Chapter 3A. Affected Environment and Environmental Consequences - Water Supply and Water Project Operations

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SUMMARY

This chapter describes Delta conditions related to water supply and consumptive use in the Delta. Delta island consumptive use is the water supplied by rainfall and channel depletion that is lost from Delta islands through crop ET and open-water evaporation. The chapter provides an overview of historical Delta water supply conditions, describes the water budget for the DW project islands, discusses possible effects of the DW project on water available for export, and describes potential impacts of the DW project alternatives on consumptive use.

Possible effects of DW project operations on water supply were assessed by comparison between simulated conditions associated with the DW project alternatives and those associated with the No-Project Alternative. The Delta Standards and Operations Simulation (DeltaSOS) model was used to simulate water supply conditions; DeltaSOS modeling was based on the initial water budget developed from results of simulations performed by DWR using the operations planning model DWRSIM. The simulations for the 1995 DEIR/EIS were performed using the 70-year hydrologic record for the Delta tributaries but assumed that Delta operations would comply with 1995 WQCP objectives and existing SWP export limits and would operate according to DWR's estimated current level of demand. Cumulative conditions were simulated also with the 1995 WQCP objectives but included full SWP pumping capacity. Updated DeltaSOS simulations of proposed project operations were performed for the 2000 REIR/EIS based on a more recent DWRSIM initial water budget and reflecting the incorporation of the FOC, biological opinion RPMs, and stipulated agreements into the proposed project. The updated simulations were performed using a 73-year hydrologic record and the same basic assumptions that were used in the 1995 DEIR/EIS evaluation. Results of the DeltaSOS modeling discussed in this chapter were used as a basis for analysis of DW project effects on topics in other resource chapters of this document.

The DW project would be required to operate under all applicable standards for protection of Delta water quality, fish and wildlife uses, and other resources and would be precluded from interfering with the ability of those holding prior water rights to comply with Delta standards. Implementation of the DW project alternatives is expected to increase water available for annual Delta exports; however, changes in export water supply are not considered in themselves to be beneficial or adverse impacts, and these changes are described in this chapter but are not assessed for impact significance.

Implementation of Alternative 1 is expected to result in a less-than-significant increase in Delta consumptive use. Implementation of Alternative 2 is expected to result in a beneficial decrease in Delta consumptive use. Implementation of Alternative 3 is expected to result in a significant and unavoidable increase in Delta consumptive use. Under cumulative conditions, implementation of Alternative 1, 2, or 3 would result in a beneficial decrease in consumptive use.

Under the No-Project Alternative, consumptive use would increase, but not measurably so at the scale of monthly water supply modeling.

CHANGES MADE TO THIS CHAPTER FOR THE FINAL ENVIRONMENTAL IMPACT STATEMENT

The evaluation of water supply and project operations under the proposed project (Alternative 1 or 2) was updated in the 2000 REIR/EIS with the results of new simulations performed using a revised version of DeltaSOS. This chapter consists of the 1995 DEIR/EIS discussion of water supply and project operations under Alternatives 1, 2, and 3 followed by the discussion of the updated simulations performed for the proposed project for the 2000 REIR/EIS. Additionally, minor changes were made to update information in this chapter in response to comments received on the 2000 REIR/EIS.

INTRODUCTION

This chapter discusses Delta conditions related to water supply (the amount of water available for beneficial uses) and the possible effects of DW project operations on water supply. Beneficial uses of Delta water include in-Delta use (e.g., crop irrigation) by other water right holders, maintenance of fish and wildlife habitat, and export to users receiving water from the CVP or the SWP. The "Affected Environment" section of this chapter discusses water rights; Delta objectives and requirements for protection of water quality and biological resources and the constraints placed on Delta water project operations by these objectives and requirements; and operations of the major water projects, the SWP and the CVP. The section also presents an overview of the historical Delta water budget (those hydrologic terms that represent the amounts of water entering and exiting the Delta).

The impact discussions of this chapter focus on potential DW project effects on consumptive use. This chapter does not quantify the effect of an increase of water available for beneficial uses. Direct effects of an increase of water available for annual Delta exports from the DW project alternatives are analyzed in subsequent chapters of this document. Chapter 3B, "Hydrodynamics", discusses potential DW project effects on channel flows and stages. Chapter 3C, "Water Quality", discusses potential DW project effects on outflow and resulting changes in water quality. Chapter 3F, "Fishery Resources", discusses the potential for fish habitat changes, increased entrainment, and other impacts resulting from project-related changes in outflow and export.

Following are definitions of the Delta boundary (systemwide) water budget terms as they are used in this document:

Inflow. The total rate (cfs) or volume (TAF) of streamflow entering the Delta from the Sacramento and San Joaquin Rivers, Yolo Bypass, and the eastside streams.

Rainfall. In-Delta precipitation.

Channel depletion. The water removed from Delta channels by diversions for irrigation and by open-water evaporation.

Consumptive use. Loss of water on the DW project islands and other Delta islands through crop ET and open-water evaporation and use for shallow-water management for wetlands and wildlife habitat. Rainfall and channel depletion supply the consumptive use water.

Exports. The water pumped from the Delta to south-of-Delta users by DWR at Banks Pumping Plant and by Reclamation at the CVP Tracy Pumping Plant, and the amount diverted by CCWD at its Rock Slough intake.

Outflow. The water flowing out of the Delta into San Francisco Bay.

The relationship between these water budget terms is described by the following equations:

Inflow + rainfall = consumptive use + exports + outflow

Channel depletion = consumptive use - rainfall

Additional definitions of terms are provided below in the section from the 2000 REIR/EIS entitled "Definition of Terms".

AFFECTED ENVIRONMENT

Numerous parties hold rights to divert water from the Delta and Delta tributaries. The reasonable beneficial requirements of existing riparian and senior appropriative users with regard to both water quantity and water quality must not be impaired by exercise of subsequent appropriative water rights. DWR's SWP and Reclamation's CVP and other users divert water from the Delta under appropriative rights. Additionally, approximately 1,800 siphons are used to divert water under riparian and appropriative rights from Delta channels to Delta islands for agricultural consumptive uses; most of these appropriative rights were applied for in the 1920s and are senior to those under which the SWP and CVP operate. DW project operations would be conducted under DW's existing riparian and appropriative water rights and new appropriative rights, as described in Chapter 2, "Delta Wetlands Project Alternatives".

Various water quality and flow objectives have been established to ensure that the quality of Delta water is sufficient to satisfy all designated uses; implementation of these objectives requires that limitations be placed on Delta water supply operations, particularly operations of the SWP and CVP, affecting amounts of fresh water and salinity levels in the Delta. The DW project would be prohibited from affecting the ability of those holding prior water rights, such as DWR and Reclamation, to exercise those rights, and the DW project would not be allowed to interfere with compliance with Delta water quality standards or protection of biological resources.

Sources of Information

Ongoing studies and analyses of the Bay-Delta served as important sources of information for this analysis. Studies and reports that were used include San Francisco Estuary Project (1993) and the estuarine standards proposed in December 1993 by EPA; Bay-Delta hearings and workshops sponsored by SWRCB; evaluations of effects of SWP and CVP operations on two federally listed endangered species, winter-run chinook salmon (NMFS 1993) and delta smelt (U.S. Fish and Wildlife Service [USFWS] 1995); and draft environmental documents for major water resource projects in or adjacent to the Delta, including the Los Vaqueros Project (CCWD and Reclamation 1993) and DWR's North Delta Program (DWR 1990a), South Delta Program (DWR 1990b), and Los Banos Grandes (DWR 1990c).

Major sources of data for this chapter were the "DAYFLOW" hydrologic database maintained by DWR's central district and simulation results from the monthly Delta operations planning models DWRSIM and DeltaSOS. DAYFLOW, DWRSIM, and DeltaSOS are described below under "Delta Water Supply Planning". DWRSIM and DeltaSOS are described further under "Analytical Approach and Impact Mechanisms" and in the sections below from the 2000 REIR/EIS entitled "Revised Delta Monthly Water Budget Simulated by DWRSIM" and "Revisions to DeltaSOS".

Other sources of information for this chapter are the environmental report prepared by SWRCB on the 1995 WQCP (SWRCB 1995) and the description and analysis of California water supply and water use demands provided in DWR Bulletin 160-93, California Water Plan Update (DWR 1994). Bulletin 160-93 describes the potential effects of environmental requirements, including Delta outflow and export limits to protect fish and wildlife species, on Delta water supply.

This chapter is also based on information presented in the following appendices:

- Appendix A1, "Delta Monthly Water Budgets for Operations Modeling of the Delta Wetlands Project", describes historical monthly Delta inflows and exports and the monthly Delta inflows, exports, and outflows simulated using study 409 of the water supply planning model DWRSIM.

- Appendix A2, "DeltaSOS: Delta Standards and Operations Simulation Model", describes the 1995 DEIR/EIS application of DeltaSOS, the water supply model developed by JSA for evaluating Delta water management operations for compliance with present and likely future Delta standards and for describing the potential effects of DW project operations on water supply.

- Appendix A3, "DeltaSOS Simulations of the Delta Wetlands Project Alternatives", presents results of DeltaSOS simulations of the DW project alternatives and the No-

Project Alternative performed for the 1995 DEIR/EIS and describes the use of DWRSIM simulation results as initial water budget terms for DeltaSOS modeling.

Appendix A4, "Possible Effects of Daily Delta Conditions on Delta Wetlands Project Operations and Impact Assessments", compares daily hydrologic conditions with monthly average conditions in the Delta as simulated for the 1995 DEIR/EIS analysis. Results from the daily water supply planning model, DailySOS, are used to describe likely daily operations. The appendix discusses potential differences between impact assessment based on monthly average hydrologic conditions and impact assessment based on actual daily hydrologic conditions.

The reader is directed to these appendices for a more detailed explanation of the analytical methods and assumptions used in the 1995 DEIR/EIS for estimating water supply effects of DW project operations. Readers who are unfamiliar with Delta water supply planning issues may choose to review the appendices before reading this chapter.

The information in these appendices is supplemented by the following updated information that was presented in the 2000 REIR/EIS:

Differences between the DWRSIM initial water budgets used for the 1995 DEIR/EIS and the 2000 REIR/EIS are described later in this chapter in the section from the 2000 REIR/EIS entitled "Revised Delta Monthly Water Budget Simulated by DWRSIM".

Revisions made to DeltaSOS for the 2000 REIR/EIS evaluation are described later in this chapter in the section from the 2000 REIR/EIS entitled "Revisions to DeltaSOS".

Results of the updated simulations of proposed project operations performed for the 2000 REIR/EIS are described later in this chapter in the section from the 2000 REIR/EIS entitled "Revised Analysis of Water Supply and Operations under the Proposed Project".

Updated DailySOS simulations of proposed project operations are described in Appendix F of the 2000 REIR/EIS.

Delta Water Rights

Riparian Water Rights

Riparian water rights are entitlements to water that are held by owners of land bordering natural flows of water. A landowner has the right to divert a portion of the natural flow for reasonable and beneficial use on his or her land within the same watershed. If natural flows are not sufficient to meet reasonable beneficial requirements of all riparian users on a stream, the users must share the available supply according to each owner's reasonable requirements and uses (SWRCB 1989). Natural flows do not include return flows from use of groundwater (e.g., for irrigation), water seasonally stored and later released (e.g., by the SWP or the CVP for Delta export), or water diverted from another watershed.

Appropriative Water Rights

Appropriative rights are held in the form of conditional permits or licenses from SWRCB. These authorizations contain terms and conditions to protect prior water right holders, including Delta and upstream riparian water users, and to protect the public interest in fish and wildlife resources. To a varying degree, SWRCB reserves jurisdiction to establish or revise certain permit or license terms and conditions for salinity control, protection of fish and wildlife, protection of vested water rights, and coordination of terms and conditions between the major water supply projects.

Diversion and storage of water in upstream reservoirs by California's two major water supply projects, DWR's SWP and Reclamation's CVP, and diversion and export of water from the Delta are authorized and regulated by SWRCB under appropriative water rights. The SWP and the CVP store and release water upstream of the Delta and export water from the Delta to areas generally south and west of the Delta. Reclamation diverts water from the Delta through its Tracy Pumping Plant to the Delta-Mendota Canal (DMC) and San Luis Canal, and DWR pumps for export through the California Aqueduct and South Bay

Aqueduct at its Banks Pumping Plant in Clifton Court Forebay (Figure 1-2 in Chapter 1). DWR also operates the North Bay Aqueduct, which diverts water at the Barker Slough Pumping Plant. SWRCB first issued water right permits to Reclamation for operation of the CVP in 1958 (Water Right Decision 893 [D-893]) and to DWR for operation of the SWP in 1967 (D-1275 and D-1291).

A third substantial diverter of Delta water is CCWD, which currently diverts water from Rock Slough under Reclamation's CVP water rights and will be diverting water from a second intake to be constructed on Old River (CCWD and Reclamation 1993). Several municipal users and many agricultural users also divert water from the Delta under riparian and appropriative rights.

Protection of Water Quality and Biological Resources

The Delta Protection Act of 1959 declared that the maintenance of an adequate water supply for agriculture, industry, urban use, and recreation in the Delta area and for export to areas of water deficiency was necessary for people of the state. Since issuing CVP's water right permit in 1958, SWRCB has established permit terms and conditions to protect beneficial uses of Delta water. SWRCB decisions and water quality control plans and other agency requirements and proposed standards for protection of Delta resources are described below.

D-1485 and the 1978 Water Quality Control Plan

In 1978, SWRCB adopted D-1485 and the Water Quality Control Plan for the Sacramento-San Joaquin Delta and Suisun Marsh (1978 Delta Plan). D-1485 modified the Reclamation and DWR permits to require the CVP and the SWP to meet water quality standards specified in the 1978 Delta Plan. The general goal of D-1485 standards was to protect Delta resources by maintaining them under conditions that would have occurred without CVP and SWP operations. D-1485 also required extensive monitoring and special studies of Delta aquatic resources.

D-1485 and the 1978 Delta Plan were challenged in litigation that was finally decided in the "Racanelli Decision" (*United States v. State Water Resources Control Board* 182 Cal. App. 3d 82 [1986]), which directed the state to revise its standards. Pursuant to that decision, SWRCB implemented a hearing process, known as the Bay-Delta hearings, to review and amend the 1978 Delta Plan.

Suisun Marsh Preservation Agreement

SWRCB's D-1485 directed Reclamation and DWR to develop a plan to protect Suisun Marsh resources. The Suisun Marsh Preservation and Restoration Act of 1979 authorized the Secretary of the Interior to enter into a cooperative agreement with the State of California to protect the marsh and specified the federal share of costs for water management facilities. An agreement between federal and state agencies was signed in 1987 with the goal to mitigate the effects of CVP and SWP operations and other upstream diversions on water quality in the marsh. A salinity control structure (tidal gate) was completed on Montezuma Slough in 1988. Additional facilities are being planned, and operation of the facilities will be governed by the 1995 WQCP objectives and monitoring results.

Draft D-1630 and the 1991 Water Quality Control Plan

Following a lengthy hearing process, SWRCB issued revised water quality objectives in the 1991 Delta Water Quality Control Plan for Salinity, Temperature and Dissolved Oxygen (1991 Delta Plan). In 1992, SWRCB proposed new interim water right terms and conditions in draft D-1630. Although subsequently withdrawn, draft D-1630 presented several new Delta water management concepts that have been partially adopted in other actions taken by SWRCB, DWR, Reclamation, fishery protection agencies, and other regulatory agencies. Because draft D-1630 was not adopted, the revised water quality objectives of the 1991 Delta Plan have not been implemented.

Endangered Fish Species

The federal Endangered Species Act requires assessment of the effect of water project operations on fish species listed under the Endangered Species Act as threatened or endangered. NMFS issued its biological opinion on the effects of SWP and CVP operations on winter-run chinook salmon in February 1993, and

USFWS issued a biological opinion on effects of SWP and CVP operations on delta smelt in March 1995. The biological opinions establish requirements to be met by the SWP and the CVP to protect these listed species. These include requirements for Delta inflow, Delta outflow, DCC gate closure, central Delta outflows (QWEST flows, described in Appendix A2), and reduced export pumping because of specified incidental "take" limits. (Take includes harassment of and harm to a species, entrainment, directly and indirectly caused mortality, and actions that adversely modify habitat.) These fish protection requirements impose important constraints on Delta water supply operations.

December 1994 Bay-Delta Framework Agreement and the 1995 WQCP

A Bay-Delta Framework Agreement was signed in June 1994 between the Federal Ecosystem Directorate and the Governor's Water Policy Council of the State of California to establish a comprehensive program for coordination and cooperation with respect to environmental protection and water supply dependability in the Bay-Delta estuary. The three major areas of agreement were:

formulation of water quality objectives that incorporate EPA and SWRCB regulatory responsibilities,

coordination of SWP and CVP operations that rapidly respond to environmental conditions in the Delta with an adaptive management approach, and

evaluation and implementation of necessary facilities and operational controls to provide long-term Delta ecosystem management that integrates water supply and environmental protection objectives.

SWRCB's 1995 WQCP (adopted May 1995) and environmental appendix incorporated several elements of the EPA, NMFS, and USFWS regulatory objectives for salinity and endangered species protection. The 1995 WQCP objectives were used as the applicable Delta standards for simulating the DW project alternatives and the No-Project Alternative. Several of the specific objectives are discussed in Appendix A2, "DeltaSOS: Delta Standards and Operations Simulation Model", and Appendix A3, "DeltaSOS Simulations of the Delta Wetlands Project Alternatives".

Delta Water Project Operations

Coordinated Operations Agreement

Reclamation, DWR, and others have worked extensively to deal with the complexities of protecting Delta beneficial uses. For example, under interim agreements, DWR cooperatively exports ("wheels") CVP water from the Delta when excess SWP pumping capacity is available.

One product of direct negotiation between Reclamation and DWR is the Agreement between the United States of America and the State of California for Coordinated Operation of the Central Valley Project and the State Water Project. The Coordinated Operations Agreement (COA) establishes the basis for cooperative CVP and SWP operations to satisfy SWRCB objectives and provides for periodic review of CVP and SWP operations to satisfy the COA. The 1994 Bay-Delta Framework Agreement further emphasizes the cooperative operations of CVP and SWP facilities.

CALFED Ops Group

The 1994 Bay-Delta Framework Agreement established the California-Federal Operations Group (referred to as the CALFED Ops Group) to coordinate SWP and CVP operations and recommend changes in combined Delta operations that might provide additional fish protection and allow Delta exports with reduced fishery impacts. The CALFED Ops Group was specifically charged with recommending operational changes based on real-time fish monitoring results to minimize incidental take and satisfy other requirements of Endangered Species Act biological opinions. The CALFED Ops Group is also charged with the exchange of information and the discussion of strategies to implement fish protection measures, satisfy 1995 WQCP water quality objectives, and cooperate with the Interagency Ecological Program (IEP) to determine factors affecting Delta habitat and the health of fisheries and to identify appropriate corrective measures for the CVP and the SWP. The CALFED Ops Group meets monthly.

Water Quality and Fishery Monitoring

DWR and Reclamation operate an extensive network of stations for monitoring Delta salinity conditions. Daily data on electrical conductivity (EC) are used to determine the response of Delta salinity conditions to changes in water supply operations and to demonstrate compliance with applicable water quality standards (see Appendix B2, "Salt Transport Modeling Methods and Results for the Delta Wetlands Project"). EC is a general measure of dissolved salts in water and is the most commonly measured water quality variable in the Delta.

Reclamation and DWR operations staffs routinely coordinate monthly planning and daily Delta operations to meet Delta objectives for municipal and agricultural uses and the protection of fish and wildlife and satisfy export pumping demands. The CVP and the SWP are obligated to follow the directives of the "reasonable and prudent" alternatives that are recommended in the biological opinions for winter-run chinook salmon and delta smelt to minimize adverse effects of project operations on these species while still achieving the water supply purposes of the projects. Fish salvage records and IEP fish monitoring data are used to guide operations.

Provisions of the CVP Improvement Act of 1992

The Central Valley Project Improvement Act (CVPIA) dedicates 800 thousand acre-feet per year (TAF/yr) of water delivery for fish and wildlife recovery and mandates the acquisition of additional water for fish and wildlife purposes. Reclamation implemented interim changes in its Delta operations during 1993 and 1994, as recommended by USFWS, to dedicate the 800 TAF/yr. Long-term changes in CVP operations to satisfy the CVPIA were being evaluated by Reclamation and USFWS and had not yet been determined at the time that the assumptions for the 1995 DEIR/EIS were developed.

Additional Delta Operating Rules

Some changes in the standards and operating criteria that govern Delta water project operations have been made since the 1995 DEIR/EIS was published; most of these are related to AFRP recommendations for the use of CVP water under the CVPIA. These modifications are described below in the section from the 2000 REIR/EIS entitled "Revised Delta Standards".

Delta Water Supply Planning

A large proportion of California's water supply moves through the Delta to be exported to urban and agricultural water users in the San Joaquin Valley, San Francisco Bay Area, and Southern California. Therefore, statewide water supply planning must be based on an accurate description of Delta standards and operational constraints.

Water supply conditions in California and the Delta are commonly evaluated using DWR's operations planning model, DWRSIM, or Reclamation's operations planning model, PROSIM. DWR and Reclamation use these models to simulate possible effects of increased demands, new facilities, or new standards on SWP or CVP project operations. These models simulate monthly patterns of water storage, diversion, and export based on historical hydrologic data. Figure 3A-1 shows the upstream reservoirs that are simulated in the DWRSIM and PROSIM operations planning models.

DAYFLOW is a database of daily hydrologic conditions, including measured Delta inflows and exports, estimated consumptive use, and net Delta outflow (DWR 1986). The daily data have been compiled for each water year (October 1 to September 30) beginning with 1930 and are updated annually. U.S. Geological Survey (USGS) and DWR streamflow gages are the sources of inflow measurements for the Sacramento, San Joaquin, Mokelumne, Cosumnes, and Calaveras Rivers. Yolo Bypass and several miscellaneous inflows between Sacramento and Stockton are also estimated from available streamflow gages. CVP and SWP operations records are the source of export pumping data. DAYFLOW provides an accounting of historical Delta boundary (systemwide) hydrology that is used for evaluating flow-related conditions in the Delta.

Results from DWR studies to evaluate flow requirements of the 1995 WQCP objectives using DWRSIM have been used along with results from the DeltaSOS model developed by JSA for this analysis to describe Delta conditions, standards, and water supply constraints as a basis for evaluating possible effects of DW operations.

Historical Delta Water Supply and Water Quality

Because of variable hydrologic conditions, seasonal demands for water diversions, and agricultural drainage flows, water supply and water quality conditions in the Delta exhibit considerable fluctuations. Periods of high inflows that result in low salinity alternate with periods of low inflow that allow greater salinity intrusion and may allow larger effects from agricultural drainage. A second source of variation in Delta water supply and water quality conditions is CVP and SWP project operations that may store water upstream for later release and export to supply south-of-Delta demands. Existing Delta water supply conditions as characterized for the 1995 DEIR/EIS are described in detail in Appendix A1, "Delta Monthly Water Budgets for Operations Modeling of the Delta Wetlands Project", and existing Delta salinity conditions as characterized for the 1995 DEIR/EIS are described in detail in Appendix B2, "Salt Transport Modeling Methods and Results for the Delta Wetlands Project".

Figure 3A-2 shows the historical annual pattern of Delta inflow and exports and estimated annual channel depletion resulting from Delta ET losses for the 1922-1991 period, based on DWR's DAYFLOW database (1930-1991) and DWR's estimates of unimpaired flow (natural tributary inflow without storage or diversions) (1922-1929). Delta inflow that is not lost to Delta ET or pumped as Delta export is calculated as Delta outflow.

Table 3A-1 gives annual values for the historical Delta water budget terms for water years 1922-1991 based on the DAYFLOW database (1930-1991) and unimpaired flow estimates (1922-1929). Historical Delta inflow averaged approximately 23.0 million acre-feet per year (MAF/yr) for 1922-1991. Consumptive use was estimated at 1.59 MAF/yr and rainfall averaged 0.82 MAF/yr, so net Delta channel depletion averaged about 0.77 MAF/yr. Historical exports increased from less than 0.1 MAF in 1950 (CCWD diversions) to about 6 MAF in 1989 and 1990 (see details in Appendix A1).

Figure 3A-3 shows DAYFLOW estimates of monthly historical Delta outflow for water years 1968-1991, corresponding to the period when most CVP and SWP facilities were constructed and operating. Delta outflow has fluctuated greatly during this historical period, with low-flow periods of less than 5,000 cfs common in fall, and high-flow periods of greater than 50,000 cfs in winter of 13 of the 24 years.

Figure 3A-4 shows historical monthly Delta EC patterns for 1968-1991 (from EPA's STORET database) measured at Pittsburg, just upstream of Chipps Island (see Appendix B2). By comparison of Figures 3A-3 and 3A-4, it can be seen that periods of low Delta outflow correspond with major salinity intrusion episodes at Pittsburg, and periods of high Delta outflow correspond with salinity being flushed from the Delta.

IMPACT ASSESSMENT METHODOLOGY

Analytical Approach and Impact Mechanisms

DWRSIM and DeltaSOS

Possible water supply effects of alternative operations of the DW project were evaluated with the DeltaSOS model developed by JSA. For assessment purposes, operations under the DW project alternatives were simulated using DeltaSOS, and the No-Project Alternative was simulated with DeltaSOS to provide a baseline condition, including the same Delta operating conditions, with which DW operations under each alternative could be compared. The EIR/EIS lead agencies (SWRCB and the Corps) determined that the simulations for this assessment should be performed assuming implementation of the 1995 WQCP objectives as interpreted by DWR for modeling the Delta water supply effects of the WQCP using DWRSIM. The lead agencies consider the DWRSIM results to be the best available representation of likely future Delta conditions under the 1995 WQCP objectives.

As described in Chapter 3, "Affected Environment and Environmental Consequences - Overview of Impact Analysis Approach", the simulations were therefore performed based on the assumption that operations of the DW project and the No-Project Alternative would be within the 1995 WQCP objectives for Delta outflow and Delta export limits and would be consistent with current Corps limits on SWP pumping (6,680 cfs). For assessment of cumulative impacts, DeltaSOS simulations were also

performed for operations that would be within the 1995 WQCP objectives, but allowing for SWP export pumping at the full physical capacity of 10,300 cfs for Banks Pumping Plant.

Because the hydrologic record for the Delta tributaries is the best available description of likely future hydrologic conditions, hydrologic data from this record serve as the basis of simulations of future Delta operations. The results of the simulations are therefore shown as corresponding to the water years of the hydrologic record (1922-1991 for the 1995 DEIR/EIS analysis and 1922-1994 for the 2000 REIR/EIS analysis)and represent estimates of operations under hydrologic conditions replicating those of this period of record.

DeltaSOS simulations require an initial Delta water budget, user-specified input parameters (switches) that govern simulated Delta operations, and specified matrices of Delta standards. As described below under "Simulated 1995 WQCP Objectives", simulation results from the DWRSIM monthly water supply planning model provided the initial water budget terms for the DeltaSOS simulations. DWR performed these simulations, referred to as DWRSIM study 1995-C6B-SWRCB-409, or Study 409, in January 1995 to represent the 1995 WQCP objectives. The specified model inputs for the DW project simulations based on DWRSIM Study 409 are described in Appendix A3, "DeltaSOS Simulations of the Delta Wetlands Project Alternatives". Selected results are presented in tables and graphs in Appendix A3 to compare each simulated DW alternative with the No-Project Alternative; results of the DWRSIM and DeltaSOS model studies are summarized in this chapter.

As described below in sections from the 2000 REIR/EIS, since the 1995 DEIR/EIS was published some assumptions used for establishing baseline conditions in the Delta have changed, and DWR has conducted new DWRSIM modeling studies to establish new simulated baseline conditions for the Delta under the 1995 WQCP. The results of one of these studies, Study 771, were used as the basis of the updated DeltaSOS simulations of proposed project operations performed for the evaluation presented in the 2000 REIR/EIS. (See the section from the 2000 REIR/EIS below entitled "Overview of the Evaluation Methods Used in the 2000 Revised Draft EIR/EIS: DeltaSOS, DWRSIM Water Budget, and Modeling Assumptions".)

Simulated 1995 WQCP Objectives

The DWRSIM simulation used for estimating the initial Delta water budget used in the DeltaSOS simulations (Study 409) represented the 1995 WQCP objectives based on assumptions summarized below. The DWRSIM modeling assumptions necessary to represent the 1995 WQCP objectives in a monthly water supply planning model have been described in detail in SWRCB (1995). More complete descriptions of these DWRSIM and DeltaSOS modeling assumptions are presented in Appendices A1, A2, and A3. Except where indicated, DWRSIM Study 771, which provided the initial water budget used in the DeltaSOS simulations for the 2000 REIR/EIS, was based on the same assumptions.

Following are major DWRSIM assumptions for the 1995 WQCP simulations:

Upstream hydrology, depletions, and diversions were based on 1995 level of development, as presented in California Water Plan Update (DWR 1994). See Appendix A1 for more details.

Water-year classification was based on the "40-30-30 Sacramento Valley Four-River Index" and the "60-20-20 San Joaquin Valley Four-River Index". The outflow requirements during February-June depend on the previous month's "Eight-River Index" runoff volume. These classification schemes are slightly different from those used for the standards specified in D-1485, which established the Delta operations criteria in effect until approval of the 1995 WQCP.

Delta outflow requirements were the combination of fixed monthly requirements, estuarine habitat requirements (expressed in terms of "X2", the position of the 2-parts-per-thousand [2-ppt] salinity gradient), and requirements for additional outflow to protect the chloride objective of 250 milligrams per liter (mg/l) for Delta exports. Because the X2 requirements in the 1995 WQCP depend on the previous month's runoff, the required outflow must be calculated for each month. Minimum outflow objectives are maintained during low runoff periods.

The CVP Delta export demand in DWRSIM Study 409 was assumed to be 3.15 MAF/yr, including 145 TAF/yr for CCWD diversions. However, these CVP demands were not always satisfied in drier years in DWRSIM simulations. The SWP Delta export demands were assumed to vary with Kern River runoff and Los Angeles rainfall conditions. The range of possible SWP export demands was 2.6-3.6 MAF/yr, with an average of 2.85 MAF/yr. The maximum combined Delta export demand of 6.7 MAF/yr was specified in about 45% of the simulated years. The simulated average annual Delta export, based on these variable demands, was 5.7 MAF/yr, with 2.8 MAF/yr simulated as SWP and delivery and 2.9 MAF/yr as CVP delivery. See Appendix A3 for more details on assumptions about export demands in Study 409. (The revised assumptions for CVP export demand used in Study 771 are described below in the section from the 2000 REIR/EIS entitled "Overview of the Evaluation Methods used in the 2000 Revised Draft EIR/EIS: DeltaSOS, DWRSIM Water Budget, and Modeling Assumptions".)

San Joaquin River inflows, estimated with another DWR model called STANSIM, met the 1995 WQCP Vernalis water quality objectives (with a maximum of 70 TAF/yr), and the Vernalis pulse-flow objectives were satisfied with additional water from upstream tributaries (Tuolumne and Merced Rivers) when necessary. This additional San Joaquin River inflow averaged 72 TAF/yr but was required in only a few years. See Appendix A3 for more details. (This assumption was slightly modified in Study 771 because of Vernalis Adaptive Management Plan [VAMP] requirements; see the section from the 2000 REIR/EIS below entitled "Overview of the Evaluation Methods used in the 2000 Revised Draft EIR/EIS: DeltaSOS, DWRSIM Water Budget, and Modeling Assumptions".)

Combined SWP and CVP Delta exports were limited as specified in the 1995 WQCP to a percentage of the simulated Delta river inflow (which does not include rainfall). These percentages are 35% in February-June and 65% for the remainder of the year. The February percentage is 45% if the January Eight-River Index is less than 1.0 MAF. Export pumping during the pulse-flow period was limited to an amount equivalent to the pulse flow during half of April and half of May. See Appendix A2 for details.

Simulated Delta Water Supply Conditions

Possible effects of the DW project on Delta water supply conditions were assessed through comparison of simulated conditions under the DW project alternatives with those under the No-Project Alternative. Delta water supply under existing conditions, which include agricultural land uses on the DW project islands, is similar to water supply under the No-Project Alternative; the estimated changes in consumptive water use between the existing agricultural land uses and the intensified agricultural uses under the No-Project Alternative (estimated to be as much as 30 TAF/yr, as shown in Table 2-2 in Chapter 2) are not measurable at the scale of monthly water supply modeling. Therefore, rather than presenting two lists of the same values for existing Delta water supply conditions and the No-Project Alternative conditions, this section describes the simulation results for the No-Project Alternative.

Appendix A3 includes details of annual and monthly values for Delta conditions simulated by DeltaSOS for the No-Project Alternative for the 1995 DEIR/EIS. Annual values summarize annual variations but do not show monthly fluctuations. Monthly percentile tables in Appendix A3 provide an important seasonal summary of simulated Delta conditions for the No-Project Alternative.

Table 3A-2 summarizes average annual DW project operations under the No-Project Alternative as simulated for the 1995 DEIR/EIS, showing DeltaSOS-adjusted exports, required outflow, and effects on export and outflow and major channel flows. Tables 3A-3 and 3A-4 show DeltaSOS average simulation output for Delta exports and outflow under the No-Project Alternative. Selected simulation results from the 1995 DEIR/EIS are summarized in graphs in this chapter and are described below.

Monthly Simulation of Maximum SWP and CVP Exports. The only adjustment made in DeltaSOS to the initial DWRSIM results is to increase the combined CVP and SWP exports to the maximum

possible within the constraints specified in the 1995 WQCP.

DeltaSOS simulations indicate that a considerable amount of Delta export would be possible in addition to that simulated by DWRSIM for its variable assumption of south-of-Delta demands (see Appendix A1). The additional simulated SWP and CVP exports average 442 TAF/yr. These additional exports are simulated in DeltaSOS to provide an appropriate basis for estimating potential water supply effects of the DW project. Only water that could not have been exported directly by the SWP or the CVP was simulated to be available for DW diversions. Only export pumping capacity that could not have been used by the CVP and the SWP because of the 1995 WQCP export limits was simulated to be available for export pumping (wheeling) of DW discharges.

The DeltaSOS adjustment of the initial DWRSIM Delta exports is fully described in Appendix A3. This assumption of maximum CVP and SWP exports within the export limits specified in the 1995 WQCP may result in more Delta export being simulated than could be fully used in some years. It seems likely that in the event that more water were needed for south-of-Delta beneficial uses than simulated with DWRSIM, SWP or CVP export pumping of available water in the Delta would occur prior to discharge from DW storage. Additional discussion of these SWP and CVP export adjustments can be found in Appendix A3. For information on the way that south-of-Delta demands were addressed in the 2000 REIR/EIS, see the section from the 2000 REIR/EIS below entitled "South-of-Delta Demands and Deficits".

Monthly Simulation Values for Outflow, Export, and Water Available for DW Diversions. Figure 3A-5 shows monthly Delta outflow and required Delta outflow under the No-Project Alternative for 1968-1991, as simulated by DeltaSOS for the 1995 DEIR/EIS. Simulated outflow values for 1922-1967 are shown in Figures A3-1A and A3-1B in Appendix A3. In many months of most years, a considerable portion of Delta outflow is represented by required Delta outflow, which includes DWRSIM estimates of X2 and requirements for "carriage water" (additional Delta outflow required to maintain acceptable chloride concentrations in export water as Delta exports are increased) (see details in Appendix A2).

Figure 3A-6 shows the monthly Delta export pumping for water years 1968-1991 for the No-Project Alternative, as simulated by DeltaSOS for the 1995 DEIR/EIS. The initial export values from DWRSIM were adjusted by DeltaSOS to estimate additional exports that could be made within specified monthly export limits and Delta outflow objectives (without considering south-of-Delta demands and storage capacity). In these simulations, DeltaSOS often simulated additional export in spring because DWRSIM-simulated exports were less than the maximum possible if demands are satisfied and San Luis Reservoir storage is full. Table 3A-4 presents monthly percentiles of the DeltaSOS simulations showing the monthly distribution of Delta exports for the 70-year simulation period for the No-Project Alternative. Monthly percentiles indicate the fraction of years that a cell value (export rate) would be less than that value. For example, the average October export was simulated to be below 11,280 cfs in 70% of years, and the minimum export rate was simulated to be 4,288 cfs.

Figure 3A-7 shows monthly values of water available for DW project diversions for the 1968-1991 period under the 1995 WQCP objectives, as simulated by DeltaSOS for the 1995 DEIR/EIS. The maximum monthly average diversion rate needed to fill the 238-TAF capacity of the two DW reservoir islands is 4,000 cfs. Because the monthly average flow of available water is often greater than 4,000 cfs, the DW project would divert only a small portion of the available water in most months.

Annual Simulation Values for Outflow and Export. Figure 3A-8 shows annual values for Delta outflow and required Delta outflow (in MAF) for the No-Project Alternative for water years 1922-1991, as simulated by DeltaSOS for the 1995 DEIR/EIS. Some years were simulated to have very little surplus Delta outflow, whereas other years were simulated to have several MAF of surplus outflow.

Figure 3A-9 shows the annual values for DWRSIM-simulated Delta exports (from DWRSIM results) and the DeltaSOS-adjusted Delta exports (that satisfy all standards and criteria but export all available water) for the No-Project Alternative for water years 1922-1991. The average annual adjusted CVP and SWP exports totaled 6.15 MAF. DeltaSOS simulated some years having no additional export pumping, whereas other years were simulated to have more than 1,000 TAF (1 MAF) of additional export beyond the amount simulated by DWRSIM. DeltaSOS simulated

total possible export for most years to be less than 7 MAF; 1958, 1975, 1982, and 1983 were the only years with simulated adjusted exports of more than 7.5 MAF/yr. Each of the DW alternatives was simulated and compared with these DeltaSOS-adjusted Delta conditions simulated for the No-Project Alternative. The simulated values are shown in Figures 3A-10, 3A-11, and 3A-12, and comparisons are discussed below.

Measures of Potential Water Supply Effects and Criteria for Determining Impact Significance

Several issues related to potential water supply effects were considered as impact assessment variables. Some of these could be simulated with the water supply planning models, whereas others could only be qualitatively assessed.

Full evaluations of potential environmental impacts on hydrodynamics, water quality, and fisheries were performed using the 1995 DEIR/EIS simulated monthly changes in Delta conditions associated with the DW project. The results of these impact assessments are presented in Chapters 3B, 3C, and 3F, respectively.

For purposes of this document, the DW project is analyzed without consideration of subsequent environmental effects caused by the delivery of purchased DW water or by the storage of water under a third party's water rights because the identity of the end user of the DW water remains speculative. The DW project could be used for interim storage of water being transferred through the Delta from sellers upstream to buyers served by Delta exports or as interim storage for water owned by parties other than DW for use to meet scheduled outflow requirements (water transfers and water banking).

For this analysis, it was assumed that the DW project would yield a water supply based only on water stored under its own appropriative permits and subsequently conveyed to Delta channels. A separate entity purchasing DW water could divert that water from Delta channels and export it, probably through CVP or SWP facilities, for direct use or to increase groundwater or surface water storage, or could use water for estuarine or Delta beneficial uses (increased outflow). The purchasing entity would affect SWP or CVP operations to the same extent as would any entity that wheels water under California Water Code provisions and contracts authorized by those provisions. A number of opportunities exist to operate the DW project conjunctively with the CVP and SWP, but these arrangements remain speculative and are beyond the scope of this analysis. Delivery of purchased DW water or temporary storage of water being transferred through the Delta may be subject to further environmental review.

The actual purchaser of DW project water and actual contractual arrangements with major water supply project operators have not been identified. DW project operations could be adjusted as necessary to be integrated with any contractor-purchaser's operating criteria. The contractor-purchaser and associated operations might be changed from time to time, reflecting future water demands, Delta conditions, and Delta operating requirements. However, DW project effects on potential purchasers of DW project water were not used as criteria for assessing impact significance.

Delta Water Rights

Project permits granted by SWRCB would require that project diversions not interfere with the diversion and use of water by other users with riparian or prior (senior) appropriative rights. Many riparian and appropriative water right holders are located upstream of the Delta in the Sacramento River and San Joaquin River Basins. A large number of riparian water diversions are located in the Delta. DWR, Reclamation, CCWD, and several smaller diverters hold senior appropriative water rights.

DWR Division of Operations and Maintenance, in cooperation with Reclamation's CVOCO, maintains daily water budget estimates for the Delta and designates the Delta condition each day as being "in balance" or "in excess" relative to all SWRCB objectives and water right terms and conditions. When the Delta condition is designated by DWR (with possible review by the CALFED Ops Group) to be in balance, all Delta inflow is determined to be required to meet Delta objectives and satisfy diversions by CCWD, the CVP, the SWP, other senior water right holders, and Delta riparian water users. Therefore, when the Delta is in balance, additional water would not be available for diversion by the DW project.

When DWR determines the Delta condition to be in excess, the DW project could be allowed to divert available excess water for storage on the reservoir islands. The daily quantity of available excess water would be estimated by DWR according to DWR's normal accounting procedures. To provide extra protection for compliance with 1995 WQCP Delta objectives and for existing water right holders, SWRCB can establish requirements for amounts of water within the designated excess water (i.e., buffers) that would not be available for DW diversions. Nevertheless, excess Delta inflow would be available for diversion by the DW project during certain periods, especially major runoff events.

DW project operations would not be permitted to interfere with senior appropriative water right holders or Delta riparian users. Since the 1995 DEIR/EIS was published, DW has entered into stipulated agreements with Reclamation, DWR, Amador County, the City of Stockton, and North Delta Water Agency. These agreements affirm the seniority of these party's water rights; they also outline general conditions under which the DW project would operate to preclude interference with those water rights or with a party's ability to meet particular water quality criteria. Additional information about the terms of these agreements is available in the section entitled "Stipulated Agreements" in Chapter 2, "Delta Wetlands Project Alternatives".

Although any interference with other riparian or prior appropriative water rights by the DW project alternatives would be considered a significant impact, SWRCB terms and conditions for DW project operations would not allow such interference with other riparian or prior water rights. Because DeltaSOS simulations of the DW alternatives were constrained to preclude interference with any riparian or prior appropriative rights, it is presumed that the DW project would have no significant impacts related to interference with prior water rights. No criteria for determining impact significance were selected and potential effects of the DW project on prior water rights are not discussed further in the impact assessment.

Compliance with Delta Objectives and Requirements

Water Quality and Biological Resources. Existing and any future Delta water quality objectives or requirements for protection of fish and wildlife and other purposes, as adopted by SWRCB or other regulatory agencies, will be applicable to the DW project. DW project operations as conditioned and limited by permits would not be allowed to violate or interfere with compliance by others with applicable Delta water quality objectives or fish and wildlife requirements.

DeltaSOS simulations of the No-Project Alternative and the DW project alternatives accounted for constraints by all 1995 WQCP objectives and operations criteria that can be interpreted on a monthly basis. The DW project therefore would not adversely affect compliance of Delta water management operations with Delta objectives.

Although any violation of applicable Delta objectives caused by the DW project would be considered a significant impact, SWRCB terms and conditions for DW project operations would not allow violation of Delta objectives. Therefore, it is presumed that none of the DW project alternatives would result in significant impacts related to violating Delta objectives. Therefore, no criteria for determining impact significance were selected and compliance of the DW project with applicable Delta objectives is assumed and is not discussed further in the impact assessment.

Delta Outflow. A general effect of the DW project diversions would be to reduce Delta outflow during periods of surplus outflow (i.e., outflows greater than those required to satisfy applicable outflow objectives) for the period of several weeks when project diversions would occur. It is also possible that a purchaser of stored DW water could use the water to increase Delta outflow for fisheries or estuarine habitat management purposes. DW project diversions are potentially substantial (maximum monthly average of 4,000 cfs), and simulated reductions in Delta outflow during periods of DW diversions can be identified in the monthly planning model results.

The 1995 WQCP objectives specify monthly minimum Delta outflows, as flows necessary for fish transport, as flows necessary to prevent salinity intrusion at agricultural control locations during the irrigation season and at water supply intakes throughout the year, or as flows necessary to maintain the X2 salinity gradient location.

As discussed above, SWRCB terms and conditions for DW project operations would not allow violation of Delta outflow requirements. DW project effects on

Delta outflow were not used as criteria for assessing water supply impact significance because it was presumed that the specified 1995 WQCP objectives adequately protect beneficial uses related to outflow. Potential effects of augmenting Delta outflow with purchased DW water during periods of reduced flows are expected to be generally beneficial. Because outflow can affect water quality and estuarine fish habitat, these potential impacts are evaluated in Chapter 3C, "Water Quality", and Chapter 3F, "Fishery Resources".

Delta Water Project Operations

Upstream Reservoir Storage. DW operations may influence upstream reservoir storage by the CVP or the SWP if these projects purchase DW water as replacement for upstream reservoir releases. The general effect of using DW storage water as replacement for upstream reservoir releases would be to maintain slightly higher reservoir levels throughout the summer and fall when reservoirs typically draw down. Minimum streamflows below these reservoirs are regulated by instream flow requirements, and streamflows would not be reduced below these minimums by CVP or SWP use of DW water as replacement for upstream reservoir releases.

It is reasonable to assume that DW project operations could be integrated in the future with operation of the SWP and CVP or other facilities; however, no specific proposals have been made for which the environmental effects could reasonably be assessed, and discussion of such arrangements would be speculative. For purposes of this analysis, the project is analyzed as a stand-alone water storage facility, operated independently of the SWP and the CVP and without regard to the specific entities to which the water could be sold. Therefore, DW project effects on upstream reservoir storage were not used as a criterion for assessing impact significance.

Delta Exports. As described in Chapter 2, "Delta Wetlands Project Alternatives", the major purpose of the DW project is to divert surplus Delta inflows, transferred water, or banked water for later sale and/or release for Delta export or to meet water quality or flow requirements. Although one of the possible uses of DW project water could be augmenting Delta outflow, the more likely use is increasing the supply of Delta exports for beneficial use in the CVP and SWP service areas.

Potential increases in Delta exports were the major water supply effects evaluated using the DWRSIM and DeltaSOS models. Annual and seasonal effects on export water supply are described in this chapter. Related impacts on hydrodynamics, water quality, and fishery resources are evaluated in Chapters 3B, 3C, and 3F, respectively. Because the lead agencies do not consider the addition or reduction of export water supply, by itself, as a beneficial or adverse impact, no criteria can be established to assess the significance of the impact. Therefore, DW project effects on export water supply were not used as criteria for assessing impact significance.

Daily CVP and SWP Operations. The DW project would be operated in response to daily changes in hydrologic, water quality, and fishery conditions. The DW project is designed to operate once all applicable Delta objectives are satisfied. If CVP and SWP compliance with Delta objectives is based, however, on fixed-period or moving averages, DW diversions during storm-related flows might reduce allowable CVP and SWP export pumping following the storm. Terms and conditions for operating the DW project to address these daily operations issues and prevent DW operations from interfering with otherwise allowable CVP and SWP operations may be specified by SWRCB or decided by the CALFED Ops Group.

To assess the effects of short-term changes in Delta conditions on DW project operations, DeltaSOS was modified to simulate Delta conditions with a daily time step. A description of the daily model (DailySOS) and a discussion of the results from the 1995 DailySOS simulations are presented in Appendix A4, "Possible Effects of Daily Delta Conditions on Delta Wetlands Project Operations and Impact Assessments". The daily model was used for simulating project operations and water supply effects in response to short-term hydrologic fluctuations. Results of revised DailySOS simulations performed for the 2000 REIR/EIS analysis are described in Appendix F of the 2000 REIR/EIS and in the section from the 2000 REIR/EIS below entitled "Results: Daily Delta Wetlands Project Operations".

Potential impacts on water quality and fisheries were not directly simulated at a daily time step, however, because available information is not sufficient to allow accurate assessment of these potential daily effects. Therefore, DW project effects on daily Delta flows were not used as criteria for assessing impact significance. The magnitude of DW diversions and discharges simulated using the daily model were

compared with the monthly model estimates to confirm that potential water quality and fishery impact estimates that were based on monthly model results are similar to likely daily estimates. While effects may be larger on particular days, the monthly average effect is likely to be similar to the estimates based on monthly average DW operations.

Delta Consumptive Use

The four DW project islands have existing riparian and appropriative water rights to use a reasonable quantity of water from Delta channels for agricultural and other beneficial purposes. As described in Appendix A1, "Delta Monthly Water Budgets for Operations Modeling of the Delta Wetlands Project", the water budget for continuing agricultural use of the DW islands under the No-Project Alternative was based on DWR estimates for riparian water use on Delta lowlands. Delta riparian water use is factored into simulations performed using the water supply planning models (DWRSIM and DeltaSOS). Estimates for the No-Project Alternative water budget consist of approximately 77 TAF of combined diverted and seepage water, 23 TAF of rainfall onto the four DW project islands, and approximately 56 TAF of drainage water off the DW project islands, with a net consumptive use of about 44 TAF (Table A1-8 in Appendix A1, Table 3A-5).

Under DW project operations, consumptive water use would generally shift from irrigation diversions and crop ET with minor amounts of open-water evaporation to open-water evaporation during periods of storage on the reservoir islands and the seasonally flooded portions of the habitat islands with minor amounts of irrigation diversions and crop ET.

A project alternative is assumed to have a significant detectable impact on Delta consumptive use if it would cause an increase in Delta lowland ET exceeding 1% of the No-Project Alternative ET from Delta lowlands (890 TAF/yr) (Table A1-7 in Appendix A1). This assumed significance criterion could also be expressed as a change of greater than 20% of the consumptive use on the DW islands (44 TAF/yr) because the DW islands represent about 5% of the area of the Delta lowlands (Table A1-8 in Appendix A1). A project is considered to have a beneficial effect on Delta consumptive use if it would cause a decrease in Delta lowland ET.

IMPACTS AND MITIGATION MEASURES OF ALTERNATIVE 1

Alternative 1 was defined in the 1995 DEIR/EIS as involving potential year-round diversion and storage of surplus water on Bacon Island and Webb Tract (reservoir islands). Bouldin Island and Holland Tract (habitat islands) would be managed primarily as wildlife habitat.

Under Alternative 1 as defined for the 1995 DEIR/EIS analysis, DW diversions could occur in any month with surplus flows. In DeltaSOS modeling, it was assumed that discharges of water from the DW project islands would be exported in any month when unused capacity within the permitted pumping rate exists at the SWP and CVP pumps and strict interpretation of the 1995 WQCP "percent inflow" export limits do not prevent use of that capacity. Such unused capacity could exist when the amount of available water (i.e., total inflow less Delta channel depletion and Delta outflow requirements) is less than the amount specified by the export limits.

Water would be diverted to the reservoir islands (238-TAF water storage capacity) at a maximum monthly average diversion rate of 4,000 cfs, which would fill the two reservoir islands in one month. The maximum daily average diversion rate would be 9,000 cfs during several days when siphoning of water onto empty reservoirs begins; at this time, the maximum head differential would exist between island bottoms and channel water surfaces. The maximum daily average discharge rate would be 6,000 cfs, but the maximum monthly average discharge rate is assumed to be 4,000 cfs, allowing the two reservoir islands to empty in one month.

Water management on the habitat islands would be slightly different from irrigation and drainage practices under the No-Project Alternative. Table A1-8 (in Appendix A1) gives the estimated monthly water budget terms for the DW habitat islands. Maximum diversion would occur in July, with an estimated diversion flow of 60 cfs (3.6 TAF). Maximum drainage would occur in January, with an estimated drainage flow of 42 cfs (2.5 TAF), assuming average rainfall. These diversions and drainage flows would not substantially change the DeltaSOS-simulated operations of the DW reservoir islands as described in this chapter.

Chapter 2, "Delta Wetlands Project Alternatives", presents a more complete description of DW project facilities and operations. Appendix A3, "DeltaSOS Simulations of the Delta Wetlands Project Alternatives", presents monthly average approximations of DW project operations under Alternative 1 from the 1995 DEIR/EIS analysis.

Delta Water Supply Simulations

The 1995 DEIR/EIS presented detailed descriptions of the results of simulations of DW project operations under the project alternatives. As described in Chapter 1, however, after the USFWS, NMFS, and DFG biological opinions were issued, SWRCB and the Corps directed that new DeltaSOS simulations of operations under the proposed project (Alternatives 1 and 2) be performed for the 2000 REIR/EIS. These new simulations were to be based on the more recent DWRSIM baseline water budget (Study 771) and the revised project description for the proposed project. The revised project description included the restrictions on project operations specified in the FOC, biological opinion RPMs, and stipulated agreements.

The results of these updated simulations, which are presented later in this chapter (see "Revised Analysis of Water Supply and Operations under the Proposed Project"), supersede the results for Alternatives 1 and 2 presented in the 1995 DEIR/EIS. Therefore, the detailed descriptions of 1995 results for Alternative 1 have been removed from this text.

Several other analyses in the 1995 DEIR/EIS were based partially on the results of simulations of water diversion, storage, and discharge operations presented in that document. For this reason, and for purposes of comparison of the results for Alternative 3 with those for Alternative 1, the tables and figures that show results of the 1995 DEIR/EIS simulations have been retained in this chapter, and brief summaries of the results are provided.

Tables 3A-2 and 3A-6 summarize average annual DW project operations and Delta conditions under Alternative 1 as simulated for the 1995 DEIR/EIS. Average diversions were 222 TAF/yr and average discharges for export were 188 TAF/yr. In some years, the annual diversion for storage or discharge for export was simulated to be greater than the 238-TAF reservoir capacity because multiple diversion and discharge sequences occurred in the same year. Figure 3A-10 shows the simulated annual DW diversions and DW discharges for export. In many years, simulated diversions were slightly greater than discharges, reflecting evaporation losses. In other years, diversions were much greater than discharges, indicating carryover storage on reservoir islands. As discussed above under "Delta Outflow" in the section entitled "Measures of Potential Water Supply Effects and Criteria for Determining Impact Significance", DW project diversions would not cause violations of applicable Delta objectives.

Table 3A-7 gives the monthly percentiles of the DeltaSOS simulations for Alternative 1. The monthly distribution gives an overview of the expected DW operations in a particular calendar month. For example, as shown in the second panel, DW storage was simulated as being empty at the end of September and October in 80% of the years and 60% of the years, respectively. The mean in a panel for each month indicates the overall importance of that month in terms of the parameter shown.

Effects on Delta Consumptive Use

Under Alternative 1, land uses would change from irrigated agriculture to primarily water storage on the reservoir islands and to wildlife habitat on the habitat islands. These land use changes would reduce ET from a total of 44 TAF/yr to 14 TAF/yr (estimated ET from the habitat islands) for the four islands. Additionally, an average of approximately 34 TAF/yr of evaporation would be lost from stored water on the reservoir islands during periods of water storage (Table 3A-5). An unknown amount of ET from moist soil and possibly from seepage would continue to be lost on the reservoir islands directly after total drawdown. Also, an ET amount approximately equal to the ET for the habitat islands (14 TAF) would be lost during periods when the reservoir islands are in a shallow-water wetland condition.

Total consumptive use on the four DW project islands is expected to increase by approximately 4 TAF/yr compared with use under the No-Project Alternative as a long-term average.

The conclusion about changes in total consumptive use in the 2000 REIR/EIS was the same as this 1995

DEIR/EIS conclusion, as described below in the section from the 2000 REIR/EIS entitled "Results: Delta Consumptive Use".

Summary of Project Impacts and Recommended Mitigation Measures

Impact A-1: Increase in Delta Consumptive Use. Implementation of Alternative 1 would increase consumptive use by approximately 4 TAF/yr compared with consumptive use under the No-Project Alternative. This impact is considered less than significant for Delta water supply.

Mitigation. No mitigation is required.

IMPACTS AND MITIGATION MEASURES OF ALTERNATIVE 2

Alternative 2, as defined for the 1995 DEIR/EIS analysis, represents DW operations with two reservoir islands (Bacon Island and Webb Tract) and two habitat islands (Bouldin Island and Holland Tract).

Under Alternative 2, it was assumed that DW diversions could occur in any month with surplus flows, as under Alternative 1. In DeltaSOS modeling, it is assumed that discharges from the DW project islands would be exported in any month when unused capacity within the permitted pumping rate exists at the SWP and CVP pumps. Under this alternative, it was assumed that DW discharges would be allowed to be exported in any month when such capacity exists and would not be subject to strict interpretation of the 1995 WQCP "percent inflow" export limits. Export of DW discharges would be limited by Delta outflow requirements and the permitted combined pumping rate of the export pumps but would not be subject to strict interpretation of the "percent inflow" export limit.

The maximum diversion and discharge rates for the reservoir islands and management of the habitat islands under Alternative 2 would be the same as described above for Alternative 1.

Delta Water Supply Simulations

As described above for Alternative 1, new DeltaSOS simulations of project operations were performed for the 2000 REIR/EIS. The results of these updated simulations, which are presented below under "Revised Analysis of Water Supply and Operations under the Proposed Project", supersede the results for Alternatives 1and 2 presented in the 1995 DEIR/EIS. The 1995 results of simulations for Alternative 2 are briefly summarized here, and the tables and figures have been retained for purposes of comparison of results for Alternative 3 with those for Alternative 2.

Tables 3A-2 and 3A-8 summarize simulated average annual DW project operations and Delta conditions under Alternative 2 as simulated for the 1995 DEIR/EIS. Average diversions were 225 TAF/yr and average discharges for export were 202 TAF/yr. Figure 3A-11 shows simulated annual diversions and discharges for export. The patterns of years of multiple reservoir island fillings, carryover storage years, and years with no diversions or discharges were similar to those for Alternative 1. Table 3A-9 shows the monthly percentiles of DW operations simulated for Alternative 2.

Effects on Delta Consumptive Use

Under Alternative 2, habitat island ET is estimated to average 14 TAF/yr, as under Alternative 1, and evaporation of stored water would average approximately 23 TAF/yr, somewhat less than for Alternative 1 because of decreases in storage duration (Table 3A-5). Total consumptive use under Alternative 2 is estimated to average approximately 7 TAF/yr less than under the No-Project Alternative.

The conclusion about changes in total consumptive use in the 2000 REIR/EIS was the same as this 1995 DEIR/EIS conclusion, as described below in the section from the 2000 REIR/EIS entitled "Results: Delta Consumptive Use".

Summary of Project Impacts and Recommended Mitigation Measures

Impact A-2: Reduction in Delta Consumptive Use. Implementation of Alternative 2 would decrease consumptive use by approximately 7 TAF compared with consumptive use for the No-Project Alternative. This impact is considered beneficial to Delta water supply and will result in reduced diversions during the irrigation season.

Mitigation. No mitigation is required.

IMPACTS AND MITIGATION MEASURES OF ALTERNATIVE 3

Alternative 3 involves storage of water on Bacon Island, Webb Tract, Bouldin Island, and Holland Tract, with secondary uses for wildlife habitat and recreation. The portion of Bouldin Island north of SR 12 would be managed as a wildlife habitat area and would not be used for water storage. Diversions to the reservoir islands (406-TAF capacity) would be allowed during any month with available surplus flows. The diversion and discharge operations for Alternative 3 would be the same as for Alternative 2, but the assumed diversion and discharge rates are higher. The maximum monthly average diversion rate would be about 6,000 cfs, which would fill the four reservoir islands in about one month (maximum daily average initial diversion rate of 9,000 cfs). The maximum monthly average discharge rate is assumed to be 6,000 cfs (maximum daily average discharge rate of 12,000 cfs).

Delta Water Supply Simulations

Table 3A-2 summarizes simulated average annual DW project operations under Alternative 3, showing DeltaSOS-adjusted exports; required outflow; DW diversions and discharges for export; and effects on export, outflow, and major Delta channel flows. Average annual reductions in Delta outflow associated with this alternative would be equivalent to the volume of diversions but would not cause violations of applicable outflow standards.

Table 3A-10 indicates that the average annual values for simulated DW operations for Alternative 3 were 356 TAF/yr of diversions and 302 TAF/yr of discharges for export. These values are much greater than for Alternative 1 or Alternative 2 because of the increased reservoir storage capacity on four project islands. Increased storage capacity allows increased DW diversions during years with plentiful surplus water but does not compensate for years of limited water availability. The greatest simulated annual DW diversion for Alternative 3 was 815 TAF/yr in 1982 (two complete DW reservoir fillings). It is unlikely that this volume of additional water supply would be needed in wet years. Table A3-13 in Appendix A3 gives the monthly results of simulations of Alternative 3.

Table 3A-11 shows the monthly percentiles of DW operations for Alternative 3. Diversions generally would occur early in the water year (October-February) and discharges would generally occur during early spring (February-March) or summer (June-August).

Figure 3A-12 shows the simulated annual DW diversions and DW discharges for Alternative 3. The patterns of years with no DW operation, years with large DW diversions and carryover DW storage, and years with reduced DW diversions because of carryover storage are similar to those of the other alternatives as simulated for the 1995 DEIR/EIS.

Appendix A3 presents detailed simulation results for Alternative 3. Appendix A4 discusses the possible differences between these monthly average simulations and likely daily DW operations.

Effects on Delta Consumptive Use

Under Alternative 3, evaporation of stored water from all four DW islands is estimated to average 54 TAF/yr (Table 3A-5). Because all four islands would be operated as reservoir islands, there would be essentially no habitat island ET as under Alternatives 1 and 2 except for ET from a small portion of Bouldin Island. Some ET would occur from intermittent wetlands during nonstorage periods on the four reservoir islands, but the extent of this ET is not predictable.

Total consumptive use under Alternative 3 is predicted to average 54 TAF/yr, approximately 10 TAF/yr greater than under the No-Project Alternative. This

increase in Delta consumptive use represents about a 1% increase in Delta lowland consumptive use. The consumptive use under Alternative 3 would be supplied by DW project diversions, whereas the No-Project Alternative consumptive use would be supplied by irrigation diversions in summer.

Summary of Project Impacts and Recommended Mitigation Measures

Impact A-3: Increase in Delta Consumptive Use. Implementation of Alternative 3 would increase consumptive use by approximately 10 TAF compared with consumptive use under the No-Project Alternative. This increase represents about a 1% increase in Delta lowland consumptive use. Therefore, this impact is considered a significant and unavoidable impact of water storage operations. The reduced diversions during the irrigation season may still be considered a benefit to Delta water supply.

Mitigation. No mitigation is available to reduce this impact to a less-than-significant level. Therefore, this impact is considered significant and unavoidable.

IMPACTS AND MITIGATION MEASURES OF THE NO-PROJECT ALTERNATIVE

The No-Project Alternative (intensified agricultural use of the four DW project islands) represents Delta water supply conditions predicted under implementation of the 1995 WQCP.

The DeltaSOS results for the No-Project Alternative as simulated for the 1995 DEIR/EIS were described above under "Impact Assessment Methodology". Table 3A-2 summarizes the simulated average annual results, showing DeltaSOS-adjusted exports; required outflow; and export, outflow, and major Delta channel flows.

Delta exports for the No-Project Alternative in these simulations averaged 6.15 MAF/yr over the 70-year hydrologic record (Appendix A3). Delta exports under actual historical conditions totaled approximately 6 MAF in 1990 (Table 3A-1). The increased Delta consumptive use of 22 TAF can be attributed to variations in Delta agricultural use between drought and normal years.

