881	2,000	1,860	7,344	6,663	8,308
90	11,045	10,959	11,273	11,550	11,633	8,895	8,869	2,000	6,026	7,603	7,110	10,728
100	11,045	10,959	11,273	11,550	11,633	11,159	10,880	2,000	6,026	9,220	11,280	11,282
Mean	7,847	8,989	9,578	9,576	7,528	6,190	5,643	1,994	2,160	6,355	5,127	6,314

Final QWEST Flow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	-2,000	-2,000	-2,000	-2,000	0	0	0	1,018	-357	0	-2,000	-2,000
10	-1,819	-1,818	-2,000	-1,416	0	0	0	1,216	267	0	-893	-804
20	-748	-1,249	-1,383	-925	506	0	0	1,416	502	0	-318	101
30	-333	-851	-1,053	-607	866	224	0	1,625	589	0	-141	437
40	-169	-436	-756	201	1,973	1,844	232	1,798	778	0	560	514
50	-31	-268	-253	820	3,546	2,522	654	2,889	1,121	0	803	670
60	360	-31	58	2,433	4,978	3,165	1,315	3,468	1,863	0	1,536	755
70	634	260	428	4,474	9,992	4,124	2,162	4,160	2,414	128	1,989	801
80	1,559	578	2,709	9,042	13,678	11,849	2,568	6,488	4,000	1,338	2,235	883
90	5,502	1,055	4,746	15,442	17,820	17,087	10,904	10,650	4,924	2,026	2,411	1,112
100	14,284	23,706	40,897	38,919	60,681	75,348	41,222	37,627	33,418	18,277	2,879	10,772
Mean	839	257	1,613	4,981	7,923	6,967	3,551	5,107	2,786	805	866	598

Final Delta Outflow (cfs)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	3,500	3,500	3,500	4,527	12,000	5,708	7,211	12,789	4,492	3,939	3,500	3,500
10	3,509	4,173	4,500	5,440	15,124	14,385	14,178	14,034	9,829	4,149	3,500	4,173
20	4,500	4,499	4,689	6,401	17,608	16,951	15,400	14,143	13,212	8,754	4,940	4,847
30	4,502	4,500	5,387	8,564	19,940	19,685	15,913	15,029	13,229	10,080	5,070	4,948
40	4,502	4,516	6,570	11,809	25,057	22,823	17,149	15,516	15,687	10,997	5,298	5,015
50	4,502	6,469	7,701	15,800	33,236	27,848	18,653	16,044	16,596	10,968	5,852	5,167
60	5,056	8,388	11,366	26,894	47,123	32,165	20,358	17,927	16,993	11,233	7,000	5,369
70	8,249	10,896	22,203	35,251	57,900	43,389	24,492	19,579	19,626	11,377	7,277	5,604
80	12,305	12,950	42,953	78,836	79,362	61,276	40,175	29,240	22,752	11,740	7,505	6,648
90	18,821	24,950	70,744	103,980	124,921	96,349	64,656	46,051	29,978	12,319	8,043	8,259
100	36,610	79,963	158,435	202,113	231,494	262,950	145,692	88,276	76,980	31,437	9,395	24,938
Mean	8,365	11,908	23,693	37,940	52,994	44,228	29,624	23,588	19,033	10,250	6,129	6,166