Consumptive use of water to supply crop ET would be somewhat greater under the No-Project Alternative compared with historical agricultural land uses, but not measurably so at the scale of monthly water supply modeling (e.g., DWRSIM or DeltaSOS). Chapter 2, "Delta Wetlands Project Alternatives", describes the likely ET increase from existing (drought) conditions (i.e., 1988-1994) to intensive agricultural land use (No-Project Alternative) as 50% of the assumed consumptive use of 44 TAF/yr for the DW project islands. The lower estimated ET for the existing condition (22 TAF/yr) was caused by reduced agricultural use during the drought.

New simulations of water project operations under the No-Project Alternative were performed for the 2000 REIR/EIS using the results of DWRSIM Study 771 and updated assumptions about Delta standards and objectives that were incorporated into DeltaSOS. The differences between the no-project conditions estimated for the 1995 DEIR/EIS and those estimated for the 2000 REIR/EIS were minor, however (see the comparisons of results of DWRSIM Studies 409 and 771 below in sections from the 2000 REIR/EIS), and do not affect the consumptive-use estimates presented in the 1995 DEIR/EIS.

CUMULATIVE IMPACTS

Cumulative water supply effects were evaluated in the 1995 DEIR/EIS using DeltaSOS simulations of the DW project alternatives under the 1995 WQCP, but assuming SWP pumping permitted at full capacity of Banks Pumping Plant. This represents reasonably foreseeable future Delta conditions and regulatory standards (see description under "Impact Assessment Methodology" above). Cumulative water supply effects of the DW project alternatives are compared below with simulated monthly Delta water supply conditions for the No-Project Alternative under cumulative conditions.

The reservoir islands may have somewhat greater water storage capacity under cumulative conditions because of effects of continued peat soil oxidation and subsidence (see Appendix C3, "Water Quality Experiments on Potential Sources of Dissolved Organics and

Trihalomethane Precursors for the Delta Wetlands Project"). DW estimates that average subsidence over the 50-year planning life of the project may average 0.5 inch per year over the 10,000 acres of the reservoir islands (Forkel pers. comm.). This average rate of subsidence would increase water storage capacity under cumulative conditions by approximately 20 TAF or 9% of the reservoir storage capacity. Therefore, possible average DW project diversions and discharges may be approximately 9% greater than those simulated by DeltaSOS.

Water Supply Conditions for the No-Project Alternative under Cumulative Conditions

Delta Water Supply Simulations

Appendix A3 presents complete results of the DeltaSOS simulations from the 1995 DEIR/EIS for cumulative Delta water supply conditions, represented as the No-Project Alternative under cumulative conditions. Selected variables are summarized in this chapter.

Figure 3A-13 shows the simulated monthly Delta outflow and the required Delta outflow for the No-Project Alternative under cumulative conditions for water years 1968-1991. The pattern of required Delta outflow is the same as for the No-Project Alternative.

Figure 3A-14 shows the simulated monthly Delta exports for the No-Project Alternative under cumulative conditions for water years 1968-1991 as simulated for the 1995 DEIR/EIS. The DWRSIM simulation of exports used as the initial Delta water budget did not assume use of the full SWP pumping capacity of 10,300 cfs. The DeltaSOS simulation of the No-Project Alternative under cumulative conditions indicated that a considerable amount of additional export pumping would be possible beyond that simulated by DWRSIM. However, DeltaSOS was not used to check for south-of-Delta demands on storage capacity or to change the DWRSIM estimates of carriage water (see Appendix A2). The DeltaSOS adjustment in exports for the cumulative No-Project Alternative averaged 1,018 TAF/yr (Table 3A-2).

Figure 3A-15 shows the simulated monthly pattern of water available for DW diversion for the cumulative No-Project Alternative for water years 1968-1991 as simulated for the 1995 DEIR/EIS. Tables 3A-12 and 3A-13 show the mean annual simulation output and monthly percentiles of simulations for exports under the No-Project Alternative.

Figure 3A-16 shows annual Delta outflow and required Delta outflow for the No-Project Alternative under cumulative conditions for water years 1922-1991. Table A3-14 in Appendix A3 shows the annual DeltaSOS adjustments in initial Delta exports (DWRSIM results) and the DeltaSOS-adjusted Delta exports (that satisfy standards while exporting all available water) for the No-Project Alternative under cumulative conditions. Monthly DeltaSOS adjustment to DWRSIM-simulated exports are shown in Table A3-16 in Appendix A3. In some years, no additional export pumping was simulated by DeltaSOS, whereas in other years more than 3 MAF of additional export was simulated beyond the DWRSIM results (1983 and 1984). The total adjusted export for 13 out of 70 years was greater than 8 MAF/yr (i.e., in wet years) because of the greater assumed Delta permitted pumping rate. Some of these potential exports may not be required for south-of-Delta beneficial uses.

Each of the DW alternatives was simulated under cumulative conditions and compared with the DeltaSOS simulation results for the No-Project Alternative under cumulative conditions to determine cumulative water supply effects.

Delta Consumptive Use

Net consumptive use on the DW project islands under the No-Project Alternative is estimated to be 44 TAF/yr under cumulative conditions.

Cumulative Impacts, Including Impacts of Alternative 1

Delta Water Supply Simulations

Tables 3A-2 and 3A-14 summarize simulated average annual DW project operations and Delta conditions under Alternative 1 cumulative conditions as simulated for the 1995 DEIR/EIS. Average diversions were 191 TAF/yr and average discharges for export were 166 TAF/yr. Alternative 1 was simulated as operating in fewer years under cumulative conditions than under existing conditions because of limited

availability of water for diversions. Because of the greater export pumping capacity, however, more DW discharges for export were simulated in several years. Figure 3A-17 shows simulated annual diversions and discharges for export. Table 3A-15 shows the monthly percentiles of DW operations simulated for Alternative 1 under cumulative conditions. Table A3-19 in Appendix A3 gives the full monthly simulation results.

See the section from the 2000 REIR/EIS below entitled "Results: Cumulative Water Supply Conditions" for results of the updated simulations of cumulative water supply conditions under the proposed project.

Effects on Delta Consumptive Use

Because of differences in periods of DW diversions and discharges, consumptive use from evaporation under Alternative 1 would be reduced by 9 TAF/yr (from 48 TAF/yr to 39 TAF/yr) under cumulative future conditions (Table 3A-5). The consumptive use of 39 TAF/yr represents a decrease of 5 TAF/yr from consumptive use under the No-Project Alternative. This conclusion was not changed by the updated simulations in the 2000 REIR/EIS.

Impact A-4: Reduction in Delta Consumptive Use under Cumulative Conditions. Under cumulative conditions, implementation of Alternative 1 would decrease Delta consumptive use from consumptive use estimated for the No-Project Alternative. This impact is considered beneficial.

Mitigation. No mitigation is required.

Cumulative Impacts, Including Impacts of Alternative 2

Delta Water Supply Simulations

Tables 3A-2 and 3A-16 summarize simulated average annual DW project operations and Delta conditions under Alternative 2 cumulative conditions as simulated for the 1995 DEIR/EIS. Average diversions were 211 TAF/yr and average discharges for export were 197 TAF/yr. Figure 3A-18 shows simulated annual diversions and discharges for export. Table 3A-17 shows the monthly percentiles of DW operations simulated for Alternative 1 under cumulative conditions. Table A3-22 in Appendix A3 gives the full monthly simulation results.

See the section from the 2000 REIR/EIS below entitled "Results: Cumulative Water Supply Conditions" for results of the updated simulations of cumulative water supply conditions under the proposed project.

Effects on Delta Consumptive Use

Consumptive use from evaporation under Alternative 2 would be reduced by 9 TAF/yr (from 37 TAF/yr to 28 TAF/yr) under cumulative future conditions (Table 3A-5). The consumptive use of 28 TAF/yr represents a decrease of 16 TAF/yr from consumptive use under the No-Project Alternative.

Under cumulative conditions, Alternative 2 would have the same impact on consumptive use as described above for Alternative 1 under cumulative conditions. This conclusion was not changed by the updated simulations in the 2000 REIR/EIS.

Cumulative Impacts, Including Impacts of Alternative 3

Delta Water Supply Simulations

Table 3A-2 summarizes simulated average annual DW project operations for Alternative 3 under cumulative conditions, showing DeltaSOS-adjusted exports; required outflow; DW diversions and discharges for export; and effects on export, outflow, and major Delta channel flows. Average annual reductions in Delta outflow associated with this alternative would be equivalent to the volume of diversions (minus No-Project Alternative consumptive use) but would not cause violations of applicable outflow standards.

Table 3A-18 indicates that the average annual simulated DW operations for Alternative 3 under cumulative conditions were 314 TAF/yr of diversions and 282 TAF/yr of discharges for export.

Table 3A-19 shows the monthly percentiles of DW operations for Alternative 3 under cumulative conditions and Table A3-25 in Appendix A3 gives the monthly results.

Figure 3A-19 shows simulated annual DW diversions and DW discharges for Alternative 3 under cumulative conditions for water years 1922-1991. DW discharges for export were 7% less under cumulative conditions (Table 3A-2). No significant cumulative water supply impacts are identified.

Effects on Delta Consumptive Use

Consumptive use under Alternative 3 would be reduced by 22 TAF/yr (from 54 TAF/yr to 32 TAF/yr) under cumulative conditions (Table 3A-5). The consumptive use of 32 TAF/yr represents a decrease of 12 TAF/yr from consumptive use under the No-Project Alternative.

Under cumulative conditions, Alternative 3 would have the same impact on consumptive use as described above for Alternative 1 under cumulative conditions.

Cumulative Impacts, Including Impacts of the No-Project Alternative

The No-Project Alternative would not contribute measurably to cumulative effects on consumptive use in the Delta.

ASSESSMENT OF WATER SUPPLY AND OPERATIONS FROM THE 2000 REVISED DRAFT EIR/EIS

The remainder of this chapter includes the revised assessment of water supply and operations that was conducted for the 2000 REIR/EIS. This information, which was presented as Chapter 3, "Water Supply and Operations", in the 2000 REIR/EIS, has been modified slightly from the 2000 REIR/EIS version in response to comments received on the 2000 REIR/EIS. However, those minor changes do not change the conclusions of the evaluation.

FOCUS OF THE 2000 REVISED DRAFT EIR/EIS ANALYSIS

This evaluation provides information on the potential range of diversion and discharge operations of the proposed project based on the updated project description (which includes the FOC and biological opinion RPMs and the stipulated agreements described in Chapter 2), current assumptions for modeling Delta water supply, current regulatory standards, and an updated baseline (no-project) water budget.

Summary of Issues Addressed in This Analysis

The analysis presented in the remainder of this chapter specifically addresses the following two questions, which represent the concerns expressed by stakeholders at the SWRCB water right hearing on the Delta Wetlands Project and in comments on the 1995 DEIR/EIS:

What is the frequency, timing, and amount of water available to the Delta Wetlands Project, considering:

- updated DWRSIM results from technical studies prepared in support of the CALFED no-action simulations;
- upstream and in-Delta actions resulting from implementation of the CVPIA;
- terms of the FOC and the USFWS, NMFS, and DFG biological opinions for the Delta Wetlands Project;
- Delta Wetlands' settlement agreements with Reclamation, DWR, Amador County, the City of Stockton, and North Delta Water Agency; and
- the proposed X2 restriction to preserve CCWD senior water rights consistent with the X2 restriction on CCWD operations described in the 1993 USFWS biological opinion for Los Vaqueros Project effects on delta smelt?

What is the project's potential water supply, considering:

- water availability (see above),
- conveyance capacity for export water,
- a range of south-of-Delta water demand assumptions, and
- quality of water at the time of diversion and discharge?

The analysis presented below answers these questions by providing new estimates of monthly water availability and project yield using a revised DeltaSOS model. The updated DeltaSOS simulations themselves are based on a revised Delta water budget developed by DWR using its operations planning model, DWRSIM. The daily operations model DailySOS is used to confirm the adequacy of the DeltaSOS analysis. Results of the new simulations are compared with results presented in the 1995 DEIR/EIS. In addition, the impacts on consumptive use identified in the 1995 DEIR/EIS are reviewed in light of the updated information on project operations to determine whether there are any differences in severity of impacts.

Definition of Terms

The following are definitions of terms as they are used in this chapter:

Channel Depletion: The water removed from Delta channels by diversions for irrigation and by open-water evaporation.

Consumptive Use: Loss of water on the Delta Wetlands Project islands and other Delta islands through crop evapotranspiration (ET) and open-water evaporation and use for shallow-water management for wetlands and wildlife habitat. Rainfall and channel depletion supply the consumptive-use water.

Delta Exports: The water pumped from the Delta to south-of-Delta users by DWR at Banks Pumping Plant and by Reclamation at the CVP Tracy Pumping Plant, and the amount diverted by CCWD at its Rock Slough and Old River intakes.

Inflow: The total rate (cfs) or volume (TAF) of streamflow entering the Delta from the Sacramento and San Joaquin Rivers, Yolo Bypass, and the eastside streams.

Interruptible Demand: An assumed additional demand for SWP water above the specified monthly demands. Interruptible demand is simulated as 84 TAF/month for 5 months, or 1,400 cfs/month during November through March when San Luis Reservoir is full. DWRSIM assumes that additional SWP deliveries are made to meet interruptible demand when there is unused export capacity and available water in the Delta.

Local Water Supply: In the DWRSIM model, the assumed amount of captured rainfall in areas south of the Delta that can be used to satisfy CVP and SWP demands.

Outflow: The water flowing out of the Delta into San Francisco Bay.

Project Yield: Average annual water discharged for export from the Delta Wetlands Project islands. Reported in TAF per year (TAF/yr).

South-of-Delta Delivery Deficit: Unmet demand, that is, total demand for CVP and SWP water minus total CVP and SWP deliveries. Total deliveries are calculated based on water exported from the Delta and the change in San Luis Reservoir storage. (When San Luis Reservoir storage drops, that amount is added to Delta exports to determine total CVP and SWP deliveries. When San Luis Reservoir storage increases, that amount is subtracted from Delta exports to determine total CVP and SWP deliveries.)

Surplus Delta Outflow: Outflow in excess of the amount required to meet all monthly water demands, protect Delta salinity standards, and comply with the export/inflow objectives of the 1995 WQCP.

X2: The mean daily location in the Bay-Delta estuary of the 2–parts-per-thousand-(ppt)–total dissolved solids (TDS) isohaline 1 meter off the bottom; an isohaline is a line connecting all points of equal salinity.

Overview of the Evaluation Methods Used in the 2000 Revised Draft EIR/EIS: DeltaSOS, DWRSIM Water Budget, and Modeling Assumptions

DeltaSOS

As described previously in this chapter, the DeltaSOS model was developed to represent possible Delta Wetlands Project operations (diversions and discharges) under various scenarios for Delta inflow conditions and regulatory standards. DeltaSOS modeling of the No-Project Alternative and project operations is based on the initial water budget developed from the results of simulations performed by DWR using the operations planning model DWRSIM for the water years 1922-1994. DWRSIM represents systemwide hydrology, including upstream reservoirs; inflows to the Delta; and Delta channel depletions, exports, and outflow. DeltaSOS is used to simulate monthly project operations as controlled by the DWRSIM Delta inflows, by appropriate Delta objectives and requirements, and by operating criteria specific to Delta Wetlands.

DeltaSOS has been updated for this analysis through the incorporation, to the extent possible, of the following:

restrictions on project operations specified in the FOC, biological opinions, and stipulated agreements;

restrictions on Delta Wetlands Project operations when CCWD's diversions to Los Vaqueros Reservoir are restricted because X2 is upstream of Chipps Island; and

revised Delta standards resulting from implementation of the CVPIA.

These modifications are described below under "Revisions to DeltaSOS".

DWRSIM

DWRSIM simulates current conditions, including the operation of water storage facilities (reservoirs), regulatory standards (e.g., instream flow requirements), and assumed demand for exports, to

estimate likely future Delta inflows, exports, and outflows under hydrologic conditions replicating those of the 73-year hydrologic record (water years 1922-1994).

Since publication of the 1995 DEIR/EIS, the implementation of state and federal programs has resulted in changes to the basic assumptions used for establishing baseline conditions in the Delta. The Anadromous Fish Restoration Program (AFRP) was implemented pursuant to the CVPIA, resulting in the establishment of several new Delta operating criteria and standards. Additionally, in response to the CALFED program, which state and federal agencies initiated in 1994 to resolve several Delta issues, and in response to other statewide planning efforts, DWR has conducted a series of DWRSIM modeling studies to establish new simulated baseline conditions for the Delta under the 1995 WQCP. These baseline conditions incorporate the new Delta operating criteria and standards established as a result of these programs. One of these studies, DWRSIM existing conditions study 1995-D06E-CALFED-771 (study 771 or run 771), completed in July 1998 for CALFED, is the currently accepted standard used by CALFED and other state water planners to represent baseline conditions. The results of study 771 are therefore used as the basis of the simulations of Delta Wetlands Project operations performed using DeltaSOS for the present evaluation. They replace the results of run 409, which provided the baseline water budget for the 1995 DEIR/EIS evaluation.

Similarities between DWRSIM Studies 409 and 771. DWRSIM study 771 is similar to study 409 in that both comply with the 1995 WQCP, use 1995 hydrology and demands, use south-of-Delta demands for SWP exports that vary according to Kern River flow and Los Angeles rainfall, and maintain minimum Trinity River flows below Lewiston Dam at 340 TAF/yr. Neither study provides for SWP pumping of water for the CVP.

Differences between DWRSIM Studies 409 and 771. The following assumptions were revised in DWRSIM study 771:

- A slightly different variable SWP demand is used, ranging from 2,644 to 3,529 TAF/yr.
- Maximum SWP interruptible demand is specified as 84 TAF/month for 5 months.
- New American River Water Forum demands have been added.
- South-of-Delta demands for CVP exports (including Level II refuge demand of 288 TAF/yr) are set at 3,433 TAF/yr.
- SWP export capacity from December through March is slightly higher than in DWRSIM study 409.

Many small changes in the FORTRAN code and parameters have also been made between studies 409 and 771 (362 different studies have been completed). In addition, three additional years of historical data (1992-1994) were added to the 70 years of data used in DWRSIM study 409.

The simulated Delta operating conditions of DWRSIM study 771 reflect new Delta operational objectives established for the AFRP, which is being implemented as part of the CVPIA. The adopted AFRP actions simulated in DWRSIM 771 include:

- # export reduction requirements for the Vernalis Adaptive Management Plan (VAMP),
- # the addition of days during the period from March through June when X2 must be at specified locations,
- # minimum flow requirements for the Sacramento River at Freeport,
- # required ramping of Delta exports in May,
- # Delta Cross Channel (DCC) closure from October through January, and
- # July export restrictions based on the X2 position in June.

These modifications are described in the next section.

REVISED DELTA MONTHLY WATER BUDGET SIMULATED BY DWRSIM

This section describes changes in the major DWRSIM input variables and simulated output between DWRSIM study 409, used for the 1995 DEIR/EIS, and DWRSIM study 771. The 25-year period of 1967-1991 was selected for comparison in the graphs referenced in this section because it represents a wide range of hydrologic year types, and because results covering this period are available from both studies.

The major hydrologic inputs for DWRSIM are the reservoir inflows and inflows from tributary streams. The Delta's two major tributary streams are the Sacramento and San Joaquin Rivers. DWRSIM simulates some, but not all, of the major tributary facilities. The simulation of upstream facility operations is important because some of these operations are controlled by Delta outflow requirements and export limits. The reservoir releases are also governed by flood control storage rules, instream flow requirements, power generation constraints, and upstream diversion targets.

Delta Inflows

Overview

Simulated Delta inflows consist of the combination of simulated upstream reservoir operations and local inflows, minus the simulated diversions along the upstream tributaries. Table 3A-20 presents annual values for the Sacramento River and Yolo Bypass, the San Joaquin River and eastside streams, CCWD diversions and net channel depletion, CVP and SWP Delta exports, Delta outflow, and required Delta outflow for water years 1922-1994. Some Sacramento River inflow is diverted into the Yolo Bypass during high-flow periods. The San Joaquin River inflow at Vernalis includes contributions from the Stanislaus, Tuolumne, and Merced Rivers. Eastside streams include the Cosumnes, Mokelumne, and Calaveras Rivers. Sacramento River runoff and San Joaquin River runoff vary considerably from one water year to the next. Local runoff from rainfall events in the Delta can provide substantial flow in some years.

Comparison of Results from Studies 409 and 771

In general, annual average inflows simulated in DWRSIM study 771 do not differ appreciably from those simulated in DWRSIM study 409 because no new upstream storage or conveyance facilities have been constructed since the 1995 DEIR/EIS was prepared, and no major changes in facility operations are simulated. However, the estimates of required Delta outflows changed substantially in some years (see "Delta Outflow" below). DWRSIM 771 has generally lower required Delta outflows, allowing for slightly higher exports for the same inflows.

Sacramento River and Yolo Bypass. Effects of local inflows, Sacramento Valley irrigation diversions, and other consumptive uses are aggregated in the combined Sacramento River and Yolo Bypass inflows. The combined average annual inflow for 1922-1991 was 18,141 TAF/yr in study 409 and 18,086 TAF/yr in study 771 (Table 3A-20). Figure 3A-20 shows the monthly Sacramento River flows simulated for studies 409 and 771 for the 1967-1991 period. Low-flow periods are generally similar for the two DWRSIM studies. Table 3A-21 provides the monthly Sacramento River and Yolo Bypass inflows for the 1967-1991 period for both DWRSIM studies; differences in the monthly and annual values are given for comparison purposes.

San Joaquin River and Eastside Streams. Fixed inputs are used for both the San Joaquin River and eastside streams in DWRSIM study 409, but the San Joaquin River tributary reservoir operations are simulated in study 771. The 70-year annual average inflow was 3,240 TAF in study 409 and 3,743 TAF in study 771 (Table 3A-20). Figure 3A-21 shows the simulated San Joaquin River flow at Vernalis for 1967-1991 in studies 409 and 771. Simulated flows during many of the peak- flow events are substantially larger in study 771 than in study 409. Summer flows in the two studies are generally similar. The magnitude of the simulated San Joaquin River changes is small relative to total Delta inflows. Table 3A-22 provides the monthly San Joaquin River and eastside stream inflows for the 1967-1991 period for both DWRSIM studies; differences in the monthly and annual values are given for comparison purposes.

Contra Costa Water District and Agricultural Diversions. The estimates of CCWD diversions and net channel depletions for agricultural diversions in the Delta were generally the same in studies 409 and 771. Table 3A-20 indicates that the 70-year average annual net Delta depletion with CCWD diversion was 1,079 TAF in study 409 and 1,140 TAF in study 771. The simulated depletion in dry water years was greater in study 771 than in study 409. For example, annual average simulated depletion was greater in study 771 than in study 409 by 68 TAF for the 1928-1934 dry-year period and by 108 TAF for the 1987-1991 dry-year period.

Delta Exports

Overview

DWRSIM simulates Delta exports and outflow after determining the amount of inflows needed for Delta channel depletion and required outflow. Delta export pumping and diversion occurs at five locations: CVP pumping at Tracy Pumping Plant, SWP pumping at Banks Pumping Plant, CCWD diversions at Rock Slough and Old River, and North Bay Aqueduct pumping at Barker Slough.

DWRSIM simulates Delta exports to meet downstream monthly demands and to fill San Luis Reservoir to meet seasonal demands, subject to 1995 WQCP and AFRP objectives for outflow and pumping limits. The magnitude of water supply demands is a major input assumption of DWRSIM that governs the

amount of simulated Delta exports. Studies 409 and 771 both use simulated 1995 "level of development" for upstream diversions and estimated south-of-Delta demands.

Comparison of Results from Studies 409 and 771

DWRSIM-simulated demands range from 5.9 to 6.9 million acre-feet per year (MAF/yr) throughout the simulated period for study 409 and from 6.1 to 6.9 MAF/yr for study 771. Figure 3A-22 compares Delta exports at the CVP Tracy Pumping Plant and the SWP Banks Pumping Plant for 1967-1991 as simulated for DWRSIM studies 409 and 771. Minimum pumping in April and May is slightly less in study 771 because of the assumed VAMP restrictions on pumping during this period, with combined pumping at 1,500 cfs in most years.

DWRSIM study 409 included CVP Delta export demands of 3.15 MAF/yr, with 145 TAF/yr to satisfy CCWD diversions. However, these CVP demands were not always satisfied in drier years in DWRSIM simulations. The SWP variable Delta export demands ranged from 2.6 to 3.6 MAF/yr, with an average of 2.85 MAF/yr. The maximum combined Delta export demand of 6.9 MAF/yr was assumed to occur in about 45% of simulated years. Exports were divided almost equally between the CVP and the SWP.

Table 3A-23 lists the monthly combined CVP and SWP exports as simulated for studies 409 and 771; the monthly and annual differences between study 771 and study 409 values are shown for comparison. The combined exports are approximately 90 TAF higher on average in study 771 for the simulated 25-year period. Neither study 409 nor study 771 includes a joint point of diversion for the CVP to use the large pumps at Banks Pumping Plant to meet CVP demands and to fill the CVP share of San Luis Reservoir.

Delta Outflow

Overview

Figure 3A-23 shows monthly Delta outflow for 1967-1991, as simulated by DWRSIM for studies 409 and 771. Differences between the two scenarios can be attributed to differences between estimates of Delta inflows, exports, or required Delta outflow.

Comparison of Results from Studies 409 and 771

Table 3A-20 indicates an annual average simulated Delta outflow from 1922-1991 in study 771 of 15,102 TAF, 520 TAF greater than the 14,582 TAF average annual outflow simulated in study 409. Table 3A-24 lists the monthly Delta outflows simulated for studies 409 and 771; the monthly and annual differences between study 771 and study 409 values are shown for comparison.

As Table 3A-20 demonstrates, the estimated required Delta outflow for the two studies is similar, although study 409 and study 771 use somewhat different methods for estimating outflow requirements to satisfy Delta salinity objectives. The required Delta outflow under 1995 WQCP objectives is a combination of some fixed outflow objectives; salinity requirements at Emmaton, Jersey Point, and Rock Slough that are satisfied by equivalent outflow requirements; and X2 requirements that depend on the previous month's runoff.

DWRSIM estimates the minimum outflow necessary to satisfy these combined objectives. The flow necessary to satisfy the salinity objectives is now calculated using a monthly procedure that incorporates the effective outflow-salinity relationships proposed by CCWD (i.e., "G-model"). Table 3A-25 lists the monthly estimates of required Delta outflow for studies 409 and 771; the monthly and annual differences between study 771 and study 409 values are shown for comparison.

Surplus Outflow Available for Delta Wetlands Diversion

Overview

Surplus Delta outflow is outflow in excess of the amount required to meet all monthly water demands, protect Delta salinity standards, and comply with the export/inflow objectives of the 1995 WQCP. Not all surplus outflow may be available for Delta Wetlands Project diversions because such diversions are assumed to be subject to the 1995 WQCP "percent of inflow" export ratio limits (see Chapter 2, "Delta Wetlands Project Alternatives", for a thorough description of assumptions about Delta Wetlands diversions).

Comparison of Results from Studies 409 and 771

Figure 3A-24 shows the monthly pattern of available water for Delta Wetlands diversions. Because most of this surplus water is present during periods of relatively high flows, the estimates of water available for diversion by Delta Wetlands are similar for studies 409 and 771. (The monthly values for study 771 are listed in Table 3A-30, which is discussed below under "Results: Monthly Delta Wetlands Project Operations".)

The availability of surplus Delta water in a few months during relatively dry years is important for estimating the Delta Wetlands Project's water supply potential. Upstream reservoirs may be able to store more of this runoff during some years and reduce the surplus flows entering the Delta. This reduced inflow may reduce simulated Delta Wetlands monthly diversions in some dry years. However, because the project is located in the Delta, any excess runoff from Sacramento or San Joaquin River tributaries can be diverted if conditions in the Delta satisfy the Delta Wetlands FOC and senior water rights are satisfied. The ability of Delta Wetlands to modify project operations to respond to daily changes in Delta conditions (i.e., storm events) is explored below under "Results: Daily Delta Wetlands Operations". Changes in operations based on daily changes in conditions would generally increase the Delta Wetlands water supply potential.

San Luis Reservoir Operations

Overview

San Luis Reservoir provides offstream storage for surplus water (i.e., water in excess of monthly demands) pumped from the Delta to the California Aqueduct and Delta-Mendota Canal (DMC) during periods of high runoff in winter and spring. San Luis Reservoir provides a source of water during the summer peak-demand period to allow more deliveries than could be pumped directly from the SWP and CVP Delta pumping plants. San Luis Reservoir facilitates the coordinated wheeling (conveyance) of state and federal water supplies allowed under the Coordinated Operations Agreement (COA) between DWR and

Reclamation. However, neither study 409 nor study 771 includes any CVP wheeling (i.e., joint point of diversion).

San Luis Reservoir storage values were not evaluated for the 1995 DEIR/EIS because south-of-Delta water supply operations were not included in the DeltaSOS simulations. For the 1995 DEIR/EIS, water stored in Delta Wetlands facilities was simulated as being released for export if excess SWP and CVP export pumping and conveyance capacity was available within the specified export limits. This assumption allowed for estimation of the maximum potential environmental impacts caused by Delta Wetlands Project discharges. However, based on concerns raised at the water right hearing, south-of-Delta demands for water supply and storage in San Luis Reservoir were considered in the 2000 REIR/EIS as constraints to simulated Delta Wetlands discharges for export. The resulting project operations were simulated in the 2000 REIR/EIS analysis to provide reviewers with estimates of a range of potential project yields.

Comparison of Results from Studies 409 and 771

Figure 3A-25 shows end-of-month combined CVP and SWP San Luis Reservoir storage for 1967-1991 as simulated by DWRSIM for study 409 and study 771. Table 3A-26 compares monthly San Luis Reservoir storage values for these two studies during this same period. On average, end-of-month storage values in study 771 are lower than study 409 values, but this is not a consistent trend in all years. The largest differences occur in dry years. For example, simulated monthly San Luis Reservoir storage values in water year 1977 were 420 TAF less in study 771 than in study 409. In contrast, during the 1987 water year, the study 771 monthly values during the winter reservoir filling period (October to February) were 270 to 496 TAF greater than the study 409 values.

Table 3A-27 lists the monthly combined CVP and SWP deliveries that have been calculated from the results of DWRSIM studies 409 and 771. Total deliveries are a combination of water exported from the Delta and water delivered from south-of-Delta storage (i.e., San Luis Reservoir storage). These total deliveries are calculated simply as the combined CVP and SWP exports minus the change in combined CVP and SWP San Luis Reservoir storage. Therefore, when the change in storage is negative (i.e., water is removed from storage), the monthly deliveries consist of the storage volume added to the exports; when the change in storage is positive (water is added to storage), the deliveries consist of the storage volume subtracted from the exports.

Other factors that influence total deliveries in the simulated conditions include SWP interruptible demands, evaporation and seepage losses, and local diversions. These factors were not included in study 409, but have been included in study 771. Table 3A-28 lists the monthly deliveries for DWRSIM study 771 that were obtained by adjusting exports and San Luis Reservoir storage for these factors. The combined deliveries include SWP interruptible demands and the assumed evaporation and seepage losses from the canals and south-of-Delta reservoirs. In some wet years, some simulated demand for CVP deliveries is satisfied through San Joaquin River spills from Friant Dam (or from the Tulare Basin) and some simulated demand for SWP deliveries is met by means of diversions from the Kern River. The monthly deliveries shown in Table 3A-28 are generally less than the estimated CVP and SWP demands, which are assumed in DWRSIM study 771 to vary with Kern River and Los Angeles rainfall conditions (i.e., rainfall in these areas is assumed to reduce demand for CVP and SWP deliveries).

Combined CVP and SWP Delivery Deficits for Study 771

Table 3A-29 shows the monthly combined CVP and SWP delivery deficits (i.e., unmet demands) that resulted from the combination of hydrologic conditions, reservoir operations, and Delta objectives as simulated in DWRSIM study 771. Figure 3A-26 shows the monthly combined CVP and SWP demands, deliveries, and corresponding delivery deficits for study 771.

The annual combined CVP and SWP delivery deficits ranged from 102 TAF to 4,485 TAF, with an average deficit of 1,205 TAF per year. Some years have relatively small deficits, and a few have large deficits. This suggests that there is commonly a deficit in meeting combined CVP and SWP south-of-Delta demands that could be partially satisfied with water supply from the Delta Wetlands Project. Figure 3A-27 shows the annual demands, interruptible SWP supply, local inflow, and total combined CVP and SWP deliveries.

Because DWRSIM study 771 did not include any CVP wheeling export at the SWP Banks Pumping Plant, most of the simulated deficits were assigned to CVP contractors. DeltaSOS simulates only the combined exports and does not account for the distribution of deliveries and deficits to CVP and SWP contractors. DeltaSOS adjusts the DWRSIM results to simulate the export of all allowable water from the Delta for full CVP and SWP deliveries and storage of any surplus water in San Luis Reservoir. Exports may be reduced in subsequent months if San Luis Reservoir is filled under DeltaSOS simulations earlier than under DWRSIM simulations. These adjustments in combined exports increase deliveries, thereby reducing the original combined CVP and SWP deficits calculated by DWRSIM 771. The DeltaSOS adjustment in combined CVP and SWP exports ranged from 0 to 450 TAF per year and averaged about 110 TAF per year. This DeltaSOS adjustment is explained more fully under "South-of-Delta Demands and Deficits" in the section "Revisions to DeltaSOS", below.

Summary of the Comparison between Results from DWRSIM Studies 409 and 771

This comparison of results from DWRSIM study 771 and study 409 indicates that both simulations of the Delta and upstream reservoir operations provide a reasonable framework for evaluating likely future Delta Wetlands Project operations and assessing their potential environmental impacts. Delta Wetlands Project operations and potential water supply benefits are not substantially different under study 409 and study 771 conditions. Most of the changes in simulated Delta Wetlands Project operations are the result of incorporation of the FOC terms into DeltaSOS, as described below under "Revisions to DeltaSOS".

REVISED DELTA STANDARDS

Several of the Delta standards and operations criteria have been modified slightly since publication of the 1995 DEIR/EIS. Most of these modifications are AFRP recommendations for the use of CVP water under CVPIA Section (b)(2) for several Delta actions. Most of the adjustments to standards and criteria have been incorporated into DWRSIM study 771. Where necessary, DeltaSOS parameters were also modified to reflect these changes in regulatory operations of Delta water supply facilities and water quality protection standards. Adjustments made to DeltaSOS for consistency with the revised Delta criteria and standards are described below.

Minimum Sacramento River Flow at Freeport

The AFRP Delta actions include requiring Sacramento River flow at Freeport of 9,000 to 15,000 cfs in May. DWRSIM includes these specified Sacramento flows in its initial Delta water budget; therefore, further adjustment of the Sacramento River inflow values is not needed in DeltaSOS.

Delta Cross Channel and Georgiana Slough Operations

Operations of the DCC gates are controlled on a daily basis and may depend on either the Sacramento River inflow or Delta outflow at Chipps Island. Whenever Sacramento River inflow is greater than 25,000 cfs, the DCC is closed to protect the gate structure and downstream levees on the Mokelumne River. Original provisions of the 1995 WQCP called for the DCC to be closed 50% of the time from November through January and at all times from February through May. The revised AFRP rules call for the DCC to be closed from November through January. The DeltaSOS input matrix for DCC closure periods was modified accordingly to address this new standard. This modification does not change either the allowable SWP and CVP export pumping or the amount of water available for Delta Wetlands diversions.

X2 Position for Estuarine Habitat Protection

The 1995 WQCP includes a specified salinity standard to protect estuarine habitat in Suisun Bay. This standard is based on the location of X2, the mean daily bottom salinity gradient value of 2 ppt TDS, which is equivalent to approximately 3 mS/cm electrical conductivity (EC). During the February-through-June control period, X2 must be downstream of the confluence of the Sacramento and San Joaquin Rivers near Collinsville. In addition, for a certain number of days each month depending on runoff conditions, X2 must be downstream of Chipps Island and Roe Island. The AFRP action requires additional X2 days at Chipps Island from March through June. DWRSIM estimates the monthly minimum outflow necessary to satisfy the X2 standard. DeltaSOS uses the DWRSIM values for minimum Delta outflow.

Vernalis Adaptive Management Plan and Delta Export Pumping Restrictions

After the 1995 WQCP was put into effect, the VAMP was proposed and implemented to provide the April-through-May pulse-flow requirements for improving the migration of San Joaquin River chinook salmon juveniles. The VAMP flow requirement depends both on San Joaquin River flows during the pulse-flow period of April 15–May 15 and the current- and previous-water-year 60-20-20 index values; these pulse-flow requirements differ slightly from the flows specified in the 1995 WQCP.

One recommended AFRP Delta action during the VAMP period would limit combined CVP and SWP pumping to less than the San Joaquin River flow (as allowed under the 1995 WQCP). The combined pumping would be 1,500 cfs during most years, but it would increase to 2,250 cfs in some wet years and would alternate between 3,000 cfs and 1,500 cfs in years with VAMP flows of greater than 7,000 cfs. These VAMP flows and the associated pumping restrictions have been included in DWRSIM study 771.

Because DWRSIM uses split-month calculations to estimate the allowable exports during the first half of April and the second half of May but does not save the split-month calculations, it is not possible for DeltaSOS to check the DWRSIM values during April or May. Therefore, DeltaSOS does not adjust the DWRSIM exports during these two months.

As a result, DeltaSOS cannot determine whether any unused pumping capacity is available for Delta Wetlands exports in the first half of April or the second half of May. These export restrictions during the VAMP period generally increase the delivery deficits because there is usually no opportunity to increase pumping during the summer period. The possibility of allowing some Delta Wetlands exports during the VAMP period is discussed under "Additional Considerations for Proposed Project Operations and Water Supply Potential" in the results section below.

REVISIONS TO DELTASOS

This section describes modifications made to DeltaSOS to incorporate the quantifiable terms of the FOC; the USFWS, NMFS, and DFG biological opinions; and the stipulated agreements.

Restrictions for Fish Protection

Delta Wetlands Project Diversion Criteria

Numerous terms limiting Delta Wetlands Project diversion and discharge operations are specified in the FOC; some additional restrictions are specified as RPMs in DFG's biological opinion. Several of these terms have been simulated with the monthly DeltaSOS model. Other terms depend on fish monitoring and daily flow or salinity conditions, which can only be approximated in DeltaSOS modeling of Delta Wetlands Project operations.

The FOC terms include the following restrictions on Delta Wetlands diversions:

Initial diversions may not be conducted from September through November unless the X2 position is downstream of Chipps Island. X2 must be downstream of Chipps Island for 10 days if the initial diversion is made in the period from December through March. This condition was simulated in DeltaSOS with a minimum Delta outflow requirement of 9,000 cfs for the months of September through January.

Delta Wetlands may not divert to storage from September through March unless X2 is west (i.e., downstream) of Collinsville. This term was simulated with a minimum required outflow of 7,100 cfs. If the delta smelt fall midwater trawl (FMWT) index value is less than 239, diversions cannot be made unless X2 is 1.4 kilometers (km) downstream of Collinsville (assumed to correspond to an outflow of 8,500 cfs). However, because the delta smelt FMWT index value cannot be calculated, this additional set of restrictions has not been included in the DeltaSOS modeling.

Diversions may not cause the X2 position to move upstream more than 2.5 km from October through March. Because the relationship between X2 and outflow is logarithmic, this limitation has been simulated by limiting the Delta Wetlands diversions to be less than 25% of the outflow.

No water may be diverted in April or May because many delta smelt and other fish species are present during these months. This no-diversion period is extended from February 15 through June if the delta smelt FMWT index is less than 239. As noted above, the FMWT index cannot be calculated and therefore cannot be included in DeltaSOS modeling. "Additional Considerations for Proposed Project Operations and Water Supply Potential", in the results section below, discusses qualitatively the effects of this restriction on Delta Wetlands Project operations.

Diversions are limited to a specific fraction of Delta outflow, 25% from June through December and 15% from January through March.

Between November and January, the diversion rate is limited to 3,000 cfs (rather than 4,000 cfs) if the DCC is closed for fish protection and Delta inflow is less than 30,000 cfs. This limitation was simulated based on monthly average inflow.

Diversions are limited to a specified percentage of the total available water calculated from the 1995 WQCP objectives. Delta Wetlands may divert 90% of available surplus water during the months of August through January, 75% in February, and 50% in March. This provides a buffer of surplus water that may not be diverted by Delta Wetlands. These fractions are used in DeltaSOS calculations of maximum monthly diversions.

Another operations rule required by the DFG biological opinion limits Delta Wetlands Project diversions in March to a maximum rate of 550 cfs unless the previous day's QWEST is positive and is calculated to remain positive during the current day's diversions to storage. (QWEST is a calculated flow parameter that represents net flow between the central and western Delta.) A minimum QWEST flow in March is specified to minimize the upstream movement of juvenile fish life stages from the western Delta into the central Delta, where they would become vulnerable to potential entrainment losses at the export pumps and at Delta Wetlands' diversions. This rule effectively eliminates project diversions in March, except under very high flow conditions, because the DCC gates are closed for fish protection during this month and export capacity is high during this month; both of these factors reduce QWEST.

As described above, Delta Wetlands Project diversions are restricted on a daily basis by salinity conditions in the Delta (i.e., X2 and Delta outflow). The DeltaSOS monthly operations model is limited in its ability to represent daily salinity conditions and daily diversion restrictions. Additionally, Delta Wetlands discharges will be limited by the quality of water on the islands (see Chapter 4, "Water Quality"), so the quality of water at the Delta Wetlands diversion points would be a consideration for project operators. Diversion restrictions as a function of monthly modeled outflow (described above) usually result in low salinity (i.e., chloride [Cl^-]) levels in Delta channels during diversions. However, for monthly modeling purposes, diversions are also restricted until the previous month's Cl^- concentration is less than 150 milligrams per liter (mg/l). This criterion affects diversion activities in less than 5 of the simulated years (i.e., delaying diversions by one month). It is not a specific restriction in the FOC but is used as a tool in the monthly model to more closely represent daily project operations.

Delta Wetlands Project Discharge Criteria

The FOC terms prohibit Delta Wetlands Project discharges for export from Webb Tract from January through June. Delta Wetlands discharges from Bacon Island are limited by the FOC to 50% of San Joaquin River inflow during the period of April through June. Whether discharges from Bacon Island would be allowed during the VAMP export limitation period has not yet been determined. In addition, discharges from the Delta Wetlands reservoir islands are limited to 75% of the unused SWP and CVP pumping capacity in February and July and to 50% of the unused pumping capacity in March through June. Each of these monthly restrictions was specified in DeltaSOS.

Restrictions to Protect Other Parties' Senior Water Rights

Stipulated Agreements

As described in Chapter 2, Delta Wetlands entered into stipulated agreements with five parties protesting Delta Wetlands' water right applications; these agreements restrict Delta Wetlands diversion and discharge operations.

Agreements reached with DWR and Reclamation prevent diversions whenever DWR and Reclamation designate Delta conditions as being "in balance", meaning that all Delta inflow is required to meet Delta objectives and satisfy exports by the CVP and the SWP and diversions by CCWD and Delta riparian and senior appropriative water users. When Delta conditions are designated as being in balance, no additional water would be available for diversion by the Delta Wetlands Project under new water rights. When DWR and Reclamation determine that Delta conditions are "in excess" and when other terms and conditions are met, the Delta Wetlands Project would be allowed to divert available excess water for storage on the designated reservoir islands under new appropriative water rights.

Agreements with the City of Stockton and Amador County include narrative requirements that prevent Delta Wetlands operations from directly or indirectly depriving inhabitants of those jurisdictions of any water reasonably required for beneficial uses.

Delta Wetlands' agreement with North Delta Water Agency prohibits Delta Wetlands Project operations if the water quality criteria for salinity in effect pursuant to the "Contract Between State of California Department of Water Resources and North Delta Water Agency for the Assurance of a Dependable Water Supply of Suitable Quality" dated January 28, 1981, as amended, are not being met.

DeltaSOS simulates these agreements by allowing maximum possible CVP and SWP export pumping and fully satisfying in-Delta diversions by agricultural and senior appropriative water right users.

Contra Costa Water District

DeltaSOS was also modified to address the possibility that the SWRCB would restrict Delta Wetlands Project diversions to preserve CCWD's senior water rights, consistent with the X2 restriction on CCWD operations described in the 1993 USFWS biological opinion for Los Vaqueros Project effects on delta smelt.

To simulate this protection of CCWD's senior water rights, the minimum outflow in February and March is specified in DeltaSOS as 11,400 to maintain X2 downstream of Chipps Island so that Delta Wetlands diversions do not interfere with CCWD operations of Los Vaqueros Reservoir, which are limited by the biological opinion if X2 is upstream of Chipps Island.

South-of-Delta Demands and Deficits

For the 1995 DEIR/EIS, Delta Wetlands discharges for export were allowed whenever there was unused permitted pumping capacity at the SWP and CVP export pumping plants. In other words, in the DeltaSOS simulations of Delta Wetlands discharges for export, south-of-Delta demand was assumed to be unlimited.

The DeltaSOS simulation of maximum possible Delta exports was based on the assumption that all available water within the specified export pumping limits would be exported to satisfy combined CVP and SWP water demands or to serve as supplemental water supply that would be purchased by an existing SWP or CVP contractor. This assumption often resulted in additional exports that used the SWP pumping capacity to satisfy CVP demands and fill the CVP portion of San Luis Reservoir. This combined use of SWP pumping and CVP storage is sometimes referred to as "joint point of diversion" and has been approved by the SWRCB in Decision 1641 implementing the 1995 WQCP and the consolidated and conformed place of use (California State Water Resources Control Board 1999).

This assumption of maximum possible export pumping is similar to the SWP interruptible supply simulated in DWRSIM 771 as 84 TAF/month (i.e., 1,400 cfs). Interruptible delivery is made when the following conditions are met:

- there is surplus water in the Delta,
- Banks Pumping Plant has excess capacity, and
- San Luis Reservoir is full.

Because DWRSIM assumes that contractors will take this additional water whenever it is available during winter, it may be reasonably assumed that the Delta Wetlands Project water would be purchased when available.

DeltaSOS simulation of maximum possible Delta Wetlands Project discharges to export and the export of all available water by the combined CVP and SWP export pumps allows for estimation of the maximum environmental impacts that would result from discharge operations.

In response to comments on the 1995 DEIR/EIS analysis and questions raised in testimony at the SWRCB water right hearing, the lead agencies determined that presentation of a broader range of Delta Wetlands Project operations would be helpful. Delta Wetlands discharges to export could be assumed to be limited to the south-of-Delta delivery deficits simulated in DWRSIM (Figure 3A-26). Therefore, DeltaSOS was modified to allow Delta Wetlands discharges for export to be limited to south-of-Delta CVP and SWP delivery deficits. Under this option, available water may not be exported if the specified CVP and SWP demands have already been satisfied. These specified CVP and SWP demands reflect the current (i.e., 1995) level of demands and upstream development; projected future levels of demand and upstream development have not been evaluated. Actual demands for Delta Wetlands exports may vary with delivery forecasts and with other hydrologic and economic conditions.

To incorporate south-of-Delta SWP and CVP delivery deficits, the delivery deficit information was extracted from the DWRSIM results and the Delta Wetlands exports were limited to these monthly delivery deficits in the simulations. The combined CVP and SWP demands and deliveries reflect the local inflow from the San Joaquin River and Tulare Basin that satisfy CVP demands in some years and the Kern River flows that satisfy SWP demands in some years. The evaporation and seepage losses from the canals and reservoirs must also be included in these overall demand and delivery values.

Table 3A-28 lists the monthly deliveries (in cfs) and annual deliveries (in TAF) for the 1922-1994 period as simulated by DWRSIM study 771. The deliveries are generally highest in the summer months, but the monthly values vary greatly from one year to the next as governed by variable demands and the fluctuations in available water for CVP and SWP exports. Table 3A-29 shows the monthly and annual delivery deficits from DWRSIM study 771 that were used to limit potential Delta Wetlands exports, for comparison with the simulation of unlimited Delta Wetlands exports. Based on the DWRSIM 771 results, the annual deficits in south-of-Delta deliveries are relatively high, ranging from 102 TAF in the wettest year (1983) to more than 4,000 TAF in extremely dry years (e.g., 1977 and 1991).

DeltaSOS then adjusts the initial DWRSIM results to increase the combined CVP and SWP exports to the maximum extent possible and to fill San Luis Reservoir within the export limits specified by the 1995 WQCP. The combined CVP and SWP demands, deliveries, and deficits as adjusted by DeltaSOS for combined export pumping capacity under study 771 conditions for 1967-1991 are shown in Figure 3A-26.

Although the baseline DWRSIM 771 study did not simulate joint-point-of-diversion operations, water is often available for exports under a joint point of diversion to satisfy some of the CVP delivery deficits. Additional opportunities for delivery of CVP and SWP exports under a joint point of diversion were simulated by DeltaSOS; values ranged from 0 TAF to 450 TAF, with an average annual additional export of 110 TAF. Figure 3A-27 shows annual average combined demands and deliveries for DWRSIM study 771 as adjusted by DeltaSOS for a joint point of diversion. Deficits are the difference between the two. The interruptible SWP deliveries are shown at the bottom; values range from 0 TAF in dry years to a maximum of 420 TAF in wet years. Interruptible supply increases the annual demand and delivery values. The annual delivery achieved with local inflows is also shown at the bottom to range from 0 TAF in most years to a maximum of more than 1 MAF (in 1983). These local inflows reduce the annual demand and delivery values. As shown in the figure, even with a joint point of diversion, delivery deficits exist in almost all years.

REVISED ANALYSIS OF WATER SUPPLY AND OPERATIONS UNDER THE PROPOSED PROJECT

Two types of results for operations of the proposed project at a monthly time step are presented below. The first consists of the results of the updated DeltaSOS simulations, which show the potential range of water supply operations under the proposed project to provide information on the timing, frequency, and amount of project diversions and discharges. The second, based on these DeltaSOS simulation results, consists of results of the analysis of project impacts on Delta consumptive use.

These results are presented below following a description of the criteria for evaluating water supply effects and impact significance and an explanation of the scenarios evaluated in this updated analysis.

Measures of Potential Water Supply Effects and Criteria for Determining Impact Significance

Diversion and Discharge Operations and Water Supply

The following are the basic assumptions underlying the evaluation of the potential range of diversions and discharges and the resulting project yield of the proposed project:

The Delta Wetlands Project would yield a water supply based only on water stored under its own appropriative permits and subsequently conveyed to Delta channels.

The economic constraints of potential purchasers of Delta Wetlands Project water were not used as criteria for assessing impact significance.

Permits granted by the SWRCB would specify that project diversions may not interfere with the diversion and use of water by other users with riparian or senior appropriative rights. Because DeltaSOS simulations of the Delta Wetlands alternatives were constrained to preclude interference with any riparian or senior appropriator, the Delta Wetlands Project presumably would have no significant impacts related to interference with senior water rights. Impacts on senior water rights were not used as criteria for assessing impact significance.

DeltaSOS simulations of the No-Project Alternative and the proposed Delta Wetlands Project accounted for assumed constraints based on 1995 WQCP objectives, AFRP Delta actions, FOC and biological opinion terms, and terms of the stipulated agreements between Delta Wetlands and other parties that can be interpreted and simulated on a monthly basis. Delta Wetlands Project operations, as conditioned and limited by permits, would not be allowed to violate applicable Delta water quality objectives or fish and wildlife requirements or to interfere with other parties' compliance with these objectives and requirements.

Delta Wetlands Project effects on Delta outflow were not used as criteria for assessing water supply impact significance; the specified 1995 WQCP objectives were presumed to adequately protect beneficial uses related to outflow. Potential effects of augmenting Delta outflow with purchased Delta Wetlands water during periods of reduced flows are assumed to be generally beneficial to the quality of the Delta water supply.

Delta Wetlands Project effects on export water supply were not used as criteria for assessing impact significance because the addition or reduction of export water supply, by itself, is not a beneficial or adverse environmental impact.

Potential impacts of the Delta Wetlands Project on water supply, water quality, and fisheries were not directly simulated at a daily time step because available information is not sufficient to allow accurate assessment of these potential daily effects. Therefore, Delta Wetlands Project effects on daily Delta flows were not used as criteria for assessing impact significance. Results of daily simulations are compared with monthly simulation results as part of the discussion and interpretation of the basic monthly findings.

An evaluation of DeltaSOS results is included here to provide useful information for document reviewers on the potential range of project operations. The estimates of diversions and discharges

represented by these results are the basis for the updated analyses of effects of the proposed project on water quality (Chapter 3C), fisheries (Chapter 3F), and Delta consumptive water use (below).

Delta Consumptive Use

In addition to the Delta boundary water budget based on the results of DWRSIM study 771, the evaluation of likely effects of Delta Wetlands Project operations relies on a water budget that represents water use on the project islands under no-project conditions (agricultural operations). This second water budget consists of estimates for rainfall, water evaporation, crop ET, soil moisture, seepage, applied irrigation and salt leaching water, and drainage water. The water budgets for the Delta Wetlands Project islands are fully described in Appendix A1 of the 1995 DEIR/EIS.

As described in the results of the assessment of consumptive use from the 1995 DEIR/EIS, the estimated water budget for the four Delta Wetlands Project islands under the No-Project Alternative indicates a net consumptive use of about 44 TAF per year (see Table A1-8 in Appendix A1).

Under Delta Wetlands Project operations, consumptive water use would generally shift from irrigation diversions and crop ET, with minor amounts of open-water evaporation, to open-water evaporation during periods of storage on the reservoir islands and the seasonally flooded portions of the habitat islands, with minor amounts of irrigation diversions and crop ET.

A Delta Wetlands alternative is assumed to have a significant impact on Delta consumptive use if it would cause an increase in Delta lowland ET exceeding 1% of the No-Project Alternative ET from Delta lowlands (estimated as 890 TAF/yr). This assumed significance criterion could also be expressed as a change of greater than 20% of the consumptive use on the Delta Wetlands Project islands (i.e., 8.8 TAF/yr) because the project islands represent about 5% of the area of the Delta lowlands. A project alternative is considered to have a beneficial effect on Delta consumptive use if it would cause a decrease in Delta lowland ET.

Scenarios Evaluated in the Revised Analysis of Delta Wetlands Water Supply and Operations

This document evaluates three alternatives for Delta Wetlands operations, as described in Chapter 2. Alternatives 1 and 2 both represent Delta Wetlands' proposed project, consisting of water storage on two reservoir islands and implementation of an HMP on two habitat islands, but these alternatives offered two different scenarios for the discharge of stored water. Under Alternative 3, all four Delta Wetlands Project islands would be used as reservoirs and limited compensation wetland habitat would be provided on Bouldin Island. Alternative 2, with the largest amount of discharge pumping for export, would have the maximum effect on fisheries associated with project discharges. Therefore, Alternative 2 was used to represent the proposed project in the biological assessment for fish species and is the alternative on which the terms and conditions of the DFG, USFWS, and NMFS biological opinions are based. For this reason, the proposed project evaluated in the 2000 REIR/EIS is Alternative 2 from the 1995 DEIR/EIS, as modified by the changes to the project description summarized in Chapter 2.

The range of potential project operations under the proposed project, as described in the remainder of this chapter, can be affected by several factors that either depend on natural conditions that cannot be simulated (e.g., occurrence of fish species) or that would result from decisions made by the SWRCB about

allowable Delta Wetlands Project operations during the water right approval process. For example, if the FMWT delta smelt index is low, Delta Wetlands operations are more restricted than if the FWMT index is high. Alternatively, if Delta Wetlands is allowed to discharge water from Bacon Island for export in April and May (i.e., during the VAMP period), potential project water supply benefits will increase.

Figure 3A-28 shows the relationship between the Delta Wetlands Project alternatives evaluated in the 1995 DEIR/EIS and the potential operations under the proposed project that were considered in the 2000 REIR/EIS evaluation. The 1995 DEIR/EIS considered three alternatives. The Delta inflows were taken from DWRSIM study 409, which incorporated the Delta objectives from the 1995 WQCP.

The proposed project in this analysis of water supply and operations is represented by 1995 DEIR/EIS Alternative 2 with the revisions described in Chapter 2. The most consequential revision is the addition of the FOC terms. Delta inflows and other parameters are taken from DWRSIM study 771 for the no-project and with-project simulations. The analysis addresses a range of potential discharge operations for the proposed project. DeltaSOS simulation results are presented for two operational scenarios for discharge to export:

1. Project discharges are assumed to be exported if pumping capacity exists and FOC and other operating rules are met (i.e., not limited by south-of-Delta delivery deficits).

2. Project discharges to export are limited by the simulated delivery deficits (total CVP and SWP deliveries minus combined CVP and SWP demands) in addition to export capacity, FOC, and other operating rules (i.e., limited by south-of-Delta delivery deficits).

Figure 3A-28 also illustrates other considerations or operating scenarios that would affect estimated project diversions, storage, and exports. These options are discussed qualitatively below.

Results: Monthly Delta Wetlands Project Operations

This section describes the results of the 2000 REIR/EIS DeltaSOS simulations of project diversion, storage, and discharge operations, and estimates project yield under different discharge scenarios.

Water Available for Diversion and Unused Pumping Capacity

The Delta Wetlands Project water supply simulation results can be described in two basic steps: determining the availability of water for Delta Wetlands diversion and determining the opportunities for Delta Wetlands discharge for export.

Water Available for Diversion. Table 3A-30 lists the monthly (in cfs) and annual (in TAF) quantities of water available for Delta Wetlands diversions, as constrained by 1995 WQCP outflow and "percent of inflow" objectives with DWRSIM study 771 inflows. Because Delta Wetlands diversions are most likely to occur from October through March, the annual total volume is calculated for the October-March period. The results in Table 3A-30 suggest that water will be available for diversion during at least one month in the majority of years. The annual amount of water available for Delta Wetlands diversions in the months of October through March ranges from 0 TAF in 10 dry years to more than 5,000 TAF in eight wet years. Under adjusted DWRSIM study 409, less than 100 TAF of water was available in 15 years out of 70. Table 3A-30 indicates that for DWRSIM study 771, less than 100 TAF of water was available for

diversions in 17 of the 73 study years (i.e., 23%). The quantity and timing of available water simulated by DeltaSOS using DWRSIM study 771 inflows and outflow requirements is similar to the results shown in the simulations previously performed for the 1995 DEIR/EIS using the results of DWRSIM study 409.

The FOC terms impose several additional limits on the available water that may be diverted by the Delta Wetlands Project. No diversions are allowed in April or May. The project can divert only a variable percentage of the available water in the other months. These FOC diversion limits are described above under "Restrictions for Fish Protection" in the section entitled "Revisions to DeltaSOS".

Unused Pumping Capacity. Table 3A-31 shows the simulated monthly unused CVP and SWP combined permitted export capacity for adjusted DWRSIM study 771. (Unused pumping capacity in April and May cannot be determined from DWRSIM study 771 because DWRSIM uses split-month calculations.) Because Delta Wetlands exports are most likely to occur from June through September, the unused pumping capacity during this period has been summarized. Unused pumping capacity was not discussed in the 1995 DEIR/EIS but was similar in magnitude and seasonal pattern to the results presented here.

Generally, enough unused permitted pumping capacity is simulated, after all possible CVP and SWP exports have been made, to allow the full Delta Wetlands project capacity of 238 TAF to be exported in most years. However, less than 100 TAF of unused export capacity is simulated from June through September in 9 of the 73 study years (12%). These are not the same years as those when limited amounts of water are available for Delta Wetlands diversions (which represent 23% of the years simulated). Project water supply potential is therefore reduced in 35% of years in the simulations by limits on either available water or unused pumping capacity.

Project Diversions, Storage, and Exports with Unlimited Demand

Table 3A-32 shows the monthly simulated diversions for the proposed project with DWRSIM 771 inflows, net channel depletions, and required Delta outflow conditions. Table 3A-33 shows the monthly storage values and Table 3A-34 shows the discharges for export under the assumptions of maximum allowable Delta Wetlands exports for adjusted DWRSIM study 771, without limitation by south-of-Delta delivery deficits. (The table shows water years, but the 250-TAF annual export limit from the FOC is based on calendar years. Some years [e.g., 1971] in the table may appear to violate the FOC limit but do not on a calendar-year basis.)

This case represents the maximum potential Delta Wetlands operations under the proposed project, similar to the simulated Alternative 2 conditions described in the 1995 DEIR/EIS (see "Impacts and Mitigation Measures of Alternative 2" above), but as modified by the FOC and other operating rules. The annual average Delta Wetlands diversions would be 165 TAF (Table 3A-32), and the water supply potential would average about 138 TAF per year (Table 3A-34). The difference between simulated diversions and discharges for export provides an estimate of evaporation from the reservoir islands of 27 TAF. Table 3A-33 indicates that Delta Wetlands storage will not be emptied every year; the simulation results show 12 years with a carryover storage of more than 50 TAF, as indicated by October storage volume.

Figure 3A-29 shows the simulated annual Delta Wetlands diversions and discharges for export for the proposed project with exports unlimited by delivery deficits. In most years, diversions were slightly greater than discharges for export, reflecting evaporation losses during the storage period. The FOC terms limit the annual (January-December calendar year) discharge for export to less than 250 TAF. Years characterized by diversions that are much greater than discharges for export reflect carryover storage years.

Project Diversions, Storage, and Exports Limited by South-of-Delta Delivery Deficits

Tables 3A-35, 3A-36, and 3A-37 show the monthly simulated Delta Wetlands diversions, storage, and discharges for export under the assumption that Delta Wetlands exports are limited to remaining SWP and CVP delivery deficits for adjusted DWRSIM study 771. Delivery deficits are often smaller than the simulated Delta Wetlands discharges for export from June through September, causing Delta Wetlands exports to be delayed and/or reduced. For example, as shown in Table 3A-29, delivery deficits in June are less than 2,000 cfs (the maximum allowed Delta Wetlands discharge for export under the FOC terms) in many years. In these years, Delta Wetlands discharges for export are delayed with the delivery-deficit assumption, resulting in evaporative losses and reduced total discharges for export. (Table 3A-34 shows the discharges for export without the delivery-deficit limit.) The Delta Wetlands water supply operations are reduced in 22 of the 70 simulated years when compared to operations under unlimited-demand conditions. The annual average diversions would be 144 TAF, and the water supply potential would average about 114 TAF per year. Delta Wetlands carryover storage of more than 50 TAF is simulated in 16 years.

Figure 3A-30 shows the simulated annual Delta Wetlands diversions and discharges for export for the proposed project with exports limited by south-of-Delta delivery deficits. In most years, diversions were slightly greater than discharges for export, reflecting evaporation losses during the storage period. In other years, diversions were much greater than discharges, indicating carryover storage on the reservoir islands. Diversions in subsequent years were much less than discharges.