Figure 1. Multi-Purpose System of Delta Standards

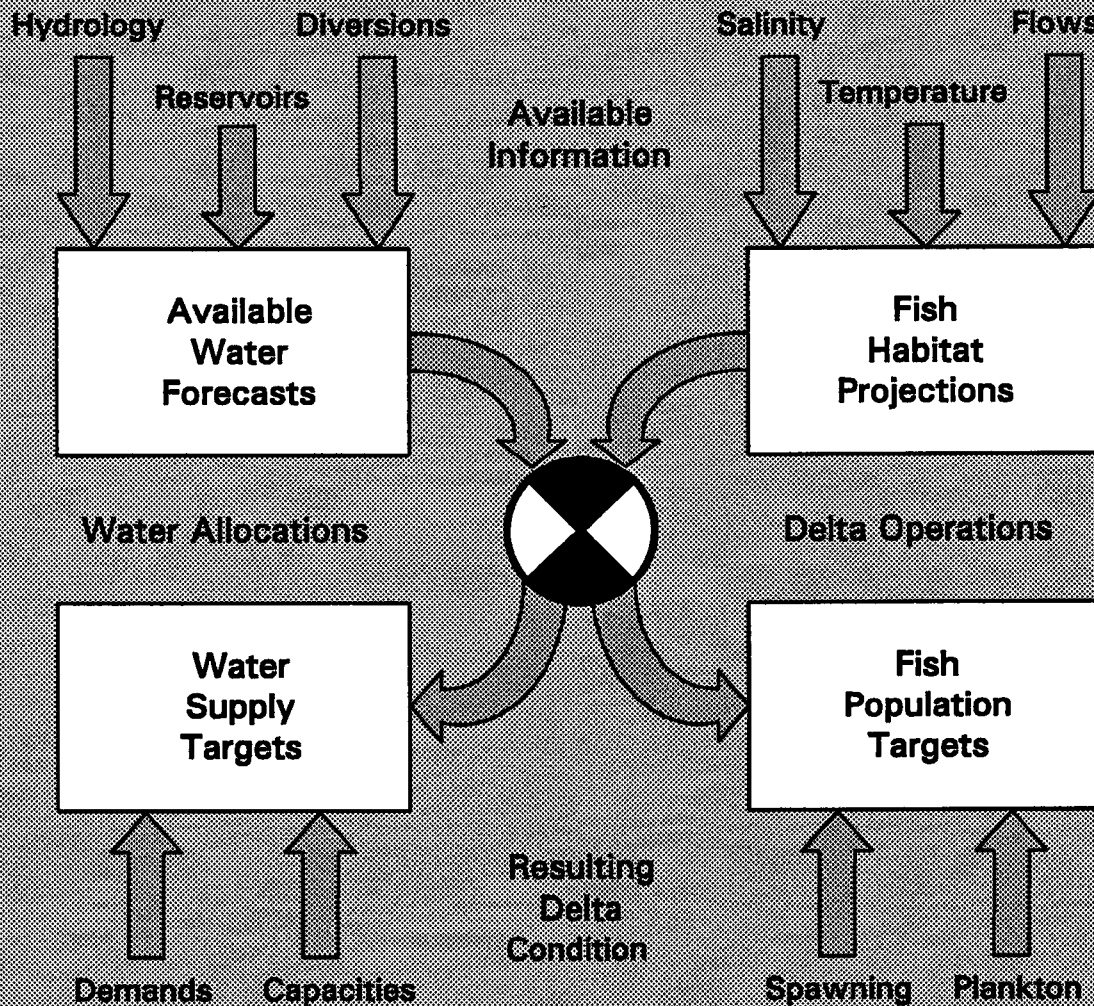
Delta Standards Purposes

Delta Water Resource Categories

	Daily Information Needs	Minimum Protection Requirements	Adaptive Allocation Objectives
Water Supply	<ul style="list-style-type: none">• Tidal and Net Channel Flows• Tributary Flows and Water Rights	<ul style="list-style-type: none">• Riparian Diversion (750 TAF/yr)• Export Pumping (2,000 cfs)	<ul style="list-style-type: none">• Maximum Export Capacity• Maximum Storage Capacity
Salinity Control	<ul style="list-style-type: none">• Concentration Patterns (EC)• Sources (Cl/EC)	<ul style="list-style-type: none">• Mineral Content (150-250 mg/l Cl)• Estuarine Habitat (7,000 cfs)	<ul style="list-style-type: none">• Estuarine and Marsh Habitat• Delta Salt Flushing
Fish Protection	<ul style="list-style-type: none">• Distribution and Abundance (fish/AF)• Entrainment and Salvage	<ul style="list-style-type: none">• Transport & Diversion (DCC)• Entrainment Limits (QWEST)	<ul style="list-style-type: none">• Reduced Entrainment (QWEST)• Control Migration Pathways