Additional Considerations for Proposed Project Operations and Water Supply Potential

Several different Delta conditions and Delta Wetlands operating choices may affect operations in particular years. Some of these conditions are listed in Figure 3A-28. Some conditions and operating choices would restrict diversions and reduce Delta Wetlands' water supply potential (i.e., yield) while others may increase potential water supply. The DeltaSOS monthly simulations described above are representative of the range of potential proposed project operations and provide the basis for evaluating environmental impacts resulting from the likely range of operations. However, several Delta conditions may necessitate adjustments in these monthly estimates of likely operations. Because most of these cannot be calculated, these additional considerations were not included in the DeltaSOS modeling.

Delta Smelt Fall Midwater Trawl Index Restriction. The Delta Wetlands FOC terms include several additional restrictions on diversions whenever the FMWT index value is less than 239. If the value is less than 239, diversions could not be made unless X2 is 1.4 km downstream of Collinsville (assumed to correspond to an outflow of 8,500 cfs), and diversions are restricted from February 15 through June. When these restrictions are in place, Delta Wetlands water supply potential would decrease.

Bacon Island Export under the Vernalis Adaptive Management Program. The possible discharge and export of Bacon Island water during April and May (the VAMP period) would increase the Delta Wetlands water supply potential. Whether VAMP rules would apply to Delta Wetlands Project exports has not been determined.

Top-Off Allowance for Evaporative Losses. The allowance for diversions to replace evaporation losses from June through October, as described in the Delta Wetlands FOC, has not been included in the DeltaSOS simulation. This "topping-off" allowance would increase the Delta Wetlands water supply potential. "Topping off" could not violate senior water rights or water quality and outflow requirements, however.

Delta Outflow Augmentation. For purposes of environmental impact assessment, Delta Wetlands Project operations modeling assumes that all Delta Wetlands water available for export would be exported. However, as indicated in the project purpose (see Chapter 2), Delta Wetlands Project water also may be released to improve Delta water quality and outflow benefits. For example, when Delta Wetlands exports are limited by export capacity or delivery deficits, the Delta Wetlands carryover storage could be reduced by the release of water during periods of relatively low Delta outflow to augment outflow or reduce salinity intrusion (i.e., through the CALFED Environmental Water Account). This could improve water quality and provide slightly improved estuarine habitat conditions. These Delta releases may reduce Delta Wetlands' water supply potential for exports (i.e., project yield) in some years compared to the simulated conditions because insufficient water may be available for diversions to refill the reservoir islands during the next winter. These Delta Wetlands releases for outflow are not assumed to replace the Delta outflow provided by CVP and SWP operations to satisfy the WQCP Delta outflow requirements.

Results: Daily Delta Wetlands Project Operations

Daily Delta Wetlands operations were evaluated in the 1995 DEIR/EIS using the DailySOS model, as described in Appendix A4, "Possible Effects of Daily Delta Conditions on Delta Wetlands Project Operations and Impact Assessments". The ability of Delta Wetlands to divert water to storage during periods of excess inflows and export during short periods of unused export pumping, while complying with the daily requirements established in the biological opinions, can be more realistically simulated with the daily model than with DeltaSOS. These daily simulations also provide a firm basis for the establishment of terms and conditions for allowable operation of the Delta Wetlands Project.

Appendix A4 of the 1995 DEIR/EIS compared the monthly and daily simulation results and determined that the monthly estimates of CVP and SWP exports were higher than the daily estimates because of inflow fluctuations resulting from storm events and because of the physical capacity of the pumping facilities. The daily Delta Wetlands Project operations were generally higher than the monthly estimates because there were short periods when diversions could be made during storm events and subsequent periods when Delta Wetlands exports could be made.

In this section, the daily rules for Delta Wetlands diversion and discharge are reviewed, and the daily results are compared with the monthly results for the case of exports not subject to limitation by delivery deficits. The 10-year period of 1985-1994 is used to illustrate the potential daily Delta Wetlands operations as constrained by the rules contained in the FOC. Appendix F of the 2000 REIR/EIS provides a narrative explanation of the DailySOS results for each year and represents the results graphically. The yearly results presented in Appendix F provide a more accurate picture of potential Delta Wetlands operations than the monthly model results; the yearly results can depict how project operations would respond to opportunities for diversions and discharges on a daily basis throughout the year.

Simulation Method

The FOC terms include rules that restrict the timing and magnitude of Delta Wetlands diversions to storage and discharges to export; those rules would be applied on a daily basis. In addition to the WQCP objectives that govern Delta exports (i.e., minimum required Delta outflow and maximum allowed exports as a percentage of inflow [E/I ratio]), several rules for Delta Wetlands diversions are applied. When more than one measure is applicable, the most restrictive is used. The FOC discharge measures differ for Bacon Island and Webb Tract, so the daily modeling simulated Bacon Island diversions, storage, and discharge

separately from Webb Tract diversions, storage, and discharge. As simulated in the daily model, Bacon Island diversions would be made first, and diversions to Webb Tract would then be made using any remaining diversion capacity under the FOC rules. Several of the criteria are more restrictive if the FMWT delta smelt index is less than 239; however, because the FMWT index value cannot be calculated, the model assumes a FMWT index greater than 239 for the daily simulations. The Delta Wetlands diversion and discharge rules are described above under "Restrictions for Fish Protection" in the section entitled "Revisions to DeltaSOS". Table 3A-38 lists those rules and the ways in which they are applied in the daily operations model.

Daily Delta Wetlands operations were simulated using daily historical Delta inflows, CCWD diversions, and net channel depletions that were adjusted to match DWRSIM 771 simulated inflows, CCWD diversions, and net channel depletions. The daily pattern of inflows caused by storm events was preserved, but upstream adjustments in reservoir storage made by the monthly planning model were assumed to provide the most realistic future seasonal inflow pattern. Figure 3A-31 illustrates this adjustment for 1985 Sacramento and San Joaquin River inflows. The daily values have been adjusted to match the DWRSIM monthly average. Adjustments in the Sacramento River flows are typically less than 2,000 cfs, with adjustments resulting in increases as well as decreases from the historical values. Adjustments in San Joaquin River flows typically reduce the flows to below historical values, except during the pulse flow (i.e., VAMP) period of April and May. Adjustments in river inflows for the other years are similar to those presented for 1985.

Summary of Daily Results

The 10-year sequence of daily simulations using the FOC for Delta Wetlands operations provides the most accurate picture of potential operations of the proposed project under highly variable Delta inflow and export conditions. Table 3A-39 provides a summary comparison between the monthly and daily model results for Delta Wetlands diversions and Delta Wetlands exports for the 1985-1994 water year sequence. The daily model results confirm the monthly Delta Wetlands diversion and export values for moderately wet years (e.g., 1985, 1986, 1993). Like the monthly results, the daily simulations indicate that there are some years with very little or no available water for Delta Wetlands diversions (i.e., 1990, 1991, 1992). However, in 1989, the monthly model indicates no available water, but the daily model shows that there is some opportunity to divert during a limited major storm event once the X2 location is downstream of Chipps Island. The daily simulation of Delta Wetlands operations indicates that more Delta Wetlands exports could be made in some dry years (i.e., 1987, 1989, and 1994) than indicated by the monthly results. On the other hand, daily simulation of 1988 shows that X2 was not located downstream of Chipps Island for a sufficient length of time to allow Delta Wetlands diversions, so exports were much less in the daily results than the monthly results for that year.

Results: Cumulative Water Supply Conditions

For the 1995 DEIR/EIS, cumulative future conditions were simulated using DeltaSOS for each of the project alternatives, based on the assumption that the full SWP pumping capacity (10,300 cfs) was available in any month for combined CVP and SWP Delta exports. This availability of full pumping capacity is considered to be the most likely change in Delta facilities that would directly influence proposed Delta Wetlands operations. It may require approval and implementation of DWR's South Delta Project and a revised USACE permit for the SWP Banks Pumping Plant. This scenario represents the reasonably foreseeable future Delta conditions and regulatory standards. Results of the DeltaSOS simulations with

DWRSIM 771 inflows and demands adjusted to the full SWP pumping capacity of 10,300 cfs were used to represent the baseline for cumulative future conditions.

For the 2000 REIR/EIS analysis, cumulative future conditions for the proposed project were simulated using DeltaSOS in the same way. The DeltaSOS simulations used DWRSIM 771 results showing likely future Delta inflows, exports, and outflows under hydrologic conditions replicating those of the 73-year hydrologic record (water years 1922-1994). The 1995 level of development and demands used in DWRSIM 771 was used for the cumulative-conditions scenario. Assumptions for maximum Delta Wetlands discharges to export in addition to maximum CVP and SWP exports (i.e., future increased demands) are briefly described for comparison with the 1995 DEIR/EIS results for cumulative future conditions.

The annual combined CVP and SWP demands, deliveries, and deficits as adjusted by DeltaSOS for baseline DWRSIM 771 conditions, but with full SWP export pumping capacity under cumulative conditions, are shown in Figure 3A-32. Additional CVP and SWP exports as adjusted for cumulative conditions ranged from 0 TAF in dry years to more than 500 TAF in wet years, with an average of 220 TAF. The delivery deficits that Delta Wetlands water supply may satisfy are less under cumulative future conditions than under existing conditions because, with full use of SWP Banks pumping capacity, the combined CVP and SWP exports will be greater.

Table 3A-40 shows the monthly diversions under the proposed project as simulated for cumulative future conditions with full pumping capacity at Banks Pumping Plant and Delta Wetlands exports unlimited by delivery deficits. Average annual diversions would be 169 TAF. Table 3A-41 shows the monthly Delta Wetlands storage values for these assumed cumulative future conditions. Carryover storage of more than 50 TAF would occur in only 3 years. Table 3A-42 shows the monthly Delta Wetlands discharge for export for these cumulative future conditions. Average annual exports of 147 TAF are simulated.

These results indicate that Delta Wetlands would operate in fewer years under cumulative conditions than under existing conditions because of reduced availability of water for diversions in some years (24 years with diversions less than 100 TAF). However, because of the greater export pumping capacity, more Delta Wetlands exports were simulated in several of the years. Average Delta Wetlands discharges for export were simulated to be approximately 9 TAF/yr more (increase of 7%) under cumulative conditions than for the proposed project without south-of-Delta delivery deficit limitations.

The likely Delta Wetlands yield under cumulative future conditions might be slightly less when limited by simulated south-of-Delta delivery deficits. However, future south-of-Delta demands and delivery deficits are likely to be greater than the 1995 level of demand simulated in DWRSIM 771. The relative effects of limiting Delta Wetlands exports by south-of-Delta delivery deficits for cumulative conditions could be similar to those reported for project conditions. For example, project yield was 138 TAF under unlimited demand versus 114 TAF when limited by south-of-Delta delivery deficits. Similarly, under cumulative conditions, project yield was 147 TAF under unlimited demand, so project yield is estimated as 123 TAF when limited by south-of-Delta delivery deficits.

When compared to results presented in the 1995 DEIR/EIS, the potential yield from Delta Wetlands Project operations under cumulative conditions is reduced from an estimated average of 197 TAF to 147 TAF because the opportunities for Delta Wetlands diversions are reduced under DWRSIM study 771 conditions and because of limitations imposed by the FOC. However, the south-of-Delta water demands are expected to increase over time, and the project would provide an increment of storage that could be used to increase deliveries to CVP and SWP contractors.

Results: Delta Consumptive Use

Under the proposed project, land uses would change from irrigated agriculture to primarily water storage on the reservoir islands and to wildlife habitat on the habitat islands. These land use changes would reduce ET for the four islands from a total of 44 TAF/yr to 14 TAF/yr (estimated ET from the habitat islands). Additionally, an average of approximately 27 TAF/yr of evaporation would be lost from stored water on the reservoir islands during periods of water storage (i.e., Delta Wetlands diversions minus discharges for export). Therefore, total consumptive use for the proposed project is simulated to be about the same as under existing conditions. There is no change from the 1995 DEIR/EIS conclusion that the project would not have a significant impact on Delta consumptive use and that no mitigation is required.

Impact Evaluation of Project Alternatives from the 1995 Draft EIR/EIS

As described in Chapter 2, project operations under Alternative 1 in the 1995 DEIR/EIS were assumed to be the same as project operations under Alternative 2, except that discharges to export were assumed to be more restricted (i.e., by strict interpretation of the E/I ratio). As shown in the 1995 DEIR/EIS analysis, Alternative 1 operations provide fewer opportunities for Delta Wetlands discharges to export—potentially meaning a lower yield—than Alternative 2 operations (i.e., project yield was 14 TAF less under Alternative 1 than Alternative 2). Changes in simulated Alternative 1 project operations between the 1995 DEIR/EIS analysis and the 2000 REIR/EIS analysis are similar in magnitude and direction to the changes described above for the proposed project (i.e., Alternative 2). Therefore, Delta Wetlands discharges to exports under Alternative 1 would be less than previously reported in the 1995 DEIR/EIS, and the potential environmental impacts of Alternative 1 are slightly less than originally estimated. Based on the daily simulation of Delta Wetlands operations, the E/I export restriction would rarely limit Delta Wetlands discharges. The likely effect of applying the E/I export limit would be an increase in the period of Delta Wetlands discharges, resulting in increased evaporative losses on the Delta Wetlands islands. These evaporative losses are estimated to result in an average annual reduction in yield of less than 10 TAF compared with the Alternative 2 results.

Alternative 3, the four-reservoir-island alternative, has not changed since the 1995 DEIR/EIS was published. The FOC and biological opinion terms were developed for two-reservoir-island operations and are not applicable to a four-reservoir-island alternative. New simulations of Alternative 3, which are based on the Delta water budget developed from DWRSIM study 771 and include AFRP actions, would result in minor changes in project diversion, storage, and discharge operations. There is no change to the conclusions of the environmental impact analysis presented in the 1995 DEIR/EIS for Alternative 3. For the results of this evaluation, see the section above from the 1995 DEIR/EIS entitled “Impacts and Mitigation Measures of Alternative 3”.

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Table 3A−1. Annual Historical Delta Water Budget for 1922 − 1991

Water Year	Sac Basin Year Type [a]	SJR Basin Year Type [a]	Sac Inflow (TAF)	Yolo Bypass Flow (TAF)	Eastside Inflow (TAF)	SJR Basin Inflow (TAF)	Total Delta Inflow (TAF)	Delta Rain (TAF)	Delta Consumptive Use (TAF)	Delta Channel Depletion (TAF)	Delta Exports (TAF)	Delta Outflow (TAF)
1922	2	1	18,998	1,302	1,840	6,732	28,873	548	1,425	877	0	28,798
1923	3	2	13,989	0	1,440	4,043	19,471	562	1,425	863	0	19,471
1924	5	5	4,373	0	106	486	4,965	146	1,425	1,279	0	4,965
1925	4	3	15,363	2,485	1,474	3,749	23,071	626	1,425	799	0	23,071
1926	4	4	11,747	721	461	1,939	14,868	446	1,425	979	0	14,868
1927	1	2	23,001	5,200	1,641	5,076	34,918	599	1,425	826	0	34,918
1928	2	3	16,199	2,092	1,034	2,709	22,033	432	1,425	993	0	22,033
1929	5	5	7,472	0	266	937	8,675	288	1,425	1,137	0	8,675
1930	4	5	13,190	906	466	1,266	15,828	607	1,411	804	0	15,017
1931	5	5	5,148	36	159	678	6,021	523	1,405	881	0	5,132
1932	4	2	12,218	432	930	3,669	17,249	731	1,400	669	0	16,577
1933	5	4	7,722	64	418	1,383	9,587	531	1,399	868	0	8,706
1934	5	5	8,041	228	432	928	9,629	558	1,399	842	0	8,786
1935	3	2	16,043	2,072	1,043	4,034	23,192	765	1,398	633	0	22,551
1936	3	2	15,512	3,357	1,602	4,986	25,458	984	1,401	416	0	25,057
1937	3	1	13,670	1,228	1,231	5,510	21,640	958	1,400	443	0	21,206
1938	1	1	25,878	14,152	2,188	10,879	53,096	1,002	1,401	399	0	52,716
1939	4	4	7,080	170	422	1,714	9,386	581	1,413	831	0	8,551
1940	2	2	18,267	6,974	1,340	4,765	31,346	948	1,429	481	0	30,867
1941	1	1	23,698	11,510	1,292	7,310	43,810	1,026	1,442	417	0	43,400
1942	1	1	22,795	6,733	1,565	6,188	37,281	1,121	1,456	335	0	36,944
1943	1	1	19,660	3,145	1,826	6,079	30,710	1,044	1,472	428	0	30,287
1944	4	3	9,069	124	515	1,798	11,506	751	1,487	737	0	10,772
1945	3	2	13,155	735	1,185	4,446	19,521	837	1,523	686	0	18,843
1946	3	2	15,903	2,101	1,091	3,627	22,723	748	1,553	805	0	21,908
1947	4	4	9,491	72	369	1,334	11,266	510	1,580	1,071	0	10,189
1948	3	3	14,552	301	703	1,550	17,106	660	1,610	951	0	16,145
1949	4	3	11,793	260	613	1,242	13,909	636	1,626	991	0	12,597
1950	3	3	13,948	357	993	1,796	17,093	606	1,642	1,036	21	15,236
1951	2	2	21,766	3,445	2,321	4,735	32,268	927	1,644	718	192	30,552
1952	1	1	28,056	3,945	2,477	7,136	41,615	1,096	1,646	550	195	40,375
1953	1	3	18,121	2,752	859	1,893	23,626	660	1,623	963	821	22,362
1954	2	3	17,110	1,213	717	1,713	20,754	589	1,637	1,049	1,063	19,140
1955	4	4	10,591	76	557	978	12,203	788	1,637	848	1,175	10,040
1956	1	1	22,328	9,860	2,359	6,287	40,833	1,159	1,686	527	765	39,743
1957	2	3	13,150	778	684	1,440	16,052	759	1,684	925	1,233	13,920
1958	1	1	26,058	10,012	2,396	6,059	44,525	1,573	1,684	111	705	43,765
1959	3	4	12,059	635	366	1,249	14,308	794	1,684	890	1,404	12,039
1960	4	5	10,771	618	255	550	12,194	559	1,686	1,127	1,460	9,707
1961	4	5	11,488	169	103	438	12,198	713	1,684	971	1,561	9,687
1962	3	3	13,089	1,123	683	1,505	16,400	820	1,684	864	1,422	14,139
1963	1	2	20,422	4,170	1,334	2,839	28,766	1,247	1,684	437	1,400	26,969
1964	4	4	11,591	67	307	1,119	13,083	643	1,686	1,044	1,726	10,384
1965	1	1	14,965	6,193	1,644	3,803	31,604	926	1,684	759	1,539	29,347
1966	3	3	13,392	377	639	1,698	16,106	686	1,684	999	1,678	13,449
1967	1	1	24,233	3,661	1,723	5,559	35,177	1,294	1,684	390	1,323	33,515
1968	3	4	13,377	668	520	1,423	15,987	653	1,686	1,033	2,564	12,507
1969	1	1	23,362	6,281	2,391	10,168	42,202	1,260	1,684	424	2,953	38,883
1970	1	2	20,289	8,500	1,415	3,076	33,280	895	1,684	789	2,162	30,290
1971	1	3	22,811	1,306	902	1,779	26,797	941	1,684	743	2,905	23,191
1972	3	4	12,470	30	365	1,112	13,977	437	1,686	1,249	3,544	9,261
1973	2	2	20,758	3,887	1,429	2,392	28,466	1,244	1,684	440	3,457	24,609
1974	1	1	30,663	7,566	1,551	2,773	42,553	995	1,684	689	4,439	37,482
1975	1	1	19,941	951	1,125	2,826	24,842	828	1,684	856	3,983	20,043
1976	5	5	10,963	15	206	1,523	12,707	460	1,686	1,226	4,951	6,583
1977	5	5	5,497	1	30	416	5,944	445	1,684	1,239	2,177	2,539
1978	2	1	17,691	2,844	1,146	4,490	26,172	1,368	1,684	316	4,427	21,467
1979	3	2	13,034	154	1,020	2,625	16,832	941	1,684	743	4,561	11,555
1980	2	1	19,248	6,502	1,830	5,986	33,566	1,045	1,686	641	4,610	28,501
1981	4	4	11,499	126	286	1,763	13,675	725	1,684	960	4,829	7,908
1982	1	1	30,101	7,229	3,038	5,477	45,845	1,655	1,684	30	4,696	41,230
1983	1	1	34,049	14,962	4,557	15,438	69,006	1,713	1,684	(29)	4,479	64,643
1984	1	2	22,384	4,689	1,807	6,260	35,140	863	1,686	824	3,938	30,592
1985	4	4	12,192	172	470	2,101	14,935	743	1,684	941	5,584	8,453
1986	1	1	18,112	10,608	2,124	5,235	36,080	1,454	1,684	230	5,396	30,493
1987	4	5	10,031	35	384	1,808	12,257	683	1,684	1,001	5,174	6,105
1988	5	5	9,653	115	143	1,164	11,075	718	1,686	968	5,746	4,409
1989	4	5	12,244	44	221	1,057	13,566	795	1,684	889	6,101	6,599
1990	5	5	9,860	21	169	914	10,965	619	1,680	1,060	5,947	3,967
1991	5	5	7,540	75	221	655	8,491	847	1,681	834	3,286	4,371
Average			15,856	2,752	1,077	3,319	23,004	819	1,587	768	1,737	20,616

Notes: [a] 1 = wet, 2 = above normal, 3 = below normal, 4 = dry, 5 = critically dry.

Sources: The 1922−1929 data are from the UNIMPAIRED data set and the 1930−1991 data are from the DAYFLOW database, both maintained by DWR. See Appendix A1 for details.

Table 3A–2. Summary of 70–Year DeltaSOS Mean Annual Simulation Output for Channel Flows, Diversions, and Exports under the DW Project Alternatives and the No–Project Alternative (TAF)

Location	No–Project Alternative	Alternative 1	Alternative 2	Alternative 3	No–Project Alternative Cumulative	Alternative 1 Cumulative	Alternative 2 Cumulative	Alternative 3 Cumulative
Sutter & Steamboat Slough flow	5,091	5,091	5,091	5,091	5,091	5,091	5,091	5,091
Revised DCC diversion	1,347	1,347	1,347	1,347	1,347	1,347	1,347	1,347
Georgiana Slough flow	4,090	4,090	4,090	4,090	4,090	4,090	4,090	4,090
Rio Vista flow	13,793	13,793	13,793	13,793	13,793	13,793	13,793	13,793
Initial DWRSIM exports	5,712	5,712	5,712	5,712	5,712	5,712	5,712	5,712
Net export change	442	450	450	464	1,018	1,029	1,029	1,046
Adjusted total export	6,154	6,162	6,162	6,177	6,730	6,741	6,741	6,759
Required Delta outflow	5,802	5,802	5,802	5,802	5,802	5,802	5,802	5,802
Outflow deficit	0	0	0	0	0	0	0	0
Montezuma Slough flow	930	931	931	931	930	931	931	931
Head of Old River diversion	1,370	1,369	1,369	1,369	1,369	1,369	1,369	1,369
Available for DW diversion	2,572	2,575	2,575	2,579	1,995	1,996	1,996	1,996
DW storage diversions	0	222	225	356	0	191	211	314
DW storage exports	0	188	202	302	0	166	197	282
DW storage releases	0	0	0	0	0	0	0	0
Final total export	6,154	6,350	6,364	6,479	6,730	6,907	6,938	7,041
Final QWEST flow	420	215	212	92	(156)	(333)	(353)	(448)
Final Delta outflow	14,120	13,915	13,912	13,792	13,544	13,367	13,347	13,252
Final Antioch flow	3,504	3,363	3,361	3,363	3,108	2,987	2,973	2,908
Old & Middle River flow	(5,304)	(5,499)	(5,514)	(5,499)	(5,879)	(6,056)	(6,087)	(6,191)

Note: Negative values shown in parentheses.

Table 3A–3. DeltaSOS Mean Annual Simulation Output for the No–Project Alternative

Water Year	SJR Basin Year Type	Available for DW Diversion (TAF)	Delta Storage (TAF)	Delta Storage Diversion (TAF)	Delta Storage Export (TAF)	Delta Storage Outflow (TAF)	Final Total Export (TAF)	Final QWEST Flow (TAF)	Final Delta Outflow (TAF)	3–Mile Slough Flow (TAF)	Old River Diversion Flow (TAF)	Final Antioch Flow (TAF)
1922	1	1,073	0	0	0	0	6,380	604	12,101	2,512	1,587	3,115
1923	2	2,231	0	0	0	0	6,491	140	10,478	2,386	1,369	2,526
1924	5	2	0	0	0	0	4,539	(1,152)	4,158	1,628	825	476
1925	3	770	0	0	0	0	5,796	(753)	8,206	2,343	852	1,590
1926	4	427	0	0	0	0	5,757	(1,085)	6,974	2,242	877	1,157
1927	2	2,854	0	0	0	0	6,604	(175)	17,268	4,140	1,038	3,966
1928	3	2,464	0	0	0	0	6,734	(706)	13,846	3,637	996	2,931
1929	5	0	0	0	0	0	4,564	(911)	4,548	1,585	851	673
1930	5	281	0	0	0	0	5,000	(1,037)	6,229	2,043	764	1,005
1931	5	0	0	0	0	0	3,327	(312)	3,677	1,054	831	743
1932	2	148	0	0	0	0	4,272	158	5,700	1,263	943	1,421
1933	4	0	0	0	0	0	3,678	(351)	4,288	1,218	853	867
1934	5	121	0	0	0	0	3,734	(445)	4,831	1,395	805	950
1935	2	612	0	0	0	0	5,986	(457)	9,392	2,459	1,131	2,002
1936	2	1,424	0	0	0	0	6,202	62	10,803	2,503	1,192	2,565
1937	1	934	0	0	0	0	5,890	768	9,629	1,842	1,494	2,610
1938	1	8,833	0	0	0	0	7,215	4,892	35,927	5,715	3,087	10,607
1939	4	548	0	0	0	0	5,781	(1,228)	5,635	2,013	995	785
1940	2	2,650	0	0	0	0	6,456	39	17,614	4,100	1,046	4,139
1941	1	5,967	0	0	0	0	6,660	2,540	30,118	5,644	2,157	8,185
1942	1	5,141	0	0	0	0	7,230	1,487	26,463	5,374	1,534	6,861
1943	1	4,699	0	0	0	0	6,712	2,090	19,572	3,441	1,611	5,531
1944	3	45	0	0	0	0	5,986	(1,246)	6,439	2,207	984	960
1945	2	880	0	0	0	0	6,487	(622)	8,286	2,294	1,254	1,672
1946	2	2,348	0	0	0	0	6,340	(139)	12,946	3,119	1,135	2,980
1947	4	1	0	0	0	0	6,032	(1,609)	5,559	2,202	958	594
1948	3	19	0	0	0	0	6,364	(1,517)	7,322	2,561	806	1,044
1949	3	449	0	0	0	0	5,709	(1,081)	7,100	2,272	842	1,191
1950	3	319	0	0	0	0	6,177	(1,212)	7,528	2,443	866	1,231
1951	2	5,184	0	0	0	0	7,131	1,567	19,847	3,789	1,430	5,356
1952	1	6,017	0	0	0	0	7,533	2,332	27,154	5,071	1,548	7,403
1953	3	2,568	0	0	0	0	6,801	(755)	15,854	4,132	1,084	3,377
1954	3	2,571	0	0	0	0	7,024	(1,203)	14,233	4,002	908	2,799
1955	4	701	0	0	0	0	6,077	(1,502)	6,170	2,283	844	781
1956	1	5,266	0	0	0	0	7,129	2,044	26,827	5,153	1,711	7,197
1957	3	931	0	0	0	0	6,761	(1,240)	9,695	2,963	964	1,723
1958	1	6,692	0	0	0	0	7,634	2,410	31,978	6,148	2,019	8,557
1959	4	1,805	0	0	0	0	6,103	(839)	9,803	2,770	997	1,931
1960	5	156	0	0	0	0	5,844	(1,661)	6,050	2,345	802	684
1961	5	222	0	0	0	0	5,768	(1,731)	6,003	2,371	763	640
1962	3	822	0	0	0	0	5,788	(967)	8,118	2,444	892	1,476
1963	2	3,051	0	0	0	0	7,129	(520)	18,205	4,546	1,021	4,025
1964	4	1,256	0	0	0	0	5,967	(1,447)	6,931	2,434	869	987
1965	1	3,152	0	0	0	0	6,732	652	19,806	4,282	1,246	4,935
1966	3	1,213	0	0	0	0	6,798	(1,380)	8,544	2,771	1,110	1,392
1967	1	4,457	0	0	0	0	7,625	1,162	21,014	4,278	1,729	5,440
1968	4	2,129	0	0	0	0	6,544	(1,080)	10,992	3,178	943	2,098
1969	1	6,435	0	0	0	0	7,306	4,789	28,667	4,081	3,097	8,870
1970	2	5,612	0	0	0	0	6,777	1,982	26,265	5,060	1,632	7,042
1971	3	2,998	0	0	0	0	6,965	(362)	16,462	4,058	993	3,696
1972	4	601	0	0	0	0	6,666	(1,896)	7,234	2,751	902	855
1973	2	4,137	0	0	0	0	6,919	660	19,041	4,090	1,204	4,750
1974	1	6,240	0	0	0	0	7,436	1,506	31,451	6,528	1,154	8,034
1975	1	2,723	0	0	0	0	7,596	(208)	15,848	3,831	1,176	3,623
1976	5	567	0	0	0	0	5,079	(1,367)	5,423	2,041	755	674
1977	5	0	0	0	0	0	3,053	(453)	3,657	1,129	676	676
1978	1	2,712	0	0	0	0	5,719	934	15,992	3,230	1,158	4,165
1979	2	1,050	0	0	0	0	6,485	(350)	9,570	2,443	1,220	2,093
1980	1	5,330	0	0	0	0	6,404	3,484	22,768	3,420	2,567	6,904
1981	4	777	0	0	0	0	6,477	(1,351)	7,698	2,559	1,068	1,208
1982	1	8,661	0	0	0	0	7,773	6,421	36,441	4,996	3,355	11,417
1983	1	21,445	0	0	0	0	8,377	18,602	61,152	4,091	9,324	22,693
1984	2	8,816	0	0	0	0	7,109	5,669	27,727	3,388	3,669	9,058
1985	4	1,574	0	0	0	0	6,239	(921)	8,171	2,431	1,103	1,511
1986	1	6,120	0	0	0	0	6,486	4,748	27,860	3,913	2,756	8,660
1987	5	67	0	0	0	0	5,844	(1,331)	5,852	2,119	919	788
1988	5	418	0	0	0	0	4,440	(980)	5,148	1,761	685	781
1989	5	228	0	0	0	0	5,296	(1,352)	6,626	2,310	646	957
1990	5	60	0	0	0	0	4,063	(835)	4,617	1,558	633	723
1991	5	4	0	0	0	0	3,804	(585)	4,857	1,478	634	892
Average		2,572	0	0	0	0	6,154	420	14,120	3,084	1,370	3,504

Notes: Definitions of the categories are provided in Table A2–3 in Appendix A2.
Water–year types: 1=wet, 2=above normal, 3=below normal, 4=dry, 5=critically dry.
Negative values shown in parentheses.

Table 3A–4. Monthly Percentiles for DeltaSOS Simulations for the No–Project Alternative

DW diversion (cfs)

Percentile	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

DW storage (TAF)

Percentile	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

DW discharge for export (cfs)

Percentile	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

DW discharge for outflow (cfs)

Percentile	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

Final CVP Tracy and SWP Banks exports (cfs)

Percentile	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	4,288	3,326	5,072	4,844	4,073	3,147	2,791	2,395	1,076	1,818	537	3,271
10	5,125	5,385	7,368	8,686	6,384	4,525	3,571	3,114	5,464	3,427	3,448	3,592
20	6,854	6,640	7,842	10,935	7,285	6,095	3,789	3,538	5,568	6,446	4,730	5,890
30	7,992	7,372	9,922	11,372	9,184	7,956	4,189	3,928	5,766	7,379	5,083	6,051
40	8,500	8,383	10,868	11,428	11,137	10,191	5,623	4,859	5,923	8,865	5,864	6,359
50	9,055	10,670	11,176	11,562	11,633	11,268	6,573	5,685	6,313	10,505	6,324	6,518
60	9,710	11,280	11,246	11,732	12,009	11,323	7,380	6,754	6,543	11,280	7,174	6,685
70	11,280	11,280	11,298	11,849	12,462	11,461	8,476	7,487	7,026	11,280	7,966	7,409
80	11,280	11,280	11,393	12,266	12,700	11,499	9,203	8,673	8,448	11,280	9,615	10,062
90	11,280	11,280	11,503	12,700	12,700	11,700	9,950	9,950	11,280	11,280	11,280	11,280
100	11,280	11,280	11,700	12,700	12,700	11,700	11,280	11,280	11,280	11,280	11,280	11,280
Mean	8,965	9,107	10,138	11,205	10,487	9,420	6,697	6,209	6,974	8,952	6,847	7,147

Table 3A-5. Consumptive Water Use Estimated for the Delta Wetlands Project Alternatives

Alternative	Consumptive Water Use (TAF/yr)			Change in Consumptive Use in Relation to the No-Project Alternative
	Habitat Island ET[a]	Stored Water Evaporation	Total	
No-Project Alternative (17,500 irrigated acres)	44[b]	0	44	Not applicable
Alternative 1 (two reservoir and two habitat islands)	14	34	48	+4
Alternative 2 (two reservoir and two habitat islands)	14	23	37	-7
Alternative 3 (four reservoir islands)	0	54	54	+10
No-Project Alternative Cumulative	44[b]	0	44	Not applicable
Alternative 1 Cumulative	14	25	39	-5
Alternative 2 Cumulative	14	14	28	-16
Alternative 3 Cumulative	0	32	32	-12

[a] ET on habitat islands consists of ET from crops grown for habitat purposes plus ET from flooded wetlands.

[b] Represents total ET on all four Delta Wetlands Project islands under intensified agriculture; wildlife habitat is not specifically developed or managed under the No-Project Alternative.

Table 3A–6. DeltaSOS Mean Annual Simulation Output for Alternative 1

Water Year	Sac Basin Year Type	Available for DW Diversion (TAF)	Delta Storage (TAF)	Delta Storage Diversion (TAF)	Delta Storage Export (TAF)	Delta Storage Outflow (TAF)	Final Total Export (TAF)	Final QWEST Flow (TAF)	Final Delta Outflow (TAF)	3–Mile Slough Flow (TAF)	Old River Diversion Flow (TAF)	Final Antioch Flow (TAF)	Old & Middle Flow (TAF)
1922	2	1,073	238	257	225	0	6,614	363	11,860	2,587	1,587	2,950	(5,526)
1923	3	2,239	238	246	241	0	6,726	(75)	10,263	2,454	1,369	2,379	(5,852)
1924	5	3	3	3	0	0	4,558	(1,149)	4,161	1,627	825	478	(4,391)
1925	4	774	222	246	183	0	5,987	(982)	7,977	2,415	852	1,433	(5,612)
1926	4	432	238	260	203	0	5,950	(1,309)	6,750	2,312	877	1,003	(5,610)
1927	1	2,854	238	277	239	0	6,857	(441)	17,003	4,224	1,038	3,783	(6,297)
1928	2	2,473	238	252	207	0	6,953	(946)	13,606	3,712	996	2,766	(6,504)
1929	5	0	0	0	0	0	4,583	(906)	4,553	1,583	851	677	(4,338)
1930	4	281	238	238	203	0	5,218	(1,264)	6,002	2,114	764	850	(5,013)
1931	5	0	0	0	0	0	3,341	(301)	3,688	1,051	831	750	(3,120)
1932	4	148	150	148	142	0	4,439	11	5,553	1,309	943	1,320	(4,009)
1933	5	0	0	0	0	0	3,696	(344)	4,295	1,216	853	872	(3,461)
1934	5	121	123	121	92	0	3,849	(564)	4,712	1,432	805	868	(3,644)
1935	3	617	238	248	206	0	6,198	(686)	9,163	2,531	1,100	1,845	(5,596)
1936	3	1,433	238	243	208	0	6,392	(138)	10,603	2,566	1,192	2,428	(5,663)
1937	3	934	238	259	214	0	6,115	522	9,383	1,920	1,494	2,442	(5,066)
1938	1	8,837	238	431	225	0	7,448	4,478	35,514	5,845	3,087	10,323	(4,735)
1939	4	552	238	84	202	0	5,995	(1,299)	5,564	2,035	995	736	(5,626)
1940	2	2,660	238	248	209	0	6,676	(195)	17,381	4,173	1,046	3,978	(6,032)
1941	1	5,968	238	249	219	0	6,887	2,307	29,885	5,717	2,157	8,025	(5,077)
1942	1	5,142	238	252	219	0	7,459	1,251	26,227	5,448	1,534	6,698	(6,371)
1943	1	4,700	238	246	214	0	6,944	1,851	19,334	3,516	1,611	5,367	(5,831)
1944	4	50	43	50	36	0	6,031	(1,281)	6,405	2,217	984	936	(5,609)
1945	3	880	238	253	201	0	6,667	(829)	8,079	2,359	1,254	1,530	(5,947)
1946	3	2,353	238	247	242	0	6,558	(338)	12,747	3,181	1,139	2,843	(5,993)
1947	4	9	5	9	0	0	6,039	(1,599)	5,568	2,199	958	600	(5,693)
1948	3	27	18	27	0	0	6,364	(1,519)	7,320	2,562	806	1,043	(6,138)
1949	4	449	238	233	201	0	5,922	(1,301)	6,880	2,341	842	1,040	(5,669)
1950	3	327	238	248	208	0	6,388	(1,438)	7,302	2,514	866	1,076	(6,111)
1951	2	5,187	238	253	204	0	7,333	1,341	19,621	3,860	1,430	5,201	(6,376)
1952	1	6,016	238	506	224	0	7,765	1,842	26,665	5,224	1,548	7,067	(6,626)
1953	1	2,567	238	6	206	0	7,018	(747)	15,861	4,130	1,084	3,382	(6,489)
1954	2	2,577	238	315	271	0	7,307	(1,504)	13,931	4,097	908	2,592	(7,006)
1955	4	709	238	249	213	0	6,292	(1,729)	5,943	2,354	844	625	(6,003)
1956	1	5,267	238	262	212	0	7,339	1,809	26,592	5,226	1,711	7,035	(6,049)
1957	2	940	238	488	444	0	7,213	(1,711)	9,224	3,111	964	1,400	(6,828)
1958	1	6,698	238	493	225	0	7,868	1,933	31,501	6,297	2,019	8,230	(6,167)
1959	3	1,811	238	219	425	0	6,543	(1,048)	9,595	2,835	997	1,787	(6,138)
1960	4	159	145	159	116	0	5,971	(1,807)	5,903	2,390	802	583	(5,769)
1961	4	227	205	227	173	0	5,950	(1,942)	5,791	2,437	763	495	(5,773)
1962	3	827	222	246	190	0	5,989	(1,199)	7,886	2,516	892	1,318	(5,631)
1963	1	3,055	238	264	224	0	7,363	(770)	17,955	4,624	1,021	3,854	(6,786)
1964	4	1,263	238	337	294	0	6,270	(1,768)	6,610	2,534	869	766	(6,015)
1965	1	3,157	238	253	216	0	6,964	408	19,562	4,359	1,246	4,767	(6,237)
1966	3	1,218	238	248	199	0	7,006	(1,612)	8,312	2,844	1,110	1,232	(6,478)
1967	1	4,461	238	498	226	0	7,853	687	20,539	4,427	1,729	5,113	(6,515)
1968	3	2,134	238	23	208	0	6,763	(1,090)	10,982	3,181	943	2,091	(6,401)
1969	1	6,436	238	497	225	0	7,538	4,309	28,188	4,231	3,097	8,541	(4,853)
1970	1	5,616	238	16	207	0	6,995	1,978	26,262	5,062	1,632	7,040	(5,866)
1971	1	3,002	238	456	431	0	7,405	(802)	16,022	4,196	993	3,393	(6,939)
1972	3	609	238	273	235	0	6,908	(2,152)	6,978	2,832	902	679	(6,642)
1973	2	4,138	238	263	218	0	7,150	408	18,790	4,169	1,204	4,577	(6,293)
1974	1	6,244	238	433	206	0	7,649	1,091	31,036	6,658	1,154	7,749	(6,978)
1975	1	2,724	238	124	212	0	7,816	(316)	15,740	3,864	1,176	3,549	(7,174)
1976	5	567	238	195	232	0	5,326	(1,554)	5,237	2,099	755	546	(5,230)
1977	5	0	0	0	0	0	3,076	(452)	3,658	1,128	676	676	(3,050)
1978	2	2,713	238	243	213	0	5,941	708	15,765	3,301	1,158	4,009	(5,160)
1979	3	1,050	238	432	393	0	6,891	(770)	9,150	2,575	1,220	1,805	(6,180)
1980	2	5,331	238	246	210	0	6,594	3,282	22,566	3,483	2,567	6,766	(4,459)
1981	4	782	238	256	217	0	6,706	(1,592)	7,456	2,635	1,068	1,042	(6,237)
1982	1	8,660	238	522	235	0	8,016	5,916	35,935	5,154	3,355	11,070	(4,988)
1983	1	21,447	238	49	0	0	8,377	18,578	61,128	4,099	9,324	22,677	760
1984	1	8,815	238	11	201	0	7,280	5,714	27,771	3,374	3,669	9,088	(4,156)
1985	4	1,578	238	242	199	0	6,450	(1,150)	7,942	2,503	1,103	1,353	(5,888)
1986	1	6,120	238	250	213	0	6,707	4,514	27,626	3,986	2,756	8,500	(4,314)
1987	4	72	68	72	58	0	5,912	(1,389)	5,794	2,137	919	748	(5,606)
1988	5	417	237	234	205	0	4,660	(1,205)	4,923	1,831	685	626	(4,551)
1989	4	236	232	236	204	0	5,504	(1,567)	6,411	2,377	646	810	(5,451)
1990	5	60	61	60	46	0	4,123	(884)	4,568	1,573	633	690	(4,081)
1991	5	4	4	4	0	0	3,824	(585)	4,858	1,477	634	893	(3,788)
Average		2,575	198	222	188	0	6,350	215	13,915	3,148	1,370	3,363	(5,499)

Notes: Definitions of the categories are provided in Table A2–3 in Appendix 2.
Water–year types: 1=wet, 2=above normal, 3=below normal, 4=dry, 5=critically dry.
Negative values shown in parentheses.

Table 3A–7. Monthly Percentiles for DeltaSOS Simulations for Alternative 1

DW diversion (cfs)

Percentile	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	15	0	0	0	0	0	0	0	0
50	0	0	13	15	30	49	0	0	0	0	0	0
60	0	25	13	15	31	49	0	0	0	85	0	0
70	53	25	13	222	31	49	0	0	0	86	0	0
80	1,020	906	384	1,065	31	49	76	99	0	86	0	0
90	3,019	4,000	1,744	3,326	2,465	76	76	99	37	86	67	734
100	3,871	4,000	3,871	3,871	4,000	3,871	192	297	118	130	115	4,000
Mean	641	698	502	691	438	216	24	29	12	43	10	379

DW storage (TAF)

Percentile	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	14	56	7	0	0	0	0	0
30	0	0	0	61	174	218	151	110	86	0	0	0
40	0	0	2	236	233	232	196	148	131	5	0	0
50	0	0	148	238	236	235	229	176	155	34	0	0
60	0	196	225	238	238	238	234	209	185	88	0	0
70	39	238	238	238	238	238	234	227	194	138	0	0
80	201	238	238	238	238	238	238	232	225	161	6	0
90	238	238	238	238	238	238	238	238	233	183	80	164
100	238	238	238	238	238	238	238	238	238	238	238	238
Mean	65	105	122	162	175	181	167	148	135	75	23	26

DW discharge for export (cfs)

Percentile	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	433	0
70	0	0	0	0	0	0	0	411	0	1,141	987	0
80	0	0	0	0	0	0	616	480	136	2,614	1,888	0
90	0	0	352	0	0	0	768	827	586	3,291	2,679	1,195
100	0	515	3,335	2,708	4,000	2,691	1,332	1,843	2,822	3,741	3,755	3,379
Mean	0	12	215	39	174	78	204	259	130	910	796	304

DW discharge for outflow (cfs)

Percentile	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

Final CVP Tracy and SWP Banks exports (cfs)

Percentile	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	4,278	3,314	5,051	4,859	6,075	4,123	2,842	2,455	1,145	1,896	597	3,296
10	5,115	5,373	7,351	9,055	6,407	4,723	3,810	3,327	5,500	6,208	3,607	3,617
20	6,844	6,628	8,569	11,036	7,754	6,095	4,662	3,956	5,568	7,611	4,790	5,966
30	7,982	7,360	10,426	11,372	9,746	8,217	4,975	4,464	5,804	10,052	5,143	6,100
40	8,490	8,371	11,114	11,428	11,320	10,191	5,753	5,424	6,202	11,280	6,824	6,405
50	9,045	10,658	11,281	11,562	11,663	11,268	6,573	6,064	6,595	11,280	8,279	6,626
60	9,700	11,280	11,315	11,732	12,097	11,340	7,380	6,581	6,968	11,280	9,116	7,589
70	11,280	11,280	11,399	11,849	12,506	11,461	8,428	7,882	7,148	11,280	10,296	9,087
80	11,280	11,280	11,472	12,266	12,700	11,499	9,203	9,437	8,756	11,280	11,280	10,268
90	11,280	11,280	11,658	12,700	12,700	11,700	9,950	9,950	11,280	11,280	11,280	11,280
100	11,280	11,280	11,700	12,700	12,700	11,700	11,280	11,280	11,280	11,280	11,280	11,280
Mean	8,958	9,113	10,343	11,247	10,664	9,506	6,886	6,484	7,125	9,902	7,694	7,472

Table 3A–8. DeltaSOS Mean Annual Simulation Output for Alternative 2

Water Year	Sac Basin Year Type	Available for DW Diversion (TAF)	Delta Storage (TAF)	Delta Storage Diversion (TAF)	Delta Storage Export (TAF)	Delta Storage Outflow (TAF)	Final Total Export (TAF)	Final QWEST Flow (TAF)	Final Delta Outflow (TAF)	3–Mile Slough Flow (TAF)	Old River Diversion Flow (TAF)	Final Antioch Flow (TAF)	Old & Middle Flow (TAF)
1922	2	1,073	238	257	225	0	6,614	363	11,860	2,587	1,587	2,950	(5,526)
1923	3	2,239	238	246	252	0	6,737	(75)	10,263	2,454	1,369	2,379	(5,862)
1924	5	3	3	3	2	0	4,559	(1,149)	4,161	1,627	825	478	(4,393)
1925	4	774	222	246	200	0	6,003	(982)	7,977	2,415	852	1,433	(5,629)
1926	4	432	238	260	230	0	5,976	(1,309)	6,750	2,312	877	1,003	(5,637)
1927	1	2,854	238	261	237	0	6,854	(424)	17,019	4,219	1,038	3,794	(6,295)
1928	2	2,473	238	287	260	0	7,006	(981)	13,571	3,723	996	2,742	(6,557)
1929	5	0	0	0	0	0	4,583	(906)	4,553	1,583	851	677	(4,338)
1930	4	281	238	244	259	0	5,273	(1,270)	5,996	2,116	764	845	(5,069)
1931	5	0	0	0	0	0	3,341	(301)	3,688	1,051	831	750	(3,120)
1932	4	148	150	148	151	0	4,447	11	5,553	1,309	943	1,320	(4,018)
1933	5	0	0	0	0	0	3,696	(344)	4,295	1,216	853	872	(3,461)
1934	5	121	123	121	132	0	3,889	(564)	4,712	1,432	805	868	(3,683)
1935	3	617	238	351	350	0	6,342	(789)	9,060	2,563	1,100	1,774	(5,740)
1936	3	1,433	238	243	222	0	6,407	(138)	10,603	2,566	1,192	2,428	(5,678)
1937	3	934	238	259	218	0	6,120	522	9,383	1,920	1,494	2,442	(5,071)
1938	1	8,837	238	431	225	0	7,448	4,478	35,514	5,845	3,087	10,323	(4,735)
1939	4	552	238	84	250	0	6,043	(1,299)	5,564	2,035	995	736	(5,674)
1940	2	2,660	238	248	227	0	6,694	(195)	17,381	4,173	1,046	3,978	(6,050)
1941	1	5,968	238	249	224	0	6,893	2,307	29,885	5,717	2,157	8,025	(5,083)
1942	1	5,142	238	260	227	0	7,467	1,242	26,218	5,450	1,534	6,692	(6,379)
1943	1	4,700	238	246	225	0	6,955	1,851	19,334	3,516	1,611	5,367	(5,841)
1944	4	50	43	50	39	0	6,034	(1,281)	6,405	2,217	984	936	(5,612)
1945	3	880	238	253	202	0	6,668	(829)	8,079	2,359	1,254	1,530	(5,948)
1946	3	2,353	238	247	252	0	6,568	(338)	12,747	3,181	1,139	2,843	(6,003)
1947	4	9	5	9	0	0	6,039	(1,599)	5,568	2,199	958	600	(5,693)
1948	3	27	18	27	7	0	6,370	(1,519)	7,320	2,562	806	1,043	(6,145)
1949	4	449	238	233	221	0	5,942	(1,301)	6,880	2,341	842	1,040	(5,689)
1950	3	327	238	248	203	0	6,383	(1,438)	7,302	2,514	866	1,076	(6,106)
1951	2	5,187	238	253	223	0	7,352	1,341	19,621	3,860	1,430	5,201	(6,396)
1952	1	6,016	238	503	220	0	7,761	1,846	26,669	5,223	1,548	7,070	(6,623)
1953	1	2,567	238	6	227	0	7,039	(747)	15,861	4,130	1,084	3,382	(6,511)
1954	2	2,577	238	289	264	0	7,300	(1,479)	13,956	4,089	908	2,610	(7,000)
1955	4	709	238	249	246	0	6,326	(1,729)	5,943	2,354	844	625	(6,037)
1956	1	5,267	238	270	220	0	7,348	1,800	26,583	5,229	1,711	7,029	(6,057)
1957	2	940	238	488	455	0	7,224	(1,711)	9,224	3,111	964	1,400	(6,839)
1958	1	6,698	238	493	225	0	7,868	1,933	31,501	6,297	2,019	8,230	(6,167)
1959	3	1,811	238	192	400	0	6,518	(1,021)	9,621	2,827	997	1,806	(6,113)
1960	4	159	145	159	141	0	5,996	(1,807)	5,903	2,390	802	583	(5,794)
1961	4	227	205	227	198	0	5,974	(1,942)	5,791	2,437	763	495	(5,798)
1962	3	827	222	246	201	0	6,000	(1,199)	7,886	2,516	892	1,318	(5,642)
1963	1	3,055	238	256	220	0	7,358	(761)	17,964	4,621	1,021	3,860	(6,782)
1964	4	1,263	238	312	306	0	6,281	(1,743)	6,635	2,526	869	784	(6,027)
1965	1	3,157	238	429	401	0	7,150	232	19,385	4,414	1,246	4,646	(6,423)
1966	3	1,218	238	248	202	0	7,009	(1,612)	8,312	2,844	1,110	1,232	(6,482)
1967	1	4,461	238	498	226	0	7,853	687	20,539	4,427	1,729	5,113	(6,515)
1968	3	2,134	238	23	207	0	6,763	(1,090)	10,982	3,181	943	2,091	(6,400)
1969	1	6,436	238	497	225	0	7,538	4,309	28,188	4,231	3,097	8,541	(4,853)
1970	1	5,616	238	16	207	0	6,996	1,978	26,262	5,062	1,632	7,040	(5,866)
1971	1	3,002	238	406	375	0	7,349	(752)	16,072	4,180	993	3,428	(6,884)
1972	3	609	238	322	289	0	6,962	(2,201)	6,929	2,847	902	646	(6,696)
1973	2	4,138	238	253	217	0	7,149	418	18,800	4,166	1,204	4,584	(6,292)
1974	1	6,244	238	433	217	0	7,661	1,091	31,036	6,658	1,154	7,749	(6,989)
1975	1	2,724	238	124	213	0	7,818	(316)	15,740	3,864	1,176	3,549	(7,176)
1976	5	567	238	195	231	0	5,326	(1,554)	5,237	2,099	755	546	(5,230)
1977	5	0	0	0	0	0	3,076	(452)	3,658	1,128	676	676	(3,050)
1978	2	2,713	238	243	228	0	5,955	708	15,765	3,301	1,158	4,009	(5,174)
1979	3	1,050	238	432	405	0	6,903	(770)	9,150	2,575	1,220	1,805	(6,192)
1980	2	5,331	238	246	220	0	6,605	3,283	22,567	3,483	2,567	6,766	(4,470)
1981	4	782	238	293	258	0	6,747	(1,630)	7,418	2,647	1,068	1,017	(6,278)
1982	1	8,660	238	509	221	0	8,002	5,930	35,949	5,150	3,355	11,080	(4,974)
1983	1	21,447	238	49	0	0	8,377	18,578	61,128	4,099	9,324	22,677	760
1984	1	8,815	238	11	201	0	7,280	5,714	27,771	3,374	3,669	9,088	(4,156)
1985	4	1,578	238	242	248	0	6,499	(1,150)	7,942	2,503	1,103	1,353	(5,937)
1986	1	6,120	238	250	227	0	6,722	4,514	27,626	3,986	2,756	8,500	(4,328)
1987	4	72	68	72	50	0	5,904	(1,389)	5,794	2,137	919	748	(5,598)
1988	5	417	237	234	244	0	4,700	(1,205)	4,923	1,831	685	626	(4,590)
1989	4	236	232	236	205	0	5,504	(1,567)	6,411	2,377	646	810	(5,452)
1990	5	60	61	60	64	0	4,141	(884)	4,568	1,573	633	690	(4,099)
1991	5	4	4	4	0	0	3,824	(585)	4,858	1,477	634	893	(3,788)
Average		2,575	198	225	202	0	6,364	212	13,912	3,149	1,370	3,361	(5,514)

Notes: Definitions of the categories are provided in Table A2–3 in Appendix 2.
Water–year types: 1=wet, 2=above normal, 3=below normal, 4=dry, 5=critically dry.
Negative values shown in parentheses.

Table 3A–9. Monthly Percentiles for DeltaSOS Simulations for Alternative 2

DW diversion (cfs)

Percentile	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	15	0	0	0	0	0	0	0	0
50	0	0	13	15	30	49	0	0	0	0	0	0
60	0	25	13	15	31	49	0	0	0	85	0	0
70	53	25	13	90	31	49	0	0	0	86	0	0
80	1,020	906	384	990	31	49	76	99	0	86	0	0
90	3,019	4,000	1,744	3,326	2,465	657	76	99	37	86	67	734
100	3,871	4,000	3,871	3,871	4,000	3,871	3,125	312	118	130	115	4,000
Mean	641	698	502	658	438	236	92	31	12	43	10	379

DW storage (TAF)

Percentile	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	61	14	0	0	0	0	0	0	0
40	0	0	2	226	145	15	30	8	0	0	0	0
50	0	0	174	238	222	226	200	99	0	5	0	0
60	0	196	233	238	238	238	225	169	0	5	0	0
70	39	238	238	238	238	238	234	204	62	5	0	0
80	201	238	238	238	238	238	238	232	147	28	0	0
90	238	238	238	238	238	238	238	238	233	137	4	164
100	238	238	238	238	238	238	238	238	238	238	238	238
Mean	65	105	125	161	147	133	130	111	61	30	9	26

DW discharge for export (cfs)

Percentile	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	266	114	0	0	0
80	0	0	0	0	1,065	181	0	457	2,228	443	0	0
90	0	0	123	0	3,353	2,309	414	880	3,283	2,614	933	0
100	0	515	3,335	2,721	4,000	3,822	1,053	3,771	3,780	3,741	3,755	2,861
Mean	0	12	176	54	667	437	81	283	783	497	293	79

DW discharge for outflow (cfs)

Percentile	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

Final CVP Tracy and SWP Banks exports (cfs)

Percentile	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	4,278	3,314	5,051	4,859	6,090	3,469	2,842	2,455	1,145	1,896	597	3,296
10	5,115	5,373	7,351	9,055	7,140	4,750	3,622	3,174	5,500	4,447	3,508	3,617
20	6,844	6,628	8,569	11,101	9,758	6,363	3,840	3,781	5,568	6,887	4,790	5,915
30	7,982	7,360	10,426	11,380	11,332	10,265	4,414	4,296	5,804	8,729	5,143	6,076
40	8,490	8,371	11,114	11,444	11,633	11,268	5,623	5,362	6,321	10,396	6,183	6,393
50	9,045	10,658	11,265	11,568	11,941	11,268	6,573	6,047	7,001	11,280	7,118	6,568
60	9,700	11,280	11,280	11,768	12,048	11,461	7,380	7,176	8,380	11,280	7,889	6,822
70	11,280	11,280	11,295	11,873	12,462	11,461	8,476	8,380	9,733	11,280	9,116	8,100
80	11,280	11,280	11,393	12,266	12,700	11,499	9,203	9,410	10,551	11,280	10,293	10,087
90	11,280	11,280	11,503	12,700	12,700	11,700	9,950	9,950	11,280	11,280	11,280	11,280
100	11,280	11,280	11,700	12,700	12,700	11,700	11,280	11,280	11,280	11,280	11,280	11,280
Mean	8,958	9,113	10,304	11,261	11,156	9,864	6,764	6,508	7,778	9,489	7,192	7,248

Table 3A–10. DeltaSOS Mean Annual Simulation Output for Alternative 3

Water Year	Sac Basin Year Type	Available for DW Diversion (TAF)	Delta Storage (TAF)	Delta Storage Diversion (TAF)	Delta Storage Export (TAF)	Delta Storage Outflow (TAF)	Final Total Export (TAF)	Final QWEST Flow (TAF)	Final Delta Outflow (TAF)	3–Mile Slough Flow (TAF)	Old River Diversion Flow (TAF)	Final Antioch Flow (TAF)	Old & Middle Flow (TAF)
1922	2	1,073	406	462	368	0	6,773	167	11,664	2,648	1,587	2,816	(5,685)
1923	3	2,247	406	426	424	0	6,916	(236)	10,101	2,504	1,369	2,268	(6,042)
1924	5	4	4	4	0	0	4,579	(1,144)	4,166	1,626	825	482	(4,412)
1925	4	779	333	371	289	0	6,110	(1,099)	7,861	2,452	852	1,353	(5,735)
1926	4	436	383	423	336	0	6,098	(1,463)	6,596	2,360	877	897	(5,759)
1927	1	2,857	406	437	374	0	7,009	(591)	16,852	4,271	1,038	3,680	(6,450)
1928	2	2,476	406	467	390	0	7,151	(1,150)	13,402	3,776	996	2,626	(6,702)
1929	5	0	0	0	0	0	4,604	(901)	4,558	1,581	851	681	(4,359)
1930	4	281	275	281	296	0	5,333	(1,303)	5,963	2,126	764	823	(5,128)
1931	5	0	0	0	0	0	3,363	(297)	3,692	1,050	831	753	(3,142)
1932	4	148	149	148	146	0	4,464	15	5,556	1,308	943	1,323	(4,035)
1933	5	0	0	0	0	0	3,722	(344)	4,295	1,216	853	872	(3,486)
1934	5	121	123	121	130	0	3,910	(560)	4,716	1,431	805	871	(3,704)
1935	3	621	369	484	457	0	6,465	(912)	8,937	2,602	1,100	1,690	(5,863)
1936	3	1,436	406	419	352	0	6,554	(306)	10,435	2,618	1,192	2,312	(5,825)
1937	3	934	406	439	371	0	6,294	347	9,208	1,974	1,494	2,321	(5,245)
1938	1	8,844	406	626	368	0	7,601	4,298	35,334	5,901	3,087	10,199	(4,888)
1939	4	559	406	255	412	0	6,215	(1,454)	5,409	2,084	995	629	(5,846)
1940	2	2,663	406	428	361	0	6,848	(370)	17,206	4,228	1,046	3,858	(6,204)
1941	1	5,971	406	430	374	0	7,058	2,136	29,714	5,771	2,157	7,907	(5,249)
1942	1	5,146	406	446	370	0	7,620	1,072	26,048	5,504	1,534	6,576	(6,532)
1943	1	4,700	406	424	382	0	7,128	1,682	19,165	3,569	1,611	5,251	(6,014)
1944	4	54	43	54	36	0	6,049	(1,277)	6,408	2,216	984	939	(5,627)
1945	3	880	406	441	335	0	6,819	(1,010)	7,898	2,416	1,254	1,406	(6,099)
1946	3	2,359	406	418	416	0	6,744	(495)	12,590	3,230	1,139	2,735	(6,180)
1947	4	17	10	17	0	0	6,053	(1,596)	5,572	2,198	958	603	(5,707)
1948	3	35	18	35	4	0	6,378	(1,512)	7,327	2,560	806	1,048	(6,153)
1949	4	449	369	362	336	0	6,077	(1,424)	6,757	2,379	842	955	(5,824)
1950	3	335	309	335	242	0	6,435	(1,511)	7,228	2,537	866	1,026	(6,158)
1951	2	5,197	406	432	353	0	7,495	1,174	19,455	3,912	1,430	5,087	(6,538)
1952	1	6,021	406	715	370	0	7,922	1,649	26,471	5,285	1,548	6,934	(6,783)
1953	1	2,569	406	154	345	0	7,169	(881)	15,728	4,172	1,084	3,291	(6,640)
1954	2	2,581	406	471	393	0	7,444	(1,649)	13,786	4,142	908	2,493	(7,143)
1955	4	719	406	423	404	0	6,488	(1,881)	5,790	2,402	839	521	(6,204)
1956	1	5,272	406	453	363	0	7,504	1,630	26,413	5,283	1,711	6,912	(6,214)
1957	2	947	406	711	624	0	7,405	(1,921)	9,014	3,176	964	1,256	(7,020)
1958	1	6,701	406	685	368	0	8,018	1,759	31,328	6,352	2,019	8,110	(6,318)
1959	3	1,815	406	367	531	0	6,660	(1,181)	9,461	2,877	997	1,696	(6,254)
1960	4	166	145	166	139	0	6,010	(1,803)	5,907	2,389	802	586	(5,807)
1961	4	231	205	231	195	0	5,989	(1,938)	5,795	2,436	763	498	(5,812)
1962	3	832	333	371	293	0	6,109	(1,315)	7,769	2,553	892	1,237	(5,752)
1963	1	3,057	406	440	363	0	7,512	(930)	17,795	4,674	1,021	3,744	(6,935)
1964	4	1,274	406	491	469	0	6,454	(1,905)	6,472	2,577	869	672	(6,199)
1965	1	3,163	406	594	522	0	7,287	77	19,230	4,463	1,246	4,539	(6,560)
1966	3	1,225	406	425	334	0	7,149	(1,772)	8,152	2,894	1,110	1,123	(6,622)
1967	1	4,468	406	694	316	0	7,952	508	20,360	4,483	1,729	4,991	(6,613)
1968	3	2,138	406	145	335	0	6,901	(1,196)	10,876	3,214	943	2,018	(6,538)
1969	1	6,436	406	806	368	0	7,694	4,013	27,892	4,324	3,097	8,337	(5,009)
1970	1	5,623	406	80	344	0	7,142	1,931	26,215	5,076	1,632	7,008	(6,013)
1971	1	3,009	406	593	498	0	7,484	(925)	15,899	4,234	993	3,309	(7,018)
1972	3	617	406	487	388	0	7,070	(2,349)	6,781	2,893	902	544	(6,805)
1973	2	4,138	406	427	371	0	7,321	253	18,634	4,218	1,204	4,470	(6,463)
1974	1	6,251	406	615	347	0	7,802	924	30,869	6,711	1,154	7,634	(7,130)
1975	1	2,727	406	310	356	0	7,968	(484)	15,572	3,917	1,176	3,433	(7,327)
1976	5	567	406	363	393	0	5,505	(1,712)	5,078	2,149	755	437	(5,408)
1977	5	0	0	0	0	0	3,103	(453)	3,657	1,129	676	676	(3,077)
1978	2	2,713	406	420	365	0	6,115	534	15,591	3,356	1,158	3,890	(5,334)
1979	3	1,052	406	607	531	0	7,045	(936)	8,984	2,627	1,220	1,691	(6,333)
1980	2	5,331	406	417	373	0	6,774	3,121	22,405	3,534	2,567	6,655	(4,639)
1981	4	786	406	467	384	0	6,884	(1,790)	7,258	2,697	1,068	906	(6,416)
1982	1	8,665	406	815	344	0	8,136	5,639	35,658	5,241	3,355	10,880	(5,108)
1983	1	21,455	406	136	0	0	8,377	18,517	61,067	4,118	9,324	22,635	760
1984	1	8,820	406	22	334	0	7,423	5,718	27,775	3,373	3,669	9,091	(4,299)
1985	4	1,584	406	419	407	0	6,668	(1,311)	7,781	2,553	1,103	1,243	(6,106)
1986	1	6,124	406	442	379	0	6,889	4,332	27,444	4,043	2,756	8,374	(4,495)
1987	4	76	68	76	46	0	5,915	(1,382)	5,801	2,135	919	753	(5,609)
1988	5	419	369	366	373	0	4,848	(1,331)	4,797	1,871	685	540	(4,738)
1989	4	244	232	244	174	0	5,487	(1,562)	6,416	2,375	646	813	(5,434)
1990	5	60	61	60	62	0	4,161	(880)	4,572	1,572	633	692	(4,119)
1991	5	4	4	4	0	0	3,848	(583)	4,859	1,477	634	894	(3,812)
Average		2,579	321	356	302	0	6,479	92	13,792	3,186	1,369	3,279	(5,628)

Notes: Definitions of the categories are provided in Table A2–3 in Appendix A2.
Water–year types: 1=wet, 2=above normal, 3=below normal, 4=dry, 5=critically dry.
Negative values shown in parentheses.

Table 3A–11. Monthly Percentiles for DeltaSOS Simulations for Alternative 3

DW diversion (cfs)

Percentile	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	29	0	0	0	0	0	0	0	0
50	0	0	26	29	59	98	0	0	0	0	0	0
60	0	50	26	102	61	98	0	0	0	157	0	0
70	106	235	822	632	61	98	0	0	0	158	0	0
80	2,452	2,434	1,111	1,593	704	98	151	198	0	158	0	0
90	3,763	5,702	4,227	3,326	3,207	773	151	198	37	158	123	778
100	6,000	6,000	6,000	6,000	6,000	6,000	3,000	484	235	260	231	6,000
Mean	996	1,152	964	976	761	322	110	55	24	80	19	445

DW storage (TAF)

Percentile	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	1	0	0	0	0	0	0	0
30	0	0	0	102	107	0	0	0	0	0	0	0
40	0	0	5	275	265	123	129	102	0	10	0	0
50	0	0	248	369	337	364	360	234	37	10	0	0
60	0	197	369	406	406	406	387	312	95	31	0	0
70	42	357	402	406	406	406	397	368	209	66	0	0
80	201	406	406	406	406	406	406	394	298	160	8	0
90	406	406	406	406	406	406	406	406	394	275	64	166
100	406	406	406	406	406	406	406	406	406	406	406	406
Mean	94	161	208	263	259	232	227	206	127	76	21	34

DW discharge for export (cfs)

Percentile	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	139	0	271	1,018	0	323	0
80	0	0	0	0	1,184	1,104	29	416	3,283	1,460	873	0
90	0	0	123	0	3,530	2,568	416	839	4,674	2,677	3,435	695
100	425	473	3,740	2,717	6,000	4,975	1,030	3,000	4,899	6,000	5,237	3,917
Mean	6	10	179	58	784	678	91	270	1,187	777	777	191

DW discharge for outflow (cfs)

Percentile	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

Final CVP Tracy and SWP Banks exports (cfs)

Percentile	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	4,329	3,356	5,087	4,862	6,108	3,360	2,865	2,496	1,207	1,968	653	3,340
10	5,166	5,415	7,387	9,055	7,109	4,810	3,645	3,215	5,500	5,172	3,564	3,661
20	6,895	6,670	8,605	11,101	10,454	7,142	3,873	3,781	5,613	7,470	4,957	5,959
30	8,033	7,402	10,462	11,380	11,632	11,079	4,797	4,300	5,864	9,807	5,199	6,144
40	8,541	8,413	11,176	11,460	11,663	11,268	5,623	5,456	6,550	11,280	7,214	6,449
50	9,096	10,700	11,259	11,578	12,009	11,268	6,573	6,047	8,152	11,280	8,082	6,614
60	9,751	11,280	11,280	11,768	12,097	11,461	7,380	7,176	9,645	11,280	8,944	7,028
70	11,280	11,280	11,298	11,873	12,462	11,461	8,476	8,380	11,280	11,280	10,217	8,266
80	11,280	11,280	11,393	12,266	12,700	11,574	9,203	9,410	11,280	11,280	11,280	10,514
90	11,280	11,280	11,503	12,700	12,700	11,700	9,950	9,950	11,280	11,280	11,280	11,280
100	11,280	11,280	11,700	12,700	12,700	11,700	11,280	11,280	11,280	11,280	11,280	11,280
Mean	8,998	9,134	10,323	11,267	11,275	10,104	6,783	6,517	8,199	9,806	7,723	7,398

Table 3A–12. DeltaSOS Mean Annual Simulation Output for the No–Project Alternative under Cumulative Conditions

Water Year	Sac Basin Year Type	Available for DW Diversion (TAF)	Delta Storage (TAF)	Delta Storage Diversion (TAF)	Delta Storage Export (TAF)	Delta Storage Outflow (TAF)	Final Total Export (TAF)	Final QWEST Flow (TAF)	Final Delta Outflow (TAF)	3–Mile Slough Flow (TAF)	Old River Diversion Flow (TAF)	Final Antioch Flow (TAF)
1922	2	276	0	0	0	0	7,177	(193)	11,304	2,761	1,587	2,568
1923	3	1,512	0	0	0	0	7,210	(579)	9,759	2,612	1,369	2,033
1924	5	0	0	0	0	0	4,542	(1,154)	4,155	1,629	825	475
1925	4	597	0	0	0	0	5,969	(926)	8,033	2,398	852	1,471
1926	4	201	0	0	0	0	5,966	(1,294)	6,765	2,307	877	1,013
1927	1	1,964	0	0	0	0	7,494	(1,065)	16,379	4,419	1,038	3,355
1928	2	1,823	0	0	0	0	7,374	(1,347)	13,205	3,838	996	2,491
1929	5	0	0	0	0	0	4,564	(911)	4,548	1,585	851	673
1930	4	85	0	0	0	0	5,196	(1,233)	6,033	2,104	764	871
1931	5	0	0	0	0	0	3,327	(312)	3,677	1,054	831	743
1932	4	0	0	0	0	0	4,420	10	5,552	1,309	943	1,320
1933	5	0	0	0	0	0	3,678	(351)	4,288	1,218	853	867
1934	5	0	0	0	0	0	3,855	(566)	4,710	1,433	805	867
1935	3	335	0	0	0	0	6,263	(734)	9,115	2,546	1,100	1,812
1936	3	1,139	0	0	0	0	6,487	(223)	10,518	2,592	1,192	2,370
1937	3	657	0	0	0	0	6,167	491	9,352	1,929	1,494	2,420
1938	1	7,361	0	0	0	0	8,687	3,419	34,455	6,176	3,087	9,596
1939	4	203	0	0	0	0	6,127	(1,574)	5,289	2,121	995	547
1940	2	2,037	0	0	0	0	7,070	(575)	17,001	4,292	1,046	3,717
1941	1	5,154	0	0	0	0	7,473	1,727	29,305	5,899	2,157	7,627
1942	1	4,079	0	0	0	0	8,293	425	25,401	5,706	1,534	6,132
1943	1	3,663	0	0	0	0	7,749	1,053	18,536	3,766	1,611	4,819
1944	4	0	0	0	0	0	6,031	(1,292)	6,394	2,221	984	929
1945	3	656	0	0	0	0	6,712	(847)	8,062	2,365	1,254	1,518
1946	3	1,793	0	0	0	0	6,895	(695)	12,390	3,293	1,135	2,598
1947	4	0	0	0	0	0	6,033	(1,609)	5,558	2,203	958	593
1948	3	0	0	0	0	0	6,382	(1,536)	7,303	2,567	806	1,031
1949	4	254	0	0	0	0	5,903	(1,275)	6,906	2,333	842	1,057
1950	3	21	0	0	0	0	6,475	(1,509)	7,230	2,536	866	1,027
1951	2	4,503	0	0	0	0	7,812	886	19,166	4,003	1,430	4,889
1952	1	4,681	0	0	0	0	8,868	997	25,819	5,490	1,548	6,486
1953	1	1,918	0	0	0	0	7,451	(1,405)	15,204	4,336	1,084	2,931
1954	2	1,496	0	0	0	0	8,099	(2,278)	13,158	4,339	908	2,061
1955	4	319	0	0	0	0	6,459	(1,884)	5,788	2,403	839	519
1956	1	4,550	0	0	0	0	7,846	1,328	26,111	5,377	1,711	6,705
1957	2	361	0	0	0	0	7,332	(1,811)	9,125	3,142	964	1,331
1958	1	5,027	0	0	0	0	9,299	744	30,313	6,670	2,019	7,414
1959	3	1,191	0	0	0	0	6,717	(1,453)	9,189	2,962	997	1,509
1960	4	0	0	0	0	0	6,000	(1,817)	5,894	2,393	802	576
1961	4	45	0	0	0	0	5,945	(1,908)	5,825	2,427	763	518
1962	3	679	0	0	0	0	5,932	(1,111)	7,974	2,489	892	1,378
1963	1	2,088	0	0	0	0	8,092	(1,484)	17,242	4,847	1,021	3,364
1964	4	756	0	0	0	0	6,467	(1,947)	6,431	2,590	869	644
1965	1	2,633	0	0	0	0	7,252	133	19,286	4,445	1,246	4,578
1966	3	726	0	0	0	0	7,285	(1,867)	8,057	2,924	1,110	1,057
1967	1	3,092	0	0	0	0	8,990	(203)	19,649	4,706	1,729	4,503
1968	3	1,224	0	0	0	0	7,449	(1,985)	10,087	3,462	943	1,477
1969	1	5,106	0	0	0	0	8,636	3,459	27,337	4,498	3,097	7,957
1970	1	4,600	0	0	0	0	7,789	969	25,253	5,378	1,632	6,347
1971	1	2,192	0	0	0	0	7,771	(1,168)	15,656	4,310	993	3,142
1972	3	76	0	0	0	0	7,190	(2,421)	6,709	2,916	902	495
1973	2	3,238	0	0	0	0	7,818	(240)	18,142	4,372	1,204	4,132
1974	1	5,056	0	0	0	0	8,619	323	30,268	6,899	1,154	7,222
1975	1	1,805	0	0	0	0	8,513	(1,125)	14,930	4,118	1,176	2,993
1976	5	131	0	0	0	0	5,515	(1,803)	4,987	2,178	755	374
1977	5	0	0	0	0	0	3,053	(453)	3,657	1,129	676	676
1978	2	2,135	0	0	0	0	6,295	358	15,415	3,411	1,158	3,769
1979	3	488	0	0	0	0	7,047	(913)	9,007	2,620	1,220	1,707
1980	2	4,573	0	0	0	0	7,161	2,727	22,011	3,657	2,567	6,384
1981	4	271	0	0	0	0	6,984	(1,857)	7,191	2,718	1,068	861
1982	1	7,155	0	0	0	0	9,279	4,916	34,935	5,468	3,355	10,384
1983	1	19,190	0	0	0	0	10,631	16,348	58,898	4,798	9,324	21,146
1984	1	7,825	0	0	0	0	8,100	4,679	26,736	3,699	3,669	8,378
1985	4	1,002	0	0	0	0	6,811	(1,492)	7,600	2,610	1,103	1,118
1986	1	5,487	0	0	0	0	7,119	4,115	27,227	4,111	2,756	8,225
1987	4	0	0	0	0	0	5,911	(1,398)	5,785	2,140	919	742
1988	5	218	0	0	0	0	4,640	(1,180)	4,948	1,823	685	643
1989	4	24	0	0	0	0	5,500	(1,556)	6,422	2,374	646	817
1990	5	0	0	0	0	0	4,123	(894)	4,557	1,577	633	682
1991	5	0	0	0	0	0	3,808	(589)	4,853	1,479	634	890
Average		1,995	0	0	0	0	6,730	(156)	13,544	3,264	1,369	3,108

Notes: Definitions of the categories are provided in Table A2–3 in Appendix 2.
Water–year types: 1=wet, 2=above normal, 3=below normal, 4=dry, 5=critically dry.
Negative values shown in parentheses.

Table 3A–13. Monthly Percentiles for DeltaSOS Simulations for the No–Project Alternative under Cumulative Conditions

DW diversion (cfs)

Percentile	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

DW storage (TAF)

Percentile	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

DW discharge for export (cfs)

Percentile	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

DW discharge for outflow (cfs)

Percentile	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

Final CVP Tracy and SWP Banks exports (cfs)

Percentile	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	4,288	3,326	5,072	4,844	4,073	3,147	2,791	2,395	1,076	1,818	537	3,271
10	5,125	5,385	7,368	8,686	6,384	4,525	3,571	3,114	5,464	3,427	3,448	3,592
20	6,854	6,640	7,842	10,935	7,285	6,095	3,789	3,538	5,568	6,446	4,730	5,890
30	7,992	7,372	9,922	11,575	9,184	7,956	4,189	3,928	5,766	7,379	5,083	6,051
40	8,500	8,383	10,868	13,474	11,137	10,191	5,623	4,859	5,923	8,865	5,864	6,359
50	9,055	10,670	11,667	14,500	14,500	11,701	6,552	5,685	6,313	10,505	6,324	6,518
60	9,710	12,488	13,050	14,500	14,500	13,992	7,380	6,754	6,543	11,287	7,174	6,685
70	11,921	14,219	14,500	14,500	14,500	14,500	8,921	7,487	7,026	11,288	7,966	7,409
80	14,542	14,900	14,500	14,500	14,500	14,500	10,960	8,829	8,448	11,288	9,615	10,062
90	14,900	14,900	14,500	14,500	14,500	14,500	11,760	11,760	11,317	11,288	11,287	14,004
100	14,900	14,900	14,500	14,500	14,500	14,500	14,900	14,900	14,900	14,900	14,155	14,900
Mean	9,968	10,424	11,479	12,759	11,671	10,752	7,249	6,614	7,326	9,026	6,889	7,552

Table 3A–14. DeltaSOS Mean Annual Simulation Output for Alternative 1 under Cumulative Conditions

Water Year	Sac Basin Year Type	Available for DW Diversion (TAF)	Delta Storage (TAF)	Delta Storage Diversion (TAF)	Delta Storage Export (TAF)	Delta Storage Outflow (TAF)	Final Total Export (TAF)	Final QWEST Flow (TAF)	Final Delta Outflow (TAF)	3–Mile Slough Flow (TAF)	Old River Diversion Flow (TAF)	Final Antioch Flow (TAF)	Old & Middle Flow (TAF)
1922	2	276	238	263	219	0	7,404	(440)	11,057	2,839	1,587	2,399	(6,316)
1923	3	1,512	238	238	241	0	7,453	(794)	9,544	2,679	1,369	1,885	(6,579)
1924	5	0	0	0	0	0	4,561	(1,149)	4,161	1,627	825	478	(4,395)
1925	4	597	222	241	190	0	6,171	(1,155)	7,804	2,469	852	1,315	(5,797)
1926	4	201	186	201	154	0	6,130	(1,481)	6,578	2,366	877	885	(5,791)
1927	1	1,965	238	274	243	0	7,749	(1,326)	16,118	4,501	1,038	3,175	(7,190)
1928	2	1,828	238	247	208	0	7,600	(1,587)	12,966	3,913	996	2,326	(7,151)
1929	5	0	0	0	0	0	4,583	(906)	4,553	1,583	851	677	(4,338)
1930	4	85	86	85	72	0	5,282	(1,307)	5,959	2,127	764	820	(5,078)
1931	5	0	0	0	0	0	3,341	(301)	3,688	1,051	831	750	(3,120)
1932	4	0	0	0	0	0	4,444	11	5,553	1,309	943	1,320	(4,014)
1933	5	0	0	0	0	0	3,696	(344)	4,295	1,216	853	872	(3,461)
1934	5	0	0	0	0	0	3,878	(564)	4,712	1,432	805	868	(3,672)
1935	3	335	238	237	207	0	6,481	(957)	8,892	2,616	1,100	1,659	(5,879)
1936	3	1,139	238	235	206	0	6,685	(424)	10,317	2,655	1,192	2,231	(5,956)
1937	3	657	238	259	214	0	6,392	245	9,106	2,006	1,494	2,251	(5,343)
1938	1	7,363	238	265	225	0	8,922	3,170	34,205	6,255	3,087	9,424	(6,209)
1939	4	203	207	203	172	0	6,315	(1,767)	5,096	2,182	995	414	(5,946)
1940	2	2,041	238	242	214	0	7,299	(808)	16,768	4,365	1,046	3,558	(6,655)
1941	1	5,155	238	249	219	0	7,700	1,494	29,072	5,972	2,157	7,466	(5,890)
1942	1	4,080	238	247	213	0	8,515	193	25,169	5,779	1,534	5,972	(7,427)
1943	1	3,664	238	243	210	0	7,976	817	18,300	3,840	1,611	4,657	(6,863)
1944	4	0	0	0	0	0	6,045	(1,281)	6,405	2,217	984	936	(5,623)
1945	3	656	222	241	190	0	6,880	(1,041)	7,867	2,426	1,254	1,384	(6,160)
1946	3	1,792	238	234	242	0	7,118	(885)	12,200	3,353	1,139	2,468	(6,553)
1947	4	0	0	0	0	0	6,048	(1,599)	5,568	2,199	958	600	(5,702)
1948	3	0	0	0	0	0	6,390	(1,519)	7,320	2,562	806	1,043	(6,165)
1949	4	254	238	233	208	0	6,123	(1,495)	6,685	2,402	842	906	(5,870)
1950	3	21	22	21	6	0	6,492	(1,517)	7,223	2,539	866	1,022	(6,215)
1951	2	4,502	238	244	206	0	8,021	663	18,943	4,073	1,430	4,736	(7,065)
1952	1	4,681	238	303	225	0	9,100	711	25,534	5,579	1,548	6,290	(7,962)
1953	1	1,917	238	194	206	0	7,668	(1,585)	15,023	4,392	1,084	2,807	(7,139)
1954	2	1,497	238	419	383	0	8,498	(2,688)	12,747	4,468	908	1,780	(8,198)
1955	4	319	238	234	204	0	6,671	(2,102)	5,570	2,471	839	369	(6,387)
1956	1	4,549	238	249	219	0	8,064	1,103	25,887	5,447	1,711	6,551	(6,773)
1957	2	361	209	361	335	0	7,683	(2,163)	8,773	3,252	964	1,090	(7,298)
1958	1	5,034	238	271	225	0	9,532	491	30,060	6,749	2,019	7,240	(7,832)
1959	3	1,192	238	427	428	0	7,165	(1,875)	8,768	3,094	997	1,220	(6,759)
1960	4	0	0	0	0	0	6,015	(1,807)	5,903	2,390	802	583	(5,812)
1961	4	45	41	45	34	0	5,993	(1,942)	5,791	2,437	763	495	(5,817)
1962	3	679	222	241	192	0	6,139	(1,342)	7,743	2,561	892	1,219	(5,782)
1963	1	2,087	238	303	267	0	8,374	(1,776)	16,949	4,939	1,021	3,163	(7,797)
1964	4	756	238	435	397	0	6,879	(2,372)	6,006	2,724	849	352	(6,645)
1965	1	2,633	238	247	217	0	7,490	(110)	19,043	4,521	1,246	4,411	(6,763)
1966	3	726	238	243	204	0	7,501	(2,097)	7,826	2,996	1,110	899	(6,974)
1967	1	3,091	238	272	218	0	9,215	(457)	19,395	4,785	1,729	4,328	(7,877)
1968	3	1,224	238	226	206	0	7,672	(2,203)	9,869	3,530	943	1,327	(7,310)
1969	1	5,106	238	400	219	0	8,861	3,077	26,955	4,618	3,097	7,694	(6,176)
1970	1	4,599	238	98	208	0	8,014	879	25,163	5,406	1,632	6,285	(6,885)
1971	1	2,192	238	433	417	0	8,202	(1,590)	15,234	4,442	993	2,853	(7,737)
1972	3	76	78	76	61	0	7,268	(2,488)	6,642	2,937	902	449	(7,002)
1973	2	3,239	238	244	209	0	8,041	(472)	17,910	4,445	1,204	3,973	(7,184)
1974	1	5,060	238	252	213	0	8,841	86	30,032	6,973	1,154	7,060	(8,170)
1975	1	1,805	238	257	208	0	8,731	(1,368)	14,688	4,194	1,176	2,826	(8,090)
1976	5	131	132	131	128	0	5,659	(1,926)	4,864	2,216	755	290	(5,563)
1977	5	0	0	0	0	0	3,076	(452)	3,658	1,128	676	676	(3,050)
1978	2	2,136	238	243	213	0	6,517	131	15,188	3,482	1,158	3,613	(5,737)
1979	3	488	238	235	206	0	7,266	(1,135)	8,785	2,689	1,220	1,554	(6,555)
1980	2	4,574	238	239	209	0	7,350	2,533	21,817	3,718	2,567	6,251	(5,215)
1981	4	271	238	233	205	0	7,204	(2,081)	6,967	2,788	1,068	707	(6,736)
1982	1	7,154	238	492	219	0	9,505	4,441	34,460	5,617	3,355	10,057	(6,477)
1983	1	19,189	238	98	41	0	10,676	16,271	58,821	4,822	9,324	21,093	(1,539)
1984	1	7,824	238	11	208	0	8,277	4,723	26,780	3,685	3,669	8,408	(5,153)
1985	4	1,001	238	242	204	0	7,031	(1,726)	7,366	2,683	1,103	958	(6,469)
1986	1	5,489	238	259	208	0	7,335	3,873	26,985	4,187	2,756	8,059	(4,941)
1987	4	0	0	0	0	0	5,926	(1,389)	5,794	2,137	919	748	(5,620)
1988	5	218	223	218	190	0	4,844	(1,388)	4,740	1,889	685	501	(4,735)
1989	4	24	25	24	14	0	5,526	(1,567)	6,411	2,377	646	810	(5,473)
1990	5	0	0	0	0	0	4,137	(884)	4,568	1,573	633	690	(4,095)
1991	5	0	0	0	0	0	3,828	(585)	4,858	1,477	634	893	(3,792)
Average		1,996	173	191	166	0	6,907	(333)	13,367	3,320	1,369	2,987	(6,056)

Notes: Definitions of the categories are provided in Table A2–3 in Appendix 2.
Water–year types: 1=wet, 2=above normal, 3=below normal, 4=dry, 5=critically dry.
Negative values shown in parentheses.

Table 3A–15. Monthly Percentiles for DeltaSOS Simulations for Alternative 1 under Cumulative Conditions

DW diversion (cfs)

Percentile	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	15	30	0	0	0	0	0	0	0
60	0	0	0	15	31	0	0	0	0	0	0	0
70	0	0	13	15	31	49	0	0	0	0	0	0
80	0	517	839	620	31	49	76	0	0	0	0	0
90	1,815	4,000	3,871	3,871	2,790	49	76	99	0	0	0	0
100	3,871	4,000	3,871	3,871	4,000	3,871	1,068	1,572	118	130	0	3,888
Mean	415	613	617	702	443	173	35	36	8	2	0	123

DW storage (TAF)

Percentile	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	29	70	12	0	0	(0)	0	0
40	0	0	0	77	186	183	153	110	86	0	0	0
50	0	0	0	238	222	229	207	147	132	0	0	0
60	0	0	83	238	236	235	231	198	182	0	0	0
70	0	124	238	238	238	238	234	224	193	0	0	0
80	0	204	238	238	238	238	238	232	220	0	0	0
90	203	238	238	238	238	238	238	238	231	0	0	0
100	238	238	238	238	238	238	238	238	238	238	189	238
Mean	35	69	96	139	153	157	147	130	118	5	3	10

DW discharge for export (cfs)

Percentile	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	1,079	0	0
50	0	0	0	0	0	0	0	0	0	2,000	0	0
60	0	0	0	0	0	0	0	0	0	2,302	0	0
70	0	0	0	0	0	0	0	52	0	2,977	0	0
80	0	0	0	0	0	0	0	456	136	3,378	0	0
90	0	0	0	0	0	0	637	703	586	3,627	0	0
100	0	2,543	3,313	0	4,000	2,691	1,332	2,428	2,822	3,741	1,379	0
Mean	0	45	171	0	169	71	140	236	130	1,759	29	0

DW discharge for outflow (cfs)

Percentile	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

Final CVP Tracy and SWP Banks exports (cfs)

Percentile	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	4,278	3,314	5,051	4,859	6,075	3,220	2,842	2,455	1,145	1,896	597	3,296
10	5,115	5,373	7,347	8,701	6,407	4,525	3,672	3,267	5,500	6,208	3,508	3,617
20	6,844	6,628	7,821	10,950	7,754	6,095	4,071	3,691	5,568	7,611	4,790	5,915
30	7,982	7,360	10,347	11,590	9,746	8,217	4,908	4,375	5,804	9,978	5,143	6,076
40	8,490	8,371	11,155	13,474	11,320	10,191	5,753	5,424	6,202	11,365	5,924	6,384
50	9,045	10,658	12,309	14,500	14,500	12,287	6,573	6,047	6,595	11,366	6,699	6,543
60	9,700	12,910	13,448	14,500	14,500	13,992	7,380	6,581	6,968	12,180	7,367	6,710
70	11,911	14,219	14,500	14,500	14,500	14,500	8,921	7,882	7,148	12,880	8,026	7,434
80	14,542	14,900	14,500	14,500	14,500	14,500	10,960	9,632	8,756	13,530	9,675	10,087
90	14,900	14,900	14,500	14,500	14,500	14,500	11,760	11,760	11,317	14,202	11,347	14,029
100	14,900	14,900	14,500	14,500	14,500	14,500	14,900	14,900	14,900	14,900	14,900	14,900
Mean	9,962	10,461	11,640	12,762	11,842	10,832	7,379	6,866	7,476	10,862	6,979	7,575

Table 3A–16. DeltaSOS Mean Annual Simulation Output for Alternative 2 under Cumulative Conditions

Water Year	Sac Basin Year Type	Available for DW Diversion (TAF)	Delta Storage (TAF)	Delta Storage Diversion (TAF)	Delta Storage Export (TAF)	Delta Storage Outflow (TAF)	Final Total Export (TAF)	Final QWEST Flow (TAF)	Final Delta Outflow (TAF)	3–Mile Slough Flow (TAF)	Old River Diversion Flow (TAF)	Final Antioch Flow (TAF)	Old & Middle Flow (TAF)
1922	2	276	220	276	232	0	7,417	(453)	11,044	2,843	1,587	2,390	(6,330)
1923	3	1,512	238	238	252	0	7,464	(794)	9,544	2,679	1,369	1,885	(6,589)
1924	5	0	0	0	0	0	4,561	(1,149)	4,161	1,627	825	478	(4,395)
1925	4	597	222	241	215	0	6,196	(1,155)	7,804	2,469	852	1,315	(5,821)
1926	4	201	186	201	179	0	6,155	(1,481)	6,578	2,366	877	885	(5,816)
1927	1	1,965	238	274	257	0	7,763	(1,326)	16,118	4,501	1,038	3,175	(7,204)
1928	2	1,828	238	558	546	0	7,937	(1,898)	12,654	4,010	996	2,113	(7,488)
1929	5	0	0	0	0	0	4,583	(906)	4,553	1,583	851	677	(4,338)
1930	4	85	86	85	92	0	5,302	(1,307)	5,959	2,127	764	820	(5,098)
1931	5	0	0	0	0	0	3,341	(301)	3,688	1,051	831	750	(3,120)
1932	4	0	0	0	0	0	4,444	11	5,553	1,309	943	1,320	(4,014)
1933	5	0	0	0	0	0	3,696	(344)	4,295	1,216	853	872	(3,461)
1934	5	0	0	0	0	0	3,878	(564)	4,712	1,432	805	868	(3,672)
1935	3	335	238	237	252	0	6,526	(957)	8,892	2,616	1,100	1,659	(5,924)
1936	3	1,139	238	235	214	0	6,692	(424)	10,317	2,655	1,192	2,231	(5,963)
1937	3	657	238	259	218	0	6,397	245	9,106	2,006	1,494	2,251	(5,348)
1938	1	7,363	238	265	225	0	8,922	3,170	34,205	6,255	3,087	9,424	(6,209)
1939	4	203	207	203	204	0	6,347	(1,767)	5,096	2,182	995	414	(5,977)
1940	2	2,041	238	242	227	0	7,312	(808)	16,768	4,365	1,046	3,558	(6,668)
1941	1	5,155	238	249	234	0	7,715	1,494	29,072	5,972	2,157	7,466	(5,906)
1942	1	4,080	238	375	338	0	8,640	65	25,041	5,819	1,534	5,884	(7,552)
1943	1	3,664	238	243	220	0	7,986	817	18,300	3,840	1,611	4,657	(6,873)
1944	4	0	0	0	0	0	6,045	(1,281)	6,405	2,217	984	936	(5,623)
1945	3	656	222	241	205	0	6,896	(1,041)	7,867	2,426	1,254	1,384	(6,175)
1946	3	1,792	238	234	252	0	7,128	(885)	12,200	3,353	1,139	2,468	(6,564)
1947	4	0	0	0	0	0	6,048	(1,599)	5,568	2,199	958	600	(5,702)
1948	3	0	0	0	0	0	6,390	(1,519)	7,320	2,562	806	1,043	(6,165)
1949	4	254	238	233	221	0	6,136	(1,495)	6,685	2,402	842	906	(5,884)
1950	3	21	22	21	22	0	6,507	(1,517)	7,223	2,539	866	1,022	(6,230)
1951	2	4,502	238	244	216	0	8,031	663	18,943	4,073	1,430	4,736	(7,075)
1952	1	4,681	238	303	225	0	9,100	711	25,534	5,579	1,548	6,290	(7,962)
1953	1	1,917	238	299	359	0	7,821	(1,690)	14,919	4,425	1,084	2,735	(7,293)
1954	2	1,497	238	419	397	0	8,512	(2,688)	12,747	4,468	908	1,780	(8,212)
1955	4	319	238	234	252	0	6,720	(2,102)	5,570	2,471	839	369	(6,436)
1956	1	4,549	238	258	231	0	8,076	1,095	25,878	5,450	1,711	6,545	(6,785)
1957	2	361	209	361	347	0	7,695	(2,163)	8,773	3,252	964	1,090	(7,310)
1958	1	5,034	238	271	225	0	9,532	491	30,060	6,749	2,019	7,240	(7,832)
1959	3	1,192	238	427	434	0	7,171	(1,875)	8,768	3,094	997	1,220	(6,766)
1960	4	0	0	0	0	0	6,015	(1,807)	5,903	2,390	802	583	(5,812)
1961	4	45	41	45	37	0	5,997	(1,942)	5,791	2,437	763	495	(5,820)
1962	3	679	222	241	215	0	6,162	(1,342)	7,743	2,561	892	1,219	(5,804)
1963	1	2,087	238	591	541	0	8,647	(2,064)	16,661	5,029	1,021	2,966	(8,071)
1964	4	756	238	474	477	0	6,958	(2,411)	5,967	2,736	849	325	(6,724)
1965	1	2,633	238	336	320	0	7,593	(199)	18,954	4,549	1,246	4,350	(6,866)
1966	3	726	238	334	340	0	7,638	(2,189)	7,735	3,025	1,110	836	(7,110)
1967	1	3,091	238	272	218	0	9,215	(457)	19,395	4,785	1,729	4,328	(7,877)
1968	3	1,224	238	422	406	0	7,872	(2,399)	9,673	3,591	943	1,192	(7,509)
1969	1	5,106	238	400	220	0	8,863	3,077	26,955	4,618	3,097	7,694	(6,177)
1970	1	4,599	238	98	209	0	8,015	879	25,163	5,406	1,632	6,285	(6,885)
1971	1	2,192	238	462	449	0	8,234	(1,619)	15,205	4,451	993	2,833	(7,769)
1972	3	76	78	76	74	0	7,281	(2,488)	6,642	2,937	902	449	(7,015)
1973	2	3,239	238	244	223	0	8,055	(472)	17,910	4,445	1,204	3,973	(7,198)
1974	1	5,060	238	252	228	0	8,856	86	30,032	6,973	1,154	7,060	(8,185)
1975	1	1,805	238	343	307	0	8,830	(1,454)	14,602	4,221	1,176	2,767	(8,189)
1976	5	131	132	131	128	0	5,659	(1,926)	4,864	2,216	755	290	(5,563)
1977	5	0	0	0	0	0	3,076	(452)	3,658	1,128	676	676	(3,050)
1978	2	2,136	238	243	228	0	6,532	131	15,188	3,482	1,158	3,613	(5,751)
1979	3	488	238	235	218	0	7,277	(1,135)	8,785	2,689	1,220	1,554	(6,566)
1980	2	4,574	238	239	220	0	7,361	2,533	21,817	3,718	2,567	6,251	(5,226)
1981	4	271	238	233	248	0	7,247	(2,081)	6,967	2,788	1,068	707	(6,779)
1982	1	7,154	238	492	225	0	9,512	4,441	34,460	5,617	3,355	10,057	(6,484)
1983	1	19,189	238	98	41	0	10,676	16,271	58,821	4,822	9,324	21,093	(1,539)
1984	1	7,824	238	11	208	0	8,277	4,723	26,780	3,685	3,669	8,408	(5,153)
1985	4	1,001	238	242	238	0	7,065	(1,726)	7,366	2,683	1,103	958	(6,503)
1986	1	5,489	238	259	223	0	7,349	3,873	26,985	4,187	2,756	8,059	(4,956)
1987	4	0	0	0	0	0	5,926	(1,389)	5,794	2,137	919	748	(5,620)
1988	5	218	223	218	231	0	4,886	(1,388)	4,740	1,889	685	501	(4,777)
1989	4	24	25	24	14	0	5,526	(1,567)	6,411	2,377	646	810	(5,473)
1990	5	0	0	0	0	0	4,137	(884)	4,568	1,573	633	690	(4,095)
1991	5	0	0	0	0	0	3,828	(585)	4,858	1,477	634	893	(3,792)
Average		1,996	173	211	197	0	6,938	(353)	13,347	3,326	1,369	2,973	(6,087)

Notes: Definitions of the categories are provided in Table A2–3 in Appendix 2.
Water–year types: 1=wet, 2=above normal, 3=below normal, 4=dry, 5=critically dry.
Negative values shown in parentheses.

Table 3A–17. Monthly Percentiles for DeltaSOS Simulations for Alternative 2 under Cumulative Conditions

DW diversion (cfs)

Percentile	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	15	30	0	0	0	0	0	0	0
60	0	0	0	15	31	0	0	0	0	0	0	0
70	0	0	13	15	31	49	0	0	0	0	0	0
80	0	517	1,260	1,676	31	49	76	0	0	0	0	0
90	1,815	4,000	3,871	3,871	2,899	307	76	99	0	0	0	0
100	3,871	4,000	3,871	3,871	4,000	3,871	2,795	1,791	118	130	0	3,888
Mean	415	613	644	811	501	226	111	41	8	2	0	123

DW Storage (TAF)

Percentile	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	14	0	0	0	0	0	0	0
50	0	0	0	238	56	0	9	0	0	0	0	0
60	0	0	0	238	222	121	169	99	0	0	0	0
70	0	86	238	238	238	238	230	169	0	0	0	0
80	0	150	238	238	238	238	234	227	18	0	0	0
90	203	238	238	238	238	238	238	238	190	0	0	0
100	238	238	238	238	238	238	238	238	238	238	189	238
Mean	35	62	86	129	120	100	102	88	37	5	3	10

DW discharge for export (cfs)

Percentile	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	52	0	0	494	0	0	0
80	0	0	0	0	360	508	0	67	2,152	0	0	0
90	0	0	1,387	0	3,840	2,726	139	664	3,414	2,268	0	0
100	0	2,543	3,858	2,703	4,000	3,822	562	3,698	3,882	3,741	1,379	0
Mean	0	160	254	90	651	507	45	212	817	500	29	0

DW discharge for outflow (cfs)

Percentile	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

Final CVP Tracy and SWP Banks exports (cfs)

Percentile	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	4,278	3,314	5,051	4,859	6,075	3,220	2,842	2,455	1,145	1,896	597	3,296
10	5,115	5,373	7,347	8,701	6,836	4,706	3,622	3,174	5,500	4,447	3,508	3,617
20	6,844	6,628	7,821	10,950	8,462	6,276	3,840	3,598	5,568	6,832	4,790	5,915
30	7,982	7,360	9,901	11,590	10,331	9,000	4,240	4,033	5,804	8,143	5,143	6,076
40	8,490	8,371	11,134	14,147	13,939	11,285	5,623	4,976	6,267	9,710	5,924	6,384
50	9,045	10,658	12,749	14,500	14,500	13,755	6,573	5,858	6,976	11,365	6,699	6,543
60	9,700	13,308	14,106	14,500	14,500	14,500	7,380	7,176	7,467	11,365	7,367	6,710
70	11,911	14,900	14,500	14,500	14,500	14,500	8,921	8,416	9,632	11,366	8,026	7,434
80	14,542	14,900	14,500	14,500	14,500	14,500	10,960	9,437	10,590	11,366	9,675	10,087
90	14,900	14,900	14,500	14,500	14,500	14,500	11,760	11,760	14,900	11,367	11,347	14,029
100	14,900	14,900	14,500	14,500	14,500	14,500	14,900	14,900	14,900	14,900	14,900	14,900
Mean	9,962	10,577	11,723	12,852	12,324	11,268	7,284	6,842	8,164	9,603	6,979	7,575

Table 3A–18. DeltaSOS Mean Annual Simulation Output for Alternative 3 under Cumulative Conditions

Water Year	Sac Basin Year Type	Available for DW Diversion (TAF)	Delta Storage (TAF)	Delta Storage Diversion (TAF)	Delta Storage Export (TAF)	Delta Storage Outflow (TAF)	Final Total Export (TAF)	Final QWEST Flow (TAF)	Final Delta Outflow (TAF)	3–Mile Slough Flow (TAF)	Old River Diversion Flow (TAF)	Final Antioch Flow (TAF)	Old & Middle Flow (TAF)
1922	2	276	207	276	204	0	7,405	(443)	11,054	2,840	1,587	2,397	(6,317)
1923	3	1,512	406	405	424	0	7,651	(951)	9,387	2,728	1,369	1,778	(6,776)
1924	5	0	0	0	0	0	4,582	(1,144)	4,166	1,626	825	482	(4,416)
1925	4	597	333	362	321	0	6,324	(1,271)	7,688	2,506	852	1,234	(5,949)
1926	4	201	186	201	176	0	6,173	(1,476)	6,583	2,364	877	888	(5,834)
1927	1	1,966	406	452	397	0	7,922	(1,497)	15,946	4,555	1,038	3,058	(7,363)
1928	2	1,827	406	733	698	0	8,109	(2,066)	12,487	4,063	996	1,998	(7,660)
1929	5	0	0	0	0	0	4,604	(901)	4,558	1,581	851	681	(4,359)
1930	4	85	86	85	90	0	5,322	(1,303)	5,963	2,126	764	823	(5,118)
1931	5	0	0	0	0	0	3,363	(297)	3,692	1,050	831	753	(3,142)
1932	4	0	0	0	0	0	4,467	15	5,556	1,308	943	1,323	(4,037)
1933	5	0	0	0	0	0	3,722	(344)	4,295	1,216	853	872	(3,486)
1934	5	0	0	0	0	0	3,900	(560)	4,716	1,431	805	871	(3,695)
1935	3	335	338	335	362	0	6,656	(1,050)	8,799	2,645	1,100	1,595	(6,054)
1936	3	1,139	406	404	363	0	6,862	(588)	10,153	2,707	1,192	2,119	(6,133)
1937	3	657	406	439	371	0	6,571	70	8,931	2,061	1,494	2,131	(5,522)
1938	1	7,367	406	458	368	0	9,078	2,990	34,025	6,311	3,087	9,301	(6,365)
1939	4	203	207	203	201	0	6,361	(1,758)	5,105	2,179	995	421	(5,991)
1940	2	2,040	406	425	384	0	7,493	(989)	16,587	4,422	1,046	3,433	(6,849)
1941	1	5,158	406	430	380	0	7,877	1,323	28,901	6,026	2,157	7,349	(6,068)
1942	1	4,083	406	545	474	0	8,787	(89)	24,887	5,868	1,534	5,778	(7,699)
1943	1	3,664	406	419	373	0	8,155	651	18,133	3,892	1,611	4,543	(7,042)
1944	4	0	0	0	0	0	6,067	(1,277)	6,408	2,216	984	939	(5,645)
1945	3	656	333	362	272	0	6,980	(1,154)	7,754	2,461	1,254	1,307	(6,260)
1946	3	1,795	406	400	424	0	7,317	(1,041)	12,043	3,402	1,139	2,360	(6,752)
1947	4	0	0	0	0	0	6,070	(1,596)	5,572	2,198	958	603	(5,724)
1948	3	0	0	0	0	0	6,409	(1,512)	7,327	2,560	806	1,048	(6,183)
1949	4	254	259	254	225	0	6,161	(1,511)	6,670	2,407	842	895	(5,908)
1950	3	21	22	21	20	0	6,526	(1,511)	7,228	2,537	866	1,026	(6,249)
1951	2	4,506	406	417	366	0	8,198	500	18,780	4,124	1,430	4,624	(7,241)
1952	1	4,683	406	491	368	0	9,257	536	25,358	5,634	1,548	6,170	(8,118)
1953	1	1,920	406	470	519	0	7,992	(1,846)	14,762	4,474	1,084	2,628	(7,464)
1954	2	1,497	406	597	549	0	8,684	(2,859)	12,577	4,521	908	1,662	(8,383)
1955	4	319	324	319	338	0	6,821	(2,177)	5,495	2,495	839	318	(6,537)
1956	1	4,551	406	438	381	0	8,242	924	25,708	5,504	1,711	6,428	(6,951)
1957	2	361	206	361	325	0	7,693	(2,157)	8,778	3,250	964	1,093	(7,308)
1958	1	5,034	406	458	368	0	9,685	319	29,887	6,803	2,019	7,122	(7,985)
1959	3	1,192	406	597	582	0	7,334	(2,034)	8,608	3,145	997	1,110	(6,929)
1960	4	0	0	0	0	0	6,037	(1,803)	5,907	2,389	802	586	(5,834)
1961	4	45	41	45	34	0	6,016	(1,938)	5,795	2,436	763	498	(5,839)
1962	3	679	333	362	314	0	6,283	(1,459)	7,626	2,598	892	1,139	(5,925)
1963	1	2,090	406	769	686	0	8,801	(2,226)	16,500	5,080	1,021	2,854	(8,225)
1964	4	756	400	661	660	0	7,161	(2,591)	5,787	2,792	849	201	(6,927)
1965	1	2,635	406	502	467	0	7,761	(360)	18,794	4,599	1,246	4,240	(7,034)
1966	3	726	406	502	500	0	7,813	(2,347)	7,577	3,074	1,110	727	(7,286)
1967	1	3,093	406	460	368	0	9,379	(632)	19,219	4,840	1,729	4,208	(8,040)
1968	3	1,224	406	591	523	0	8,003	(2,556)	9,516	3,641	943	1,085	(7,641)
1969	1	5,107	406	581	370	0	9,026	2,908	26,787	4,670	3,097	7,579	(6,341)
1970	1	4,602	406	274	335	0	8,154	716	24,999	5,457	1,632	6,173	(7,025)
1971	1	2,194	406	704	655	0	8,455	(1,851)	14,973	4,524	993	2,673	(7,990)
1972	3	76	78	76	72	0	7,295	(2,479)	6,651	2,934	902	455	(7,029)
1973	2	3,239	406	415	362	0	8,210	(635)	17,747	4,496	1,204	3,861	(7,353)
1974	1	5,063	406	431	368	0	9,010	(81)	29,865	7,025	1,154	6,945	(8,339)
1975	1	1,805	406	522	438	0	8,971	(1,617)	14,438	4,272	1,176	2,655	(8,330)
1976	5	131	130	131	126	0	5,673	(1,917)	4,874	2,213	755	297	(5,577)
1977	5	0	0	0	0	0	3,103	(453)	3,657	1,129	676	676	(3,077)
1978	2	2,136	406	420	368	0	6,694	(43)	15,015	3,536	1,158	3,494	(5,913)
1979	3	488	406	411	367	0	7,445	(1,304)	8,616	2,742	1,220	1,438	(6,734)
1980	2	4,574	406	409	372	0	7,531	2,371	21,655	3,769	2,567	6,140	(5,396)
1981	4	271	276	271	280	0	7,297	(2,110)	6,939	2,797	1,068	687	(6,828)
1982	1	7,159	406	678	375	0	9,673	4,270	34,290	5,670	3,355	9,940	(6,645)
1983	1	19,194	406	308	38	0	10,676	16,083	58,633	4,881	9,324	20,964	(1,539)
1984	1	7,829	406	22	334	0	8,413	4,728	26,785	3,683	3,669	8,411	(5,289)
1985	4	1,004	406	411	417	0	7,259	(1,883)	7,209	2,733	1,103	850	(6,697)
1986	1	5,490	406	439	369	0	7,514	3,701	26,814	4,240	2,756	7,942	(5,120)
1987	4	0	0	0	0	0	5,945	(1,382)	5,801	2,135	919	753	(5,639)
1988	5	218	223	218	230	0	4,906	(1,384)	4,744	1,887	685	503	(4,797)
1989	4	24	25	24	3	0	5,536	(1,562)	6,416	2,375	646	813	(5,483)
1990	5	0	0	0	0	0	4,159	(880)	4,572	1,572	633	692	(4,117)
1991	5	0	0	0	0	0	3,852	(583)	4,859	1,477	634	894	(3,816)
Average		1,996	272	314	282	0	7,041	(448)	13,252	3,356	1,369	2,908	(6,191)

Notes: Definitions of the categories are provided in Table A2–3 in Appendix 2.
Water–year types: 1=wet, 2=above normal, 3=below normal, 4=dry, 5=critically dry.
Negative values shown in parentheses.

Table 3A–19. Monthly Percentiles for DeltaSOS Simulations for Alternative 3 under Cumulative Conditions

DW diversion (cfs)

Percentile	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	29	59	0	0	0	0	0	0	0
60	0	0	0	29	61	0	0	0	0	0	0	0
70	0	0	822	632	61	98	0	0	0	0	0	0
80	0	517	1,260	3,390	729	98	151	0	0	0	0	0
90	2,847	4,949	4,914	5,499	2,945	399	151	198	0	0	0	0
100	6,000	6,000	6,000	6,000	6,000	4,951	2,939	1,791	235	260	0	3,888
Mean	526	848	1,117	1,295	796	305	127	55	17	4	0	125

DW storage (TAF)

Percentile	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	52	0	0	0	0	0	0	0
50	0	0	0	276	189	31	16	0	0	0	0	0
60	0	0	52	369	333	240	266	207	0	0	0	0
70	0	81	278	406	406	406	389	315	14	0	0	0
80	0	149	406	406	406	406	397	385	179	0	0	0
90	200	357	406	406	406	406	406	406	330	21	0	0
100	406	406	406	406	406	406	406	406	406	406	353	406
Mean	44	84	137	210	205	175	174	159	72	15	5	12

DW discharge for export (cfs)

Percentile	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	683	0	0	0
80	0	0	0	0	329	1,031	0	67	3,583	1,454	0	0
90	0	0	1,296	0	3,851	2,922	167	636	5,878	3,463	112	0
100	0	2,518	4,215	2,703	6,000	6,000	895	3,000	6,000	6,000	3,938	0
Mean	0	159	255	90	841	732	61	204	1,352	861	127	0

DW discharge for outflow (cfs)

Percentile	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

Final CVP Tracy and SWP Banks exports (cfs)

Percentile	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0	4,329	3,356	5,087	4,862	6,075	3,202	2,865	2,496	1,207	1,968	653	3,340
10	5,166	5,415	7,383	8,704	6,836	4,723	3,645	3,215	5,500	4,519	3,564	3,661
20	6,895	6,670	7,857	10,953	9,184	6,570	3,873	3,639	5,595	6,959	4,957	5,959
30	8,033	7,402	9,937	11,593	12,331	9,174	4,412	4,074	5,804	8,325	5,199	6,120
40	8,541	8,413	11,170	14,147	14,500	12,287	5,623	5,017	6,267	11,260	6,064	6,428
50	9,096	10,700	12,749	14,500	14,500	14,500	6,573	6,047	7,026	11,437	7,028	6,587
60	9,751	13,325	14,500	14,500	14,500	14,500	7,380	7,176	9,209	11,438	7,625	6,754
70	11,962	14,900	14,500	14,500	14,500	14,500	8,921	8,457	10,551	11,438	8,521	7,478
80	14,542	14,900	14,500	14,500	14,500	14,500	10,960	9,437	12,588	11,438	9,980	10,131
90	14,900	14,900	14,500	14,500	14,500	14,500	11,760	11,760	14,900	13,615	11,403	14,073
100	14,900	14,900	14,500	14,500	14,500	14,500	14,900	14,900	14,900	14,900	14,900	14,900
Mean	9,997	10,602	11,742	12,853	12,516	11,491	7,310	6,856	8,717	10,034	7,132	7,615

Table 3A-20. DeltaSOS Mean Annual Input Data from Historical Data, DWRSIM Study 409, and DWRSIM Study 771

	Historic Flows					DWRSIM Study 409 (1995 DW DEIR/EIS)						DWRSIM Study 771 (1999 DW REIR/EIS)					
Water Year	Sacramento + Yolo*	SJR + Eastside*	Depletion + CCWD	CVP+SWP Exports	Delta Outflow	Sacramento + Yolo	SJR + Eastside	Depletion + CCWD	CVP+SWP Exports	Delta Outflow	Required Outflow	Sacramento + Yolo	SJR + Eastside	Depletion + CCWD	CVP+SWP Exports	Delta Outflow	Required Outflow
1922	-	-	-	0	28,838	15,460	4,080	1,035	6,193	12,313	6,112	16,271	4,131	1,000	6,522	12,879	6,356
1923	-	-	-	0	19,498	14,704	3,311	1,022	6,199	10,793	5,841	14,266	3,551	942	5,938	10,943	5,653
1924	-	-	-	0	4,972	8,667	1,462	1,421	4,548	4,161	4,069	7,900	1,352	1,431	3,604	4,219	3,921
1925	-	-	-	0	23,103	12,891	2,095	965	5,743	8,278	5,202	12,639	2,275	853	4,445	9,626	5,866
1926	-	-	-	0	14,889	11,974	1,903	1,129	5,741	7,007	5,013	11,426	1,769	1,287	5,157	6,756	4,397
1927	-	-	-	0	34,966	22,268	2,619	981	6,251	17,655	6,990	23,331	3,076	1,009	6,308	19,095	6,830
1928	-	-	-	0	22,064	19,474	2,286	1,152	6,336	14,271	6,674	18,710	2,640	1,257	6,114	13,985	5,961
1929	-	-	-	0	8,687	8,808	1,605	1,288	4,570	4,554	4,424	8,618	1,406	1,306	4,315	4,406	3,931
1930	-	1,734	812	0	15,038	10,947	1,470	1,173	5,016	6,229	5,059	11,322	1,404	1,134	5,080	6,516	4,775
1931	-	838	890	0	5,140	6,852	1,462	1,300	3,332	3,682	3,662	7,586	1,084	1,449	3,397	3,831	3,760
1932	-	4,605	673	0	16,600	8,787	2,244	1,045	4,153	5,833	5,197	8,616	2,755	1,107	3,933	6,322	5,151
1933	-	1,804	882	0	8,719	7,629	1,654	1,306	3,683	4,294	4,055	7,305	1,504	1,372	3,227	4,204	3,821
1934	-	1,362	844	0	8,798	8,330	1,507	1,260	3,742	4,835	4,539	8,487	1,299	1,377	3,577	4,830	4,477
1935	-	4,995	637	0	22,582	13,725	2,692	1,018	5,934	9,466	6,464	13,490	2,864	1,082	5,528	9,748	6,168
1936	-	6,598	402	0	25,092	14,769	3,205	945	6,162	10,867	6,257	15,255	4,276	1,070	6,056	12,408	6,472
1937	-	6,751	434	0	21,235	12,689	3,750	898	5,887	9,654	5,294	12,679	4,713	992	5,506	10,892	5,578
1938	-	13,085	381	0	52,788	36,820	7,100	719	6,235	36,966	8,137	36,707	10,362	789	6,729	39,557	7,471
1939	-	2,139	836	0	8,563	10,796	1,984	1,348	5,096	6,337	4,363	10,917	2,338	1,490	4,889	6,887	4,013
1940	-	6,114	480	0	30,910	22,241	2,655	792	6,428	17,675	7,256	21,570	3,829	922	5,988	18,490	7,253
1941	-	8,614	410	0	43,460	32,989	4,492	652	6,283	30,546	7,020	33,977	5,600	711	6,507	32,363	7,096
1942	-	7,763	338	0	36,995	30,494	4,146	900	5,957	27,783	6,681	30,385	5,261	987	6,077	28,588	6,689
1943	-	7,916	423	0	30,329	22,643	4,707	1,030	5,566	20,755	7,319	22,235	6,555	1,129	5,686	21,982	7,181
1944	-	2,316	735	0	10,787	11,595	2,039	1,192	5,937	6,505	4,959	11,629	2,436	1,305	5,286	7,479	4,191
1945	-	5,638	678	0	18,869	12,920	2,993	1,119	6,142	8,651	5,284	13,398	3,584	1,250	5,910	9,823	6,141
1946	-	4,725	816	0	21,938	17,663	2,871	1,222	6,299	13,013	6,288	16,859	3,677	1,323	6,249	12,967	6,015
1947	-	1,705	1,079	0	10,203	11,073	1,850	1,316	6,042	5,566	5,079	10,915	1,778	1,427	5,888	5,379	4,445
1948	-	2,257	962	0	16,167	13,157	1,785	1,237	6,310	7,394	5,494	12,622	1,829	1,258	5,911	7,287	4,622
1949	12,070	1,858	1,005	0	12,615	12,203	1,881	1,258	5,700	7,127	4,928	12,199	1,890	1,303	6,041	6,747	4,428
1950	14,324	2,793	1,066	0	15,257	12,940	2,043	1,259	6,159	7,564	5,606	13,002	2,237	1,337	6,221	7,685	5,096
1951	25,246	7,066	755	163	30,594	23,605	4,379	969	6,775	20,240	6,335	23,879	5,487	1,006	6,601	21,762	6,331
1952	32,046	9,627	589	165	40,431	30,744	4,800	810	6,936	27,799	7,996	30,899	6,998	834	6,633	30,439	7,675
1953	20,902	2,756	1,014	788	22,393	21,360	2,501	1,175	5,312	17,374	6,088	21,115	3,099	1,213	5,772	17,232	6,004
1954	18,349	2,434	1,101	1,022	19,167	20,648	1,943	1,304	6,382	14,904	7,031	19,938	2,027	1,352	6,205	14,414	6,718
1955	10,682	1,538	906	1,129	10,054	11,635	1,802	1,174	6,025	6,239	5,058	11,371	1,738	1,186	5,494	6,429	4,304
1956	32,232	8,645	572	722	39,798	30,078	4,762	837	6,833	27,171	6,230	30,508	6,803	862	6,796	29,659	6,491
1957	13,947	2,126	978	1,181	13,939	15,512	2,200	1,233	6,295	10,185	5,669	15,133	2,455	1,293	6,334	9,964	5,257
1958	36,120	8,463	159	658	43,825	35,187	5,061	581	7,056	32,611	7,277	35,637	6,310	577	6,861	34,513	6,653
1959	12,712	1,616	958	1,338	12,056	15,120	2,074	1,265	5,184	10,745	5,301	14,192	2,334	1,393	4,971	10,164	5,066

Water Year	Historical Flows: Sacramento + Yolo*	Historical Flows: SJR + Eastside*				DWRSIM Study 409 (1995 DEIR/EIS)						DWRSIM Study 771 (2000 REIR/EIS)					
1960	11,405	802	1,207	1,386	9,720	11,672	1,523	1,285	5,864	6,046	5,210	11,294	1,510	1,396	5,625	5,785	4,563
1961	11,673	542	1,048	1,485	9,700	11,682	1,357	1,252	5,784	6,003	5,104	11,866	1,172	1,298	5,735	6,001	4,312
1962	14,232	2,189	935	1,352	14,158	13,101	1,947	1,122	5,805	8,120	5,070	13,503	2,279	1,172	6,206	8,410	4,720
1963	24,626	4,177	499	1,339	27,006	23,586	2,679	897	6,661	18,708	7,339	23,549	3,008	857	7,187	18,510	6,855
1964	11,674	1,426	1,123	1,646	10,399	12,563	1,675	1,323	5,922	6,993	5,150	11,924	1,680	1,340	5,389	6,874	4,359
1965	26,194	5,451	830	1,469	29,388	24,106	3,550	1,082	6,660	19,914	6,680	24,487	4,774	1,065	7,068	21,130	6,857
1966	13,788	2,339	1,082	1,596	13,467	14,240	2,365	1,241	6,411	8,952	5,610	13,209	2,881	1,310	5,775	9,006	4,765
1967	27,933	7,289	461	1,254	33,561	24,830	4,609	760	6,875	21,804	7,564	25,998	6,632	745	7,084	24,807	7,639
1968	14,064	1,939	1,134	2,471	12,524	16,703	2,095	1,238	4,789	12,771	5,565	15,739	2,294	1,333	5,054	11,649	5,521
1969	29,684	12,572	502	2,879	38,936	29,451	7,387	814	6,439	29,584	7,978	30,183	11,340	865	6,435	34,229	7,478
1970	28,829	4,494	883	2,070	30,332	29,644	4,485	1,041	5,038	28,049	5,644	29,227	5,264	1,169	5,104	28,226	5,639
1971	24,150	2,682	818	2,834	23,223	22,122	2,443	1,105	6,822	16,637	7,103	22,062	2,787	1,132	6,763	16,959	7,051
1972	12,517	1,476	1,352	3,445	9,273	13,421	1,875	1,377	6,352	7,567	5,417	12,990	1,601	1,487	5,890	7,213	4,898
1973	24,679	3,824	532	3,369	24,643	23,309	3,340	653	6,618	19,378	6,830	23,318	4,043	724	6,879	19,762	6,804
1974	38,282	4,327	768	4,366	37,534	36,436	3,497	992	6,838	32,103	6,954	37,025	4,702	1,076	6,766	33,892	6,679
1975	20,920	3,954	934	3,910	20,070	21,389	3,209	1,122	6,503	16,973	6,636	21,026	4,091	1,186	6,773	17,168	6,653
1976	10,992	1,731	1,337	4,846	6,592	10,557	1,382	1,423	5,006	5,510	4,423	10,754	1,669	1,503	5,335	5,586	3,694
1977	5,506	446	1,337	2,081	2,542	6,939	1,167	1,387	3,057	3,662	3,662	6,825	1,290	1,453	2,695	3,965	3,965
1978	20,564	5,642	393	4,356	21,497	19,343	3,111	714	4,513	17,228	7,944	19,034	4,935	778	5,431	17,760	8,205
1979	13,206	3,648	834	4,476	11,571	14,143	2,993	1,059	5,813	10,264	5,852	14,134	3,854	1,123	5,651	11,219	5,816
1980	25,785	7,806	732	4,529	28,541	23,927	6,151	866	5,681	23,531	6,577	24,028	6,669	871	5,905	23,927	6,591
1981	11,641	2,052	1,066	4,728	7,919	13,220	2,258	1,284	5,595	8,599	5,116	12,865	2,198	1,404	4,767	8,891	4,618
1982	37,381	8,522	105	4,627	41,287	36,386	8,491	602	7,276	36,999	7,109	36,684	9,721	596	7,043	38,771	6,966
1983	49,079	20,014	51	4,405	64,732	49,206	20,669	249	5,421	64,201	6,206	49,309	19,397	239	5,294	63,181	6,413
1984	27,110	8,070	922	3,846	30,634	27,404	8,629	1,150	4,582	30,301	5,684	27,000	7,597	1,247	4,838	28,515	6,144
1985	12,381	2,574	1,053	5,478	8,465	13,248	2,321	1,139	5,942	8,488	5,075	12,721	1,919	1,229	5,716	7,700	4,502
1986	28,760	7,366	341	5,293	30,535	27,876	7,208	691	6,277	28,117	6,164	28,579	7,547	760	6,186	29,189	5,985
1987	10,079	2,194	1,131	5,050	6,113	11,045	1,985	1,318	5,816	5,896	4,826	10,887	1,695	1,421	5,054	6,111	4,206
1988	9,782	1,307	1,101	5,619	4,415	9,567	1,258	1,223	4,452	5,150	4,511	9,484	1,205	1,348	3,936	5,399	4,318
1989	12,306	1,279	1,023	5,975	6,608	11,878	1,330	1,270	5,285	6,653	4,823	11,593	1,279	1,377	4,871	6,657	4,374
1990	9,894	1,085	1,211	5,819	3,973	8,787	1,156	1,251	4,071	4,621	4,512	9,400	1,098	1,378	4,438	4,687	4,092
1991	7,626	877	941	3,185	4,377	8,700	1,228	1,256	3,813	4,860	4,094	8,334	1,179	1,335	2,666	5,510	4,055
1992	-	1,247	961	2,912	-	-	-	-	-	-	-	8,774	1,371	1,262	3,132	5,764	4,486
1993	-	-	-	-	-	-	-	-	-	-	-	19,349	3,523	625	6,157	16,090	8,402
1994	-	-	-	-	-	-	-	-	-	-	-	11,038	1,692	1,353	5,312	6,064	3,961
Avg ('22-'91	19,892	4,419	798	1,691	20,644	18,141	3,240	1,079	5,720	14,582	5,810	18,086	3,743	1,140	5,590	15,102	5,586

*Notes: Sacramento + Yolo = Sacramento River and Yolo Bypass
SJR + Eastside = San Joaquin River and eastside streams
Depletion + CCWD = Contra Costa Water Distric diversions and net channel depletion
See "Notes and Acronyms" at end of tables section

Table 3A-21. Comparison of Sacramento River + Yolo Bypass Flow (cfs) between DWRSIM Studies 771 and 409

Water Year	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	Total TAF
	DWRSIM Study 409 (1995 DEIR/EIS)												
1967	12680	15473	41319	46741	59682	56679	43818	46199	40864	15589	12698	19813	24830
1968	23643	18017	16207	29254	67429	37050	12293	10820	14760	21516	14177	11675	16703
1969	14078	12574	23151	111492	111153	52937	43896	44733	25335	13042	12083	23658	29451
1970	21939	18806	57778	184333	85637	36152	13232	10762	15238	23106	13363	10993	29644
1971	13723	22988	67713	53426	29159	52059	19441	31548	22990	23192	13662	16761	22122
1972	18865	16485	21278	18288	25382	32355	11592	10956	14603	21618	20089	10936	13421
1973	15127	23028	27877	72678	88679	56526	17416	17979	19696	22972	12753	11608	23309
1974	15026	66497	69975	127939	47112	106615	71375	24715	21434	18189	13856	21175	36436
1975	22724	17840	18043	16081	64541	83394	22644	32443	25262	20252	13015	18274	21389
1976	23074	20504	15689	13414	19069	15202	9873	10305	14737	16563	8650	7893	10557
1977	8183	11104	18131	8303	13468	10403	9127	6787	7009	9003	6316	7178	6939
1978	7179	6260	16102	58430	57316	64666	38711	19681	14350	13255	10870	13778	19343
1979	18469	15924	10638	25785	40922	30818	16689	15571	20572	17819	11205	10001	14143
1980	10623	18125	20806	100940	112793	51001	16691	14264	12647	13041	11215	14433	23927
1981	17286	14254	16319	25675	28599	32518	14686	10889	13654	20878	14221	10145	13220
1982	12801	35650	94683	73874	92720	67180	115305	36117	22606	15164	13851	23136	36386
1983	30060	41797	68882	78120	141232	200690	79835	59449	52097	23412	15591	24410	49206
1984	27521	69988	131698	60540	39887	33563	14220	12617	15445	21437	12186	15112	27404
1985	18599	35922	26287	14443	19838	17790	9859	13784	13489	20965	17901	10706	13248
1986	12711	10997	15940	18764	198107	122935	20232	11194	12479	16354	11426	10901	27876
1987	10638	12133	9495	12911	19356	32272	13457	11495	13656	21261	16142	10254	11045
1988	10369	9911	16405	26311	17146	12006	9207	9574	14318	15770	10258	7289	9567
1989	7179	9446	11759	12971	13986	39617	22383	14636	13464	21670	19283	10483	11878
1990	9151	8092	14263	17463	15935	11083	13102	7884	14643	16078	10380	7568	8787
1991	7159	7716	9364	10525	13924	29237	14113	8058	13814	12442	9529	8320	8700
	DWRSIM Study 771 (1999 REIR/EIS)												
1967	11270	19007	40723	51132	59437	57832	42904	46009	45274	21012	18085	18217	25998
1968	17353	13461	16361	31421	59786	39129	14335	12555	13730	15190	16101	11444	15739
1969	12149	14200	25110	110525	110357	52790	42534	48155	27678	18085	16832	21847	30183
1970	15938	14805	57149	183384	86985	38771	14604	13255	14016	18556	15531	11428	29227
1971	11921	23628	63492	54400	28647	52351	21360	29713	23746	21728	17190	17494	22062
1972	15336	13932	21402	20459	23730	33388	11781	14230	15276	16654	17076	12033	12990
1973	13108	21494	26200	76372	87526	56596	20099	15369	20318	21061	13791	14553	23318
1974	14051	64784	70485	126349	47571	109272	67288	27615	24216	22150	19435	20452	37025
1975	16475	13764	17743	18410	59833	83658	26922	27452	28048	20313	18101	17780	21026
1976	20589	15612	16702	16751	20079	17515	9680	9872	15831	13238	11287	11092	10754
1977	11108	8823	8977	8928	13342	8083	9999	7383	11058	8717	8847	7848	6825
1978	6164	6117	13027	59426	57114	59214	34837	20036	15108	14507	15515	14419	19034
1979	14393	12722	12604	27338	41827	32640	18234	12864	21796	17011	10815	12016	14134
1980	12929	15713	21402	93172	111367	51294	20015	15076	13461	13531	16231	14066	24028
1981	11775	10470	16979	29046	30033	30656	17746	12328	13999	13840	15678	10688	12865
1982	11335	40585	90521	71086	87454	74355	111117	37682	25208	20427	18036	20217	36684
1983	23045	35577	67346	80454	140714	195451	81405	58889	59289	27826	24037	23242	49309
1984	20882	64364	129146	61930	36282	36218	16251	14897	18839	20410	14539	13747	27000
1985	13287	31560	23956	17125	21697	21955	12906	13011	13814	13482	16117	11932	12721
1986	11563	12033	18133	22980	190014	126934	23309	14068	11579	16605	12149	14318	28579
1987	12604	11226	12311	15564	21697	28379	12554	10034	15579	14198	16393	9915	10887
1988	10327	8672	17450	28152	14064	15271	9327	9433	14217	12750	8506	9024	9484
1989	9075	9966	10165	13417	11794	41910	25914	13401	13226	14133	16767	12386	11593
1990	13515	10638	14686	19857	16205	13677	13612	9481	15058	10864	8928	9277	9400
1991	8701	8235	8164	7985	12244	32591	17158	9498	8503	7904	8213	8940	8334
	Change: DWRSIM 771 - DWRSIM 409												
1967	-1410	3534	-596	4391	-245	1153	-914	-190	4410	5423	5387	-1596	1167
1968	-6290	-4556	154	2167	-7643	2079	2042	1735	-1030	-6326	1924	-231	-964
1969	-1929	1626	1959	-967	-796	-147	-1362	3422	2343	5043	4749	-1811	732
1970	-6001	-4001	-629	-949	1348	2619	1372	2493	-1222	-4550	2168	435	-417
1971	-1802	640	-4221	974	-512	292	1919	-1835	756	-1464	3528	733	-60
1972	-3529	-2553	124	2171	-1652	1033	189	3274	673	-4964	-3013	1097	-431
1973	-2019	-1534	-1677	3694	-1153	70	2683	-2610	622	-1911	1038	2945	9
1974	-975	-1713	510	-1590	459	2657	-4087	2900	2782	3961	5579	-723	589
1975	-6249	-4076	-300	2329	-4708	264	4278	-4991	2786	61	5086	-494	-363
1976	-2485	-4892	1013	3337	1010	2313	-193	-433	1094	-3325	2637	3199	198
1977	2925	-2281	-9154	625	-126	-2320	872	596	4049	-286	2531	670	-114
1978	-1015	-143	-3075	996	-202	-5452	-3874	355	758	1252	4645	641	-309
1979	-4076	-3202	1966	1553	905	1822	1545	-2707	1224	-808	-390	2015	-9
1980	2306	-2412	596	-7768	-1426	293	3324	812	814	490	5016	-367	101
1981	-5511	-3784	660	3371	1434	-1862	3060	1439	345	-7038	1457	543	-355
1982	-1466	4935	-4162	-2788	-5266	7175	-4188	1565	2602	5263	4185	-2919	298
1983	-7015	-6220	-1536	2334	-518	-5239	1570	-560	7192	4414	8446	-1168	103
1984	-6639	-5624	-2552	1390	-3605	2655	2031	2280	3394	-1027	2353	-1365	-405
1985	-5312	-4362	-2331	2682	1859	4165	3047	-773	325	-7483	-1784	1226	-527
1986	-1148	1036	2193	4216	-8093	3999	3077	2874	-900	251	723	3417	703
1987	1966	-907	2816	2653	2341	-3893	-903	-1461	1923	-7063	251	-339	-158
1988	-42	-1239	1045	1841	-3082	3265	120	-141	-101	-3020	-1752	1735	-83
1989	1896	520	-1594	446	-2192	2293	3531	-1235	-238	-7537	-2516	1903	-285
1990	4364	2546	423	2394	270	2594	510	1597	415	-5214	-1452	1709	613
1991	1542	519	-1200	-2540	-1680	3354	3045	1440	-5311	-4538	-1316	620	-366

Note: See "Notes and Acronyms" at end of tables section.