Figure 2. Parallel Management of Delta Water and Fish Resources



Accurate accounting of fish habitat and responses will provide the greatest possible Delta water supply:

- ▲ Migration pathways
- ▲ Spawning and transport
- ▲ Estuarine and marsh habitat
- ▲ Entrainment and mortality



Figure 3. Adaptive Management for Delta Fish Protection

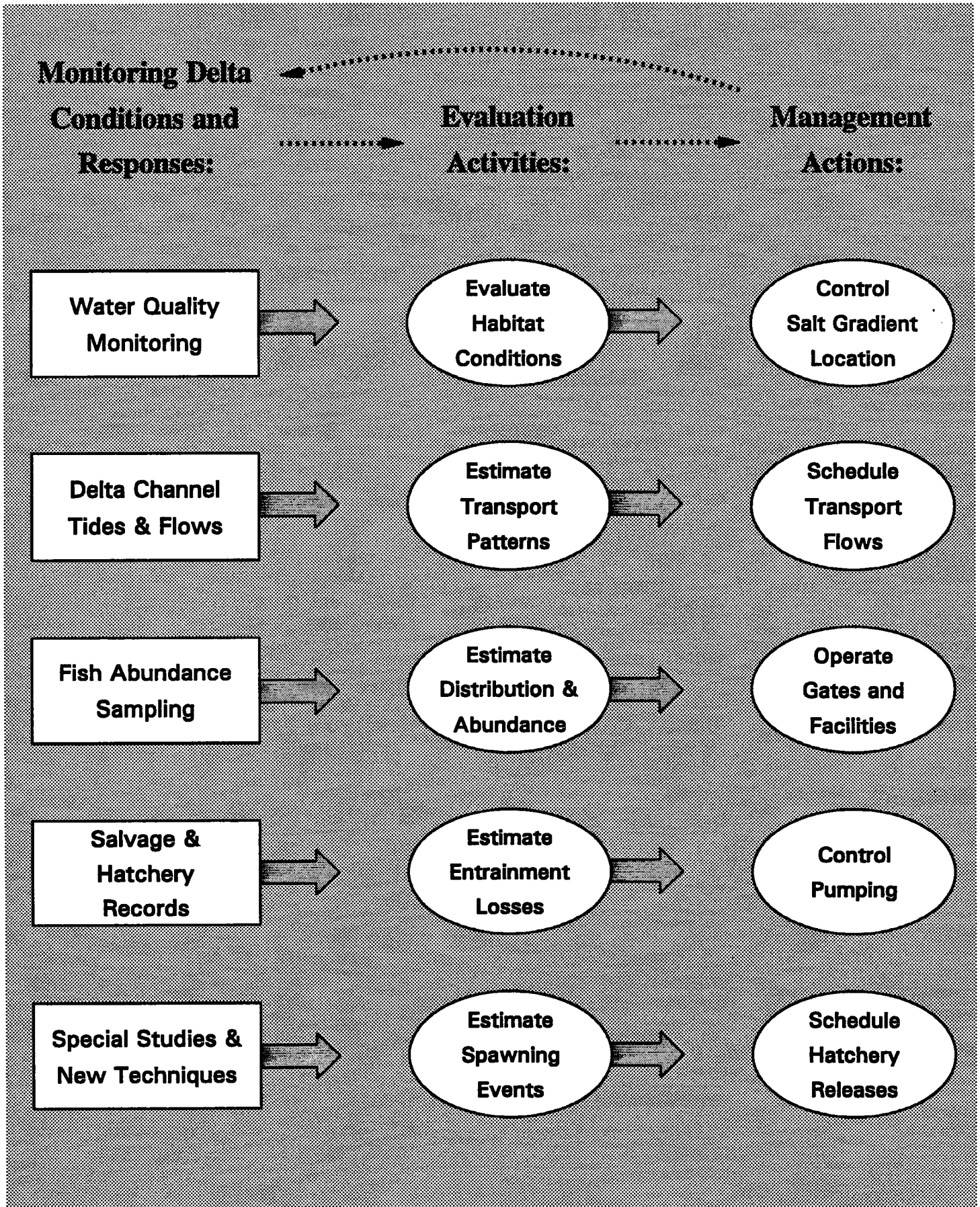
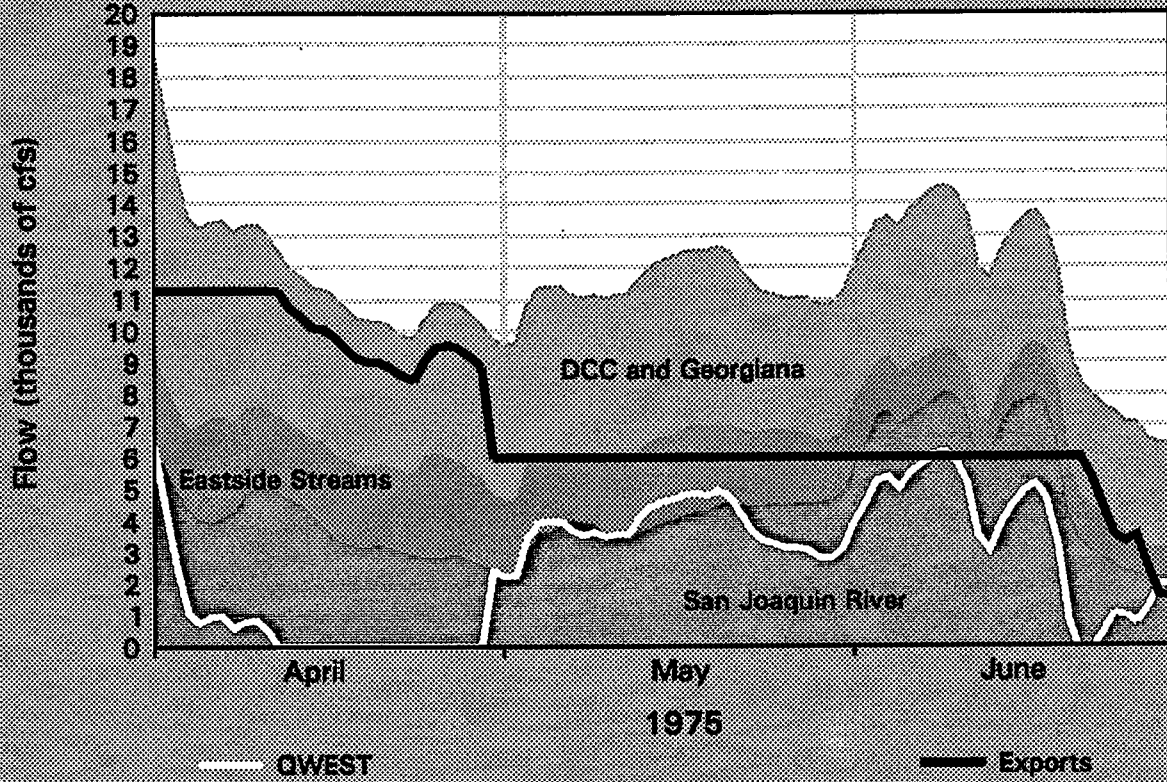