Table 3A-22. Comparison of San Joaquin River + Eastside Streams Flow (cfs) between DWRSIM Studies 771 and 409

Water Year	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	Total TAF
	DWRSIM Study 409 (1995 DEIR/EIS)												
1967	2163	2285	4607	6732	7039	5746	12312	9585	10645	9511	2251	3508	4609
1968	4058	2290	2802	3036	4613	3565	4291	3202	2163	2017	1330	1360	2095
1969	1641	2532	2555	13179	27970	11301	11590	24907	15284	6059	2298	3117	7387
1970	8283	4208	5047	21274	10411	6234	5998	4607	2667	2063	1983	1563	4485
1971	1851	3718	6567	3529	3145	3516	4980	4795	2802	2066	1999	1516	2443
1972	2260	2170	2968	2476	3109	2752	4459	3365	2165	2032	1298	2022	1875
1973	1606	3098	2270	6126	10661	10686	6603	6239	2551	2033	1953	1531	3340
1974	2566	4156	5710	8513	4286	7570	8363	7097	3893	2124	2078	1605	3497
1975	2335	3183	2918	1889	7839	8722	7741	7683	4565	2121	2068	2119	3209
1976	2569	3048	2381	1121	1340	2049	2398	2387	2111	1339	1099	1072	1382
1977	1721	1616	1189	1127	1382	1741	2430	2250	2109	1298	1204	1280	1167
1978	1779	1511	1873	6100	6865	6312	8783	7081	5196	2108	2186	1776	3111
1979	3530	2780	1772	4350	9098	7206	6301	6336	2568	2024	1930	1706	2993
1980	2354	3750	2793	16699	24189	24976	7187	6869	4739	2521	2241	3640	6151
1981	4478	4059	3295	3543	3567	4200	4106	3153	2156	2022	1441	1410	2258
1982	1537	2639	4246	11796	14264	20962	36202	24293	9727	5948	3354	5768	8491
1983	13458	12724	28435	31556	49188	62664	37426	32518	34260	20942	7553	11848	20669
1984	18450	18643	30960	28088	13948	9620	6721	4949	3592	2435	2676	2944	8629
1985	3399	4577	5682	3706	3700	3374	3598	3267	2166	2009	1446	1548	2321
1986	2130	2826	2817	2564	28698	36518	20598	9361	5580	2600	2647	3134	7208
1987	6669	3493	3918	2037	2329	2948	2543	2275	2154	1753	1303	1473	1985
1988	1643	1895	2110	1566	1053	1489	2410	2308	2159	1537	1297	1383	1258
1989	1989	1538	1554	1100	1205	2952	3178	2422	2249	1391	1327	1141	1330
1990	1570	1316	1083	1319	1421	1685	2528	2275	1939	1327	1259	1444	1156
1991	2008	1407	1258	857	1269	2599	2561	2487	2005	1288	1223	1397	1228
	DWRSIM Study 771 (1999 REIR/EIS)												
1967	2082	2252	3968	7416	5600	9156	21914	22394	17646	10311	2992	4185	6632
1968	5351	2302	2472	2651	5424	4342	5109	3480	1798	1740	1691	1664	2294
1969	2017	2000	2683	23695	40729	23793	26132	31160	20654	6570	4033	4487	11340
1970	5904	3378	4521	27469	12550	10506	6957	6001	3008	2212	2244	2504	5264
1971	2472	3126	6603	4017	3241	5123	6168	5529	2823	2326	2309	2454	2787
1972	2163	1983	2927	2179	2712	2196	3227	2862	1731	1464	1626	1462	1601
1973	1838	2168	2000	6944	13954	13515	8235	7530	3311	2505	2407	2605	4043
1974	3692	4470	6310	12571	6536	11710	11344	8262	4554	2781	2732	2975	4702
1975	3887	2487	2862	2635	8445	13791	8957	8392	7596	2944	2814	2991	4091
1976	4602	2353	2244	1984	2451	2212	2891	2716	1580	1578	1529	1529	1669
1977	3204	2386	1968	1529	1494	1464	2286	1952	1496	1138	1155	1311	1290
1978	1545	1529	1919	6473	9345	14003	18167	12490	7865	3350	2082	3025	4935
1979	4668	2353	2082	5757	12784	11677	7596	7026	2790	2358	2309	2487	3854
1980	2765	2218	2667	20719	27468	17483	8201	8896	8924	4879	2651	3664	6669
1981	5237	2269	2130	3123	3259	4716	5109	3741	1798	1643	1708	1697	2198
1982	1968	2806	3724	15824	25766	22768	40450	19939	12033	5481	3919	6436	9721
1983	9384	12789	28314	34754	50110	60727	26284	26964	40568	17483	4781	9344	19397
1984	8148	21007	32803	19060	12778	8001	7075	5920	3311	2505	2553	2756	7597
1985	2391	3361	2618	2130	3133	3253	4386	3692	1832	1626	1724	1664	1919
1986	1984	2201	2326	2830	40099	34868	11747	10457	10503	2683	2602	2790	7547
1987	3838	2252	2082	1984	2773	3090	2941	2700	1613	1610	1594	1613	1695
1988	1691	1832	2065	1838	1512	1447	2218	2049	1496	1138	1171	1512	1205
1989	1529	1529	1756	1366	1548	3041	2504	2212	1714	1236	1203	1563	1279
1990	1529	1529	1366	1529	1711	1756	2168	1773	1260	1041	1073	1462	1098
1991	1415	1311	1301	1106	1314	3757	2554	2082	1328	1041	1008	1328	1179
	Change: DWRSIM 771 - DWRSIM 409												
1967	-81	-33	-639	684	-1439	3410	9602	12809	7001	800	741	677	2023
1968	1293	12	-330	-385	811	777	818	278	-365	-277	361	304	199
1969	376	-532	128	10516	12759	12492	14542	6253	5370	511	1735	1370	3953
1970	-2379	-830	-526	6195	2139	4272	959	1394	341	149	261	941	779
1971	621	-592	36	488	96	1607	1188	734	21	260	310	938	344
1972	-97	-187	-41	-297	-397	-556	-1232	-503	-434	-568	328	-560	-274
1973	232	-930	-270	818	3293	2829	1632	1291	760	472	454	1074	703
1974	1126	314	600	4058	2250	4140	2981	1165	661	657	654	1370	1205
1975	1552	-696	-56	746	606	5069	1216	709	3031	823	746	872	882
1976	2033	-695	-137	863	1111	163	493	329	-531	239	430	457	287
1977	1483	770	779	402	112	-277	-144	-298	-613	-160	-49	31	123
1978	-234	18	46	373	2480	7691	9384	5409	2669	1242	-104	1249	1823
1979	1138	-427	310	1407	3686	4471	1295	690	222	334	379	781	862
1980	411	-1532	-126	4020	3279	-7493	1014	2027	4185	2358	410	24	517
1981	759	-1790	-1165	-420	-308	516	1003	588	-358	-379	267	287	-60
1982	431	167	-522	4028	11502	1806	4248	-4354	2306	-467	565	668	1230
1983	-4074	65	-121	3198	922	-1937	-11142	-5554	6308	-3459	-2772	-2504	-1271
1984	-10302	2364	1843	-9028	-1170	-1619	354	971	-281	70	-123	-188	-1032
1985	-1008	-1216	-3064	-1576	-567	-121	788	425	-334	-383	278	116	-402
1986	-146	-625	-491	266	11401	-1650	-8851	1096	4923	83	-45	-344	339
1987	-2831	-1241	-1836	-53	444	142	398	425	-541	-143	291	140	-290
1988	48	-63	-45	272	459	-42	-192	-259	-663	-399	-126	129	-53
1989	-460	-9	202	266	343	89	-674	-210	-535	-155	-124	422	-51
1990	-41	213	283	210	290	71	-360	-502	-679	-286	-186	18	-58
1991	-593	-96	43	249	45	1158	-7	-405	-677	-247	-215	-69	-49

Note: See "Notes and Acronyms" at end of tables section.

Table 3A-23. Comparison of CVP + SWP Exports (cfs) between DWRSIM Studies 771 and 409

Water Year	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	Total TAF
	DWRSIM Study 409 (1995 DEIR/EIS)												
1967	8718	10672	11526	11916	10784	6352	7644	8128	10257	10775	5927	11243	6875
1968	9342	7641	6876	4239	4835	6480	4666	3870	5924	11287	7538	6684	4789
1969	9074	8547	11249	12373	11632	6647	6727	7690	9600	6578	5360	11243	6439
1970	11027	7887	7427	4700	4822	6543	5990	4706	6268	11287	6324	6526	5038
1971	9054	10941	11411	11618	9028	10190	6116	7704	9028	11287	6640	10061	6822
1972	11027	10941	11264	10891	8473	8443	4578	3924	5870	11287	11287	7294	6352
1973	10113	10941	11250	11573	12382	7836	6772	6930	7786	11110	6124	6866	6618
1974	10863	10941	11352	11037	8319	8492	8550	8701	8864	8065	6913	11243	6838
1975	11027	10941	9893	7640	6018	7644	8266	8756	10439	9670	6241	11243	6503
1976	11027	10941	10586	8462	8468	6038	3070	3268	5896	7623	3547	4042	5006
1977	5434	6433	11057	4844	6067	4197	2825	2394	1076	1817	941	3580	3057
1978	4415	3326	10812	10363	5453	5280	6313	6696	6613	2839	4473	8219	4513
1979	11027	10941	6331	10707	7836	8114	6604	6512	8100	8864	5187	6117	5813
1980	7828	10941	11332	12621	8081	6096	6262	6772	5681	3232	4873	10445	5681
1981	11027	10941	9165	7318	7774	7239	5026	3874	5534	11287	7551	6005	5595
1982	8382	10941	11217	12015	11725	8742	8607	9742	11277	8589	8123	11243	7276
1983	11027	8298	7936	6107	4628	4948	6594	6273	7679	7796	10177	8388	5421
1984	7062	5299	5242	3218	4144	6341	6270	5104	6664	10505	5856	10243	4582
1985	11027	10941	11708	7800	8028	7408	3696	4418	5480	11287	10258	6439	5942
1986	8726	7912	11320	11410	12821	10247	8347	7354	6322	6447	5051	8075	6277
1987	11027	8936	7785	9199	9758	10838	3800	3456	5534	11287	8755	6020	5816
1988	6587	6114	11175	11273	6370	4724	2964	3114	5768	7321	4885	3498	4452
1989	4627	5403	6928	8317	6836	11402	5466	4050	5500	11287	11287	6501	5285
1990	5470	3927	7841	11255	6076	4468	3620	2804	5804	7330	5021	3857	4071
1991	4665	3854	5073	6171	6384	11142	3790	2873	5453	5022	4228	4544	3813
	DWRSIM Study 771 (1999 REIR/EIS)												
1967	8067	11226	11547	12067	10893	7709	7041	5416	11612	11661	11693	11596	7272
1968	9172	8672	8164	7725	6884	7221	4336	3318	5781	5936	11384	8302	5243
1969	9026	10772	11401	12295	6230	6326	6235	4310	11612	11026	11010	9495	6621
1970	8018	7445	6668	7725	8481	7188	5126	4115	6302	8213	9237	9075	5285
1971	9270	11209	11466	11791	7292	9091	5697	4863	9646	11661	11693	11512	6950
1972	11466	10587	11368	8831	8779	9091	3411	2911	6302	7302	11693	9108	6085
1973	10002	11209	11319	11710	12910	8863	6403	4554	8621	11238	8798	11495	7066
1974	11433	11226	11579	8034	8805	8310	6235	4310	10419	11661	11693	11528	6952
1975	11466	10806	9059	8278	9057	8148	7041	5416	11612	11205	11693	11528	6957
1976	11466	11226	10311	8294	8675	7156	3059	2488	6403	6473	7871	8167	5526
1977	7611	6857	6554	5838	2287	2814	2958	699	1395	1464	4310	4773	2869
1978	960	3411	9904	12132	12946	7432	6235	4310	8403	5529	10213	11612	5616
1979	11563	9915	7058	7660	8373	8392	5966	4163	8957	8668	6456	9613	5839
1980	10490	11209	11417	8652	6606	5692	5395	3562	8184	6538	11693	11478	6089
1981	11352	7310	6082	5188	6086	7221	4924	3285	5882	6050	11026	7764	4958
1982	8473	11209	11368	12880	9795	9059	6235	4310	11612	11661	11693	11528	7229
1983	11466	11243	9725	3415	3241	4131	6184	4310	8772	8522	10750	9041	5478
1984	7660	6974	4261	5253	5441	7188	4571	3204	8100	10522	9042	11058	5024
1985	10474	11226	11319	8278	9057	8473	3697	2814	5815	5855	11693	9176	5905
1986	8424	9293	11368	11579	12874	9075	6235	3610	8083	7026	6603	11411	6370
1987	10961	8050	9042	8636	5870	6749	3479	2488	6352	6782	11677	6689	5235
1988	6863	5294	11287	11433	4242	4293	2806	2358	5092	5090	3757	5663	4113
1989	3789	7294	7758	9742	2413	11270	5613	2797	5563	5757	11677	9394	5012
1990	10034	6873	10604	11384	6752	5627	3580	2391	5663	3334	4131	5899	4602
1991	3432	5142	5139	4310	1152	11498	4218	2407	471	455	3497	5294	2837
	Change: DWRSIM 771 - DWRSIM 409												
1967	-651	554	21	151	109	1357	-603	-2712	1355	886	5766	353	397
1968	-170	1031	1288	3486	2049	741	-330	-552	-143	-5351	3846	1618	453
1969	-48	2225	152	-78	-5402	-321	-492	-3380	2012	4448	5650	-1748	182
1970	-3009	-442	-759	3025	3659	645	-864	-591	34	-3074	2913	2549	246
1971	216	268	55	173	-1736	-1099	-419	-2841	618	374	5053	1451	127
1972	439	-354	104	-2060	306	648	-1167	-1013	432	-3985	406	1814	-267
1973	-111	268	69	137	528	1027	-369	-2376	835	128	2674	4629	449
1974	570	285	227	-3003	486	-182	-2315	-4391	1555	3596	4780	285	114
1975	439	-135	-834	638	3039	504	-1225	-3340	1173	1535	5452	285	454
1976	439	285	-275	-168	207	1118	-11	-780	507	-1150	4324	4125	520
1977	2177	424	-4503	994	-3780	-1383	133	-1695	319	-353	3369	1193	-187
1978	-3455	85	-908	1769	7493	2152	-78	-2386	1790	2690	5740	3393	1103
1979	536	-1026	727	-3047	537	278	-638	-2349	857	-196	1269	3496	27
1980	2662	268	85	-3969	-1475	-404	-867	-3210	2503	3306	6820	1033	407
1981	325	-3631	-3083	-2130	-1688	-18	-102	-589	348	-5237	3475	1759	-638
1982	91	268	151	865	-1930	317	-2372	-5432	335	3072	3570	285	-47
1983	439	2945	1789	-2692	-1387	-817	-410	-1963	1093	726	573	653	57
1984	598	1675	-981	2035	1297	847	-1699	-1900	1436	17	3186	815	442
1985	-553	285	-389	478	1029	1065	1	-1604	335	-5432	1435	2737	-37
1986	-302	1381	48	169	53	-1172	-2112	-3744	1761	579	1552	3336	94
1987	-66	-886	1257	-563	-3888	-4089	-321	-968	818	-4505	2922	669	-580
1988	276	-820	112	160	-2128	-431	-158	-756	-676	-2231	-1128	2165	-339
1989	-838	1891	830	1425	-4423	-132	147	-1253	63	-5530	390	2893	-274
1990	4564	2946	2763	129	676	1159	-40	-413	-141	-3996	-890	2042	531
1991	-1233	1288	66	-1861	-5232	356	428	-466	-4982	-4567	-731	750	-976

Note: See "Notes and Acronyms" at end of tables section.

Table 3A-23. Comparison of CVP + SWP Exports (cfs) between DWRSIM Studies 771 and 409

Water Year	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	Total TAF
	DWRSIM Study 409 (1995 DEIR/EIS)												
1967	8718	10672	11526	11916	10784	6352	7644	8128	10257	10775	5927	11243	6875
1968	9342	7641	6876	4239	4835	6480	4666	3870	5924	11287	7538	6684	4789
1969	9074	8547	11249	12373	11632	6647	6727	7690	9600	6578	5360	11243	6439
1970	11027	7887	7427	4700	4822	6543	5990	4706	6268	11287	6324	6526	5038
1971	9054	10941	11411	11618	9028	10190	6116	7704	9028	11287	6640	10061	6822
1972	11027	10941	11264	10891	8473	8443	4578	3924	5870	11287	11287	7294	6352
1973	10113	10941	11250	11573	12382	7836	6772	6930	7786	11110	6124	6866	6618
1974	10863	10941	11352	11037	8319	8492	8550	8701	8864	8065	6913	11243	6838
1975	11027	10941	9893	7640	6018	7644	8266	8756	10439	9670	6241	11243	6503
1976	11027	10941	10586	8462	8468	6038	3070	3268	5896	7623	3547	4042	5006
1977	5434	6433	11057	4844	6067	4197	2825	2394	1076	1817	941	3580	3057
1978	4415	3326	10812	10363	5453	5280	6313	6696	6613	2839	4473	8219	4513
1979	11027	10941	6331	10707	7836	8114	6604	6512	8100	8864	5187	6117	5813
1980	7828	10941	11332	12621	8081	6096	6262	6772	5681	3232	4873	10445	5681
1981	11027	10941	9165	7318	7774	7239	5026	3874	5534	11287	7551	6005	5595
1982	8382	10941	11217	12015	11725	8742	8607	9742	11277	8589	8123	11243	7276
1983	11027	8298	7936	6107	4628	4948	6594	6273	7679	7796	10177	8388	5421
1984	7062	5299	5242	3218	4144	6341	6270	5104	6664	10505	5856	10243	4582
1985	11027	10941	11708	7800	8028	7408	3696	4418	5480	11287	10258	6439	5942
1986	8726	7912	11320	11410	12821	10247	8347	7354	6322	6447	5051	8075	6277
1987	11027	8936	7785	9199	9758	10838	3800	3456	5534	11287	8755	6020	5816
1988	6587	6114	11175	11273	6370	4724	2964	3114	5768	7321	4885	3498	4452
1989	4627	5403	6928	8317	6836	11402	5466	4050	5500	11287	11287	6501	5285
1990	5470	3927	7841	11255	6076	4468	3620	2804	5804	7330	5021	3857	4071
1991	4665	3854	5073	6171	6384	11142	3790	2873	5453	5022	4228	4544	3813
	DWRSIM Study 771 (1999 REIR/EIS)												
1967	8067	11226	11547	12067	10893	7709	7041	5416	11612	11661	11693	11596	7272
1968	9172	8672	8164	7725	6884	7221	4336	3318	5781	5936	11384	8302	5243
1969	9026	10772	11401	12295	6230	6326	6235	4310	11612	11026	11010	9495	6621
1970	8018	7445	6668	7725	8481	7188	5126	4115	6302	8213	9237	9075	5285
1971	9270	11209	11466	11791	7292	9091	5697	4863	9646	11661	11693	11512	6950
1972	11466	10587	11368	8831	8779	9091	3411	2911	6302	7302	11693	9108	6085
1973	10002	11209	11319	11710	12910	8863	6403	4554	8621	11238	8798	11495	7066
1974	11433	11226	11579	8034	8805	8310	6235	4310	10419	11661	11693	11528	6952
1975	11466	10806	9059	8278	9057	8148	7041	5416	11612	11205	11693	11528	6957
1976	11466	11226	10311	8294	8675	7156	3059	2488	6403	6473	7871	8167	5526
1977	7611	6857	6554	5838	2287	2814	2958	699	1395	1464	4310	4773	2869
1978	960	3411	9904	12132	12946	7432	6235	4310	8403	5529	10213	11612	5616
1979	11563	9915	7058	7660	8373	8392	5966	4163	8957	8668	6456	9613	5839
1980	10490	11209	11417	8652	6606	5692	5395	3562	8184	6538	11693	11478	6089
1981	11352	7310	6082	5188	6086	7221	4924	3285	5882	6050	11026	7764	4958
1982	8473	11209	11368	12880	9795	9059	6235	4310	11612	11661	11693	11528	7229
1983	11466	11243	9725	3415	3241	4131	6184	4310	8772	8522	10750	9041	5478
1984	7660	6974	4261	5253	5441	7188	4571	3204	8100	10522	9042	11058	5024
1985	10474	11226	11319	8278	9057	8473	3697	2814	5815	5855	11693	9176	5905
1986	8424	9293	11368	11579	12874	9075	6235	3610	8083	7026	6603	11411	6370
1987	10961	8050	9042	8636	5870	6749	3479	2488	6352	6782	11677	6689	5235
1988	6863	5294	11287	11433	4242	4293	2806	2358	5092	5090	3757	5663	4113
1989	3789	7294	7758	9742	2413	11270	5613	2797	5563	5757	11677	9394	5012
1990	10034	6873	10604	11384	6752	5627	3580	2391	5663	3334	4131	5899	4602
1991	3432	5142	5139	4310	1152	11498	4218	2407	471	455	3497	5294	2837
	Change: DWRSIM 771 - DWRSIM 409												
1967	-651	554	21	151	109	1357	-603	-2712	1355	886	5766	353	397
1968	-170	1031	1288	3486	2049	741	-330	-552	-143	-5351	3846	1618	453
1969	-48	2225	152	-78	-5402	-321	-492	-3380	2012	4448	5650	-1748	182
1970	-3009	-442	-759	3025	3659	645	-864	-591	34	-3074	2913	2549	246
1971	216	268	55	173	-1736	-1099	-419	-2841	618	374	5053	1451	127
1972	439	-354	104	-2060	306	648	-1167	-1013	432	-3985	406	1814	-267
1973	-111	268	69	137	528	1027	-369	-2376	835	128	2674	4629	449
1974	570	285	227	-3003	486	-182	-2315	-4391	1555	3596	4780	285	114
1975	439	-135	-834	638	3039	504	-1225	-3340	1173	1535	5452	285	454
1976	439	285	-275	-168	207	1118	-11	-780	507	-1150	4324	4125	520
1977	2177	424	-4503	994	-3780	-1383	133	-1695	319	-353	3369	1193	-187
1978	-3455	85	-908	1769	7493	2152	-78	-2386	1790	2690	5740	3393	1103
1979	536	-1026	727	-3047	537	278	-638	-2349	857	-196	1269	3496	27
1980	2662	268	85	-3969	-1475	-404	-867	-3210	2503	3306	6820	1033	407
1981	325	-3631	-3083	-2130	-1688	-18	-102	-589	348	-5237	3475	1759	-638
1982	91	268	151	865	-1930	317	-2372	-5432	335	3072	3570	285	-47
1983	439	2945	1789	-2692	-1387	-817	-410	-1963	1093	726	573	653	57
1984	598	1675	-981	2035	1297	847	-1699	-1900	1436	17	3186	815	442
1985	-553	285	-389	478	1029	1065	1	-1604	335	-5432	1435	2737	-37
1986	-302	1381	48	169	53	-1172	-2112	-3744	1761	579	1552	3336	94
1987	-66	-886	1257	-563	-3888	-4089	-321	-968	818	-4505	2922	669	-580
1988	276	-820	112	160	-2128	-431	-158	-756	-676	-2231	-1128	2165	-339
1989	-838	1891	830	1425	-4423	-132	147	-1253	63	-5530	390	2893	-274
1990	4564	2946	2763	129	676	1159	-40	-413	-141	-3996	-890	2042	531
1991	-1233	1288	66	-1861	-5232	356	428	-466	-4982	-4567	-731	750	-976

Note: See "Notes and Acronyms" at end of tables section.

Table 3A-24. Comparison of Delta Outflow (cfs) between DWRSIM Studies 771 and 409

Water Year	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	Total TAF
	DWRSIM Study 409 (1995 DEIR/EIS)												
1967	4506	6538	34816	46682	55505	56651	48507	45279	37462	9803	5741	9902	21804
1968	16772	11630	11134	28914	67389	33948	10325	7579	6840	7724	5259	4158	12771
1969	5157	5675	13929	116820	130914	56981	47434	59410	26877	8002	5741	13407	29584
1970	17934	14092	55147	205170	91229	35248	11579	7959	7579	9358	5741	3872	28049
1971	5063	15618	64439	45778	22775	44856	16812	26487	12689	9449	5741	6040	16637
1972	8528	6661	12423	9956	19716	25452	9811	7579	6840	7840	6820	3791	7567
1973	5618	15492	18954	72356	89859	59498	15653	14634	10301	9373	5302	4147	19378
1974	5615	59398	65122	126767	42649	106026	70318	20652	12454	8002	5741	9345	32103
1975	12707	9012	10182	10316	67661	85520	20861	28861	15245	8263	5741	6958	16973
1976	13567	11491	6355	5879	11385	9744	7475	6366	6897	5750	3415	3008	5510
1977	2992	5211	7186	4505	8083	6897	6897	4505	4000	4001	3415	3008	3662
1978	2992	3537	6832	59011	60344	67366	40512	17640	8774	8002	5302	5227	17228
1979	9352	6861	4984	21446	44456	29641	15028	12903	10882	6505	4668	3397	10264
1980	4001	9948	12113	107524	132325	69498	16291	12000	7579	8002	5302	5436	23531
1981	9134	6252	9481	22569	24089	29667	12223	7579	6117	7090	4831	3492	8599
1982	4793	26967	87982	77836	95820	82058	142617	48242	16998	8002	5801	16124	36999
1983	31393	46767	89976	107902	189090	262789	110435	83414	74552	32036	9719	26029	64201
1984	37420	83000	159165	85443	49713	36149	13094	9792	8231	8845	5741	5638	30301
1985	9792	29597	19994	10628	15513	14122	8185	10012	6117	7164	5807	3758	8488
1986	4675	5194	7089	11205	219765	150695	31242	10807	7579	8002	5741	4037	28117
1987	4677	5554	4598	5767	12344	24487	10473	7579	6117	7205	5409	3515	5896
1988	4001	4740	6877	17924	11400	7804	7300	6496	6897	5491	3415	3008	5150
1989	2992	4648	5565	5788	8175	31151	18361	10268	6117	7264	6120	3818	6653
1990	4001	4504	6416	7862	11400	7310	10251	5910	6897	5584	3447	3008	4621
1991	2992	4187	4532	5025	8258	21264	11259	5362	7037	4215	3415	3008	4860
	DWRSIM Study 771 (1999 REIR/EIS)												
1967	4033	10487	35486	46903	49408	58580	63154	62337	46147	12848	5595	8117	24320
1968	10392	6689	13043	30445	58465	36153	13293	12116	5126	6505	4342	3008	12041
1969	4033	4924	17841	125650	146746	70241	66163	73184	29527	8001	5757	11915	34027
1970	10018	10050	55083	206998	91181	41162	14721	12799	6604	8001	5578	3008	28067
1971	4033	16469	58791	45260	24650	46806	23981	30526	13764	8001	4911	3882	16958
1972	4050	4504	10880	16963	19714	25533	10655	12197	6218	6505	4180	3008	7506
1973	4342	16368	22004	77478	91469	55799	23780	15727	10234	8001	4586	3479	20107
1974	5432	56583	66533	131618	45608	113338	76229	31664	13646	8506	6668	9461	34106
1975	7725	4588	9010	15174	62930	89399	31880	29274	17108	8001	5952	5344	17279
1976	12051	5260	6700	10864	17420	14653	8218	7562	6285	4001	2992	3008	5974
1977	5302	3496	3497	4863	11668	6522	6773	6896	6873	4001	2992	3008	3975
1978	5416	3496	5253	57653	55151	71200	52416	27387	9579	8001	4521	3748	18331
1979	4017	4537	4505	24427	47715	35177	21309	13482	11024	6505	4001	3008	10842
1980	4342	5848	13076	98799	136419	64906	25830	20914	10638	8001	4456	3865	23958
1981	4163	4504	8766	26509	27315	27973	18620	10539	5277	4993	3497	3008	8758
1982	4033	31560	83414	74648	103569	89529	150239	55262	20452	8001	5595	11713	38494
1983	20085	39156	86390	115160	190824	257170	106865	83658	84816	31258	15125	21208	63454
1984	17532	78733	156940	73119	42732	36023	18671	15434	9646	8001	5269	3075	28066
1985	4375	24805	19565	14051	18042	19500	13780	10994	5344	4993	3497	3008	8564
1986	4033	4958	10978	20898	220786	153167	33644	21158	10066	8001	5188	4100	29984
1987	4017	4521	4977	9368	19878	23452	10050	7904	6218	4993	3497	3008	6147
1988	4033	4504	8701	20231	11022	11433	7596	7497	6436	4001	2992	3008	5518
1989	5464	3496	3497	5107	11146	36690	23410	9530	5310	4993	3497	3664	6987
1990	4017	4504	4521	11026	12802	9953	10218	7985	6134	4001	2992	3008	4897
1991	5481	3496	3497	4749	11974	29469	16520	7351	5865	4001	2992	3008	5937
	Change: DWRSIM 771 - DWRSIM 409												
1967	-473	3949	670	221	-6097	1929	14647	17058	8685	3045	-146	-1785	2516
1968	-6380	-4941	1909	1531	-8924	2205	2968	4537	-1714	-1219	-917	-1150	-730
1969	-1124	-751	3912	8830	15832	13260	18729	13774	2650	-1	16	-1492	4443
1970	-7916	-4042	-64	1828	-48	5914	3142	4840	-975	-1357	-163	-864	18
1971	-1030	851	-5648	-518	1875	1950	7169	4039	1075	-1448	-830	-2158	321
1972	-4478	-2157	-1543	7007	-2	81	844	4618	-622	-1335	-2640	-783	-61
1973	-1276	876	3050	5122	1610	-3699	8127	1093	-67	-1372	-716	-668	729
1974	-183	-2815	1411	4851	2959	7312	5911	11012	1192	504	927	116	2003
1975	-4982	-4424	-1172	4858	-4731	3879	11019	413	1863	-262	211	-1614	305
1976	-1516	-6231	345	4985	6035	4909	743	1196	-612	-1749	-423	0	464
1977	2310	-1715	-3689	358	3585	-375	-124	2391	2873	-0	-423	0	313
1978	2424	-41	-1579	-1358	-5193	3834	11904	9747	805	-1	-781	-1479	1103
1979	-5335	-2324	-479	2981	3259	5536	6281	579	142	0	-667	-389	578
1980	341	-4100	963	-8725	4094	-4592	9539	8914	3059	-1	-846	-1571	427
1981	-4971	-1748	-715	3940	3226	-1694	6397	2960	-840	-2097	-1334	-484	159
1982	-760	4593	-4568	-3188	7749	7471	7622	7020	3454	-1	-206	-4411	1495
1983	-11308	-7611	-3586	7258	1734	-5619	-3570	244	10264	-778	5406	-4821	-747
1984	-19888	-4267	-2225	-12324	-6981	-126	5577	5642	1415	-844	-472	-2563	-2236
1985	-5417	-4792	-429	3423	2529	5378	5595	982	-773	-2171	-2310	-750	76
1986	-642	-236	3889	9693	1021	2472	2402	10351	2487	-1	-553	63	1867
1987	-660	-1033	379	3601	7534	-1035	-423	325	101	-2212	-1912	-507	251
1988	32	-236	1824	2307	-378	3629	296	1001	-461	-1490	-423	0	368
1989	2472	-1152	-2068	-681	2971	5539	5049	-738	-807	-2271	-2623	-154	334
1990	16	-0	-1895	3164	1402	2643	-33	2075	-763	-1583	-455	0	276
1991	2489	-691	-1035	-276	3716	8205	5261	1989	-1172	-214	-423	0	1077

Note: See "Notes and Acronyms" at end of section.

Table 3A-25. Comparison of Required Delta Outflow (cfs) between DWRSIM Studies 771 and 409

Water Year	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	Total TAF
	DWRSIM Study 409 (1995 DEIR/EIS)												
1967	4506	6538	7120	6001	24954	14889	15102	11288	15427	8002	5741	5795	7564
1968	4001	5464	4685	6001	9901	20302	10325	7579	6840	7724	5259	4158	5565
1969	5157	5675	6705	6001	22447	15373	10822	20587	19795	8002	5741	5921	7978
1970	4001	4562	4885	6001	16029	12369	11579	7579	7579	9358	5741	3872	5644
1971	5063	5876	5719	8484	22775	15023	16279	9466	7822	9449	5741	6040	7103
1972	5475	6485	6235	6103	11400	11400	9811	7579	6840	7840	6820	3791	5417
1973	5618	5947	7461	6001	23408	16464	10742	8440	10301	9373	5302	4147	6830
1974	5615	7269	6591	6001	17027	12241	16292	15365	8779	8002	5741	6333	6954
1975	5398	6266	5984	6001	11400	19282	15699	7722	12026	8263	5741	6212	6636
1976	5242	6313	6355	5865	8609	8007	7475	6366	6897	5750	3415	3008	4423
1977	2992	5211	7186	4505	8083	6897	6897	4505	4000	4001	3415	3008	3662
1978	2992	3537	6832	6001	28559	19427	21202	15808	8774	8002	5302	5227	7944
1979	5026	6316	4984	6294	11400	16369	13576	7579	10882	6505	4668	3397	5852
1980	4001	6096	6397	6001	23044	16110	11084	9962	7579	8002	5302	5436	6577
1981	4597	6062	5589	6001	11276	9935	12223	7579	6117	7090	4831	3492	5116
1982	4793	7477	7160	6001	18180	17080	13890	15768	9704	8002	5801	3975	7109
1983	4001	4504	4505	6001	16285	13554	11748	10940	14572	8002	5741	3008	6206
1984	4001	4504	4505	6001	14676	12102	12388	7579	8231	8845	5741	5638	5684
1985	4950	7066	7108	6001	7382	10891	7863	10012	6117	7164	5807	3758	5075
1986	4675	5194	6742	6993	11400	19425	14337	8034	7579	8002	5741	4037	6164
1987	4001	5554	4598	5767	8363	11400	10473	7579	6117	7205	5409	3515	4826
1988	4001	4740	6877	7344	11400	7804	7300	6496	6897	5491	3415	3008	4511
1989	2992	4648	5565	5788	8175	8765	10416	10268	6117	7264	6120	3818	4823
1990	4001	4504	6416	6418	11400	6949	10251	5910	6897	5584	3447	3008	4512
1991	2992	4187	4532	5025	8258	8566	11259	5362	7037	4215	3415	3008	4094
	DWRSIM Study 771 (1999 REIR/EIS)												
1967	4001	4504	4505	6001	25460	18280	17998	13807	17041	8001	4001	3008	7639
1968	4001	4504	4505	6001	10118	22915	13360	6863	5327	6505	4407	3008	5521
1969	4001	4504	4505	6001	22273	15759	13360	19304	19175	8001	4050	3008	7478
1970	4001	4504	4505	6001	16223	15043	14688	5253	6621	8001	5611	3008	5639
1971	4001	4504	4505	6001	24272	17190	18704	13320	8352	8001	5009	3008	7051
1972	4001	4504	4505	6001	11005	11401	9848	9823	6386	6505	4196	3008	4898
1973	4001	4504	4505	6001	24434	17890	14352	11043	10453	8001	4586	3008	6804
1974	4001	4504	4505	6001	17249	15174	17074	17337	9428	8001	4424	3008	6679
1975	4001	4504	4505	6001	11398	22785	18066	9986	13276	8001	4733	3008	6653
1976	4001	4504	4505	4505	6589	6505	7798	6115	6705	4001	2992	3008	3694
1977	5464	3496	3497	4733	12010	5643	7092	6896	6890	4001	2992	3008	3965
1978	5448	3496	3497	9807	28467	22004	20066	18020	9663	8001	4521	3008	8205
1979	4001	4504	4505	4505	11146	18296	15747	8994	11192	6505	4001	3008	5816
1980	4001	4504	4505	6001	23052	16686	14974	10961	8991	8001	4554	3008	6591
1981	4001	4504	4505	6001	10479	9351	13192	7692	5310	4993	3497	3008	4618
1982	4001	4504	4505	6001	19572	17467	16099	15450	12856	8001	4001	3008	6966
1983	4001	4504	4505	6001	17033	13856	11814	13368	16200	8001	4001	3008	6413
1984	4001	4504	4505	6001	16498	16279	15511	8408	9865	8001	5253	3008	6144
1985	4001	4504	4505	6001	7274	11401	9041	11010	5378	4993	3497	3008	4502
1986	4001	4504	4505	6001	11398	18540	14839	10929	8235	8001	5237	3008	5985
1987	4001	4504	4505	4505	7400	11401	9949	5318	6638	4993	3497	3008	4206
1988	4001	4504	4505	6001	11005	11401	7193	6261	6705	4001	2992	3008	4318
1989	5464	3496	3497	4733	10821	7725	9949	10002	5310	4993	3497	3008	4374
1990	4001	4504	4505	4505	11398	6652	10234	5708	6319	4001	2992	3008	4092
1991	5448	3496	3497	4733	11974	5643	10655	5773	5983	4001	2992	3008	4055
	Change: DWRSIM 771 - DWRSIM 409												
1967	-505	-2034	-2615	0	506	3391	2896	2519	1614	-1	-1740	-2787	75
1968	-0	-960	-180	0	217	2613	3035	-716	-1513	-1219	-852	-1150	-44
1969	-1156	-1171	-2200	0	-174	386	2538	-1283	-620	-1	-1691	-2913	-500
1970	-0	-58	-380	0	194	2674	3109	-2326	-958	-1357	-130	-864	-6
1971	-1062	-1372	-1214	-2483	1497	2167	2425	3854	530	-1448	-732	-3032	-52
1972	-1474	-1981	-1730	-102	-395	1	37	2244	-454	-1335	-2624	-783	-519
1973	-1617	-1443	-2956	0	1026	1426	3610	2603	152	-1372	-716	-1139	-26
1974	-1614	-2765	-2086	0	222	2933	782	1972	649	-1	-1317	-3325	-275
1975	-1397	-1762	-1479	0	-2	3503	2367	2264	1250	-262	-1008	-3204	16
1976	-1241	-1809	-1850	-1360	-2020	-1502	323	-251	-192	-1749	-423	0	-728
1977	2472	-1715	-3689	228	3927	-1254	195	2391	2890	-0	-423	0	303
1978	2456	-41	-3335	3806	-92	2577	-1136	2212	889	-1	-781	-2219	261
1979	-1025	-1812	-479	-1789	-254	1927	2171	1415	310	0	-667	-389	-36
1980	-0	-1592	-1892	0	8	576	3890	999	1412	-1	-748	-2428	14
1981	-596	-1558	-1084	0	-797	-584	969	113	-807	-2097	-1334	-484	-498
1982	-792	-2973	-2655	0	1392	387	2209	-318	3152	-1	-1800	-967	-143
1983	-0	-0	-0	0	748	302	66	2428	1628	-1	-1740	0	207
1984	-0	-0	-0	0	1822	4177	3123	829	1634	-844	-488	-2630	460
1985	-949	-2562	-2603	0	-108	510	1178	998	-739	-2171	-2310	-750	-574
1986	-674	-690	-2237	-992	-2	-885	502	2895	656	-1	-504	-1029	-179
1987	-0	-1050	-93	-1262	-963	1	-524	-2261	521	-2212	-1912	-507	-619
1988	-0	-236	-2372	-1343	-395	3597	-107	-235	-192	-1490	-423	0	-193
1989	2472	-1152	-2068	-1055	2646	-1040	-467	-266	-807	-2271	-2623	-810	-449
1990	-0	-0	-1911	-1913	-2	-297	-17	-202	-578	-1583	-455	0	-420
1991	2456	-691	-1035	-292	3716	-2923	-604	411	-1054	-214	-423	0	-39

Note: See "Notes and Acronyms" at end of tables section.

Table 3A-26. Comparison of SWP+CVP San Luis Reservoir Storage (TAF) between DWRSIM Studies 771 and 409

Water Year	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	Total TAF
	DWRSIM Study 409 (1995 DEIR/EIS)												
1967	675	949	1277	1699	1994	2038	2038	2038	1928	1786	1372	1643	0
1968	1812	1948	2005	2038	2038	2038	1794	1434	961	768	415	401	0
1969	673	847	1138	1616	1970	2038	2038	2038	1935	1671	1235	1519	0
1970	1819	1955	2012	2038	2038	2038	1867	1552	1090	886	448	419	0
1971	689	1003	1299	1724	1891	2026	1799	1597	1254	999	531	668	0
1972	1010	1288	1538	1847	1972	2038	1742	1310	797	590	449	439	0
1973	737	1025	1292	1687	2019	2038	1858	1692	1359	1117	637	603	0
1974	956	1245	1513	1847	1977	2038	1982	1964	1734	1302	871	1096	0
1975	1458	1748	1876	2038	2038	2038	1939	1798	1564	1206	713	918	0
1976	1261	1538	1747	1906	2031	2037	1783	1507	1267	985	613	548	0
1977	661	707	966	1219	1269	1349	1349	1302	1098	910	699	751	0
1978	907	1044	1554	1853	2038	2038	2038	2038	1816	1158	672	776	0
1979	1181	1512	1516	1847	1972	2038	1913	1805	1471	1125	624	578	0
1980	778	1101	1401	1847	1998	2038	2038	1996	1613	1104	635	871	0
1981	1277	1607	1717	1883	2007	2038	1816	1455	960	767	415	361	0
1982	591	908	1196	1648	1940	2023	2038	2038	1935	1615	1255	1469	0
1983	1739	1875	1936	2038	2038	2038	2038	2038	1935	1793	1684	1821	0
1984	1981	2038	2038	2038	2038	2038	1901	1617	1188	944	486	682	0
1985	1079	1401	1657	1847	1972	2016	1677	1330	834	643	458	404	0
1986	623	737	1014	1402	1794	2030	2038	1921	1596	1126	632	695	0
1987	1067	1243	1304	1564	1768	1986	1662	1257	798	640	418	366	0
1988	463	512	776	1163	1182	1129	891	666	480	386	160	107	0
1989	179	263	387	679	813	1114	953	691	347	318	344	380	0
1990	426	355	465	878	912	881	736	560	425	339	168	155	0
1991	258	320	369	559	699	1130	1030	829	648	548	185	164	0
	DWRSIM Study 771 (1999 REIR/EIS)												
1967	253	582	1030	1509	1799	1876	1891	1719	1724	1637	1495	1509	0
1968	1565	1725	1869	1990	2038	2038	1802	1388	937	454	374	353	0
1969	519	851	1277	1754	1895	1990	1961	1730	1750	1631	1435	1440	0
1970	1490	1617	1755	1879	2037	2038	1849	1485	1066	724	510	533	0
1971	715	1073	1504	1875	1929	1992	1779	1385	1073	840	685	785	0
1972	1041	1311	1661	1806	1945	2024	1695	1206	728	270	152	163	0
1973	321	633	1008	1486	1874	1949	1806	1430	1161	952	663	792	0
1974	1074	1403	1703	1871	1998	2038	1888	1498	1297	1083	946	1068	0
1975	1344	1592	1751	1893	2033	2038	1899	1532	1326	1053	888	983	0
1976	1237	1544	1710	1851	2010	2038	1771	1354	1016	662	440	415	0
1977	492	578	696	916	916	916	876	665	444	279	206	262	0
1978	138	197	684	1329	1809	1951	1961	1768	1510	927	677	820	0
1979	1107	1302	1433	1546	1702	1783	1651	1307	1055	751	375	442	0
1980	705	1071	1505	1764	1937	2038	2038	1838	1657	1361	1340	1533	0
1981	1848	1992	2038	2038	2038	2038	1832	1409	956	469	358	302	0
1982	432	789	1211	1721	1876	1969	1899	1605	1528	1313	1154	1253	0
1983	1506	1852	2030	2038	2038	2038	2038	1897	1842	1716	1588	1651	0
1984	1822	2004	2038	2038	2038	2038	1816	1396	1081	878	649	795	0
1985	1053	1417	1698	1852	1991	2038	1726	1228	720	170	80	121	0
1986	142	331	709	1222	1733	1985	1989	1744	1622	1265	933	1096	0
1987	1371	1525	1800	2038	2038	2038	1758	1295	896	490	443	308	0
1988	321	408	728	1255	1276	1276	1102	836	628	398	130	123	0
1989	80	299	589	1031	1031	1545	1357	886	410	80	80	123	0
1990	262	343	639	1155	1349	1431	1306	1046	879	551	315	312	0
1991	241	320	440	566	510	1056	1096	997	727	445	366	457	0
	Change: DWRSIM 771 - DWRSIM 409												
1967	-422	-367	-247	-190	-195	-162	-147	-319	-204	-149	123	-134	0
1968	-247	-223	-136	-48	0	0	8	-46	-24	-314	-41	-48	0
1969	-154	4	139	138	-75	-48	-77	-308	-185	-40	200	-79	0
1970	-329	-338	-257	-159	-1	0	-18	-67	-24	-162	62	114	0
1971	26	70	205	151	38	-34	-20	-212	-181	-159	154	117	0
1972	31	23	123	-41	-27	-14	-47	-104	-69	-320	-297	-276	0
1973	-416	-392	-284	-201	-145	-89	-52	-262	-198	-165	26	189	0
1974	118	158	190	24	21	0	-94	-466	-437	-219	75	-28	0
1975	-114	-156	-125	-145	-5	0	-40	-266	-238	-153	175	65	0
1976	-24	6	-37	-55	-21	1	-12	-153	-251	-323	-173	-133	0
1977	-169	-129	-270	-303	-353	-433	-473	-637	-654	-631	-493	-489	0
1978	-769	-847	-870	-524	-229	-87	-77	-270	-306	-231	5	44	0
1979	-74	-210	-83	-301	-270	-255	-262	-498	-416	-374	-249	-136	0
1980	-73	-30	104	-83	-61	0	0	-158	44	257	705	662	0
1981	571	385	321	155	31	0	16	-46	-4	-298	-57	-59	0
1982	-159	-119	15	73	-64	-54	-139	-433	-407	-302	-101	-216	0
1983	-233	-23	94	0	0	0	0	-141	-93	-77	-96	-170	0
1984	-159	-34	0	0	0	0	-85	-221	-107	-66	163	113	0
1985	-26	16	41	5	19	22	49	-102	-114	-473	-378	-283	0
1986	-481	-406	-305	-180	-61	-45	-49	-177	26	139	301	401	0
1987	304	282	496	474	270	52	96	38	98	-150	25	-58	0
1988	-142	-104	-48	92	94	147	211	170	148	12	-30	16	0
1989	-99	36	202	352	218	431	404	195	63	-238	-264	-257	0
1990	-164	-12	174	277	437	550	570	486	454	212	147	157	0
1991	-17	0	71	7	-189	-74	66	168	79	-103	181	293	0

Note: See "Notes and Acronyms" at end of tables section.

Table 3A-27. Comparison of CVP + SWP Deliveries [Banks+Tracy-San Luis Reservoir Storage Change] between DWRSIM Studies 771 and 409

Water Year	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	Total TAF
	DWRSIM Study 409 (1995 DEIR/EIS)												
1967	5108	6067	6192	5053	5472	5636	7644	8128	12106	13084	12660	6689	5662
1968	6594	5355	5949	3702	4835	6480	8766	9725	13873	14426	13279	6919	6028
1969	4650	5623	6516	4599	5258	5541	6727	7690	11331	10871	12451	6470	5293
1970	6148	5601	6500	4277	4822	6543	8864	9829	14032	14605	13447	7013	6135
1971	4663	5664	6597	4706	6021	7994	9931	10989	14792	15434	14251	7759	6564
1972	5465	6269	7198	5866	6300	7370	9552	10950	14491	14653	13580	7462	6586
1973	5267	6101	6908	5149	6404	7527	9797	9630	13382	15046	13930	7437	6430
1974	5122	6084	6993	5605	5978	7500	9491	8994	12729	15091	13922	7462	6333
1975	5140	6067	7811	5005	6018	7644	9930	11049	14371	15492	14259	7798	6672
1976	5449	6286	7187	5876	6295	5940	7339	7757	9929	12209	9597	5134	5370
1977	3596	5660	6845	729	5167	2896	2825	3158	4504	4874	4373	2706	2856
1978	1878	1024	2518	5500	2122	5280	6313	6696	10344	13540	12377	6471	4468
1979	4440	5378	6266	5324	5585	7041	8705	8268	13713	14491	13335	6890	5999
1980	4575	5513	6453	5368	5456	5445	6262	7455	12117	11510	12500	6479	5378
1981	4424	5395	7376	4618	5541	6735	8757	9745	13853	14426	13276	6912	6097
1982	4641	5614	6533	4664	6467	7392	8355	9742	13008	13793	13978	7647	6144
1983	6636	6012	6944	4448	4628	4948	6594	6273	9410	10105	11950	6086	5070
1984	4460	4341	5242	3218	4144	6341	8572	9723	13873	14473	13305	6949	5710
1985	4571	5530	7545	4710	5777	6692	9393	10061	13815	14393	13267	7346	6220
1986	5164	5996	6815	5100	5763	6409	8213	9257	11784	14091	13085	7016	5954
1987	4977	5978	6793	4971	6085	7293	9245	10043	13248	13857	12365	6894	6139
1988	5009	5291	6882	4979	6040	5586	6964	6773	8894	8850	8560	4389	4719
1989	3456	3991	4911	3568	4423	6507	8172	8311	11281	11759	10864	5896	5016
1990	4722	5120	6052	4538	5464	4972	6057	5666	8073	8729	7802	4075	4300
1991	2990	2812	4276	3081	3863	4133	5471	6142	8495	6648	10132	4897	3797
	DWRSIM Study 771 (1999 REIR/EIS)												
1967	6652	5462	4066	4098	5510	6310	6604	7936	11192	12702	13596	11041	5742
1968	7969	5747	5627	5595	5980	7058	8134	9758	12991	13336	12295	8319	6203
1969	6034	4958	4277	4375	3547	4635	6554	7790	10940	12588	13791	9075	5343
1970	6928	5075	4245	5546	5474	7091	8117	9758	12991	13401	12328	8369	5992
1971	6034	4958	4261	5595	6158	7904	9092	10994	14553	15076	13807	9512	6513
1972	7009	5815	5481	6310	6224	7644	8756	10587	13948	14295	13206	8588	6508
1973	7140	5731	5042	3789	5762	7497	8621	10376	12789	14263	13092	8991	6220
1974	6554	5445	6505	5139	6356	7562	8571	10376	13444	14767	13515	9142	6478
1975	6700	6403	6278	5790	6374	7969	9193	11108	14738	15271	13970	9613	6842
1976	7058	5831	7416	5822	5754	6489	7310	8961	11764	11856	11140	8251	5892
1977	6050	5159	4407	2098	2125	2618	3462	3887	4840	3806	5220	3546	2849
1978	2716	2218	1789	1496	4105	4977	5899	7172	12369	14621	13889	8873	4834
1979	6619	6386	4733	5660	5402	6928	7999	9465	12839	13238	12181	8151	6009
1980	5920	4823	4163	4277	3460	3952	5226	6538	10873	10978	11628	7898	4811
1981	5952	4638	5123	5025	5924	7058	8201	9872	13159	13580	12425	8386	5994
1982	6066	4974	4310	4424	6842	7400	7226	8815	12570	14783	13873	9545	6083
1983	7074	5176	6635	3139	3079	3984	6016	6326	9361	10197	12441	7646	4892
1984	4602	3680	3497	5074	5302	7042	8134	9758	13058	13450	12360	8268	5685
1985	5985	4857	6554	5595	6392	7562	8772	10604	14016	14442	12750	8151	6376
1986	7790	5882	5025	3106	3547	4830	5999	7302	9781	12458	11596	8335	5168
1987	6196	5210	4424	4619	5726	6603	7999	9742	12722	13011	12051	8638	5849
1988	6375	3613	5904	2732	3755	4163	5596	6456	8268	8294	7741	5495	4126
1989	4472	3613	2879	2423	2305	2814	8604	10197	13243	10766	11287	8352	4884
1990	7514	5025	5611	2879	3115	4066	5495	6359	8201	8619	7725	5647	4239
1991	4326	3596	2992	2098	1981	2423	3361	3757	4739	4716	4489	3479	2531
	Change: DWRSIM 771 - DWRSIM 409												
1967	1544	-606	-2126	-955	37	674	-1040	-192	-913	-383	936	4352	80
1968	1375	392	-322	1892	1145	578	-633	33	-882	-1090	-984	1399	175
1969	1383	-665	-2239	-224	-1711	-906	-173	100	-391	1716	1340	2605	50
1970	780	-526	-2255	1269	652	548	-747	-71	-1042	-1204	-1120	1356	-142
1971	1371	-707	-2336	888	137	-91	-839	5	-239	-358	-444	1753	-52
1972	1544	-454	-1717	444	-76	274	-797	-362	-543	-358	-374	1125	-78
1973	1873	-370	-1866	-1360	-642	-30	-1176	746	-593	-783	-838	1553	-210
1974	1432	-639	-488	-466	378	62	-920	1382	715	-324	-408	1680	145
1975	1561	335	-1534	784	356	325	-737	59	367	-221	-289	1815	170
1976	1610	-454	229	-54	-541	549	-28	1204	1834	-353	1543	3117	522
1977	2454	-501	-2438	1369	-3042	-278	637	729	336	-1069	848	840	-7
1978	838	1195	-729	-4004	1983	-303	-414	476	2025	1080	1512	2402	366
1979	2179	1008	-1533	336	-184	-113	-705	1197	-874	-1253	-1154	1261	10
1980	1344	-690	-2290	-1090	-1996	-1494	-1036	-917	-1244	-532	-872	1420	-567
1981	1528	-757	-2253	407	383	323	-556	127	-694	-846	-851	1473	-103
1982	1425	-639	-2223	-240	375	8	-1129	-927	-438	990	-105	1899	-61
1983	439	-836	-309	-1309	-1549	-964	-578	53	-49	92	492	1561	-178
1984	143	-661	-1745	1856	1158	701	-439	35	-816	-1024	-945	1319	-25
1985	1414	-673	-991	885	615	870	-621	542	200	48	-516	804	156
1986	2626	-114	-1790	-1994	-2216	-1579	-2213	-1955	-2003	-1633	-1489	1319	-787
1987	1219	-769	-2369	-352	-359	-690	-1246	-301	-526	-846	-314	1744	-290
1988	1366	-1677	-978	-2247	-2285	-1423	-1367	-317	-626	-556	-819	1107	-593
1989	1016	-378	-2033	-1145	-2119	-3693	433	1886	1962	-992	423	2456	-132
1990	2792	-95	-441	-1660	-2349	-906	-561	693	128	-109	-77	1571	-61
1991	1336	784	-1284	-983	-1883	-1709	-2109	-2385	-3756	-1932	-5643	-1418	-1266

Note: See "Notes and Acronyms" at end of tables section.

Table 3A-28. South of Delta SWP & CVP Deliveries [Exports/Interruptible/Local/Changes in Reservoirs] (cfs) for DWRSIM Study 771

Water Year	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	Total
1922	7011	5600	5038	4611	5665	6692	7939	8860	13069	14720	13331	8715	6109
1923	6377	5129	6844	5456	4458	6286	8645	10210	13540	13955	12859	8799	6188
1924	6474	5297	4583	3179	2757	3570	4729	5559	7104	7076	6793	5237	3762
1925	3856	3348	2761	1521	2099	5164	6998	8226	10734	11207	10095	6850	4396
1926	5255	4188	3607	2968	3090	5359	7199	9088	11927	12183	11298	8077	5082
1927	5938	4944	4209	3228	6853	7392	8577	10291	13473	14297	13054	8631	6087
1928	6247	5079	5738	5554	5886	7180	8426	10178	13523	13890	12811	8782	6232
1929	6442	5297	4567	3066	3306	4334	5838	6795	8784	8979	8306	5993	4326
1930	4555	3734	3136	2415	3900	5180	7670	9104	11826	12118	11200	8144	5007
1931	6117	5079	4339	2561	2658	3326	4578	5299	6784	6068	6891	4850	3532
1932	3677	3096	2550	1830	3348	4497	6090	7120	9221	9402	8680	6228	3966
1933	4702	3885	3266	2285	2370	2724	4527	5266	6717	6653	6322	4850	3232
1934	3628	3129	2550	1683	2478	3976	5368	6258	8045	8166	7558	5556	3523
1935	4246	3532	2957	2074	3090	4172	7653	10259	13775	14183	13054	8749	5294
1936	6312	5179	4485	2968	3383	7684	7922	9234	13557	14004	12843	8598	5802
1937	6198	5112	4388	3245	4944	6497	6292	7039	12028	13370	12290	8211	5407
1938	5954	4826	3786	5668	5376	6611	7065	8193	11557	13679	13900	10866	5881
1939	8101	6272	5673	5651	5611	6513	7636	9218	12280	12557	11623	7909	5976
1940	5743	4658	3965	2545	3696	6530	9031	10649	14195	14639	13152	9135	5909
1941	6718	5566	4648	3635	4800	6269	8897	9055	12565	14411	10176	8497	5746
1942	7808	4911	4144	5424	5665	6985	8056	9657	11322	14021	12778	8396	5983
1943	7775	6053	5364	4968	6079	5863	7351	7039	12028	13272	12209	8245	5807
1944	6019	4877	4193	5847	5365	6790	7788	9397	12549	12866	11900	8009	5768
1945	5808	4709	4030	3749	5755	7034	8157	9803	12649	13516	12420	8329	5790
1946	6052	4927	4241	6253	5106	7505	8846	10665	14179	14704	13445	9018	6331
1947	6653	5415	4746	4106	5611	6627	8830	10698	14179	13939	12095	9152	6157
1948	7710	6289	5055	2757	2740	3261	6326	11153	14666	14801	13071	9808	5891
1949	7938	6087	5347	3537	3558	4806	8359	9852	12868	13289	12193	8530	5814
1950	6474	5280	4583	2805	3810	5261	8661	10275	13456	13874	12794	9018	5810
1951	6751	5465	4388	6221	6745	7636	8779	10633	14061	14508	13347	9253	6503
1952	6848	5633	4843	4611	4565	6172	6796	7949	11238	15126	13705	8951	5818
1953	6865	5011	4404	5700	6151	7001	8309	10080	13473	13972	12778	8497	6168
1954	6182	6860	5429	5651	6601	7587	8981	10861	14363	14850	13624	9354	6657
1955	6930	5684	4973	4269	5629	5814	7418	8942	11691	12069	11087	7741	5565
1956	5808	4726	3737	4090	6704	6839	8712	10129	13725	15338	14014	9539	6236
1957	7076	5784	5412	6448	6385	7603	8729	10584	13977	14395	13282	9219	6570
1958	6832	5616	4876	5944	5791	7327	7670	8519	10582	14183	12924	8581	5964
1959	8946	6171	5461	5245	5953	5895	8275	9934	13254	13712	11022	8346	6167
1960	6100	4961	4290	2968	2844	6660	8443	10259	13439	13809	12469	8967	5744
1961	6702	5549	4811	3212	4152	6237	8140	9820	12817	12606	10729	8514	5628
1962	6426	5280	4567	2838	2730	7733	9535	11479	15271	15679	12453	9976	6273
1963	7320	6087	5364	4497	6403	7359	8577	10389	13221	14769	13494	9068	6428
1964	6686	5616	6941	5782	5174	5830	8594	10194	13439	12963	11249	8329	6081
1965	7418	6137	4859	3781	5358	7424	7804	10291	13574	14037	12908	9001	6190
1966	6686	5482	7088	5326	6457	7636	8863	10682	14195	14541	11444	9001	6480
1967	6621	5431	4030	4074	5485	6237	6561	7933	11170	12687	13575	10950	5717
1968	7971	5684	5559	5586	5852	7001	8090	9738	12969	13370	12258	8261	6174
1969	6003	4911	4225	4350	3504	4578	6510	7754	10902	12524	13754	8984	5309
1970	6897	5028	4176	5521	5467	6969	8073	9722	12985	13386	12274	8261	5959
1971	6019	4911	4209	5554	6133	7847	9065	10958	14498	15061	13770	9438	6484
1972	7011	5734	5461	6253	6182	7571	8678	10535	13876	14281	13120	8665	6478
1973	6979	5667	4990	3765	5899	7408	8577	10340	12733	14199	13054	8934	6187
1974	6539	5381	6437	5115	6331	7440	8561	10340	13406	14752	13477	9085	6447
1975	6686	6322	6226	5765	6349	7847	9166	11072	14700	15257	13965	9505	6809
1976	7060	5768	7380	5798	5660	6351	7132	8779	11490	11614	10924	8060	5793
1977	5938	5062	4306	2074	2099	2578	3418	3867	4835	3547	5183	3506	2800
1978	2701	2154	1769	1472	4080	4936	5855	7136	12347	14622	13868	8816	4812
1979	6572	6356	4664	5635	5376	6871	7956	9446	12801	13191	12144	8093	5979
1980	5905	4759	4111	4253	3418	3846	5166	6502	10834	10947	11591	7841	4777
1981	5889	4591	5071	4985	5917	7018	8174	9836	13120	13533	12388	8295	5962
1982	6052	4927	4258	4383	6835	7343	7199	8779	12498	14769	13851	9488	6056
1983	7027	5129	6583	3098	3018	3928	5956	6291	9305	10166	12404	7556	4854
1984	4588	3633	3445	5050	5261	6985	8107	9722	12985	13419	12323	8194	5654
1985	5986	4810	6502	5570	6367	7489	8729	10584	13977	14378	12745	8093	6349
1986	7775	5818	4990	3082	3450	4790	5956	7283	9776	12476	11607	8278	5145
1987	6198	5179	4306	4529	5683	6546	7905	9592	12549	12850	11884	8497	5775
1988	6328	3936	5656	2724	3748	4172	5620	6470	8364	8589	7834	5539	4162
1989	4246	3432	2892	2415	2244	2757	8577	10161	13221	10947	11266	8295	4854
1990	7483	4188	5998	3488	3090	4025	5435	6339	8146	8280	7655	5606	4207
1991	4279	3532	2957	2074	1955	2366	3301	3705	4717	4669	4451	3422	2499
1992	2620	2104	1737	1342	1905	3131	5267	6128	7893	7987	7444	5505	3201
1993	4198	3482	2924	2318	4962	7782	8897	9608	13288	14980	13152	8698	5689
1994	6344	5095	6844	5440	5575	5229	7972	9348	12448	11483	10778	7942	5701
Minimum	2620	2104	1737	1342	1905	2366	3301	3705	4717	3547	4451	3422	2499
Average	6209	4994	4629	4081	4698	5971	7493	8947	12010	12662	11677	8155	5522
Maximum	8946	6860	7380	6448	6853	7847	9535	11479	15271	15679	14014	10950	6809

Note: See "Notes and Acronyms" at end of tables section.

Table 3A-29. South of Delta SWP & CVP Deficits (cfs) for DWRSIM Study 771

Water Year	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	Total
1922	360	335	305	43	1141	506	429	464	677	802	629	262	359
1923	206	124	191	317	717	799	1101	1212	1736	2070	1605	649	647
1924	525	328	461	1982	3493	3797	5290	6208	8565	9345	8063	4616	3178
1925	3450	2570	2575	3641	4274	2204	3022	3541	4936	5182	4713	2969	2599
1926	2068	1747	1729	1960	3022	1748	2536	2302	3299	3771	3094	1372	1728
1927	1027	664	835	1418	691	457	647	707	1013	1208	938	380	603
1928	314	192	256	447	1136	951	1118	1244	1770	2119	1654	665	716
1929	542	328	477	2096	3068	3033	4181	4972	6885	7443	6551	3843	2620
1930	2751	2184	2201	2747	2474	2187	2349	2663	3843	4287	3623	1725	1993
1931	1206	856	998	2600	3716	4041	5442	6452	8868	9768	8405	4952	3457
1932	3646	2805	2787	2817	2345	2297	3304	3819	5456	5995	5162	2649	2599
1933	1816	1331	1427	2626	3724	4383	5208	6108	8492	9268	8022	4515	3434
1934	3303	2462	2494	3479	3878	3391	4652	5509	7608	8223	7234	4246	3408
1935	3044	2385	2380	2573	2707	2622	1840	1000	1450	1761	1345	531	1426
1936	428	276	400	1679	1789	652	899	984	1400	1680	1312	531	726
1937	428	259	368	1061	2061	1238	1017	1130	1618	1940	1491	598	797
1938	493	309	433	703	747	7	0	0	0	0	0	0	162
1939	0	8	18	30	1090	1205	1454	1602	2291	2737	2126	867	810
1940	688	428	611	2366	2284	717	882	968	1400	1664	1573	531	851
1941	428	259	368	597	593	1	1	0	0	233	2922	0	326
1942	6	0	21	30	730	733	1017	756	1081	1306	1003	413	428
1943	339	209	302	471	744	815	1118	1228	1753	2103	1638	665	687
1944	542	331	470	755	1288	945	1302	1423	2038	2444	1898	783	858
1945	623	377	546	898	1412	815	1050	1163	1669	1989	1540	632	767
1946	515	309	451	724	735	642	697	756	1081	1306	1003	413	521
1947	330	210	298	1055	2149	1813	1151	1260	1803	2168	2126	682	908
1948	542	343	481	2422	3545	4123	3660	838	1215	1485	1134	430	1220
1949	363	225	335	1673	2834	2561	1660	1898	2784	3084	2631	1288	1287
1950	848	654	754	2357	2564	2106	1358	1492	2196	2515	2046	835	1190
1951	588	369	526	779	727	772	1050	1163	1652	1973	1540	632	710
1952	509	318	445	691	57	0	0	0	0	0	0	0	122
1953	3	10	25	26	709	817	899	886	1282	1534	1182	481	474
1954	401	242	354	551	835	805	849	935	1349	1615	1247	514	585
1955	411	268	363	1049	1437	1455	2116	2449	3518	3885	3322	1692	1325
1956	1173	883	981	860	764	441	613	675	980	1160	906	363	591
1957	298	184	266	421	1088	805	1101	1212	1736	2087	1621	665	693
1958	525	335	461	732	1070	473	647	707	1013	1208	938	380	512
1959	314	196	291	443	907	671	933	1033	1467	1761	2825	565	688
1960	450	276	403	2194	3406	2090	1375	1508	2213	2564	2290	835	1183
1961	588	385	526	1950	2474	2220	1677	1947	2835	3767	4046	1305	1431
1962	881	654	770	2324	3644	1147	630	691	997	1241	2922	380	982
1963	298	192	254	431	735	799	664	740	1047	1257	971	397	470
1964	314	194	282	454	990	1042	1437	1586	2257	3014	2922	850	926
1965	688	436	591	1186	1070	1439	2013	1475	2112	2385	1964	902	981
1966	669	469	591	691	717	496	681	740	1064	1452	2922	397	657
1967	330	194	282	459	693	782	781	138	190	233	174	77	261
1968	54	49	76	101	799	817	1118	1228	1753	2103	1638	665	627
1969	548	326	468	739	446	0	0	0	0	0	0	0	152
1970	3	10	25	26	781	850	1134	1244	1770	2119	1654	682	621
1971	548	326	484	746	493	561	765	838	1198	1436	1117	447	541
1972	363	234	315	519	1129	838	1139	1228	1776	2119	1639	665	722
1973	556	352	477	1195	943	750	1000	1098	1568	1875	1459	598	716
1974	477	292	412	675	843	691	681	756	1081	1290	1003	413	520
1975	330	210	298	470	1088	545	664	724	1030	1241	955	397	480
1976	314	201	282	454	1615	1911	2685	2988	4179	4792	3916	1793	1516
1977	1369	873	1030	3072	4274	4773	6568	7867	10767	12110	10193	6296	4175
1978	4670	3679	3567	2988	1205	717	513	0	0	0	0	0	1046
1979	0	0	0	30	1378	847	1101	1212	1753	2087	1621	665	645
1980	525	327	464	743	1156	799	1085	1195	1719	2054	1589	649	742
1981	531	326	470	735	889	801	1034	1130	1618	1940	1508	615	700
1982	499	309	435	678	709	799	647	707	1013	1208	938	380	502
1983	319	192	284	434	467	1	1	0	0	0	0	0	102
1984	6	0	21	30	870	717	983	1098	1568	1875	1459	598	557
1985	477	293	416	665	1070	903	1101	1212	1719	2070	1654	649	738
1986	525	335	461	1785	1967	1221	1689	1862	2643	3144	2467	1035	1154
1987	818	494	660	1413	1825	1862	1912	2175	3104	3539	2924	1356	1332
1988	995	705	851	2519	2502	3196	4383	5265	7271	7768	6941	4246	2814
1989	3044	2452	2445	2747	4130	4611	1442	1589	2415	4320	3526	919	2030
1990	588	385	559	2357	3302	3407	4568	5411	7490	8093	7136	4213	2866
1991	3028	2385	2380	3072	4400	4985	6685	8030	10935	11704	10340	6397	4485
1992	4751	3746	3600	3570	4092	3976	4468	5262	7332	7967	6981	3910	3599
1993	2751	2109	2120	2235	781	408	244	252	375	444	711	145	759
1994	119	74	91	186	1180	961	1319	1456	2089	3762	2922	800	903
Minimum	0	0	0	26	57	0	0	0	0	0	0	0	102
Average	924	668	754	1301	1734	1493	1709	1855	2614	3015	2652	1247	1205
Maximum	4751	3746	3600	3641	4400	4985	6685	8030	10935	12110	10340	6397	4485

Note: See "Notes and Acronyms" at end of tables section.

Table 3A-30. Available Water For Delta Wetlands Diversions under 1995 Water Quality Control Plan and
Delta Wetlands Final Operations Criteria (cfs)

DW%	90%	90%	90%	90%	75%	50%	0%	0%	50%	75%	90%	90%	
Water Year	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	Oct - Mar (TAF)
1922	0	0	416	2,102	2,783	2,376	0	0	2,024	0	0	0	461
1923	0	0	14,793	14,456	0	0	0	0	0	51	0	0	1,755
1924	0	0	0	0	0	0	0	0	0	0	0	0	0
1925	0	0	0	0	7,038	0	0	0	0	0	0	0	422
1926	0	0	0	109	2,128	0	0	0	0	0	0	0	134
1927	0	3,199	0	9,823	19,849	2,314	0	0	0	0	0	0	2,111
1928	0	1,218	0	7,132	2,213	6,505	0	0	0	0	0	0	1,024
1929	0	0	0	0	0	0	0	0	0	0	0	0	0
1930	0	0	0	4,583	0	0	0	0	0	0	0	0	275
1931	0	0	0	0	0	0	0	0	0	0	0	0	0
1932	0	0	1,639	2,613	0	0	0	0	0	0	0	0	255
1933	0	0	0	0	0	0	0	0	0	0	0	0	0
1934	0	0	0	187	0	0	0	0	0	0	0	0	11
1935	0	0	0	8,347	0	0	0	0	0	0	0	0	501
1936	0	0	0	11,104	11,508	991	0	0	0	0	0	0	1,416
1937	0	0	0	0	4,068	5,623	0	0	0	0	0	0	582
1938	0	4,954	16,329	14,297	34,940	23,535	0	0	3,733	0	46	0	5,643
1939	2,728	0	4,084	6,033	960	0	0	0	0	0	0	0	828
1940	0	0	0	7,990	7,278	6,453	0	0	0	64	0	0	1,303
1941	0	0	12,873	19,842	25,504	8,897	0	0	160	0	924	0	4,027
1942	943	0	18,671	30,505	26,316	2,435	0	0	1,021	0	60	0	4,732
1943	0	1,611	9,493	33,337	12,955	13,773	0	0	0	0	0	0	4,270
1944	0	0	0	3,019	4,826	807	0	0	0	0	0	0	519
1945	0	0	0	0	6,376	3,221	0	0	0	0	0	0	576
1946	0	0	19,160	15,044	0	422	0	0	0	51	0	0	2,078
1947	0	0	0	0	0	0	0	0	0	0	75	0	0
1948	0	0	0	0	0	0	0	0	0	51	60	0	0
1949	0	0	0	0	0	913	0	0	0	64	0	0	55
1950	0	0	0	3,154	1,809	0	0	0	0	39	46	0	298
1951	0	17,887	30,714	25,622	11,740	2,904	0	0	0	0	46	0	5,332
1952	0	0	14,999	26,244	18,474	10,332	0	0	3,724	3,272	2,844	616	4,203
1953	35	0	19,142	24,419	4,286	582	0	0	0	0	60	0	2,908
1954	0	0	0	11,483	11,922	2,065	0	0	0	0	46	0	1,528
1955	0	0	6,181	5,280	0	0	0	0	0	0	0	0	688
1956	0	0	26,198	44,925	16,820	3,143	0	0	0	51	60	0	5,465
1957	3,036	0	0	302	3,746	1,932	0	0	0	51	0	0	541
1958	0	0	4,922	12,589	21,123	12,257	0	0	3,362	613	3,168	0	3,053
1959	328	0	0	16,242	10,196	0	0	0	0	0	46	0	1,606
1960	0	0	0	0	0	0	0	0	0	0	60	0	0
1961	0	0	0	0	821	0	0	0	0	0	75	0	49
1962	0	0	0	0	5,656	0	0	0	0	0	60	0	339
1963	9,363	0	6,732	2,340	12,345	0	0	0	0	0	0	0	1,847
1964	0	8,478	0	7,615	0	0	0	0	0	0	60	0	966
1965	0	0	19,957	30,729	2,679	0	0	0	0	64	60	0	3,202
1966	0	5,317	1,740	11,108	3,455	496	0	0	0	0	46	0	1,327
1967	0	356	12,744	18,126	8,052	4,098	0	0	5,371	5,467	2,178	87	2,603
1968	738	0	2,686	14,755	12,139	1,425	0	0	0	0	0	0	1,905
1969	0	0	6,184	36,108	32,869	11,112	0	0	2,818	417	1,846	3,535	5,176
1970	313	1,388	20,689	48,182	21,438	4,321	0	0	0	0	0	0	5,780
1971	0	5,499	17,922	13,754	0	1,567	0	0	0	51	46	0	2,324
1972	0	0	3,159	2,100	215	0	0	0	0	0	60	0	328
1973	0	3,472	6,486	19,565	17,114	5,314	0	0	0	0	0	0	3,117
1974	0	14,891	17,861	26,204	8,820	9,919	0	0	0	1,015	2,816	828	4,662
1975	0	0	0	2,822	12,342	9,054	0	0	598	0	1,802	0	1,453
1976	3,475	0	0	0	454	0	0	0	0	0	0	0	236
1977	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	17,771	7,920	6,460	0	0	0	0	0	0	1,929
1979	0	0	0	8,337	9,089	3,895	0	0	0	0	0	0	1,279
1980	0	0	3,219	30,753	32,228	9,507	0	0	0	0	46	0	4,542
1981	0	0	2,540	13,671	3,648	1,352	0	0	0	0	0	0	1,273
1982	0	10,999	16,249	25,857	20,195	12,695	0	0	877	1,625	2,692	4,549	5,160
1983	8,819	18,142	38,390	52,532	47,491	36,495	0	0	11,835	14,121	6,707	11,086	12,112
1984	12,416	37,108	52,339	32,698	8,293	3,082	0	0	0	0	0	0	8,756
1985	0	10,277	5,473	0	640	0	0	0	0	0	60	0	983
1986	0	0	0	4,819	46,285	18,154	0	0	0	0	0	0	4,155
1987	0	0	0	0	806	25	0	0	0	0	60	0	50
1988	0	0	0	7,394	0	0	0	0	0	0	0	0	444
1989	0	0	0	0	0	0	0	0	0	0	60	0	0
1990	0	0	0	1,289	0	0	0	0	0	0	0	0	77
1991	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	717	0	0	0	0	0	0	0	43
1993	0	0	0	21,161	6,303	426	0	0	577	0	60	0	1,673
1994	0	0	0	0	1,442	0	0	0	0	0	0	0	86
Avg ('22-'94)	578	1,984	5,945	11,102	8,114	3,437	0	0	495	371	360	284	1,870

Note: See "Notes and Acronyms" at end of tables section.

Table 3A-31. Unused CVP and SWP Permitted Pumping Capacity for Delta Wetlands Exports (cfs)

Water Year	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	Jun - Sep (TAF)
1922	3,353	3,108	0	0	0	3,052	0	0	0	4,176	1,494	1,558	434
1923	0	0	0	2,693	7,805	4,582	0	0	3,922	0	3,706	1,613	554
1924	3,971	4,570	1,946	660	2,821	7,424	0	0	9,262	9,852	10,098	6,633	2,151
1925	6,899	6,284	1,537	4,155	0	6,047	0	0	6,472	6,160	5,007	2,919	1,234
1926	5,370	5,662	2,506	0	0	4,590	0	0	5,633	5,396	210	5,322	994
1927	4,394	0	0	0	562	3,678	0	0	3,728	1,184	3,397	1,438	585
1928	32	0	0	0	3,324	3,268	0	0	4,992	1,639	1,332	4,028	719
1929	3,581	1,511	547	347	2,292	6,706	0	0	6,774	9,299	9,626	5,003	1,842
1930	6,704	5,427	0	0	4,270	0	0	0	5,951	5,689	470	4,482	995
1931	4,671	4,956	819	1,636	5,283	7,534	0	0	10,959	10,958	6,991	5,171	2,045
1932	8,753	6,872	0	0	1,552	8,138	0	0	8,959	9,120	6,259	5,407	1,785
1933	5,289	6,334	4,956	967	4,699	6,356	0	0	10,774	10,974	8,048	5,339	2,108
1934	8,232	6,838	839	0	5,245	7,052	0	0	6,892	10,730	7,870	5,087	1,835
1935	8,558	3,998	3,934	0	5,954	253	0	0	2,940	598	4,845	3,272	699
1936	2,670	4,402	4,250	0	0	268	0	0	3,939	1,444	5,040	1,558	719
1937	4,020	4,385	1,456	27	0	3,998	0	0	4,153	4,827	6,146	2,180	1,038
1938	1,694	0	0	1,523	6,558	5,114	0	0	0	484	0	0	29
1939	0	0	4,567	5,966	5,321	4,508	0	0	5,239	4,957	1,462	6,112	1,066
1940	5,695	6,553	6,575	0	0	0	0	0	4,134	0	2,129	2,017	497
1941	3,109	1,629	0	0	651	5,428	0	0	0	3,965	0	0	238
1942	0	0	1,658	7,182	6,301	3,979	0	0	0	2,875	0	0	173
1943	0	0	0	6,559	5,856	5,036	0	0	4,633	3,119	2,698	1,340	707
1944	857	2,066	649	2,526	5,295	3,722	0	0	4,045	972	5,349	5,457	949
1945	4,947	0	0	106	790	3,884	0	0	2,998	452	5,007	3,289	705
1946	1,523	0	0	0	6,674	2,271	0	0	3,275	0	3,153	2,348	527
1947	3,435	1,220	0	628	1,052	2,600	0	0	5,669	5,591	0	1,372	758
1948	3,256	2,738	4,254	0	6,791	4,047	0	0	2,351	0	0	892	195
1949	1,369	2,015	0	706	3,570	0	0	0	3,734	0	4,503	2,953	671
1950	3,841	3,713	3,910	0	0	2,214	0	0	3,316	0	0	804	247
1951	2,833	0	0	0	1,746	3,289	0	0	4,563	712	0	695	358
1952	1,483	0	0	0	7,542	5,525	0	0	0	0	0	0	0
1953	0	3,372	6,932	6,710	5,816	3,727	0	0	1,404	2,452	0	0	231
1954	0	0	0	2,547	4,099	2,946	0	0	4,939	582	0	2,079	456
1955	1,662	0	0	0	3,342	5,071	0	0	4,192	3,688	5,446	3,390	1,003
1956	4,768	2,738	0	0	165	4,438	0	0	204	0	0	0	12
1957	0	1,847	624	83	4,235	3,057	0	0	3,598	0	779	957	320
1958	0	0	0	0	3,748	3,933	0	0	0	0	0	0	0
1959	0	1,175	3,363	5,858	5,500	5,482	0	0	5,816	5,754	0	2,181	825
1960	4,134	4,150	860	923	0	2,481	0	0	5,475	4,957	0	2,197	758
1961	3,223	881	0	0	0	3,579	0	0	5,751	5,672	0	4,045	928
1962	3,906	3,595	0	2,871	0	0	0	0	4,228	923	0	1,930	425
1963	0	0	0	0	0	0	0	0	3,116	13	161	116	204
1964	455	0	0	0	4,698	4,581	0	0	5,886	5,689	0	2,028	816
1965	3,630	0	0	0	0	1,254	0	0	4,504	0	0	586	305
1966	1,190	0	0	1,699	5,461	3,379	0	0	5,663	4,957	0	2,936	813
1967	3,532	0	0	0	0	1,380	0	0	0	0	0	0	0
1968	0	1,091	5,420	5,751	5,344	3,578	0	0	5,845	5,672	242	3,289	903
1969	2,573	750	0	0	3,645	7,119	0	0	0	0	0	0	0
1970	0	4,726	7,253	7,088	6,447	3,912	0	0	5,322	3,395	2,389	2,516	817
1971	2,312	0	0	0	4,427	1,318	0	0	1,981	0	0	0	119
1972	0	957	0	0	2,480	2,732	0	0	5,328	4,306	0	2,508	729
1973	1,565	0	0	0	0	903	0	0	3,010	354	2,828	127	379
1974	0	0	0	1,453	5,521	3,582	0	0	1,210	0	0	0	73
1975	0	717	0	2,736	5,186	3,322	0	0	0	403	0	0	24
1976	0	0	0	705	4,265	4,271	0	0	5,186	5,087	3,674	3,423	1,042
1977	3,971	4,670	4,854	5,630	9,172	8,401	0	0	10,068	10,063	7,186	6,785	2,046
1978	10,558	8,065	1,408	0	0	2,349	0	0	3,239	6,063	1,413	0	643
1979	0	1,629	2,147	0	5,704	3,979	0	0	2,675	2,940	5,154	1,978	765
1980	1,079	0	0	0	7,078	7,053	0	0	3,445	5,054	0	0	510
1981	223	4,234	4,899	5,901	4,977	3,605	0	0	5,751	5,542	600	3,827	943
1982	3,126	0	0	0	0	3,098	0	0	0	0	0	0	0
1983	0	0	1,896	9,121	9,233	7,804	0	0	0	656	0	2,418	184
1984	6,552	7,620	8,210	7,620	6,586	4,030	0	0	3,528	1,070	2,584	553	464
1985	1,089	0	0	0	3,703	2,867	0	0	5,804	5,737	0	2,443	839
1986	3,158	2,267	0	0	0	753	0	0	3,551	4,566	5,040	160	799
1987	593	3,494	2,349	1,581	4,026	2,836	0	0	5,263	4,794	0	4,902	898
1988	4,719	6,233	0	0	7,150	6,848	0	0	6,421	6,453	7,821	5,894	1,595
1989	7,744	4,200	3,516	1,652	8,968	0	0	0	6,051	5,819	0	2,214	845
1990	1,516	4,654	673	0	4,996	5,694	0	0	5,816	8,209	7,365	5,659	1,623
1991	8,118	6,368	6,164	6,718	10,217	0	0	0	10,976	11,072	8,000	6,247	2,178
1992	8,265	7,326	6,850	2,768	0	2,984	0	0	8,556	9,559	10,146	6,919	2,111
1993	8,232	7,359	80	0	0	104	0	0	0	5,054	0	804	352
1994	0	1,931	0	0	2,470	4,942	0	0	5,392	5,315	291	3,205	852
Avg ('22-'94)	2,910	2,470	1,533	1,577	3,570	3,671	0	0	4,226	3,658	2,410	2,419	763

Note: See "Notes and Acronyms" at end of tables section.

Table 3A-32. Delta Wetlands Diversions (cfs) with Unlimited Demands

Water Year	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	Total (TAF)
1922	0	0	0	1,723	2,409	49	0	0	296	0	0	0	270
1923	0	0	3,871	15	0	0	0	0	0	51	0	0	237
1924	0	0	0	0	0	0	0	0	0	0	0	0	0
1925	0	0	0	0	4,000	0	0	0	0	0	0	0	241
1926	0	0	0	0	2,128	0	0	0	0	0	0	0	128
1927	0	0	0	3,576	357	49	0	0	0	0	0	0	240
1928	0	1,218	0	2,719	30	49	0	0	0	0	0	0	242
1929	0	0	0	0	0	0	0	0	0	0	0	0	0
1930	0	0	0	2,238	0	0	0	0	0	0	0	0	135
1931	0	0	0	0	0	0	0	0	0	0	0	0	0
1932	0	0	0	1,786	0	0	0	0	0	0	0	0	108
1933	0	0	0	0	0	0	0	0	0	0	0	0	0
1934	0	0	0	0	0	0	0	0	0	0	0	0	0
1935	0	0	0	0	0	0	0	0	0	0	0	0	0
1936	0	0	0	0	4,000	177	0	0	0	0	0	0	252
1937	0	0	0	0	4,000	307	0	0	0	0	0	0	259
1938	0	0	3,871	15	31	49	0	0	296	0	46	0	259
1939	822	0	37	15	31	0	0	0	0	0	0	0	54
1940	0	0	0	0	4,000	177	0	0	0	64	0	0	256
1941	0	0	0	3,871	31	49	0	0	160	0	924	0	303
1942	943	0	2,179	15	31	49	0	0	296	0	60	0	215
1943	0	1,611	1,676	15	31	49	0	0	0	0	0	0	204
1944	0	0	0	0	4,000	177	0	0	0	0	0	0	252
1945	0	0	0	0	4,000	307	0	0	0	0	0	0	259
1946	0	0	3,871	15	0	422	0	0	0	51	0	0	263
1947	0	0	0	0	0	0	0	0	0	0	75	0	5
1948	0	0	0	0	0	0	0	0	0	51	60	0	7
1949	0	0	0	0	0	913	0	0	0	64	0	0	59
1950	0	0	0	0	1,809	0	0	0	0	39	46	0	114
1951	0	0	3,871	15	31	49	0	0	0	0	46	0	242
1952	0	0	3,871	15	30	49	0	0	296	130	115	87	277
1953	35	0	3,319	15	31	49	0	0	0	0	60	0	211
1954	0	0	0	3,668	255	49	0	0	0	0	46	0	242
1955	0	0	3,000	885	0	0	0	0	0	0	0	0	234
1956	0	0	0	3,871	30	49	0	0	0	51	60	0	245
1957	755	0	0	302	2,087	49	0	0	0	51	0	0	195
1958	0	0	3,000	885	31	49	0	0	296	130	115	0	271
1959	137	0	0	3,871	31	0	0	0	0	0	46	0	246
1960	0	0	0	0	0	0	0	0	0	0	60	0	4
1961	0	0	0	0	821	0	0	0	0	0	75	0	54
1962	0	0	0	0	4,000	0	0	0	0	0	60	0	245
1963	0	0	3,000	885	31	0	0	0	0	0	0	0	236
1964	0	3,533	0	28	0	0	0	0	0	0	60	0	218
1965	0	0	0	3,871	31	0	0	0	0	64	60	0	243
1966	0	0	1,740	2,145	31	49	0	0	0	0	46	0	242
1967	0	0	3,871	15	31	49	0	0	296	130	115	87	277
1968	53	0	1,093	15	30	49	0	0	0	0	0	0	75
1969	0	0	0	3,871	31	49	0	0	296	130	115	87	276
1970	53	25	13	15	31	49	0	0	0	0	0	0	11
1971	0	0	3,871	15	0	1,567	0	0	0	51	46	0	334
1972	0	0	3,000	200	30	0	0	0	0	0	60	0	198
1973	0	0	3,000	885	31	49	0	0	0	0	0	0	239
1974	0	4,000	13	15	31	49	0	0	0	1,015	688	87	355
1975	0	0	0	799	31	49	0	0	296	0	649	0	110
1976	137	0	0	0	265	0	0	0	0	0	0	0	24
1977	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	4,000	307	0	0	0	0	0	0	259
1979	0	0	0	3,417	533	49	0	0	0	0	0	0	241
1980	0	0	3,000	885	30	49	0	0	0	0	46	0	242
1981	0	0	0	3,871	31	49	0	0	0	0	0	0	238
1982	0	0	3,871	15	31	49	0	0	296	130	115	87	277
1983	53	25	13	15	31	49	0	0	296	130	115	87	49
1984	53	25	13	15	30	49	0	0	0	0	0	0	11
1985	0	0	3,000	0	640	0	0	0	0	0	60	0	223
1986	0	0	0	2,356	1,708	49	0	0	0	0	0	0	248
1987	0	0	0	0	806	25	0	0	0	0	60	0	54
1988	0	0	0	2,999	0	0	0	0	0	0	0	0	181
1989	0	0	0	0	0	0	0	0	0	0	60	0	4
1990	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	3,871	31	49	0	0	296	0	60	0	259
1994	0	0	0	0	1,442	0	0	0	0	0	0	0	87
Avg ('22-'94)	42	143	850	818	659	80	0	0	47	32	58	7	165

Note: See "Notes and Acronyms" at end of tables section.

Table 3A-33. Delta Wetlands Storage (TAF) with Unlimited Demands

Water Year	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1922	0	0	0	106	238	238	234	227	238	0	0	0
1923	0	0	238	238	125	0	0	0	0	3	0	0
1924	0	0	0	0	0	0	0	0	0	0	0	0
1925	0	0	0	0	222	96	92	86	0	0	0	0
1926	0	0	0	0	118	0	0	0	0	0	0	0
1927	0	0	0	220	238	238	234	227	101	21	0	0
1928	0	72	72	238	238	238	234	227	101	0	0	0
1929	0	0	0	0	0	0	0	0	0	0	0	0
1930	0	0	0	138	25	22	17	11	0	0	0	0
1931	0	0	0	0	0	0	0	0	0	0	0	0
1932	0	0	0	110	108	0	0	0	0	0	0	0
1933	0	0	0	0	0	0	0	0	0	0	0	0
1934	0	0	0	0	0	0	0	0	0	0	0	0
1935	0	0	0	0	0	0	0	0	0	0	0	0
1936	0	0	0	0	230	238	234	227	101	5	0	0
1937	0	0	0	0	222	238	234	227	101	0	0	0
1938	0	0	238	238	238	238	234	227	238	200	196	191
1939	238	237	238	238	238	112	108	101	0	0	0	0
1940	0	0	0	0	230	238	234	227	101	97	0	0
1941	0	0	0	238	238	238	234	227	230	0	57	52
1942	106	105	238	238	238	238	234	227	238	53	50	45
1943	41	136	238	238	238	238	234	227	101	0	0	0
1944	0	0	0	0	230	238	234	227	101	34	0	0
1945	0	0	0	0	222	238	234	227	101	66	0	0
1946	0	0	238	238	125	148	144	138	12	7	0	0
1947	0	0	0	0	0	0	0	0	0	0	5	0
1948	0	0	0	0	0	0	0	0	0	3	4	0
1949	0	0	0	0	0	56	52	46	0	4	0	0
1950	0	0	0	0	100	0	0	0	0	2	3	0
1951	0	0	238	238	238	238	234	227	101	50	45	0
1952	0	0	238	238	238	238	234	227	238	238	238	238
1953	237	35	238	238	238	238	234	227	137	0	4	0
1954	0	0	0	226	238	238	234	227	101	58	53	0
1955	0	0	184	238	125	0	0	0	0	0	0	0
1956	0	0	0	238	238	238	234	227	208	203	200	195
1957	238	127	106	124	238	238	234	227	101	97	42	0
1958	0	0	184	238	238	238	234	227	238	238	238	233
1959	238	167	0	238	238	112	108	101	0	0	3	0
1960	0	0	0	0	0	0	0	0	0	0	4	0
1961	0	0	0	0	46	0	0	0	0	0	5	0
1962	0	0	0	0	222	219	215	209	83	18	14	0
1963	0	0	184	238	238	235	231	224	98	90	73	61
1964	29	238	237	238	121	0	0	0	0	0	4	0
1965	0	0	0	238	238	207	203	197	71	67	63	23
1966	0	0	107	238	238	238	234	227	101	0	3	0
1967	0	0	238	238	238	238	234	227	238	238	238	238
1968	238	172	238	238	238	238	234	227	101	0	0	0
1969	0	0	0	238	238	238	234	227	238	238	238	238
1970	238	238	238	238	238	238	234	227	101	0	0	0
1971	0	0	238	238	125	219	214	208	83	78	74	69
1972	66	43	227	238	238	112	108	101	0	0	4	0
1973	0	0	184	238	238	238	234	227	101	72	0	0
1974	0	238	238	238	238	238	234	227	148	203	238	238
1975	235	191	190	238	238	238	234	227	238	205	238	233
1976	238	237	236	224	238	112	108	101	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	222	238	234	227	101	0	0	0
1979	0	0	0	210	238	238	234	227	101	0	0	0
1980	0	0	184	238	238	238	234	227	101	0	3	0
1981	0	0	0	238	238	238	234	227	101	0	0	0
1982	0	0	238	238	238	238	234	227	238	238	238	238
1983	238	238	238	238	238	238	234	227	238	238	238	238
1984	238	238	238	238	238	238	234	227	101	28	0	0
1985	0	0	184	184	217	91	87	81	0	0	4	0
1986	0	0	0	145	238	238	234	227	101	0	0	0
1987	0	0	0	0	45	43	39	33	0	0	4	0
1988	0	0	0	184	68	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	4	0
1990	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	238	238	238	234	227	238	0	4	0
1994	0	0	0	0	80	0	0	0	0	0	0	0
Avg ('22-'94)	36	37	87	136	162	142	139	135	80	42	39	35

Note: See "Notes and Acronyms" at end of tables section.

Table 3A-34. Delta Wetlands Discharge for Exports (cfs) under Unlimited Demands

Water Year	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	Total (TAF)	Calendar (TAF)
1922	0	0	0	0	0	0	0	0	0	3,741	0	0	225	226
1923	0	0	0	0	2,000	1,988	0	0	0	0	0	0	240	241
1924	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1925	0	0	0	0	0	2,000	0	0	1,320	0	0	0	200	200
1926	0	0	0	0	0	1,873	0	0	0	0	0	0	113	113
1927	0	0	0	0	0	0	0	0	2,000	1,184	220	0	205	205
1928	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1929	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1930	0	0	0	0	2,000	0	0	0	71	0	0	0	125	125
1931	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1932	0	0	0	0	0	1,709	0	0	0	0	0	0	103	103
1933	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1934	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1935	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1936	0	0	0	0	0	0	0	0	2,000	1,444	0	0	207	208
1937	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1938	0	0	0	0	0	0	0	0	0	484	0	0	29	29
1939	0	0	0	0	0	2,000	0	0	1,587	0	0	0	216	216
1940	0	0	0	0	0	0	0	0	2,000	0	1,467	0	209	209
1941	0	0	0	0	0	0	0	0	0	3,609	0	0	217	218
1942	0	0	0	0	0	0	0	0	0	2,875	0	0	173	173
1943	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1944	0	0	0	0	0	0	0	0	2,000	972	431	0	205	205
1945	0	0	0	0	0	0	0	0	2,000	452	952	0	205	205
1946	0	0	0	0	2,000	0	0	0	2,000	0	0	0	241	241
1947	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1948	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1949	0	0	0	0	0	0	0	0	647	0	0	0	39	39
1950	0	0	0	0	0	1,585	0	0	0	0	0	0	95	96
1951	0	0	0	0	0	0	0	0	2,000	712	0	674	204	204
1952	0	0	0	0	0	0	0	0	0	0	0	0	0	203
1953	0	3,372	0	0	0	0	0	0	1,404	2,095	0	0	414	211
1954	0	0	0	0	0	0	0	0	2,000	582	0	809	204	205
1955	0	0	0	0	2,000	1,988	0	0	0	0	0	0	240	241
1956	0	0	0	0	0	0	0	0	204	0	0	0	12	143
1957	0	1,847	319	0	0	0	0	0	2,000	0	779	611	335	205
1958	0	0	0	0	0	0	0	0	0	0	0	0	0	234
1959	0	1,175	2,696	0	0	2,000	0	0	1,587	0	0	0	449	216
1960	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1961	0	0	0	0	0	692	0	0	0	0	0	0	42	42
1962	0	0	0	0	0	0	0	0	2,000	923	0	154	185	186
1963	0	0	0	0	0	0	0	0	2,000	13	161	116	138	166
1964	455	0	0	0	2,000	1,923	0	0	0	0	0	0	264	237
1965	0	0	0	0	0	452	0	0	2,000	0	0	586	183	203
1966	322	0	0	0	0	0	0	0	2,000	1,519	0	0	231	212
1967	0	0	0	0	0	0	0	0	0	0	0	0	0	66
1968	0	1,091	0	0	0	0	0	0	2,000	1,519	0	0	278	212
1969	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1971	0	0	0	0	2,000	0	0	0	1,981	0	0	0	240	262
1972	0	354	0	0	0	2,000	0	0	1,587	0	0	0	237	216
1973	0	0	0	0	0	0	0	0	2,000	354	1,049	0	205	205
1974	0	0	0	0	0	0	0	0	1,210	0	0	0	73	116
1975	0	717	0	0	0	0	0	0	0	403	0	0	67	24
1976	0	0	0	168	0	2,000	0	0	1,587	0	0	0	226	227
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1979	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1980	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1981	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1982	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	2,000	1,070	334	0	205	205
1985	0	0	0	0	0	2,000	0	0	1,241	0	0	0	195	196
1986	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1987	0	0	0	0	0	0	0	0	432	0	0	0	26	26
1988	0	0	0	0	2,000	1,052	0	0	0	0	0	0	184	184
1989	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	3,741	0	0	225	226
1994	0	0	0	0	0	1,253	0	0	0	0	0	0	76	76
Avg ('22-'94)	11	117	41	2	192	363	0	0	888	567	74	40	138	139

Note: See "Notes and Acronyms" at end of tables section.

Table 3A-35. Delta Wetlands Diversions (cfs) Limited by South-of-Delta Delivery Deficits

Water Year	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	Total (TAF)
1922	0	0	0	1,723	2,409	49	0	0	296	0	0	0	270
1923	0	0	3,556	15	0	0	0	0	0	51	0	0	218
1924	0	0	0	0	0	0	0	0	0	0	0	0	0
1925	0	0	0	0	4,000	0	0	0	0	0	0	0	241
1926	0	0	0	0	2,128	0	0	0	0	0	0	0	128
1927	0	0	0	3,576	357	49	0	0	0	0	0	0	240
1928	0	1,218	0	2,719	30	49	0	0	0	0	0	0	242
1929	0	0	0	0	0	0	0	0	0	0	0	0	0
1930	0	0	0	2,238	0	0	0	0	0	0	0	0	135
1931	0	0	0	0	0	0	0	0	0	0	0	0	0
1932	0	0	0	1,786	0	0	0	0	0	0	0	0	108
1933	0	0	0	0	0	0	0	0	0	0	0	0	0
1934	0	0	0	0	0	0	0	0	0	0	0	0	0
1935	0	0	0	0	0	0	0	0	0	0	0	0	0
1936	0	0	0	0	4,000	177	0	0	0	0	0	0	252
1937	0	0	0	0	4,000	307	0	0	0	0	0	0	259
1938	0	0	3,871	15	31	49	0	0	296	0	46	0	259
1939	337	0	37	15	31	0	0	0	0	0	0	0	25
1940	0	0	0	0	4,000	177	0	0	0	64	0	0	256
1941	0	0	0	3,871	31	49	0	0	160	0	377	0	270
1942	137	0	37	15	31	49	0	0	296	0	60	0	38
1943	0	359	13	15	31	49	0	0	0	0	0	0	28
1944	0	0	0	0	4,000	177	0	0	0	0	0	0	252
1945	0	0	0	0	4,000	307	0	0	0	0	0	0	259
1946	0	0	3,871	15	0	422	0	0	0	51	0	0	263
1947	0	0	0	0	0	0	0	0	0	0	75	0	5
1948	0	0	0	0	0	0	0	0	0	51	60	0	7
1949	0	0	0	0	0	913	0	0	0	64	0	0	59
1950	0	0	0	0	1,809	0	0	0	0	39	46	0	114
1951	0	0	3,871	15	31	49	0	0	0	0	46	0	242
1952	0	0	3,871	15	30	49	0	0	296	130	115	87	277
1953	35	0	55	15	31	49	0	0	0	0	60	0	15
1954	0	0	0	3,668	255	49	0	0	0	0	46	0	242
1955	0	0	3,000	885	0	0	0	0	0	0	0	0	234
1956	0	0	0	3,871	30	49	0	0	0	51	60	0	245
1957	755	0	0	302	270	49	0	0	0	51	0	0	86
1958	0	0	3,000	885	31	49	0	0	296	130	115	0	271
1959	137	0	0	52	31	0	0	0	0	0	46	0	16
1960	0	0	0	0	0	0	0	0	0	0	60	0	4
1961	0	0	0	0	821	0	0	0	0	0	75	0	54
1962	0	0	0	0	4,000	0	0	0	0	0	60	0	245
1963	0	0	3,000	885	31	0	0	0	0	0	0	0	236
1964	0	1,893	0	28	0	0	0	0	0	0	60	0	119
1965	0	0	0	3,871	31	0	0	0	0	64	60	0	243
1966	0	0	1,740	2,145	31	49	0	0	0	0	46	0	242
1967	0	0	3,871	15	31	49	0	0	296	130	115	87	277
1968	53	0	37	15	30	49	0	0	0	0	0	0	11
1969	0	0	0	3,871	31	49	0	0	296	130	115	87	276
1970	53	25	13	15	31	49	0	0	0	0	0	0	11
1971	0	0	3,871	15	0	485	0	0	0	51	46	0	269
1972	0	0	2,797	15	30	0	0	0	0	0	60	0	175
1973	0	0	3,000	885	31	49	0	0	0	0	0	0	239
1974	0	4,000	13	15	31	49	0	0	0	1,015	688	87	355
1975	0	0	0	332	31	49	0	0	296	0	649	0	82
1976	137	0	0	0	85	0	0	0	0	0	0	0	13
1977	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	4,000	307	0	0	0	0	0	0	259
1979	0	0	0	721	31	49	0	0	0	0	0	0	48
1980	0	0	3,000	885	30	49	0	0	0	0	46	0	242
1981	0	0	0	3,871	31	49	0	0	0	0	0	0	238
1982	0	0	3,871	15	31	49	0	0	296	130	115	87	277
1983	53	25	13	15	31	49	0	0	296	130	115	87	49
1984	53	25	13	15	30	49	0	0	0	0	0	0	11
1985	0	0	3,000	0	640	0	0	0	0	0	60	0	223
1986	0	0	0	2,356	1,708	49	0	0	0	0	0	0	248
1987	0	0	0	0	806	25	0	0	0	0	60	0	54
1988	0	0	0	2,999	0	0	0	0	0	0	0	0	181
1989	0	0	0	0	0	0	0	0	0	0	60	0	4
1990	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	3,871	31	49	0	0	296	0	60	0	259
1994	0	0	0	0	446	0	0	0	0	0	0	0	27
Avg ('22-'94)	24	103	732	720	612	65	0	0	47	32	51	7	144

Note: See "Notes and Acronyms" at end of tables section.

Table 3A-36. Delta Wetlands Storage (TAF) Limited by South-of-Delta Delivery Deficits

Water Year	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1922	0	0	0	106	238	238	234	227	238	91	47	25
1923	22	20	238	238	236	233	229	223	97	92	0	0
1924	0	0	0	0	0	0	0	0	0	0	0	0
1925	0	0	0	0	222	96	92	86	0	0	0	0
1926	0	0	0	0	118	10	5	0	0	0	0	0
1927	0	0	0	220	238	238	234	227	101	21	0	0
1928	0	72	72	238	238	238	234	227	101	0	0	0
1929	0	0	0	0	0	0	0	0	0	0	0	0
1930	0	0	0	138	25	22	17	11	0	0	0	0
1931	0	0	0	0	0	0	0	0	0	0	0	0
1932	0	0	0	110	108	0	0	0	0	0	0	0
1933	0	0	0	0	0	0	0	0	0	0	0	0
1934	0	0	0	0	0	0	0	0	0	0	0	0
1935	0	0	0	0	0	0	0	0	0	0	0	0
1936	0	0	0	0	230	238	234	227	101	5	0	0
1937	0	0	0	0	222	238	234	227	101	0	0	0
1938	0	0	238	238	238	238	234	227	238	230	226	221
1939	238	237	238	238	238	180	175	169	43	0	0	0
1940	0	0	0	0	230	238	234	227	101	97	0	0
1941	0	0	0	238	238	238	234	227	230	222	238	233
1942	238	237	238	238	238	238	234	227	238	230	227	221
1943	218	238	238	238	238	238	234	227	101	0	0	0
1944	0	0	0	0	230	238	234	227	101	34	0	0
1945	0	0	0	0	222	238	234	227	101	66	0	0
1946	0	0	238	238	210	233	229	223	97	92	0	0
1947	0	0	0	0	0	0	0	0	0	0	5	0
1948	0	0	0	0	0	0	0	0	0	3	4	0
1949	0	0	0	0	0	56	52	46	0	4	0	0
1950	0	0	0	0	100	0	0	0	0	2	3	0
1951	0	0	238	238	238	238	234	227	101	50	45	0
1952	0	0	238	238	238	238	234	227	238	238	238	238
1953	237	235	238	238	238	238	234	227	137	0	4	0
1954	0	0	0	226	238	238	234	227	101	58	53	0
1955	0	0	184	238	158	68	63	57	0	0	0	0
1956	0	0	0	238	238	238	234	227	208	203	200	195
1957	238	223	207	225	238	238	234	227	101	97	42	0
1958	0	0	184	238	238	238	234	227	238	238	238	233
1959	238	237	236	238	238	201	197	191	65	0	3	0
1960	0	0	0	0	0	0	0	0	0	0	4	0
1961	0	0	0	0	46	0	0	0	0	0	5	0
1962	0	0	0	0	222	219	215	209	83	18	14	0
1963	0	0	184	238	238	235	231	224	189	180	163	151
1964	127	238	237	238	236	233	229	223	97	0	4	0
1965	0	0	0	238	238	207	203	197	71	67	63	23
1966	0	0	107	238	238	238	234	227	101	0	3	0
1967	0	0	238	238	238	238	234	227	238	238	238	238
1968	238	237	238	238	238	238	234	227	101	0	0	0
1969	0	0	0	238	238	238	234	227	238	238	238	238
1970	238	238	238	238	238	238	234	227	101	0	0	0
1971	0	0	238	238	211	238	234	227	103	98	93	88
1972	85	67	238	238	238	235	231	224	98	0	4	0
1973	0	0	184	238	238	238	234	227	101	72	0	0
1974	0	238	238	238	238	238	234	227	148	203	238	238
1975	235	219	218	238	238	238	234	227	238	205	238	233
1976	238	237	236	235	238	140	135	129	3	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	222	238	234	227	220	212	205	200
1979	197	195	195	238	238	238	234	227	220	97	0	0
1980	0	0	184	238	238	238	234	227	101	0	3	0
1981	0	0	0	238	238	238	234	227	101	0	0	0
1982	0	0	238	238	238	238	234	227	238	238	238	238
1983	238	238	238	238	238	238	234	227	238	238	238	238
1984	238	238	238	238	238	238	234	227	101	28	0	0
1985	0	0	184	184	217	210	206	199	73	0	4	0
1986	0	0	0	145	238	238	234	227	101	0	0	0
1987	0	0	0	0	45	43	39	33	0	0	4	0
1988	0	0	0	184	68	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	4	0
1990	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	238	238	238	234	227	238	230	227	221
1994	218	217	216	215	238	235	231	224	154	0	0	0
Avg ('22-'94)	48	53	97	141	170	160	156	152	94	61	52	48

Note: See "Notes and Acronyms" at end of tables section.

Table 3A-37. Delta Wetlands Discharges (cfs) for Export Limited by South-of-Delta Delivery Deficits

Water Year	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	Total (TAF)	Calendar (TAF)
1922	0	0	0	0	0	0	0	0	0	2,256	602	287	189	190
1923	0	0	0	0	0	0	0	0	2,000	0	1,378	0	204	204
1924	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1925	0	0	0	0	0	2,000	0	0	1,320	0	0	0	200	200
1926	0	0	0	0	0	1,711	0	0	0	0	0	0	103	103
1927	0	0	0	0	0	0	0	0	2,000	1,184	220	0	205	205
1928	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1929	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1930	0	0	0	0	2,000	0	0	0	71	0	0	0	125	125
1931	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1932	0	0	0	0	0	1,709	0	0	0	0	0	0	103	103
1933	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1934	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1935	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1936	0	0	0	0	0	0	0	0	2,000	1,444	0	0	207	208
1937	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1938	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1939	0	0	0	0	0	895	0	0	2,000	575	0	0	209	209
1940	0	0	0	0	0	0	0	0	2,000	0	1,467	0	209	209
1941	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1942	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1943	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1944	0	0	0	0	0	0	0	0	2,000	972	431	0	205	205
1945	0	0	0	0	0	0	0	0	2,000	452	952	0	205	205
1946	0	0	0	0	470	0	0	0	2,000	0	1,376	0	232	232
1947	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1948	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1949	0	0	0	0	0	0	0	0	647	0	0	0	39	39
1950	0	0	0	0	0	1,585	0	0	0	0	0	0	95	96
1951	0	0	0	0	0	0	0	0	2,000	712	0	674	204	204
1952	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	1,404	2,095	0	0	211	211
1954	0	0	0	0	0	0	0	0	2,000	582	0	809	204	205
1955	0	0	0	0	1,414	1,415	0	0	844	0	0	0	221	222
1956	0	0	0	0	0	0	0	0	204	0	0	0	12	41
1957	0	229	244	0	0	0	0	0	2,000	0	779	611	233	205
1958	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1959	0	0	0	0	0	549	0	0	2,000	921	0	0	209	209
1960	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1961	0	0	0	0	0	692	0	0	0	0	0	0	42	42
1962	0	0	0	0	0	0	0	0	2,000	923	0	154	185	186
1963	0	0	0	0	0	0	0	0	483	13	161	116	47	67
1964	337	0	0	0	0	0	0	0	2,000	1,442	0	0	228	208
1965	0	0	0	0	0	452	0	0	2,000	0	0	586	183	203
1966	322	0	0	0	0	0	0	0	2,000	1,519	0	0	231	212
1967	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1969	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1971	0	0	0	0	452	0	0	0	1,981	0	0	0	147	164
1972	0	280	0	0	0	0	0	0	2,000	1,470	0	0	226	209
1973	0	0	0	0	0	0	0	0	2,000	354	1,049	0	205	205
1974	0	0	0	0	0	0	0	0	1,210	0	0	0	73	87
1975	0	235	0	0	0	0	0	0	0	403	0	0	38	24
1976	0	0	0	0	0	1,545	0	0	2,000	0	0	0	214	214
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	1,881	1,458	0	201	201
1980	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1981	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1982	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	2,000	1,070	334	0	205	205
1985	0	0	0	0	0	72	0	0	2,000	1,064	0	0	189	189
1986	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1987	0	0	0	0	0	0	0	0	432	0	0	0	26	26
1988	0	0	0	0	2,000	1,052	0	0	0	0	0	0	184	184
1989	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	1,057	2,382	0	0	207	208
Avg ('22-'94)	9	10	3	0	87	187	0	0	927	491	140	44	114	115

Note: See "Notes and Acronyms" at end of tables section.

Table 3A-38. Diversion and Discharge Rules from the Final Operations Criteria and Application to the Daily Delta Wetlands Operations Model

Diversion Rules	Discharge Rules
X2 at Chipps Island: The X2 location must be downstream of Chipps Island (74 km) for at least 1 day prior to Delta Wetlands diversions in September through November, and for at least 10 days if the initial Delta Wetlands diversion occurs after November 30. The combined Delta Wetlands diversions are then limited to 5,500 cfs for 5 days.	**San Joaquin Inflow:** During the period of April through June, Bacon Island discharges for export are limited to 50% of the San Joaquin River inflow at Vernalis. No Delta Wetlands discharges for export are simulated in April or May because the monthly DWRSIM results do not allow an accurate simulation of the "split-month" VAMP pulse flows and exports. There may be some opportunity for discharging stored water from Bacon Island at the allowable 50% of San Joaquin River flow during April and May. Such discharges were not included in the daily results shown in this report.
X2 at Collinsville: The X2 locations must always be downstream of Collinsville (81 km). This is approximately equivalent to an outflow of 7,100 cfs.	**Webb Tract Discharge Prohibition:** No discharges from Webb Tract are allowed from January through June.
X2 Shift: The Delta Wetlands diversions cannot cause a cumulative upstream shift in the X2 location of more than 2.5 km. This is generally equivalent to limiting the Delta Wetlands diversions to less than 25% of the outflow.	**Habitat Island Discharges:** No discharges from Delta Wetlands habitat islands can be exported by Delta Wetlands or rediverted onto the Delta Wetlands reservoir islands.
Diversion Prohibition: No Delta Wetlands diversions are allowed in the months of April or May.	**Export Capacity:** Delta Wetlands discharges are limited to a specified fraction of the unused permitted CVP and SWP export capacity. This fraction is 75% in February and July, and 50% from March through June (but no Delta Wetlands discharges are simulated in April or May). Delta Wetlands discharges can use 100% of the unused permitted export capacity in August through January.
Surplus Available Water: Delta Wetlands diversions are limited to a specified fraction of the "surplus" available water for diversions as defined by the required Delta outflow and the E/I ratio. Delta Wetlands may divert 90% of this available water in August through January, 75% in February or July, and 50% in March or June.	**Environmental Water:** Delta Wetlands discharges for export made during December through June will be mitigated by an allocation of 10% of the discharge volume to an "environmental water account" that will be controlled by DFG. The daily modeling assumed that an additional 10% of any Delta Wetlands discharges for export were released to increase Delta outflows during the December-June period.
Delta Outflows: Delta Wetlands diversions are limited to a specified fraction of Delta outflow. A maximum of 25% of outflows can be diverted in June through December, and a maximum of 15% of outflows can be diverted in January through March.	**Discharge Maximum:** A calendar-year maximum of 250 TAF of Delta Wetlands storage can be exported. The daily water-year model specifies the amount of Delta Wetlands export from the previous January-September. Any remaining export volume can be exported during the October-December period. The 250-TAF cumulative export limit is reset on January 1.
DFG Limits: At the request of DFG, Delta Wetlands diversions can be limited to a specified fraction of the San Joaquin River flow for a maximum of 15 days between December and March. This criterion is a "real-time" adaptive management criterion that was not included in the daily modeling.	
Delta Smelt: A daily monitoring program is required during Delta Wetlands diversion periods. The Delta Wetlands diversion rate must be reduced to 50% if delta smelt are sampled near the Delta Wetlands islands. This was not included in the daily modeling.	

Table 3A-38. Continued

Diversion Rules	Discharge Rules
DCC Gates and Delta Inflow: During the November-through-January period, Delta Wetlands diversions will be limited to 3,000 cfs if the DCC gates are closed and Delta inflow is less than 30,000 cfs. Delta Wetlands diversions will be limited to 4,000 cfs if the inflow is less than 50,000 cfs and DCC gates are closed. **Topping Off:** The FOC allow some Delta Wetlands diversions for replacement of evaporative losses from the reservoir islands in June through October. This allowance was not included in the daily modeling; Delta Wetlands storage discharge for export generally begins in June from Bacon Island and in July from Webb Tract, so the potential gain in Delta Wetlands storage is limited to about 10 TAF.	

Note: See "Notes and Acronyms" at end of tables section.

Table 3A-39 Comparison of Monthly and Daily Operations Model Results for Delta Wetlands Diversions and Exports (1985-1994)

Delta Wetlands Diversions (cfs)

Monthly Model Results

Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	(TAF)
85	0	0	3,000	0	640	0	0	0	0	0	60	0	223
86	0	0	0	2,356	1,708	49	0	0	0	0	0	0	248
87	0	0	0	0	806	25	0	0	0	0	60	0	54
88	0	0	0	2,999	0	0	0	0	0	0	0	0	181
89	0	0	0	0	0	0	0	0	0	0	60	0	4
90	0	0	0	0	0	0	0	0	0	0	0	0	0
91	0	0	0	0	0	0	0	0	0	0	0	0	0
92	0	0	0	0	0	0	0	0	0	0	0	0	0
93	0	0	0	3,871	31	49	0	0	296	0	60	0	259
94	0	0	0	0	1,442	0	0	0	0	0	0	0	87

Daily Model Results

Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	(TAF)
85	0	1,186	2,356	659	226	49	0	0	0	0	128	0	278
86	0	0	0	0	4,074	260	0	0	0	0	0	295	279
87	0	0	0	0	110	1,777	0	0	0	0	154	0	123
88	0	0	0	269	0	0	0	0	0	0	0	0	16
89	0	0	0	0	0	978	0	0	0	0	750	0	104
90	0	0	0	0	0	0	0	0	0	0	0	0	0
91	0	0	0	0	0	199	0	0	0	0	0	0	12
92	0	0	0	0	86	21	0	0	0	0	0	0	6
93	0	0	0	1,729	2,361	650	0	0	1,036	0	425	17	375
94	0	0	0	0	491	1,187	0	0	0	0	141	0	110

Delta Wetlands Exports (cfs)

Monthly Model Results

Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	(TAF)
85	0	0	0	0	0	2,000	0	0	1,241	0	0	0	195
86	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212
87	0	0	0	0	0	0	0	0	432	0	0	0	26
88	0	0	0	0	2,000	1,052	0	0	0	0	0	0	184
89	0	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	0
91	0	0	0	0	0	0	0	0	0	0	0	0	0
92	0	0	0	0	0	0	0	0	0	0	0	0	0
93	0	0	0	0	0	0	0	0	0	3,741	0	0	225
94	0	0	0	0	0	1,253	0	0	0	0	0	0	76

Daily Model Results

Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	(TAF)
85	0	0	287	110	0	0	0	0	590	2,839	95	0	237
86	0	0	0	0	0	0	0	0	1,435	1,977	0	0	206
87	259	0	0	0	0	89	0	0	753	706	108	0	115
88	0	0	0	0	259	0	0	0	0	0	0	0	16
89	0	0	0	0	0	0	0	0	750	9	501	191	88
90	0	0	0	0	0	0	0	0	0	0	0	0	0
91	0	0	0	0	0	0	0	0	98	0	0	0	6
92	0	0	0	0	0	89	0	0	0	0	0	0	5
93	0	0	0	0	0	1,184	0	0	157	2,729	0	0	246
94	91	933	0	0	0	0	0	0	757	625	0	126	153

Notes: See "Notes and Acronyms" at end of tables section.