Figure 4. Central Delta Daily Flows in April-June 1975

A. DCC Closed



B. DCC Open

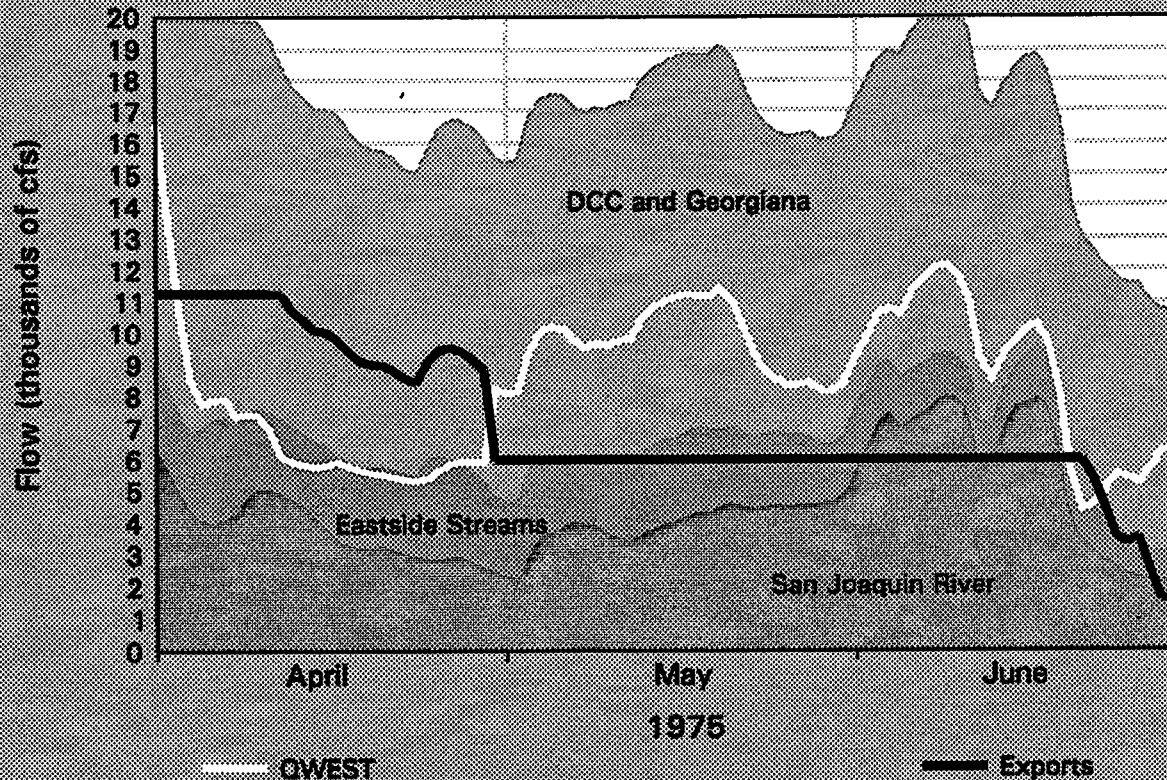
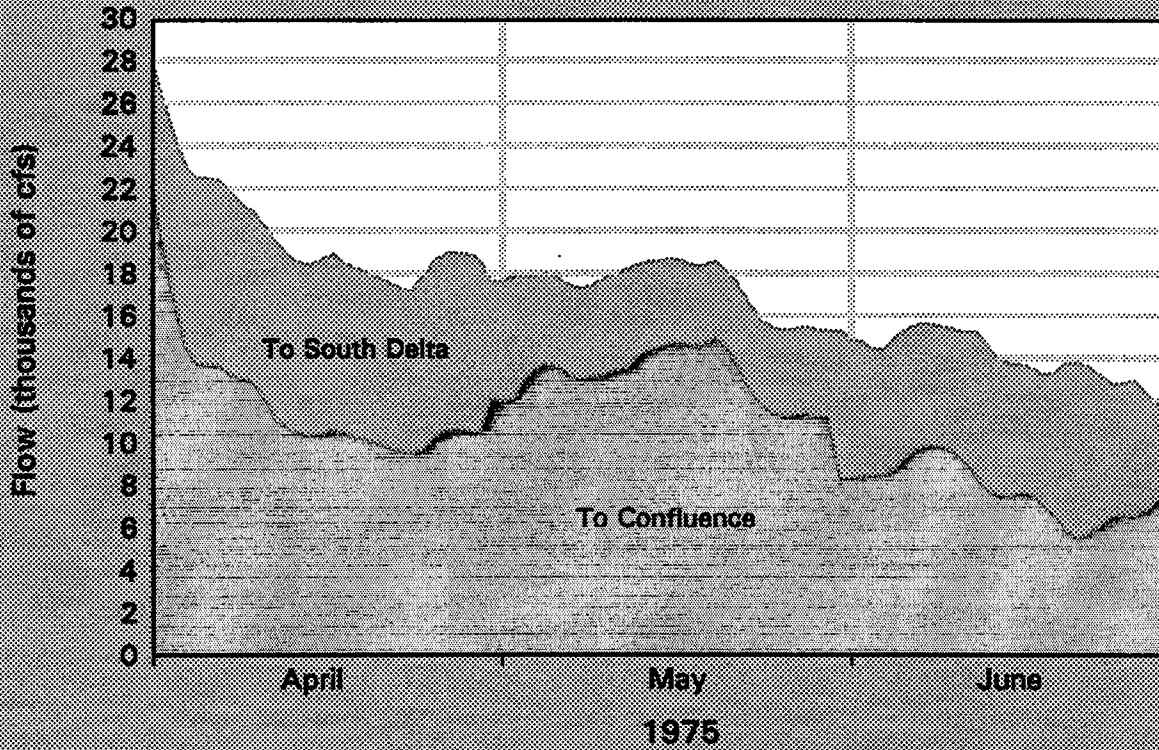