Table 3A-40. Delta Wetlands Diversions (cfs) under Cumulative Conditions

Water Year	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	Total (TAF)
1922	0	0	0	0	4,000	307	0	0	214	0	0	0	272
1923	0	0	3,871	15	0	0	0	0	0	0	0	0	234
1924	0	0	0	0	0	0	0	0	0	0	0	0	0
1925	0	0	0	0	4,000	0	0	0	0	0	0	0	241
1926	0	0	0	0	15	0	0	0	0	0	0	0	1
1927	0	0	0	3,299	664	49	0	0	0	0	0	0	242
1928	0	0	0	3,375	559	49	0	0	0	0	0	0	240
1929	0	0	0	0	0	0	0	0	0	0	0	0	0
1930	0	0	0	0	0	0	0	0	0	0	0	0	0
1931	0	0	0	0	0	0	0	0	0	0	0	0	0
1932	0	0	0	379	0	0	0	0	0	0	0	0	23
1933	0	0	0	0	0	0	0	0	0	0	0	0	0
1934	0	0	0	0	0	0	0	0	0	0	0	0	0
1935	0	0	0	0	0	0	0	0	0	0	0	0	0
1936	0	0	0	0	4,000	177	0	0	0	0	0	0	252
1937	0	0	0	0	3,050	1,165	0	0	0	0	0	0	254
1938	0	0	3,871	15	31	49	0	0	296	0	0	0	257
1939	2,474	1,468	13	15	31	0	0	0	0	0	0	0	241
1940	0	0	0	0	4,000	177	0	0	0	0	0	0	252
1941	0	0	0	3,871	31	49	0	0	0	0	0	0	238
1942	0	0	3,871	15	31	49	0	0	0	0	0	0	239
1943	0	0	3,871	15	31	49	0	0	0	0	0	0	239
1944	0	0	0	0	4,000	177	0	0	0	0	0	0	252
1945	0	0	0	0	4,000	307	0	0	0	0	0	0	259
1946	0	0	3,871	15	0	1,039	0	0	0	0	0	0	297
1947	0	0	0	0	0	0	0	0	0	0	0	0	0
1948	0	0	0	0	0	0	0	0	0	0	0	0	0
1949	0	0	0	0	0	0	0	0	0	0	0	0	0
1950	0	0	0	0	0	0	0	0	0	0	0	0	0
1951	0	0	3,871	15	31	49	0	0	0	0	0	0	239
1952	0	0	3,871	15	30	49	0	0	296	130	115	87	277
1953	53	25	13	15	31	49	0	0	0	0	0	0	11
1954	0	0	0	3,871	31	49	0	0	0	0	0	0	238
1955	0	0	3,000	885	0	0	0	0	0	0	0	0	234
1956	0	0	0	3,871	30	49	0	0	0	0	0	0	238
1957	0	0	0	1,854	2,263	49	0	0	0	0	0	0	251
1958	0	0	1,913	1,972	31	49	0	0	296	0	0	0	257
1959	1,698	0	762	1,988	31	0	0	0	0	0	0	0	270
1960	0	0	0	0	0	0	0	0	0	0	0	0	0
1961	0	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	4,000	0	0	0	0	0	0	0	241
1963	0	0	3,000	0	1,510	49	0	0	0	0	0	0	275
1964	0	4,000	0	188	30	0	0	0	0	0	0	0	254
1965	0	0	0	3,871	31	49	0	0	0	0	0	0	238
1966	0	0	0	3,871	31	49	0	0	0	0	0	0	238
1967	0	0	3,871	15	31	49	0	0	296	130	0	154	274
1968	1,304	0	2,785	133	30	49	0	0	0	0	0	0	259
1969	0	0	0	3,871	31	49	0	0	296	0	0	3,343	457
1970	688	25	13	15	31	49	0	0	0	0	0	0	49
1971	0	0	3,871	15	31	49	0	0	0	0	0	0	239
1972	0	0	157	2,048	1,429	0	0	0	0	0	0	0	219
1973	0	0	3,000	885	31	49	0	0	0	0	0	0	239
1974	0	4,000	13	15	31	49	0	0	0	0	0	0	247
1975	0	0	3,000	885	31	49	0	0	0	0	0	0	239
1976	217	0	0	1,834	454	0	0	0	0	0	0	0	151
1977	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	4,000	307	0	0	0	0	0	0	259
1979	0	0	0	0	4,000	307	0	0	0	0	0	0	259
1980	0	0	259	3,626	30	49	0	0	0	0	0	0	239
1981	0	0	0	3,871	31	49	0	0	0	0	0	0	238
1982	0	0	3,871	15	31	49	0	0	0	0	0	1,291	317
1983	2,674	25	13	15	31	49	0	0	296	130	115	87	207
1984	53	25	13	15	30	49	0	0	0	0	0	0	11
1985	0	0	3,000	885	31	0	0	0	0	0	0	0	236
1986	0	0	0	1,894	2,219	49	0	0	0	0	0	0	251
1987	0	0	0	0	806	25	0	0	0	0	0	0	50
1988	0	0	0	2,516	0	0	0	0	0	0	0	0	152
1989	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	3,871	31	49	0	0	0	0	0	0	238
1994	0	0	0	1,316	2,859	0	0	0	0	0	0	0	252
Avg ('22-'94)	126	131	817	838	722	75	0	0	27	5	3	68	169

Note: See "Notes and Acronyms" at end of tables section.

Table 3A-41. Delta Wetlands Storage (TAF) under Cumulative Conditions

Water Year	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1922	0	0	0	0	222	238	234	227	233	0	0	0
1923	0	0	238	238	125	0	0	0	0	0	0	0
1924	0	0	0	0	0	0	0	0	0	0	0	0
1925	0	0	0	0	222	96	92	86	0	0	0	0
1926	0	0	0	0	1	0	0	0	0	0	0	0
1927	0	0	0	203	238	238	234	227	101	0	0	0
1928	0	0	0	208	238	238	234	227	101	0	0	0
1929	0	0	0	0	0	0	0	0	0	0	0	0
1930	0	0	0	0	0	0	0	0	0	0	0	0
1931	0	0	0	0	0	0	0	0	0	0	0	0
1932	0	0	0	23	0	0	0	0	0	0	0	0
1933	0	0	0	0	0	0	0	0	0	0	0	0
1934	0	0	0	0	0	0	0	0	0	0	0	0
1935	0	0	0	0	0	0	0	0	0	0	0	0
1936	0	0	0	0	230	238	234	227	101	0	0	0
1937	0	0	0	0	169	238	234	227	101	0	0	0
1938	0	0	238	238	238	238	234	227	238	0	0	0
1939	152	238	238	238	238	112	108	101	0	0	0	0
1940	0	0	0	0	230	238	234	227	101	0	0	0
1941	0	0	0	238	238	238	234	227	101	0	0	0
1942	0	0	238	238	238	238	234	227	127	0	0	0
1943	0	0	238	238	238	238	234	227	101	0	0	0
1944	0	0	0	0	230	238	234	227	101	0	0	0
1945	0	0	0	0	222	238	234	227	101	0	0	0
1946	0	0	238	238	125	186	182	175	49	22	14	9
1947	6	5	4	0	0	0	0	0	0	0	0	0
1948	0	0	0	0	0	0	0	0	0	0	0	0
1949	0	0	0	0	0	0	0	0	0	0	0	0
1950	0	0	0	0	0	0	0	0	0	0	0	0
1951	0	0	238	238	238	238	234	227	101	0	0	0
1952	0	0	238	238	238	238	234	227	238	238	238	238
1953	238	238	238	238	238	238	234	227	101	0	0	0
1954	0	0	0	238	238	238	234	227	101	0	0	0
1955	0	0	184	238	125	0	0	0	0	0	0	0
1956	0	0	0	238	238	238	234	227	101	0	0	0
1957	0	0	0	114	238	238	234	227	101	0	0	0
1958	0	0	118	238	238	238	234	227	238	58	44	0
1959	104	71	117	238	238	112	108	101	0	0	0	0
1960	0	0	0	0	0	0	0	0	0	0	0	0
1961	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	222	96	92	86	0	0	0	0
1963	0	0	184	156	238	238	234	227	101	0	0	0
1964	0	238	227	238	238	112	108	101	0	0	0	0
1965	0	0	0	238	238	238	234	227	101	0	0	0
1966	0	0	0	238	238	238	234	227	101	0	0	0
1967	0	0	238	238	238	238	234	227	238	238	157	161
1968	238	60	231	238	238	238	234	227	101	0	0	0
1969	0	0	0	238	238	238	234	227	238	42	0	199
1970	238	238	238	238	238	238	234	227	101	0	0	0
1971	0	0	238	238	238	238	234	227	101	0	0	0
1972	0	0	10	135	215	89	85	79	0	0	0	0
1973	0	0	184	238	238	238	234	227	101	0	0	0
1974	0	238	238	238	238	238	234	227	101	0	0	0
1975	0	0	184	238	238	238	234	227	101	0	0	0
1976	13	0	0	113	137	11	7	1	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	222	238	234	227	101	0	0	0
1979	0	0	0	0	222	238	234	227	101	0	0	0
1980	0	0	16	238	238	238	234	227	101	0	0	0
1981	0	0	0	238	238	238	234	227	101	0	0	0
1982	0	0	238	238	238	238	234	227	109	12	0	77
1983	238	238	238	238	238	238	234	227	238	238	238	238
1984	238	238	238	238	238	238	234	227	101	0	0	0
1985	0	0	184	238	238	112	108	101	0	0	0	0
1986	0	0	0	116	238	238	234	227	101	0	0	0
1987	0	0	0	0	45	43	39	33	0	0	0	0
1988	0	0	0	155	38	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	238	238	238	234	227	101	0	0	0
1994	0	0	0	81	238	112	108	101	0	0	0	0
Avg ('22-'94)	20	25	75	125	159	142	139	135	68	12	9	13

Note: See "Notes and Acronyms" at end of tables section.

Table 3A-42. Delta Wetlands Discharges for Export (cfs) under Cumulative Conditions

Water Year	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	Total (TAF)	Calendar (TAF)
1922	0	0	0	0	0	0	0	0	0	3,661	0	0	221	221
1923	0	0	0	0	2,000	1,988	0	0	0	0	0	0	240	241
1924	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1925	0	0	0	0	0	2,000	0	0	1,320	0	0	0	200	200
1926	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1927	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1928	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1929	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1930	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1931	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1932	0	0	0	0	376	0	0	0	0	0	0	0	23	23
1933	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1934	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1935	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1936	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1937	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1938	0	0	0	0	0	0	0	0	0	3,741	0	0	225	226
1939	0	0	0	0	0	2,000	0	0	1,587	0	0	0	216	216
1940	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1941	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1942	0	0	0	0	0	0	0	0	1,578	1,928	0	0	211	211
1943	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1944	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1945	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1946	0	0	0	0	2,000	0	0	0	2,000	324	0	0	261	261
1947	0	0	0	46	0	0	0	0	0	0	0	0	3	3
1948	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1949	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1950	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1951	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1952	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1954	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1955	0	0	0	0	2,000	1,988	0	0	0	0	0	0	240	241
1956	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1957	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1958	0	0	0	0	0	0	0	0	0	2,803	100	658	215	248
1959	0	543	0	0	0	2,000	0	0	1,587	0	0	0	249	216
1960	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1961	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	2,000	0	0	1,320	0	0	0	200	200
1963	0	0	0	451	0	0	0	0	2,000	1,519	0	0	239	249
1964	0	0	160	0	0	2,000	0	0	1,587	0	0	0	226	216
1965	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1966	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1967	0	0	0	0	0	0	0	0	0	0	1,200	0	72	251
1968	0	2,961	0	0	0	0	0	0	2,000	1,519	0	0	390	212
1969	0	0	0	0	0	0	0	0	0	3,064	562	0	218	219
1970	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1971	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1972	0	0	0	0	0	2,000	0	0	1,203	0	0	0	193	193
1973	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1974	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1975	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	224
1976	0	199	0	0	0	2,000	0	0	0	0	0	0	132	121
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1979	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1980	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1981	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1982	0	0	0	0	0	0	0	0	1,866	1,453	80	0	205	205
1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1985	0	0	0	0	0	2,000	0	0	1,587	0	0	0	216	216
1986	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1987	0	0	0	0	0	0	0	0	432	0	0	0	26	26
1988	0	0	0	0	2,000	568	0	0	0	0	0	0	155	155
1989	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	2,000	1,519	0	0	212	212
1994	0	0	0	0	0	2,000	0	0	1,587	0	0	0	216	216
Avg ('22-'94)	0	51	2	7	115	309	0	0	1,064	857	27	9	147	147

Note: See "Notes and Acronyms" at end of tables section.

Notes and Acronyms

The following acronyms and terms appear in the tables that accompany Chapter 3A.

CCWD	Contra Costa Water District
cfs	cubic feet per second
CVP	Central Valley Project
DCC	Delta Cross Channel
DFG	California Department of Fish and Game
E/I ratio	allowable amount of exports as a percentage of inflow
km	kilometer
SJR	San Joaquin River
SWP	State Water Project
TAF	thousand acre-feet
VAMP	Vernalis Adaptive Management Plan
WQCP	Water Quality Control Plan for the San Francisco Bay/Sacramento–San Joaquin Delta Estuary

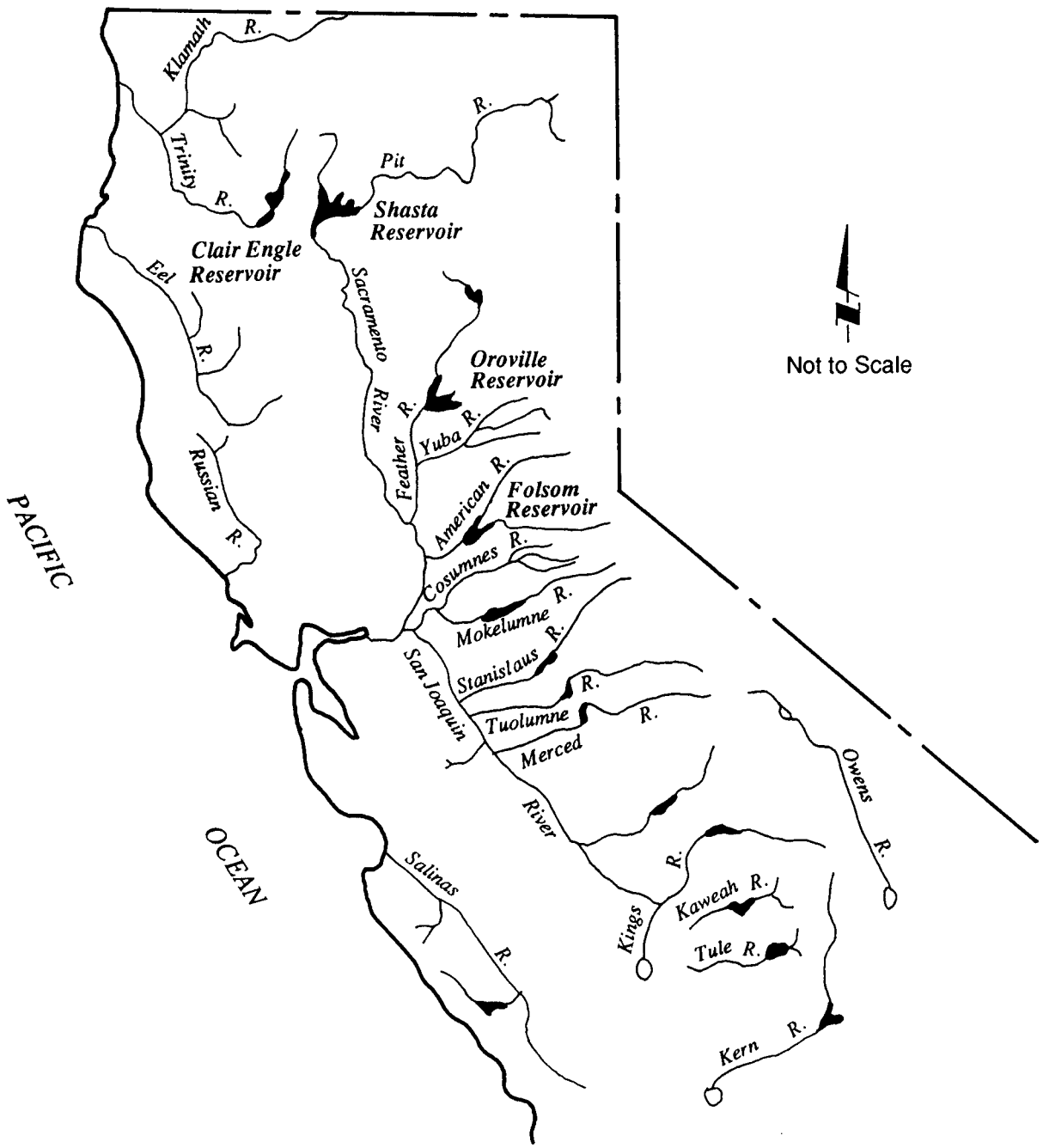

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Figure 3A-1
Upstream Reservoirs Included in the DWRSIM Statewide Water Supply Planning Model

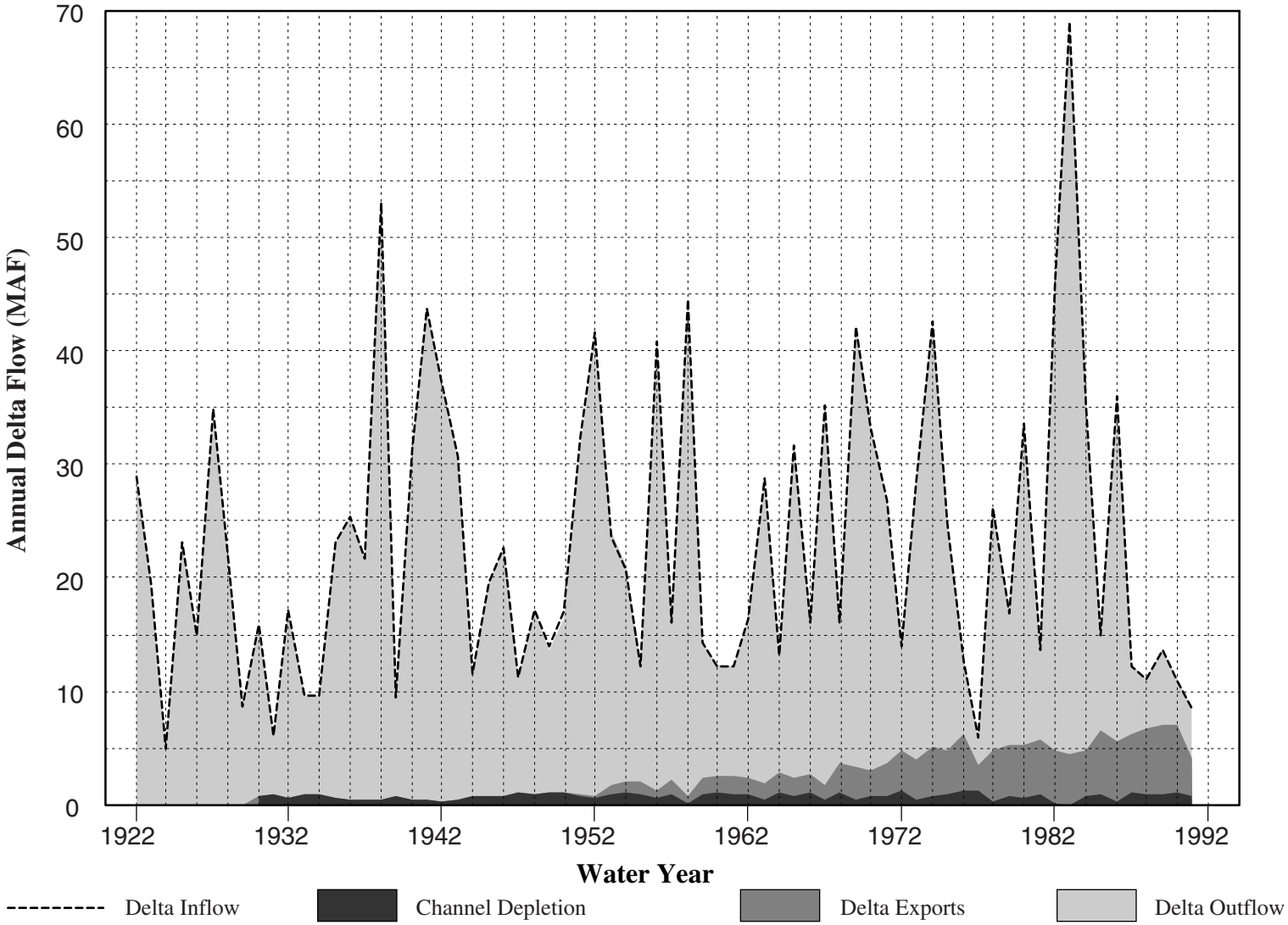

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Figure 3A-2
Historical Annual Delta Inflow, Channel Depletion, Delta Exports, and Delta Outflow for 1922-1991

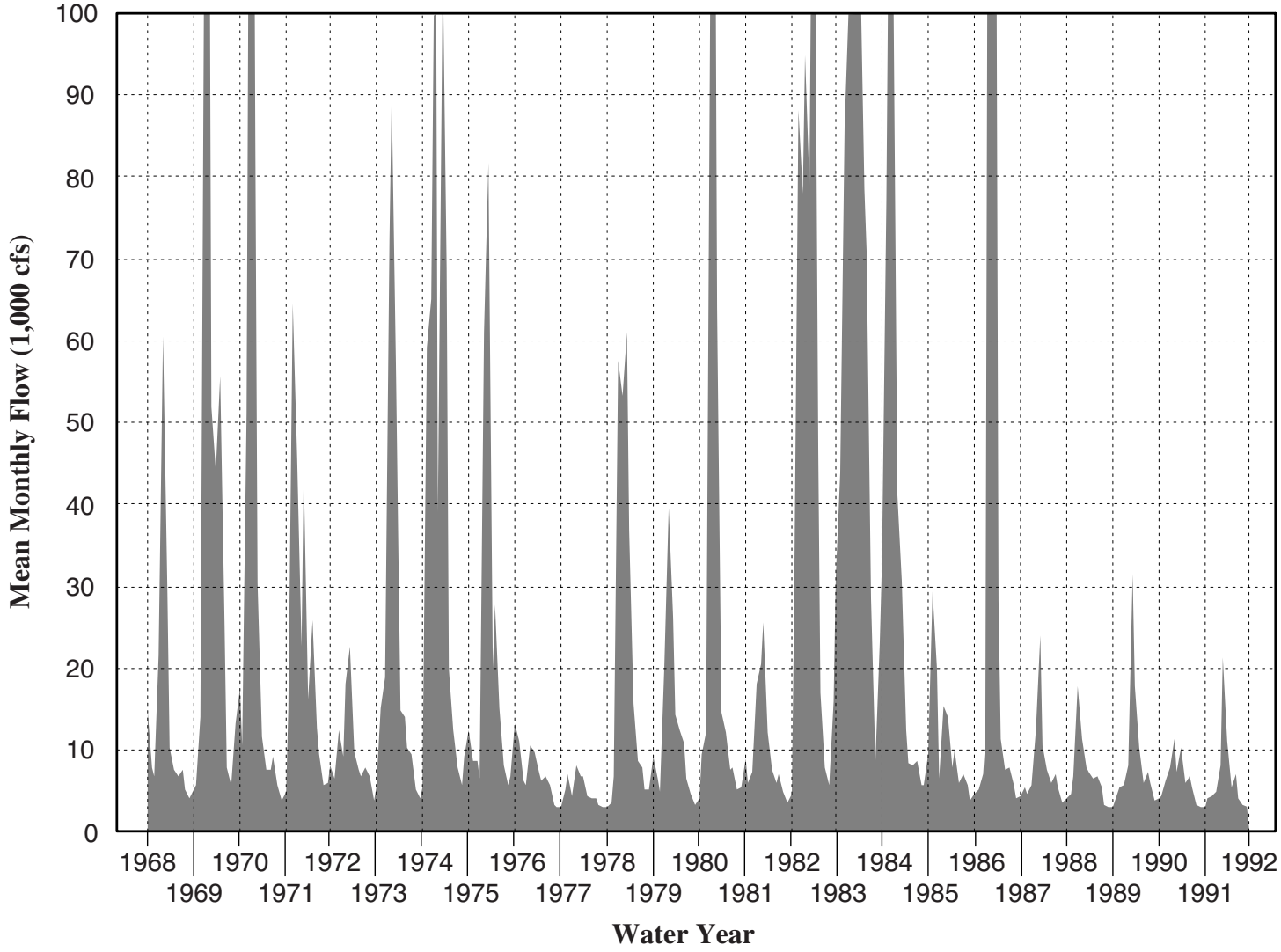

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Figure 3A-3
Historical Mean Monthly Delta Outflow for 1968-1991

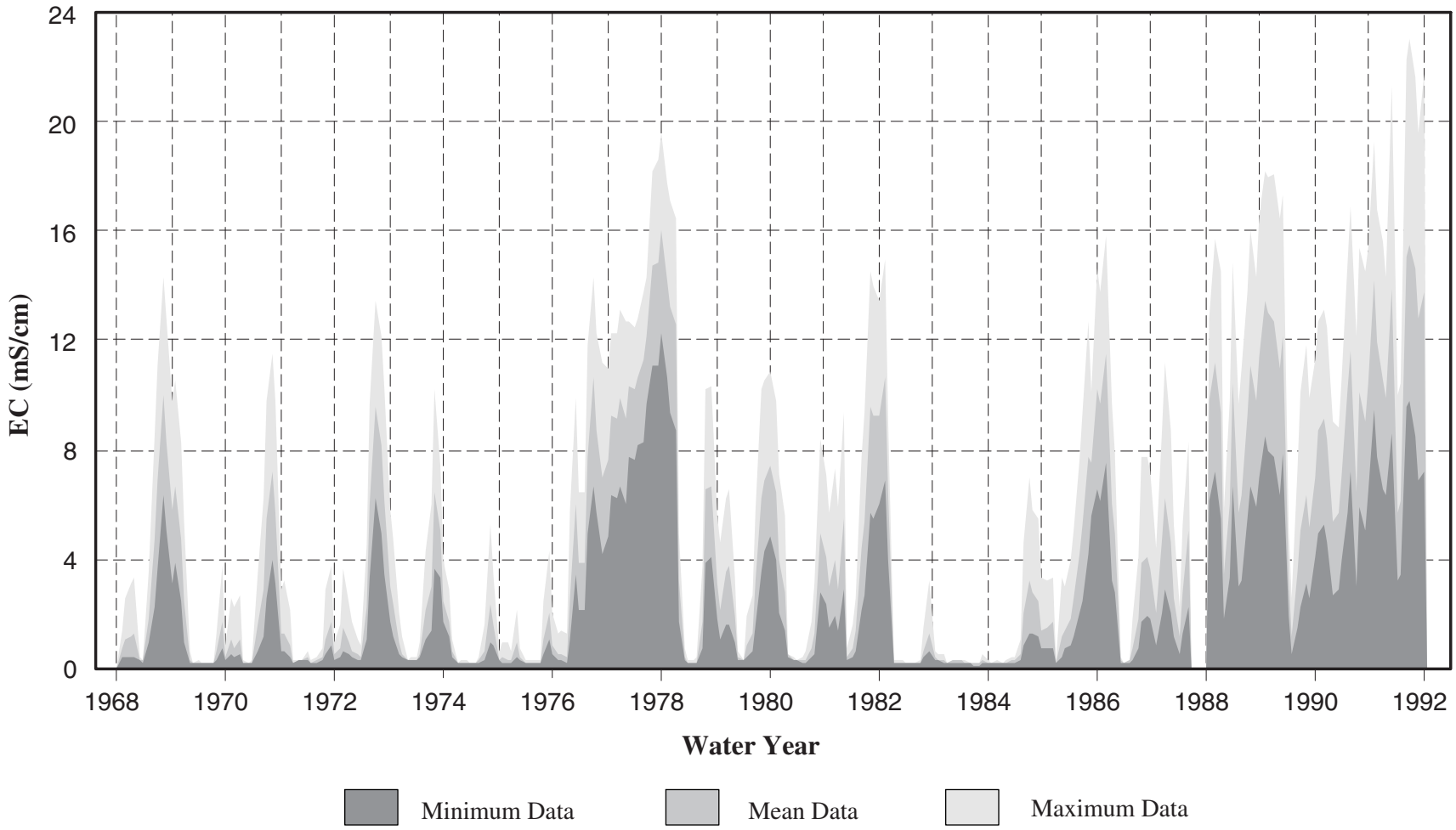

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Figure 3A-4
Historical Minimum, Mean, and Maximum Monthly EC at Pittsburg for 1968-1991

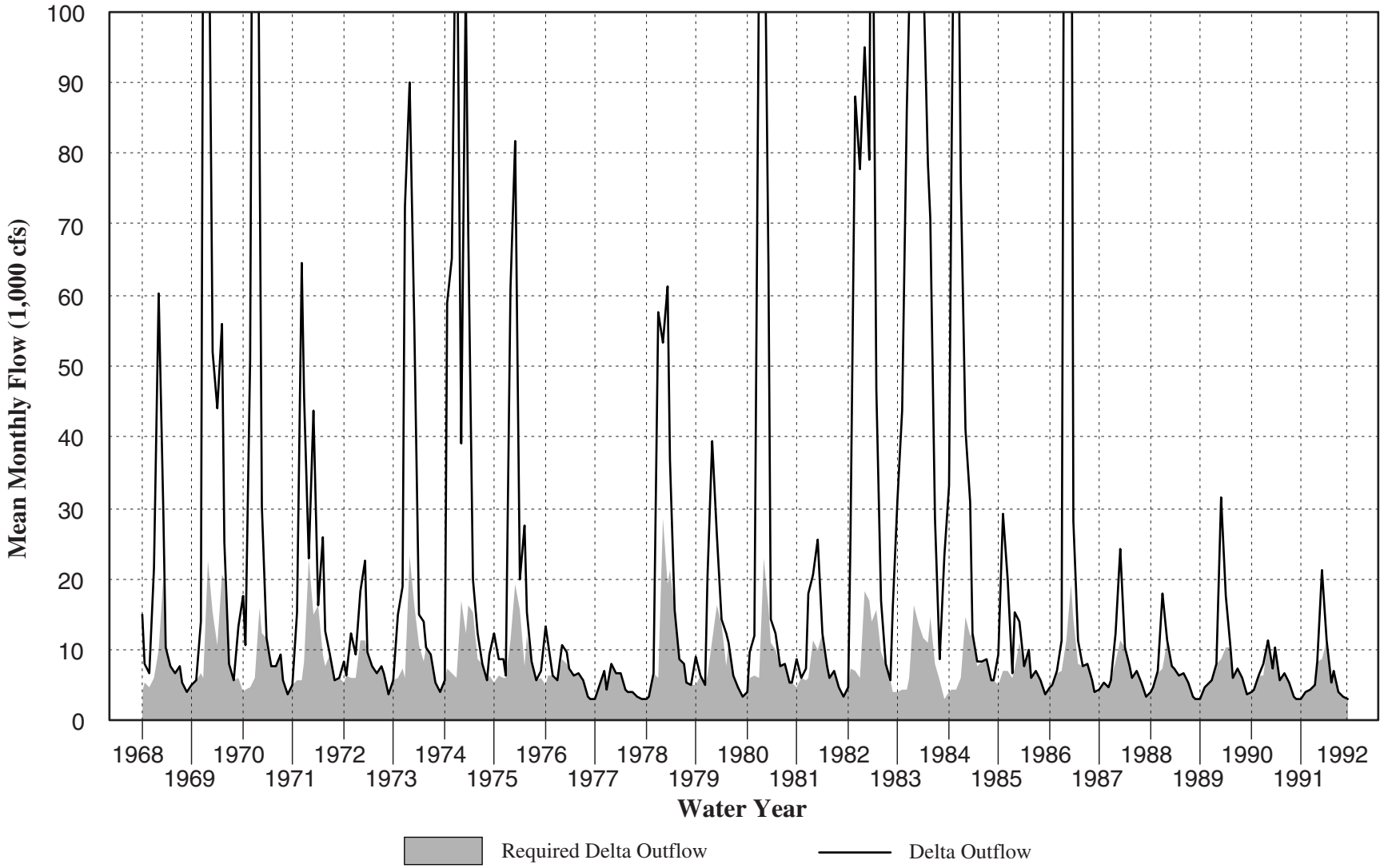

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Figure 3A-5
DeltaSOS-Simulated Mean Monthly Delta Outflow and Required Delta Outflow for 1968-1991 for the No-Project Alternative

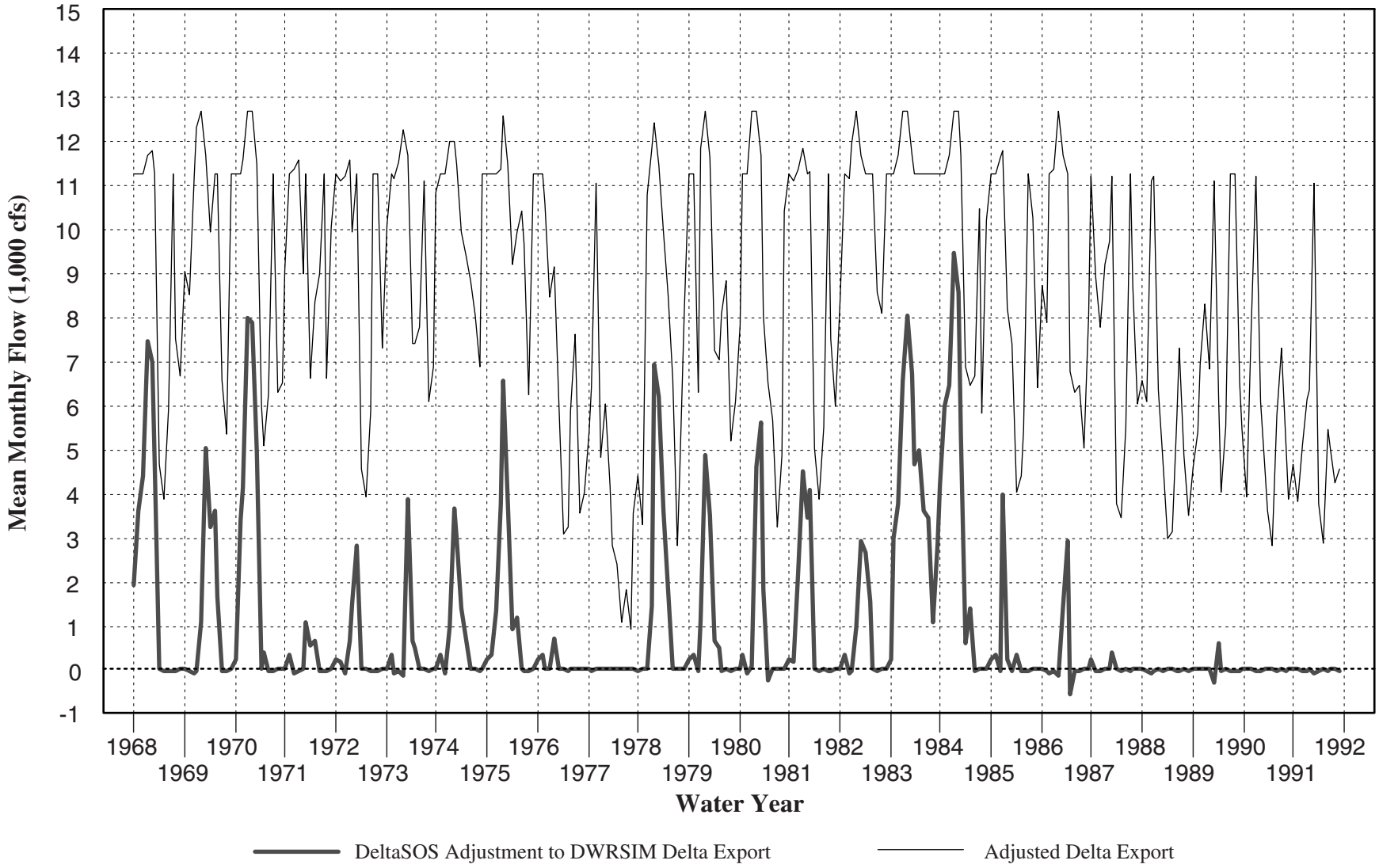

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Figure 3A-6
DeltaSOS-Simulated Mean Monthly Delta Export and Export Adjustment for 1968-1991 for the No-Project Alternative

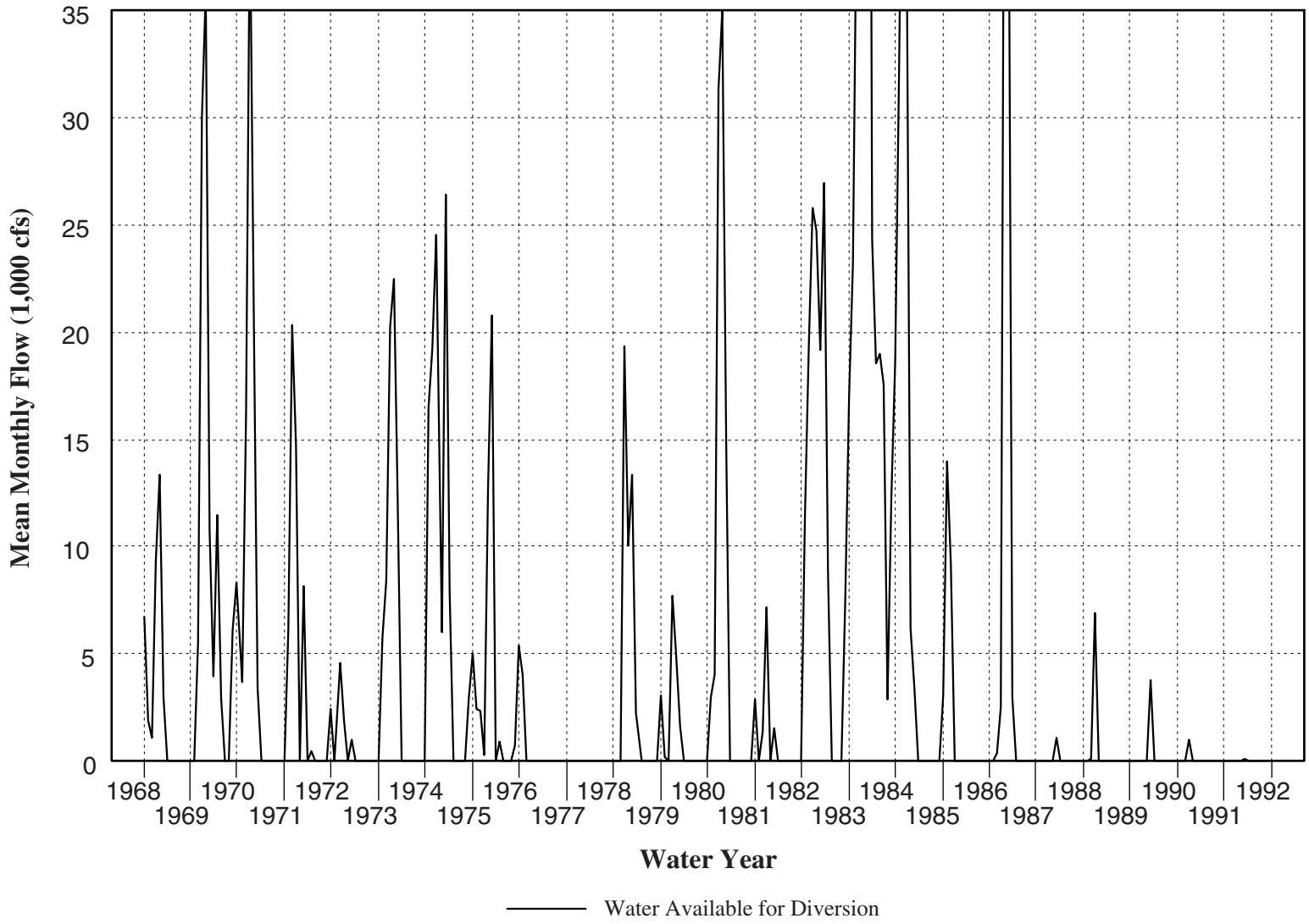

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Figure 3A-7
DeltaSOS-Simulated Mean Monthly Water Available for DW Diversion for 1968-1991 for the No-Project Alternative

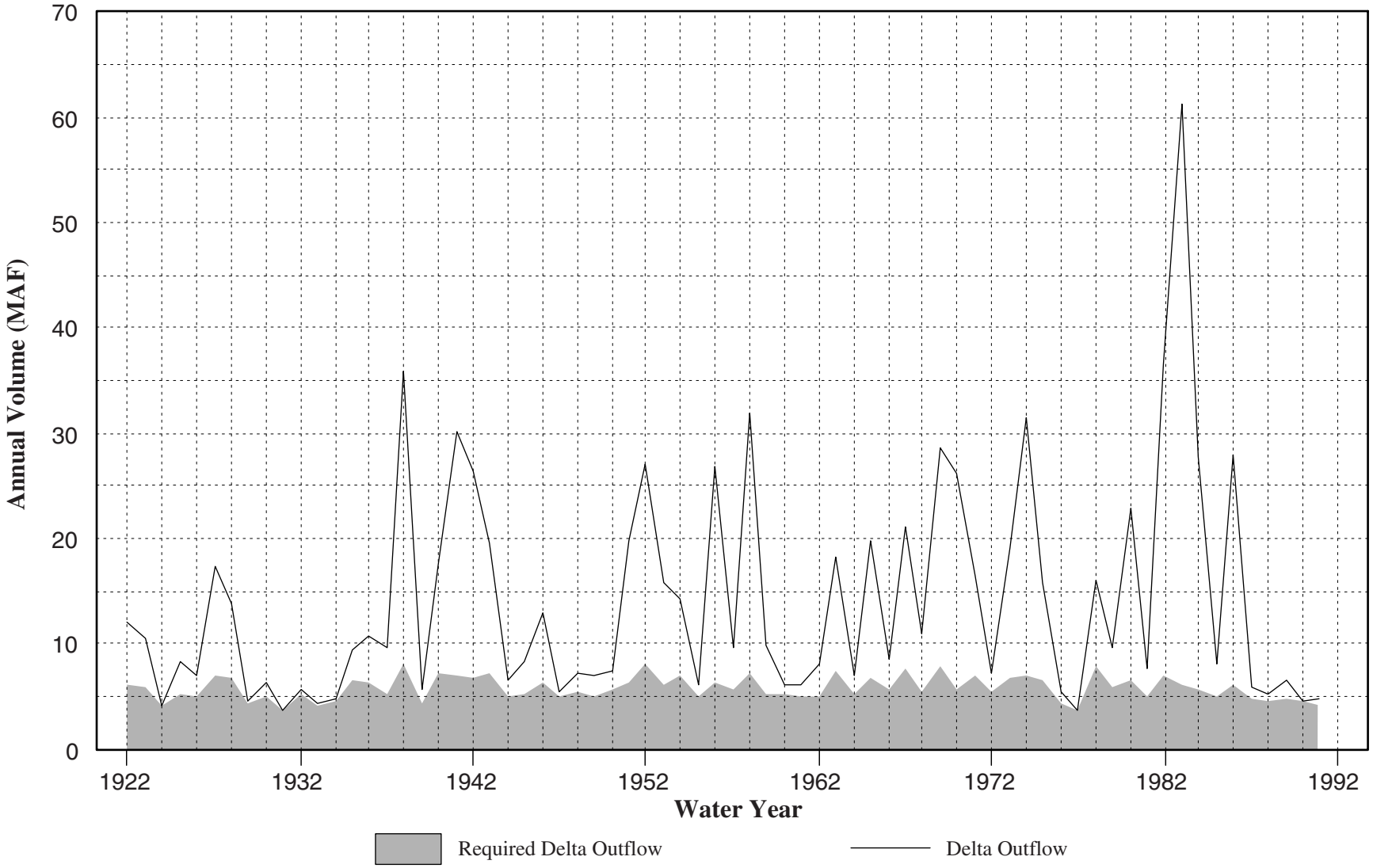

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Figure 3A-8
DeltaSOS-Simulated Annual Delta Outflow and Required Delta Outflow for 1922-1991 for the No-Project Alternative

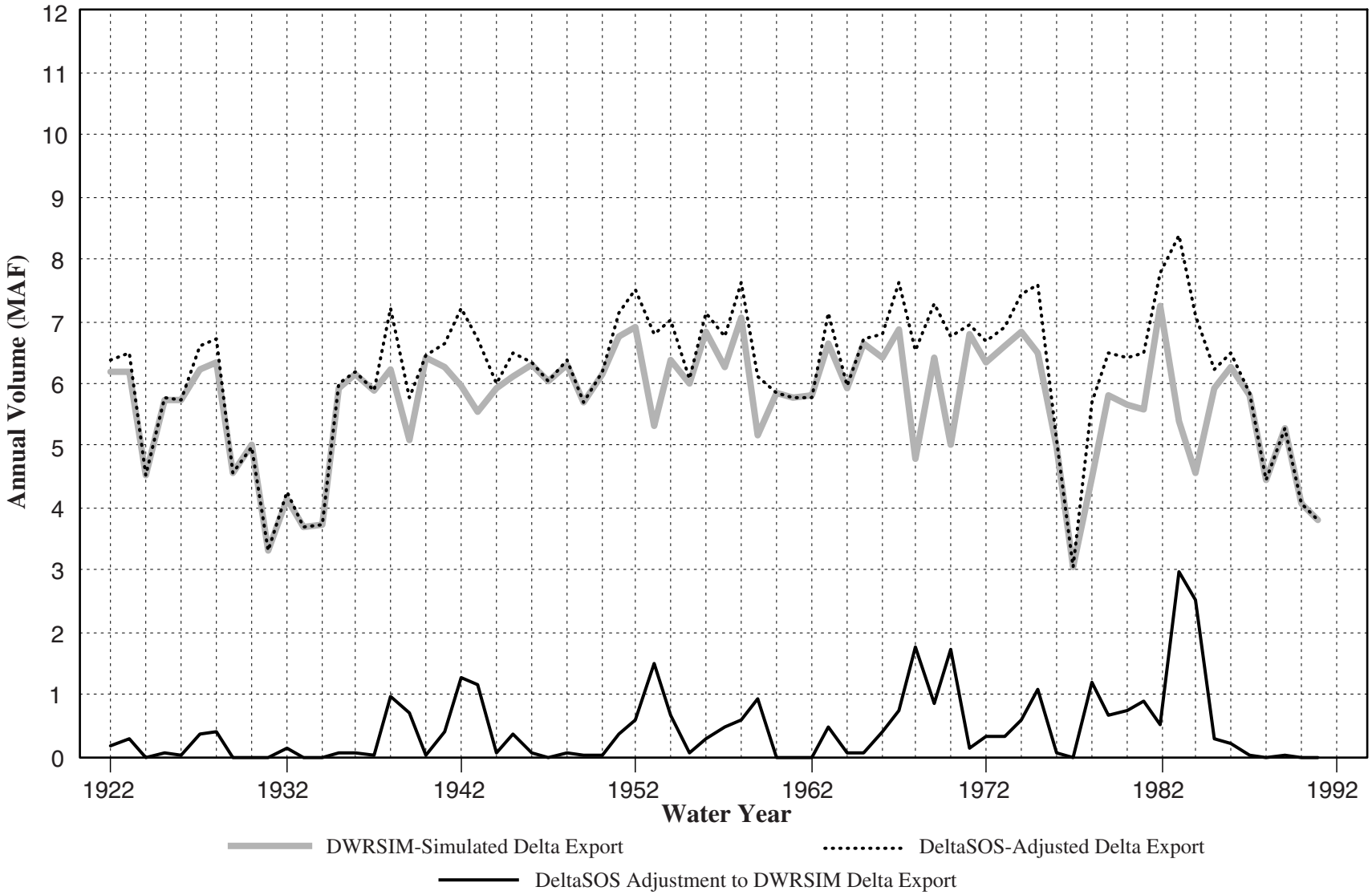

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Figure 3A-9
DWRSIM-Simulated and DeltaSOS-Adjusted Annual Delta Export for 1922-1991 for the No-Project Alternative

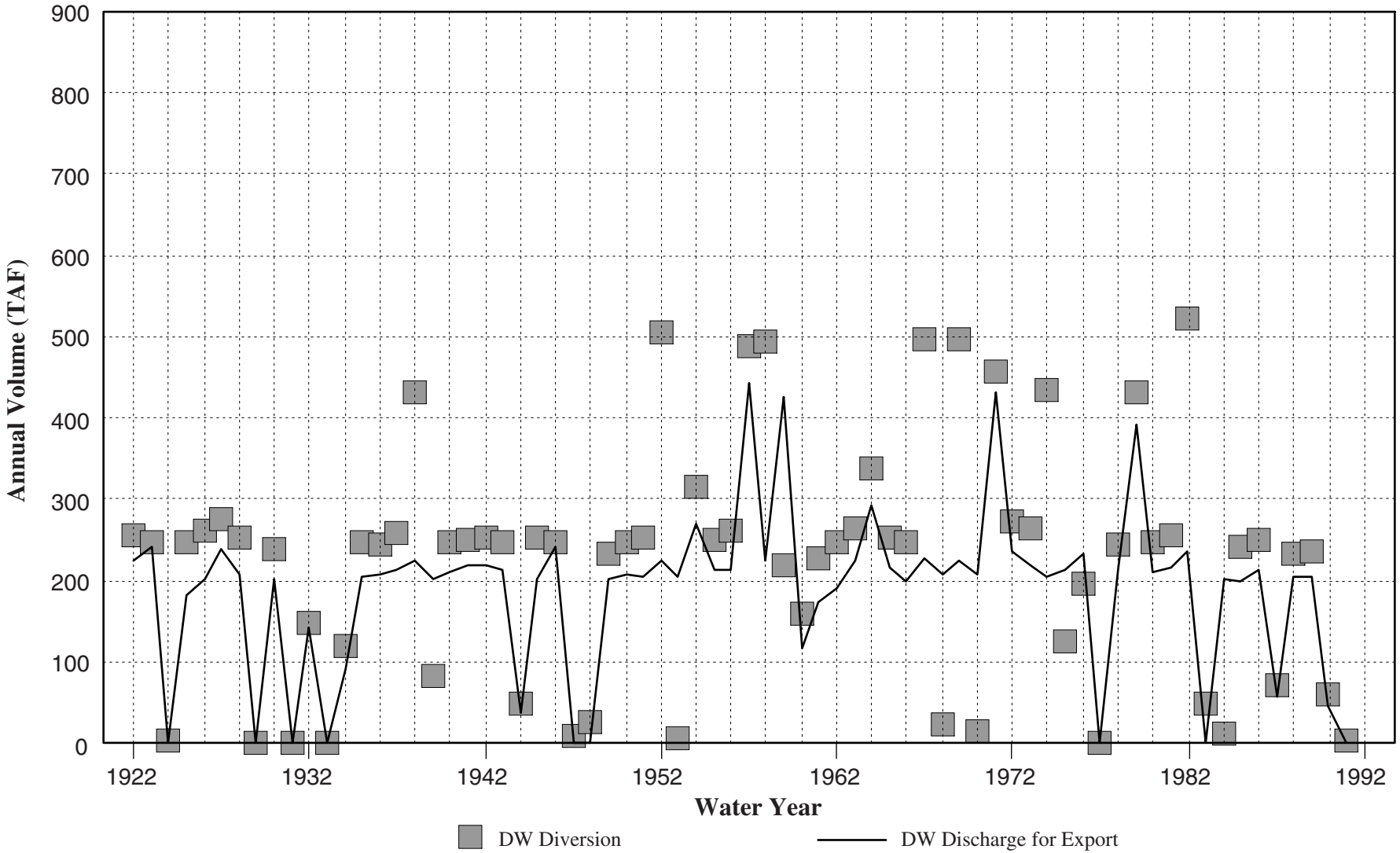

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Figure 3A-10
DeltaSOS-Simulated Annual DW Diversion and DW Discharge for Export for 1922-1991 for Alternative 1

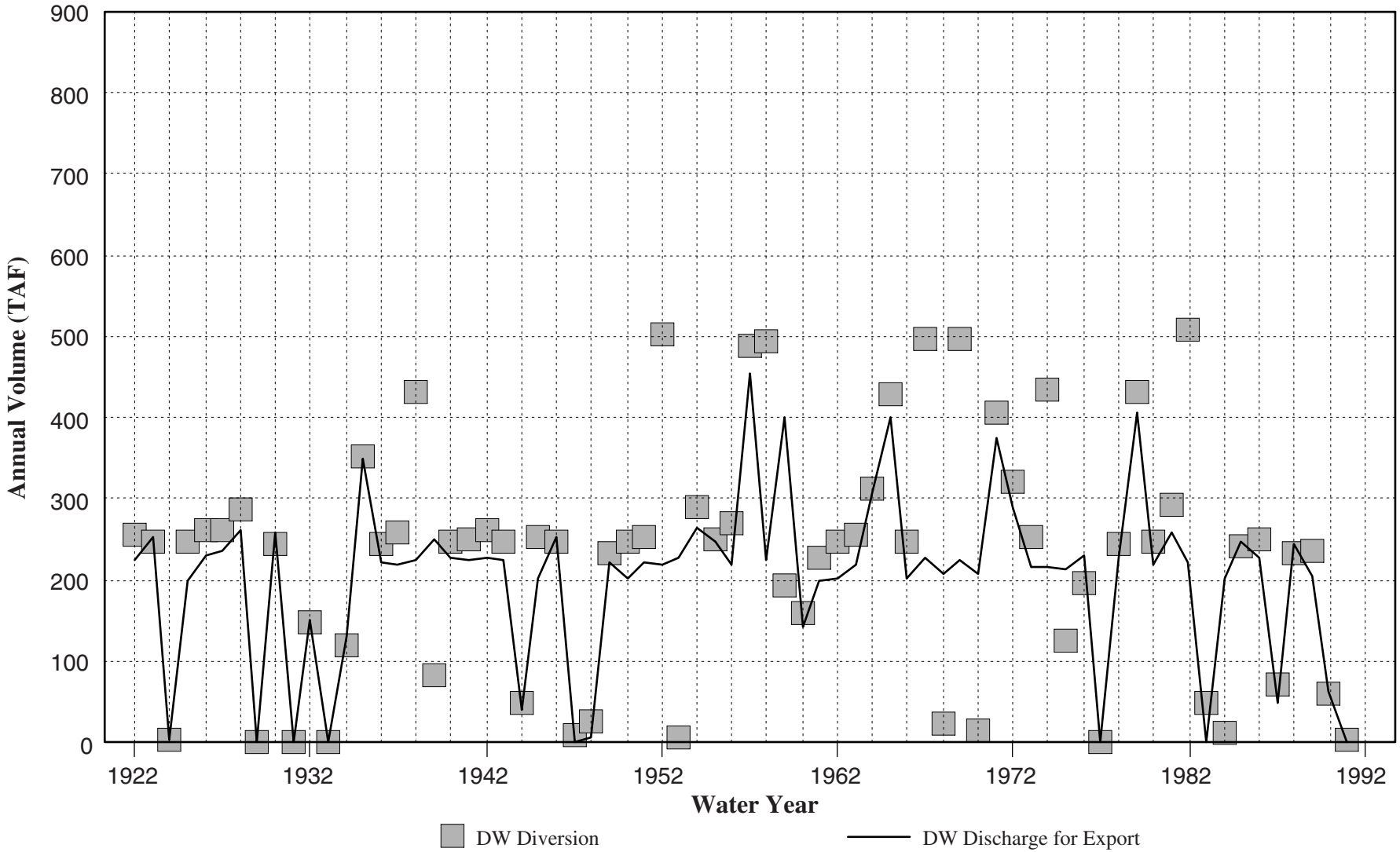

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Figure 3A-11
DeltaSOS-Simulated Annual DW Diversion and DW Discharge for Export for 1922-1991 for Alternative 2

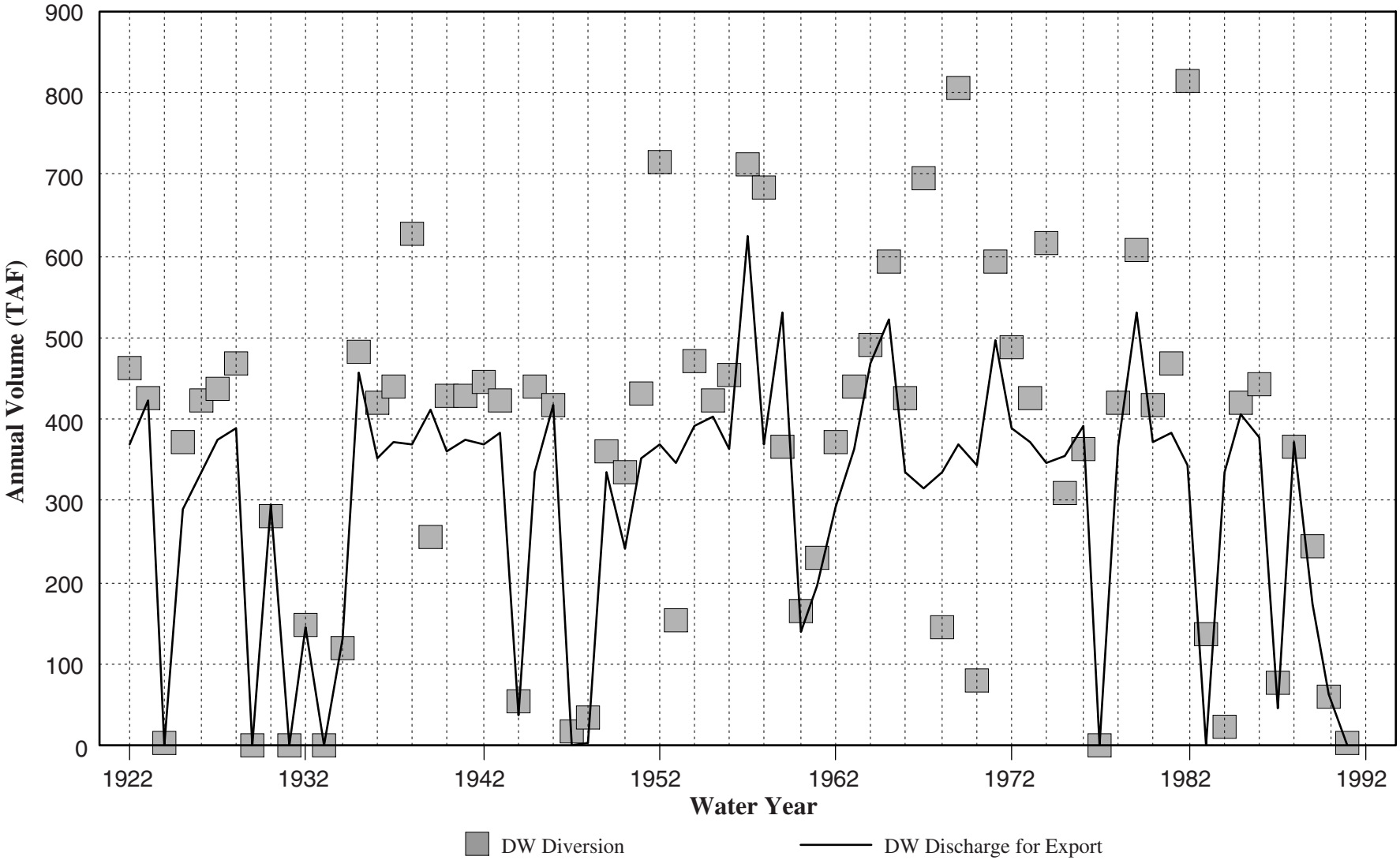

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Figure 3A-12
DeltaSOS-Simulated Annual DW Diversion and DW Discharge for Export for 1922-1991 for Alternative 3

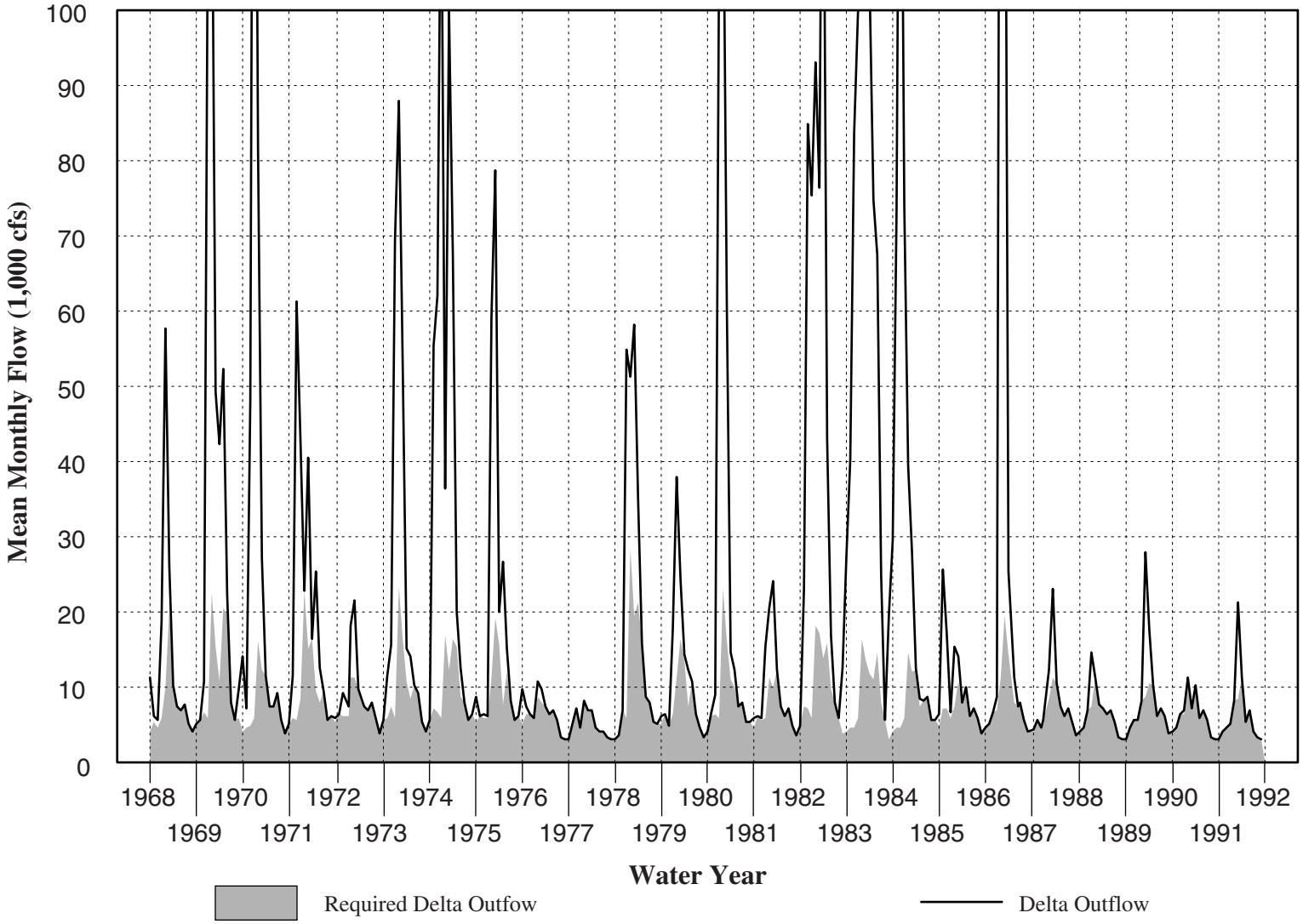

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Figure 3A-13
DeltaSOS-Simulated Mean Monthly Delta Outflow and Required Delta Outflow for 1968-1991 for the No-Project Alternative under Cumulative Conditions