Figure 5. Daily Outflows from Lower San Joaquin River Delta Segment in April-June 1975

A. DCC Closed



B. DCC Open

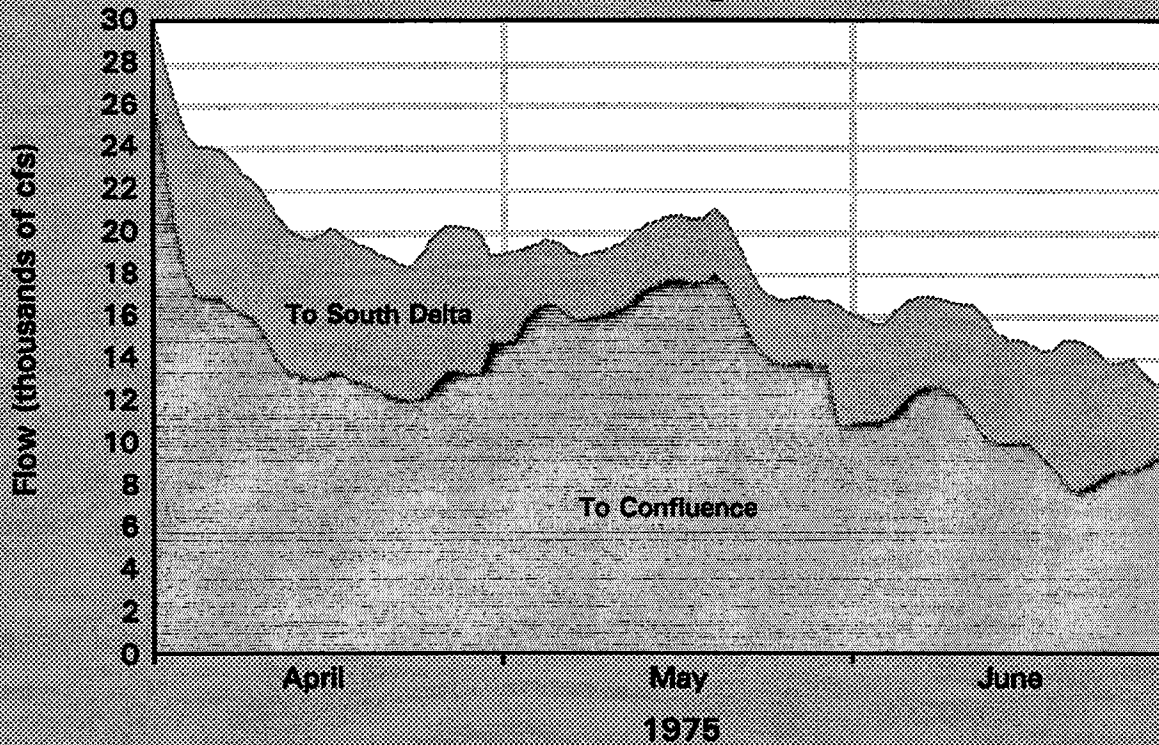
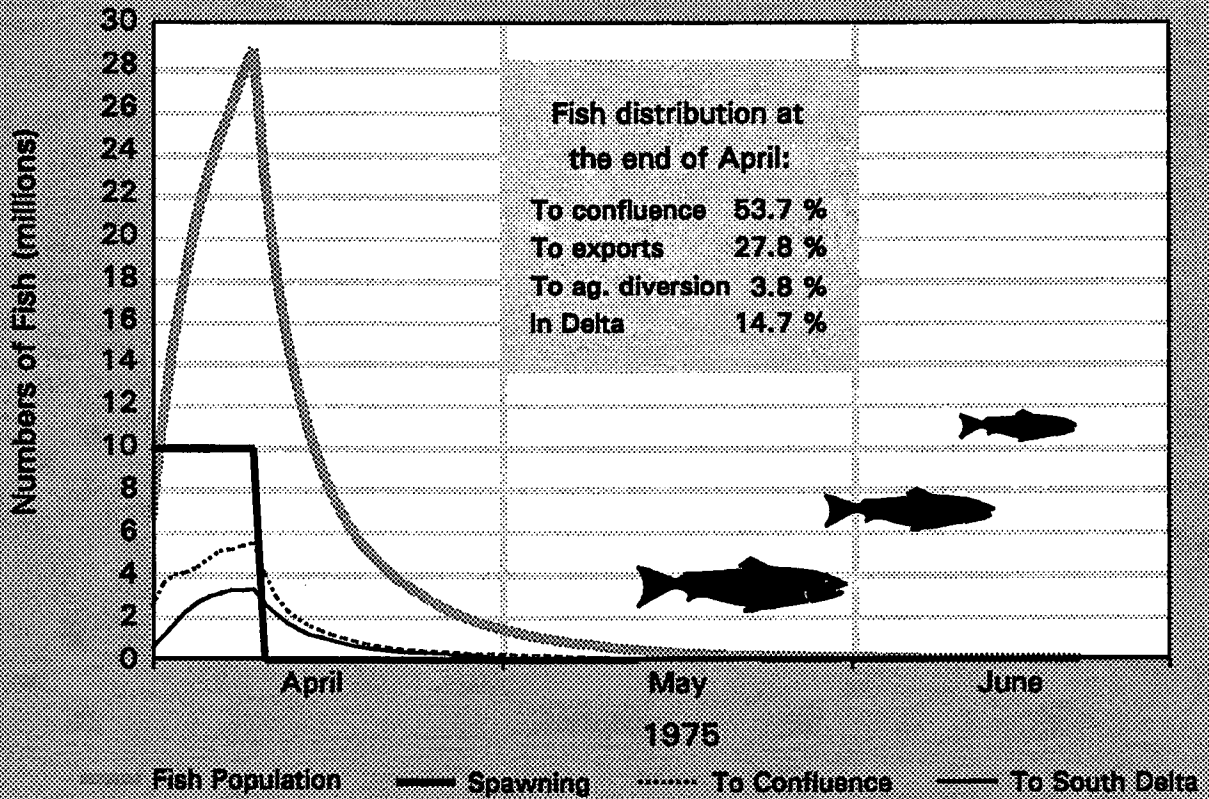




Figure 6. Simulated Fish Transport Patterns Following April 1-10 1975 Spawn in Lower San Joaquin River

A. DCC Closed



B. DCC Open