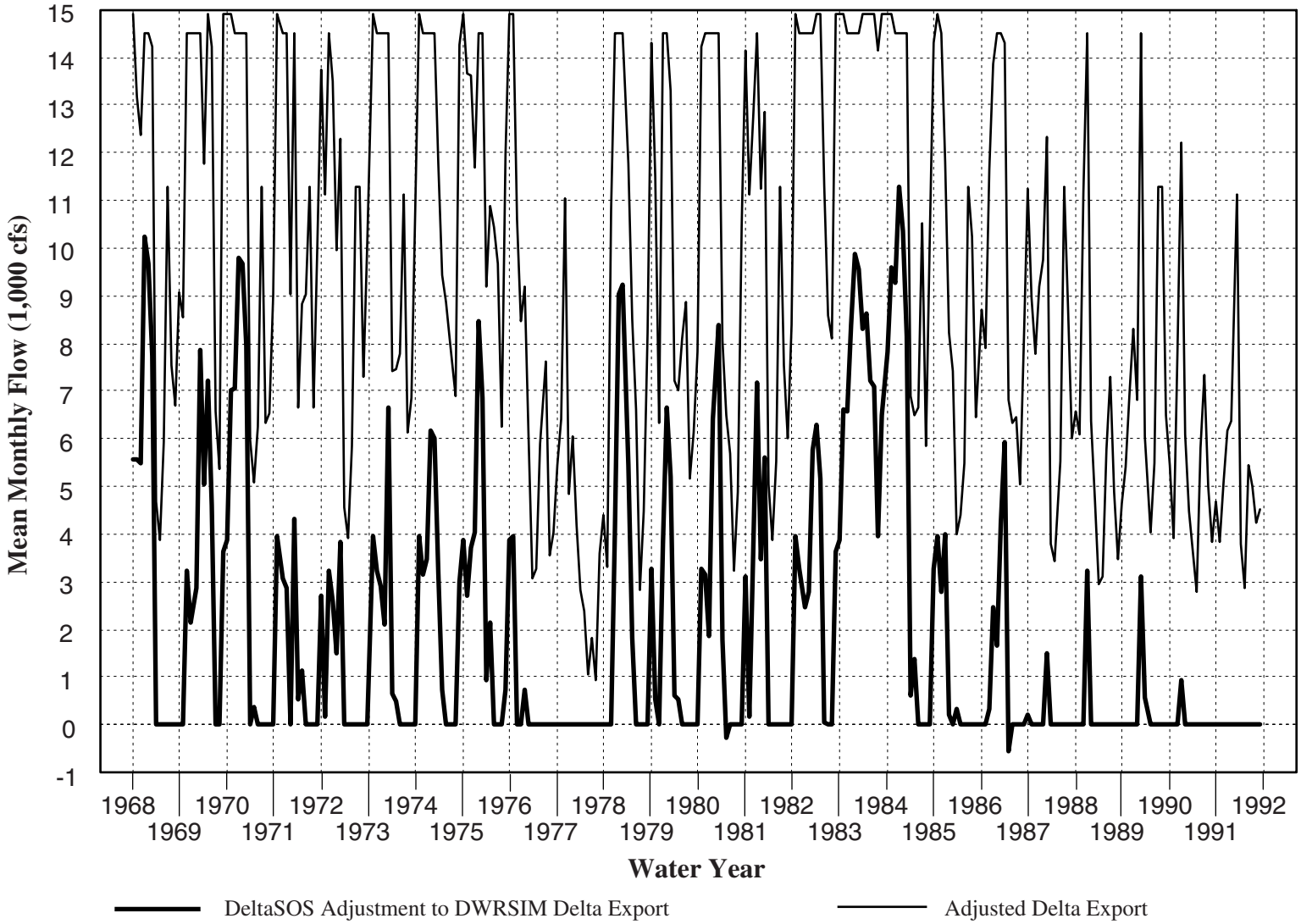

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Figure 3A-14
DeltaSOS-Simulated Mean Monthly Delta Export and Export Adjustment for 1968-1991 for the No-Project Alternative under Cumulative Conditions

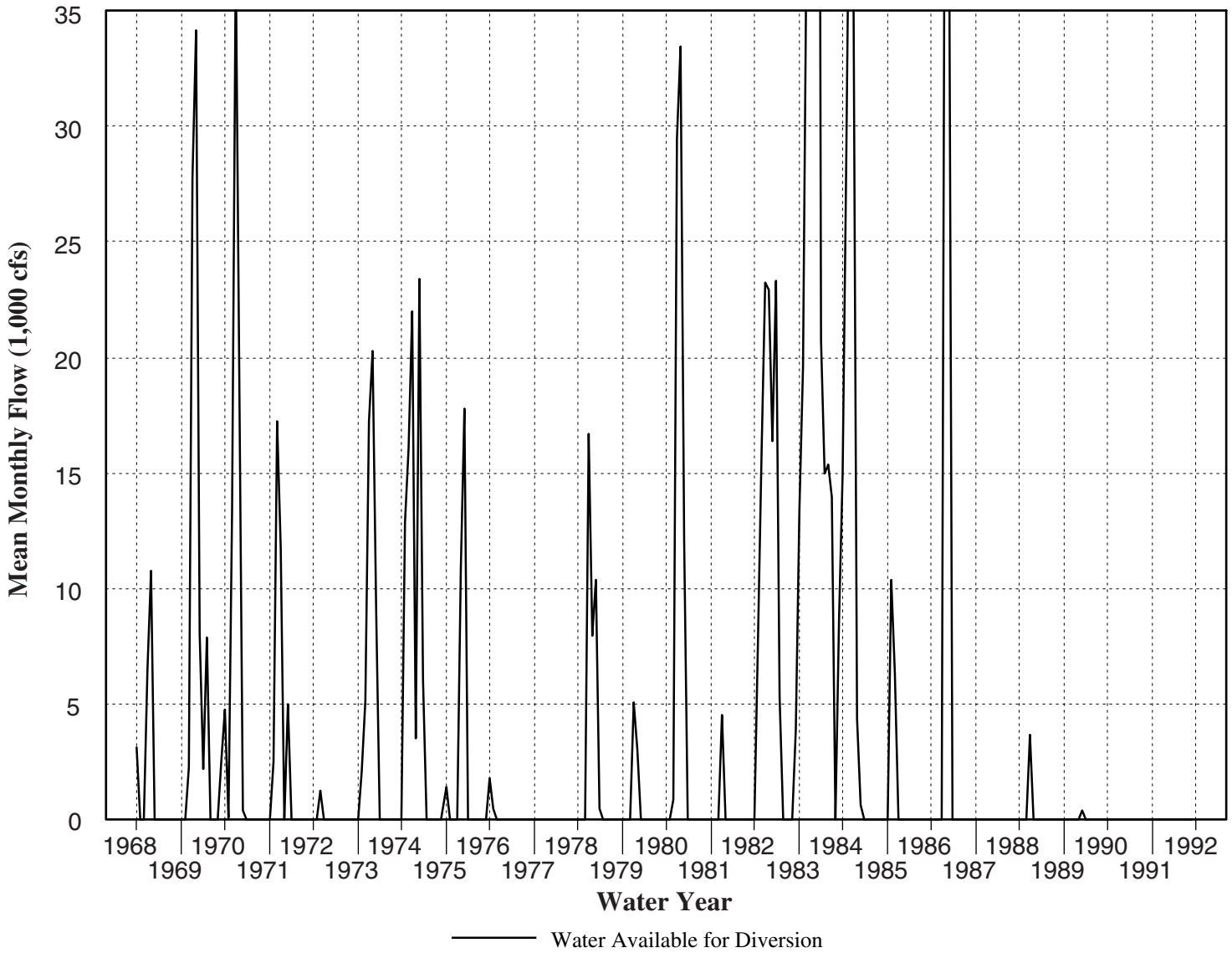

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Figure 3A-15
DeltaSOS-Simulated Mean Monthly Water Available for Diversion for 1968-1991 for the No-Project Alternative under Cumulative Conditions

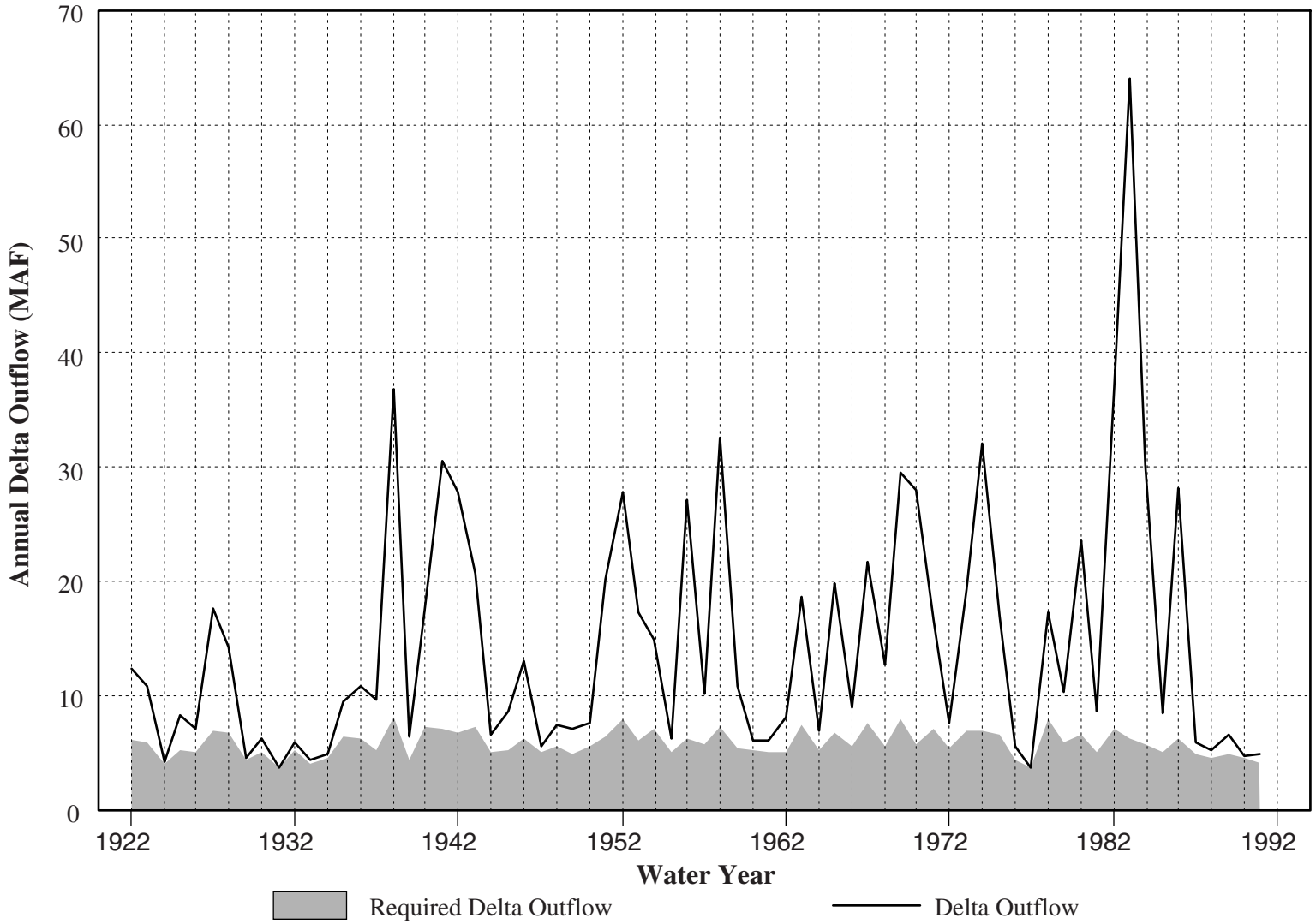

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Figure 3A-16
DeltaSOS-Simulated Annual Delta Outflow and Required Delta Outflow for 1922-1991 for the No-Project Alternative under Cumulative Conditions

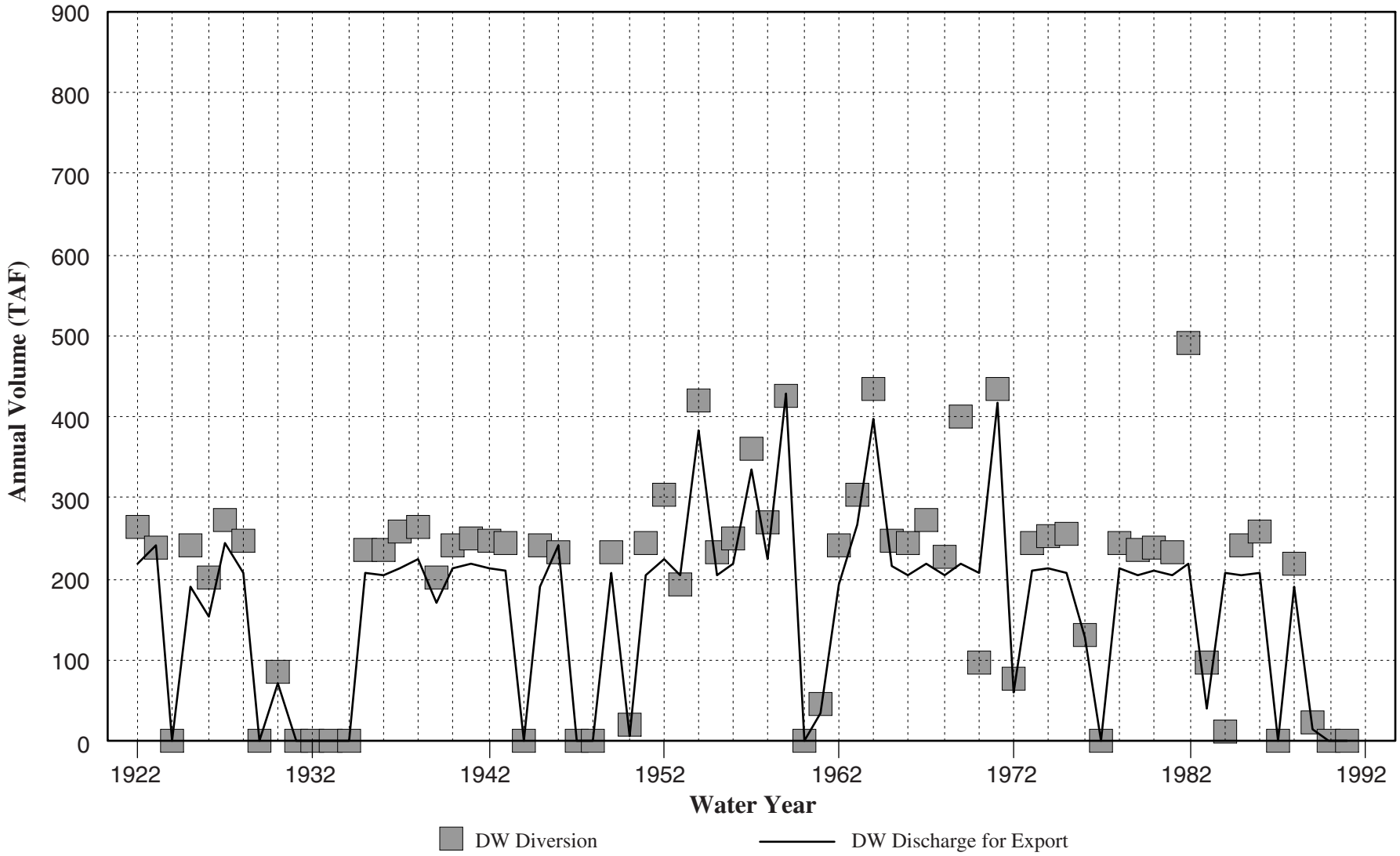

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Figure 3A-17
DeltaSOS-Simulated Annual DW Diversion and DW Discharge for Export for 1922-1991 for Alternative 1 under Cumulative Conditions

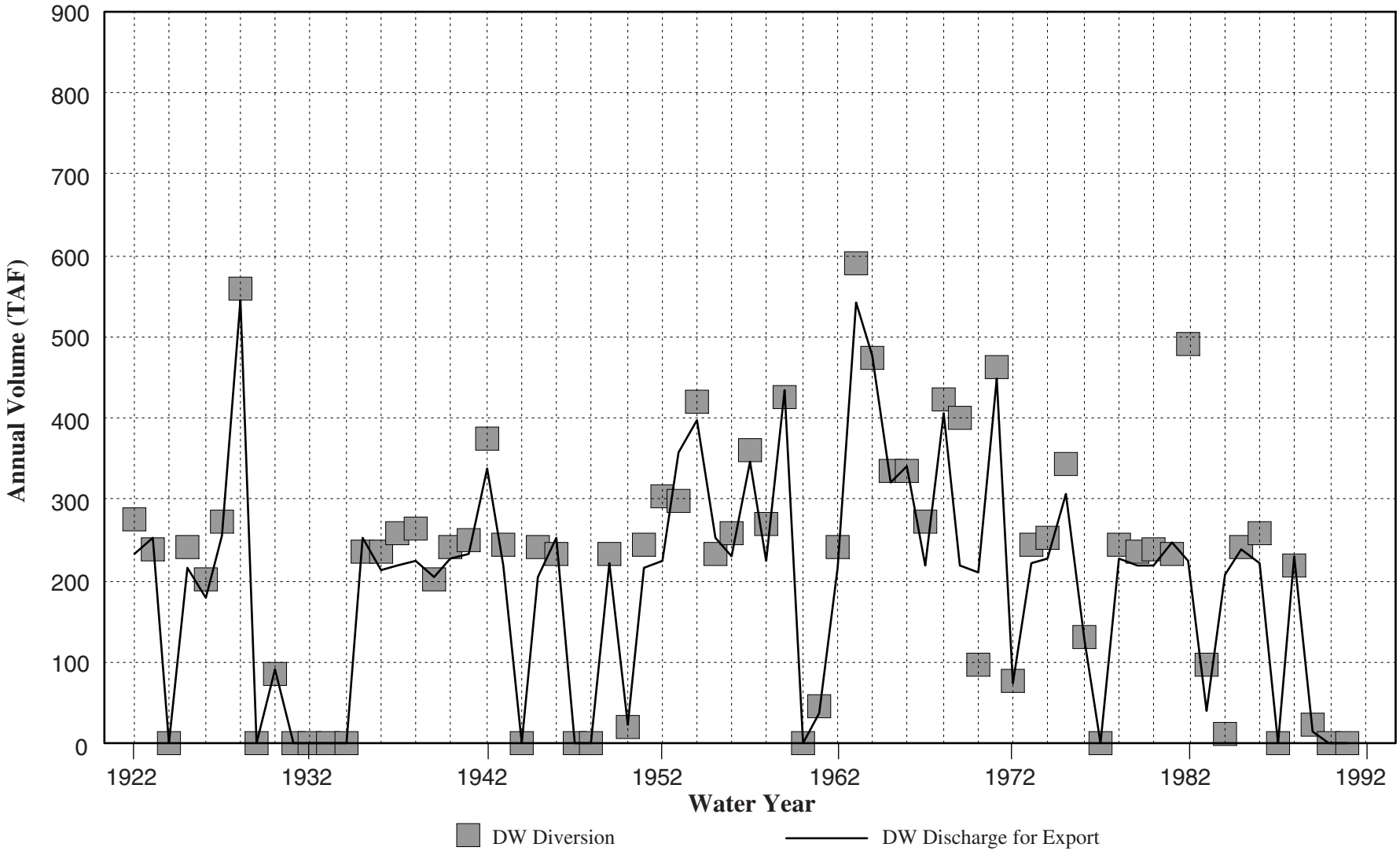

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Figure 3A-18
DeltaSOS-Simulated Annual DW Diversion and DW Discharge for Export for 1922-1991 for Alternative 2 under Cumulative Conditions

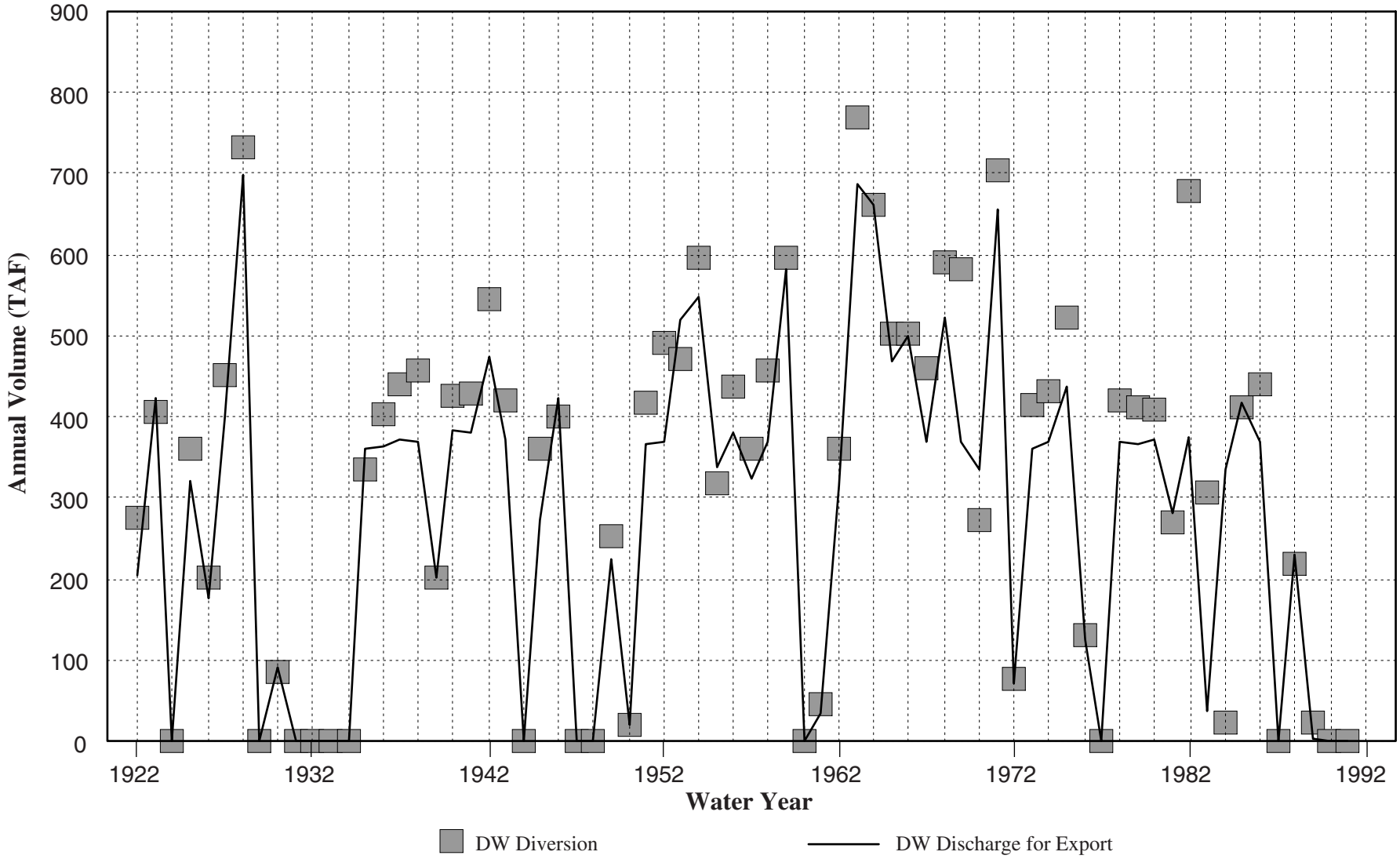

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Figure 3A-19
DeltaSOS-Simulated Annual DW Diversion and DW Discharge for Export for 1922-1991 for Alternative 3 under Cumulative Conditions

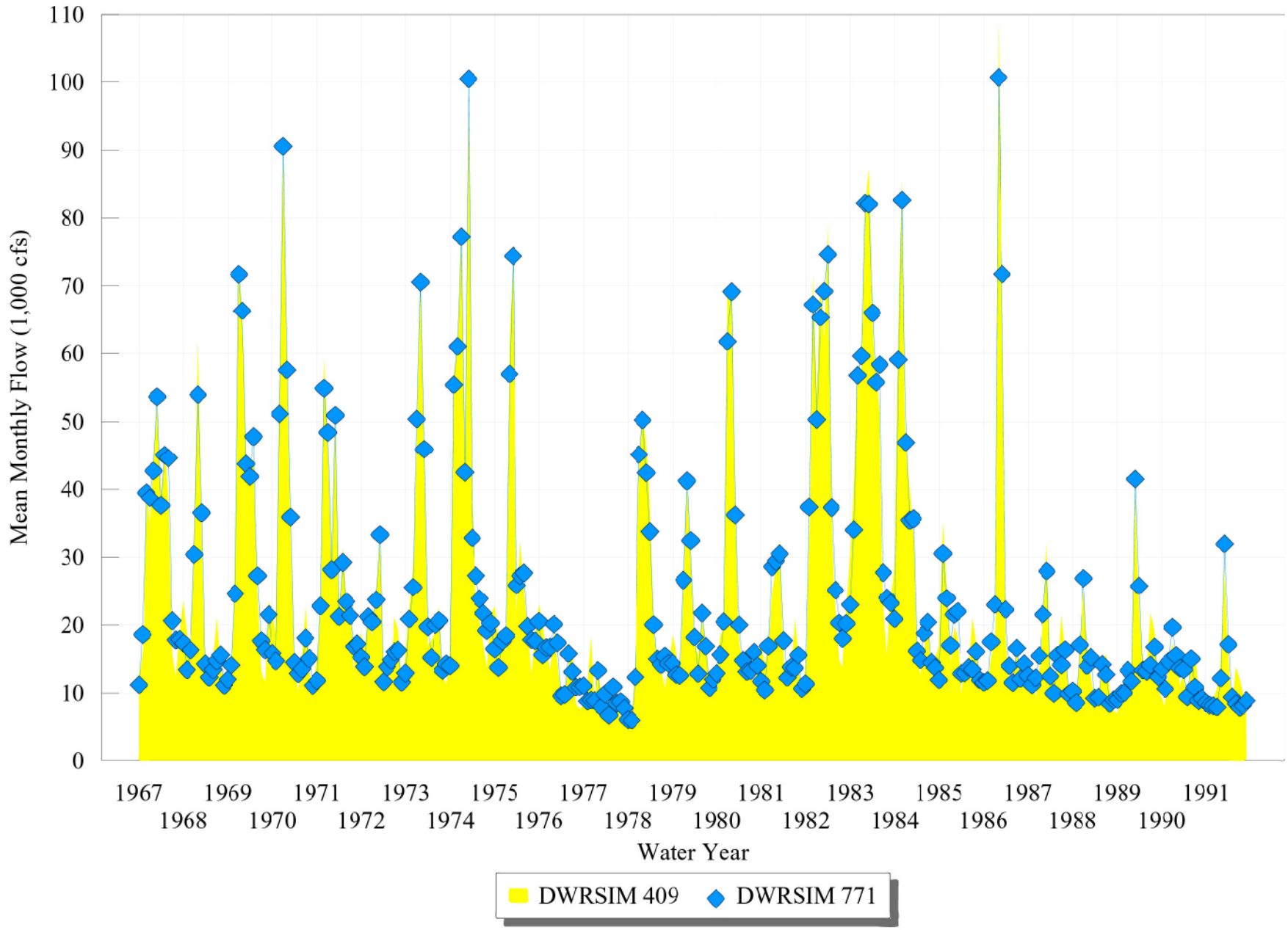

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Figure 3A-20
DWRSIM-Simulated Mean Monthly Sacramento River Flows: Studies 409 and 771

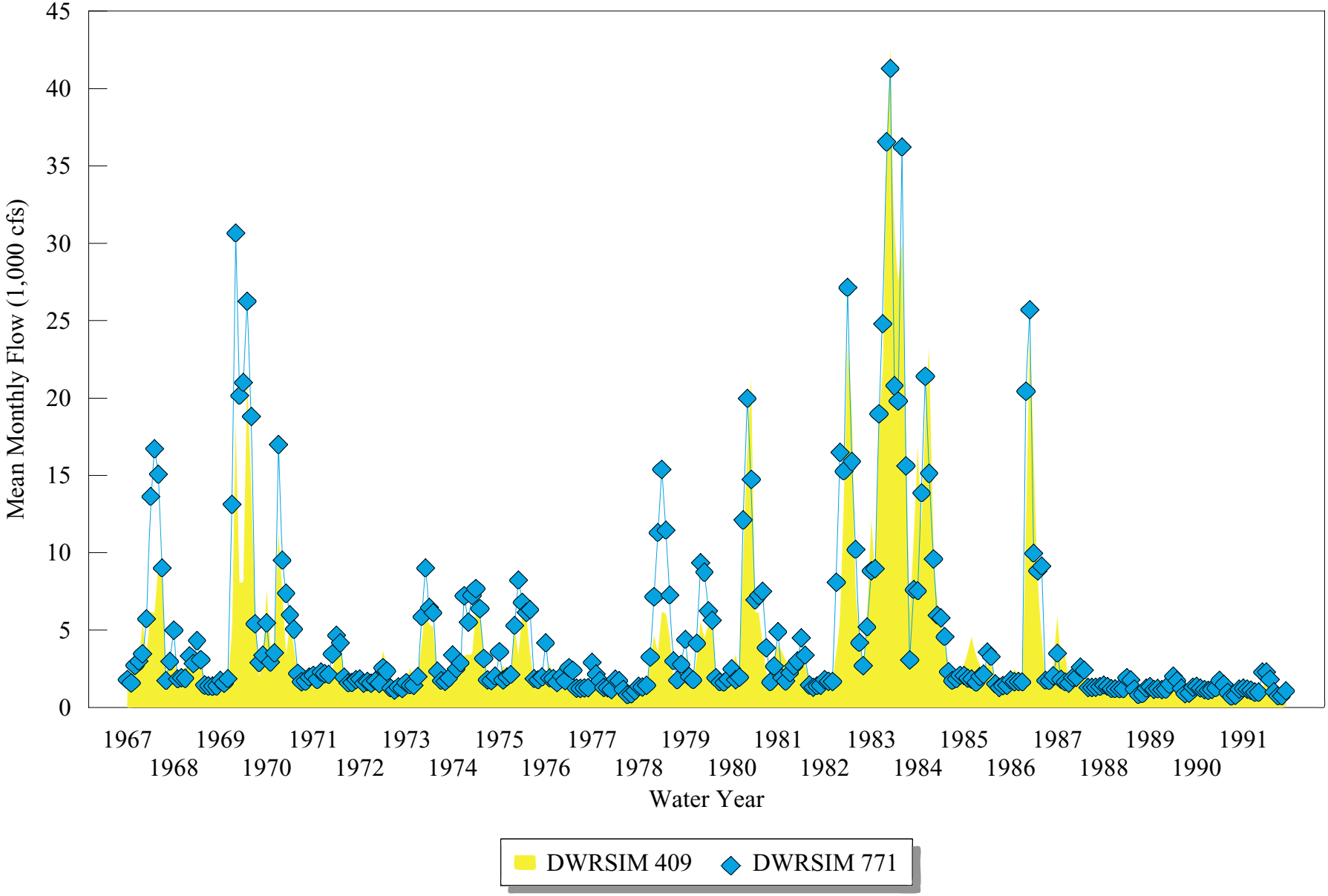

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Figure 3A-21
DWRSIM-Simulated Mean Monthly San Joaquin River Flows: Studies 409 and 771

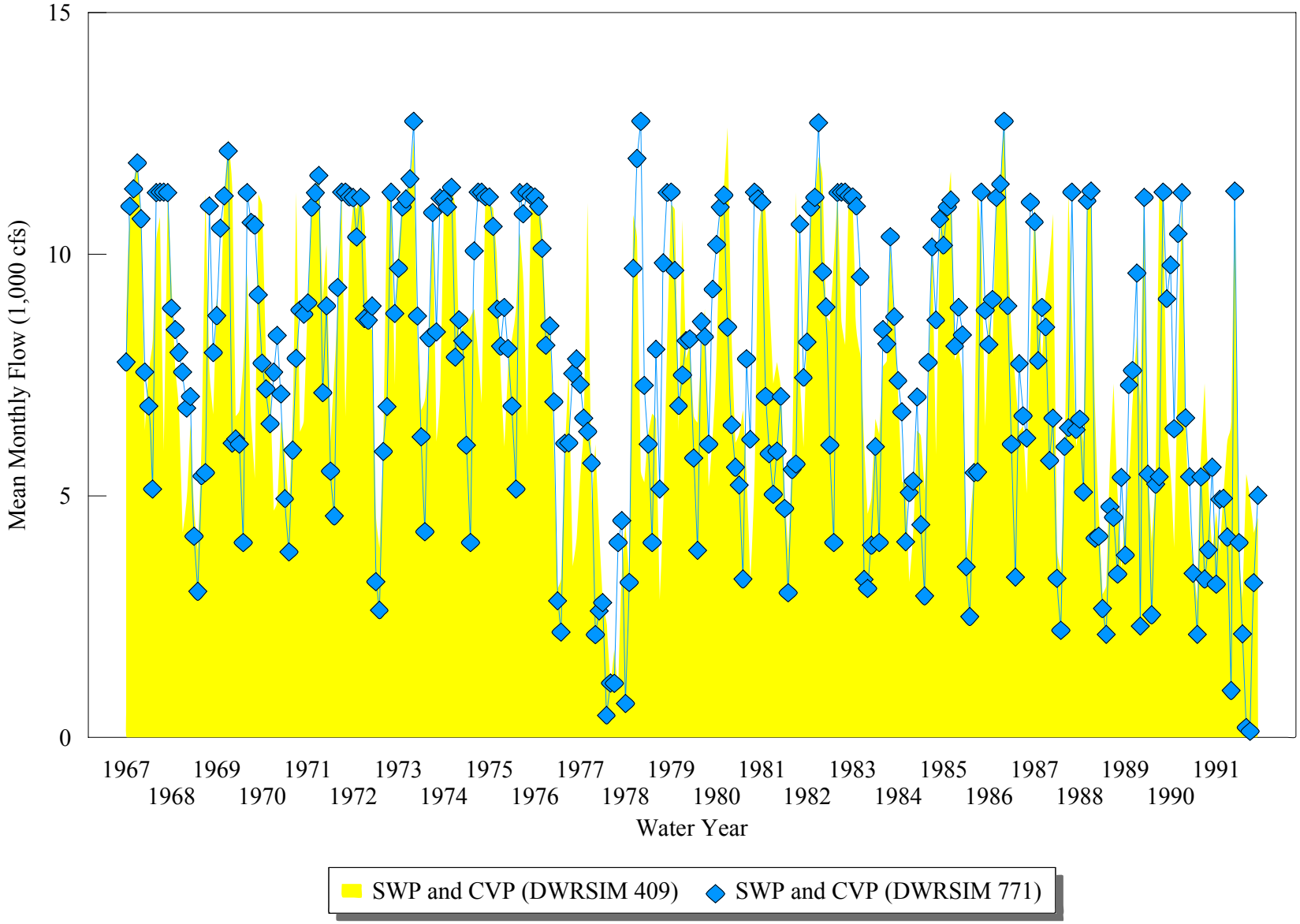

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Figure 3A-22
DWRSIM-Simulated Mean Monthly SWP and CVP Exports: Studies 409 and 771

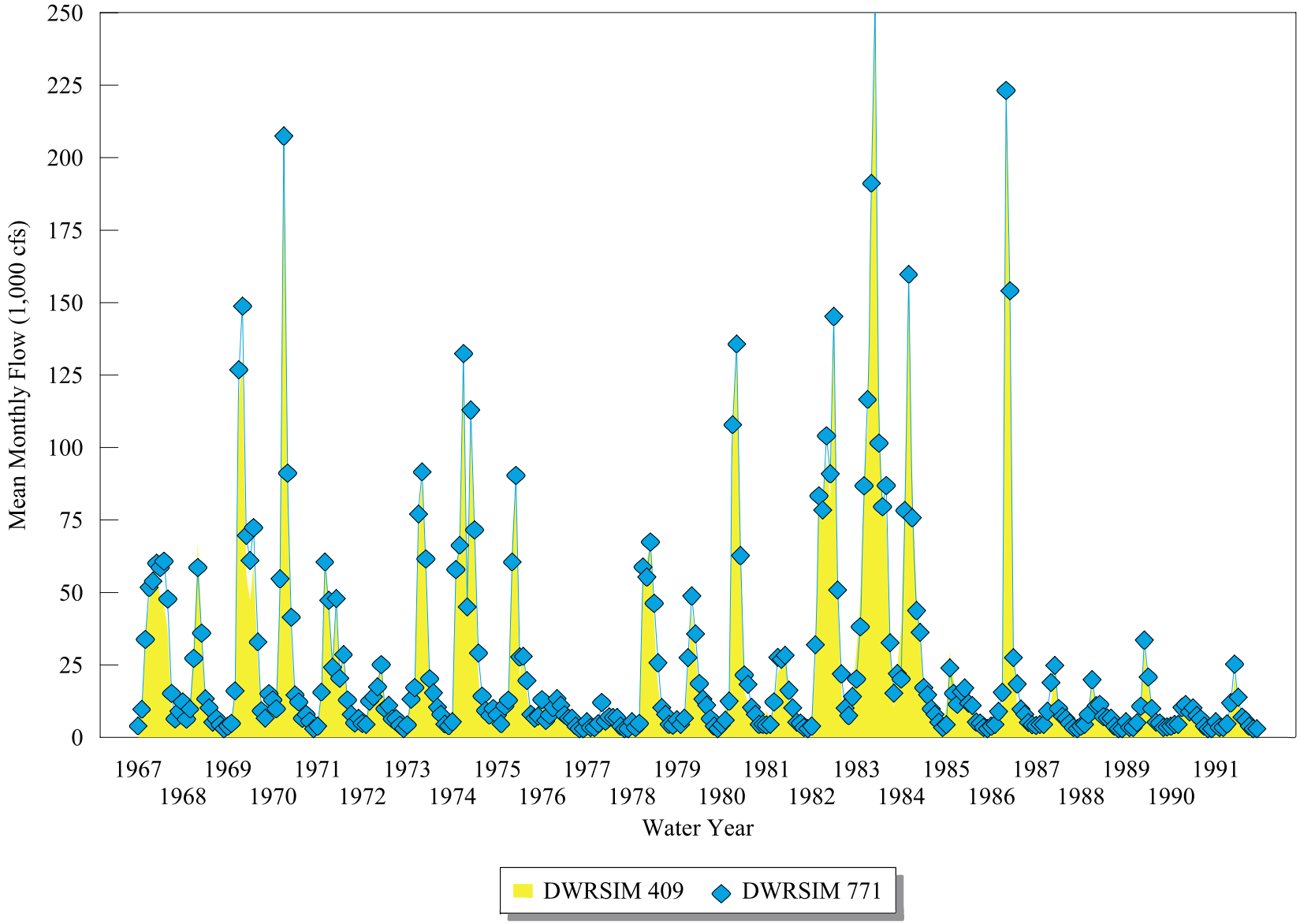

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Figure 3A-23
DWRSIM-Simulated Mean Monthly Delta Outflow: Studies 409 and 771

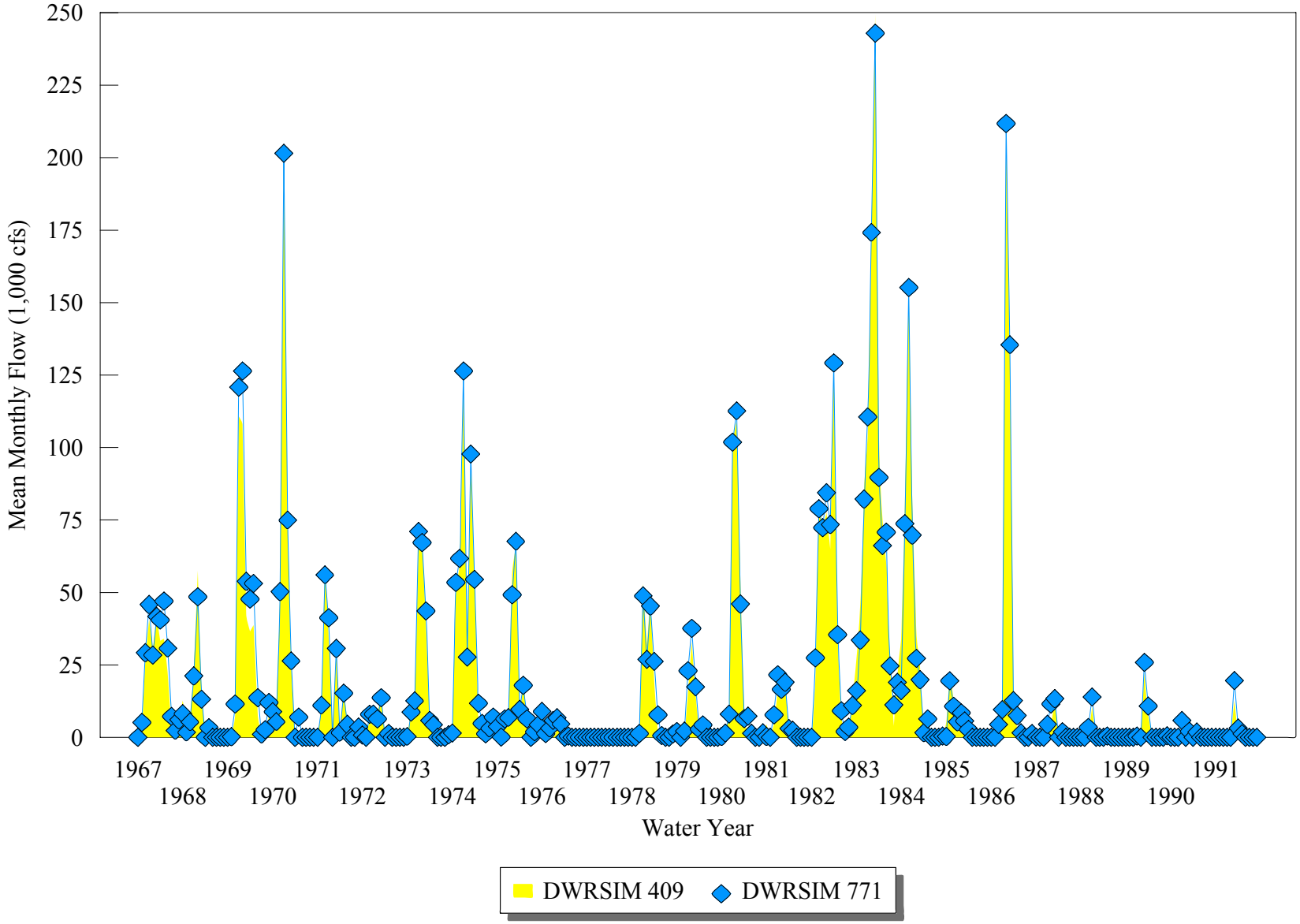

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Figure 3A-24
DWRSIM-Simulated Mean Monthly Available Water for Delta Wetlands Diversion: Studies 409 and 771

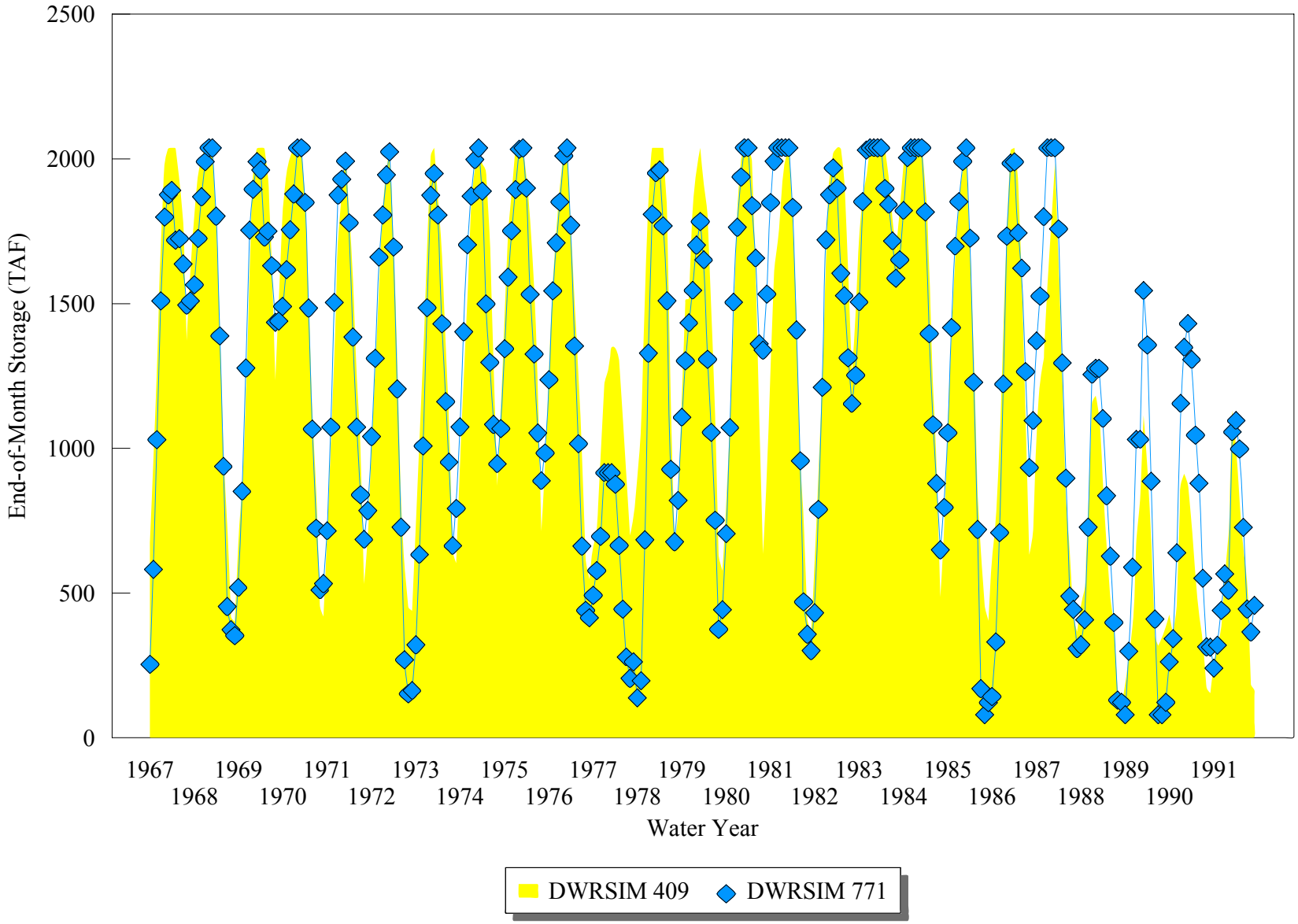

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Figure 3A-25
DWRSIM-Simulated Mean Monthly SWP and CVP San Luis Reservoir Storage: Studies 409 and 771

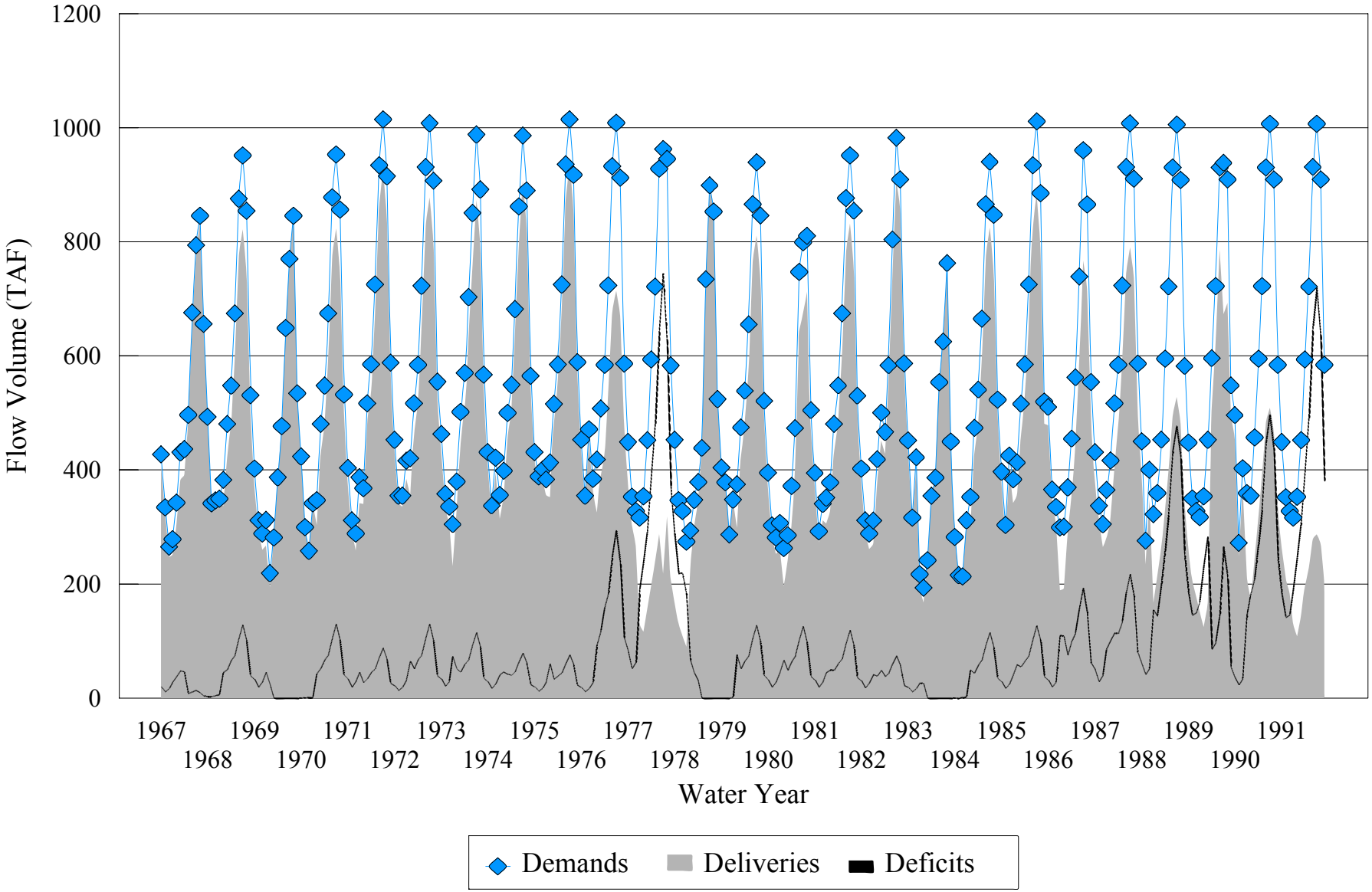

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Figure 3A-26
South-of-Delta Demands and Deliveries: DWRSIM Study 771 with VAMP

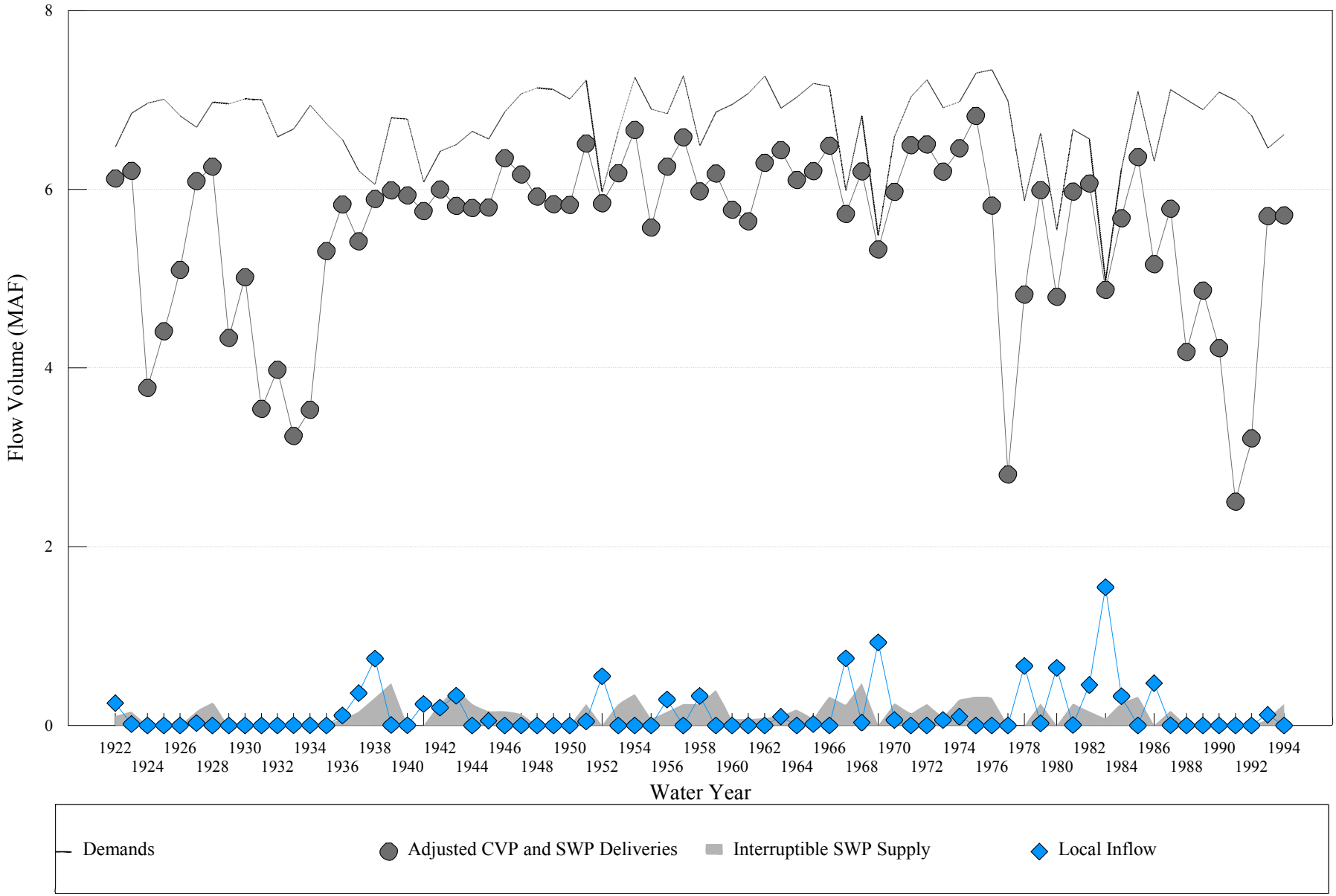

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Figure 3A-27
Annual Demands and Deliveries for South-of-Delta Water Supply: DWRSIM Study 771 as Adjusted by DeltaSOS for Joint Point of Diversion

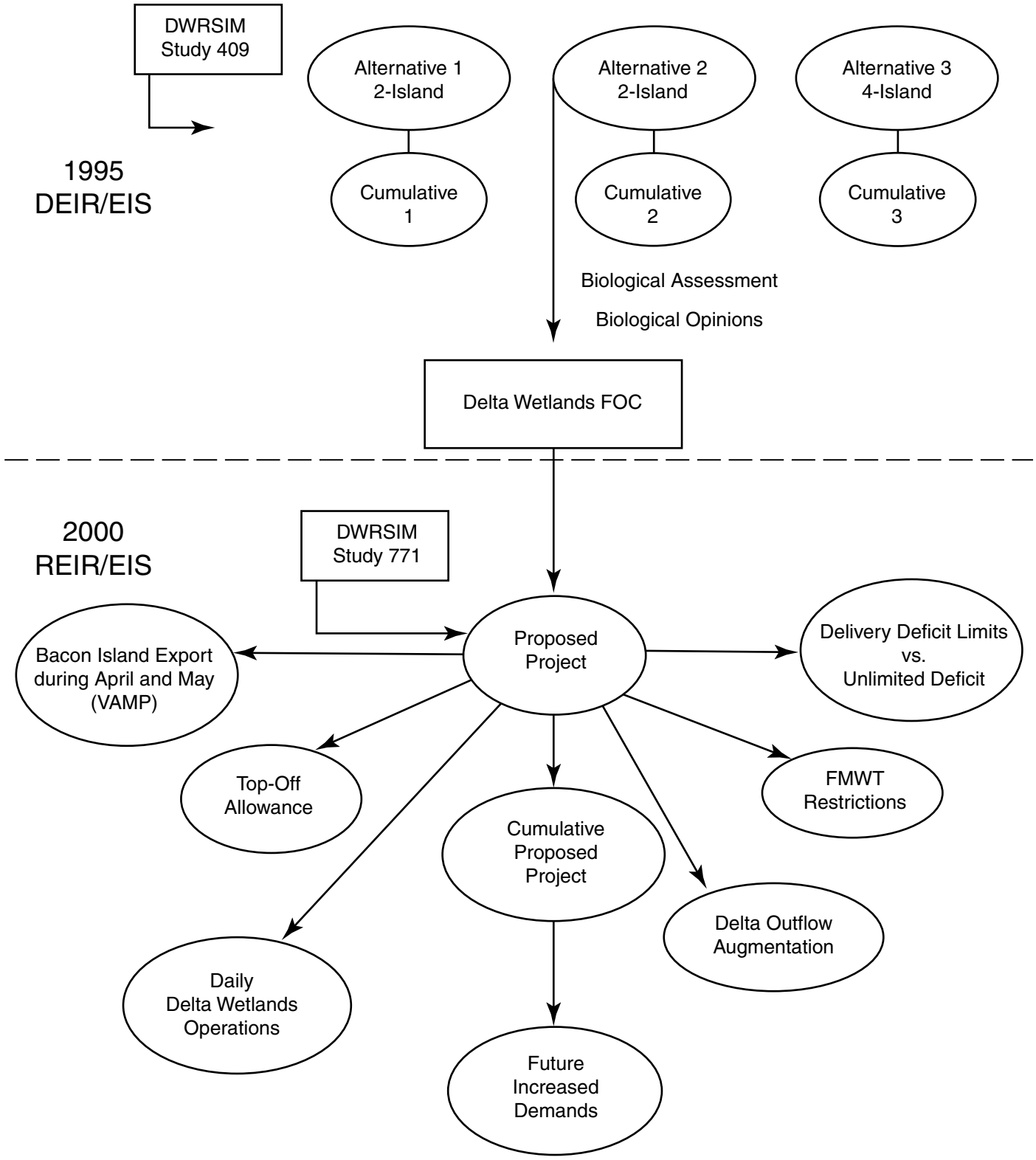

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Figure 3A-28
Relationship between 1995 DEIR/EIS Alternatives and 2000 REIR/EIS Simulated Potential Project Operations

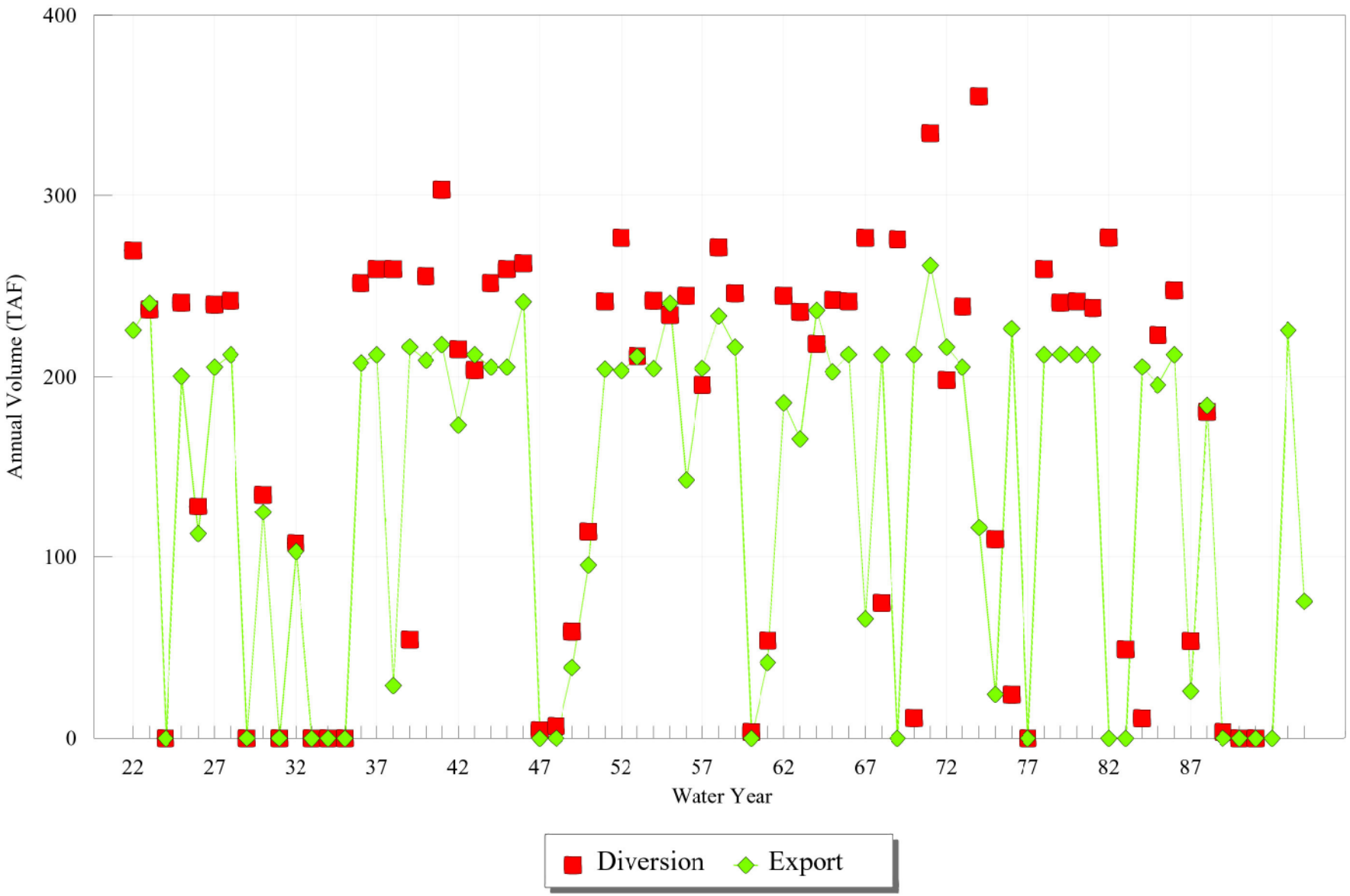

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Figure 3A-29
Simulated Annual Delta Wetlands Diversion and Export Volumes Unlimited by South-of-Delta Delivery Deficits

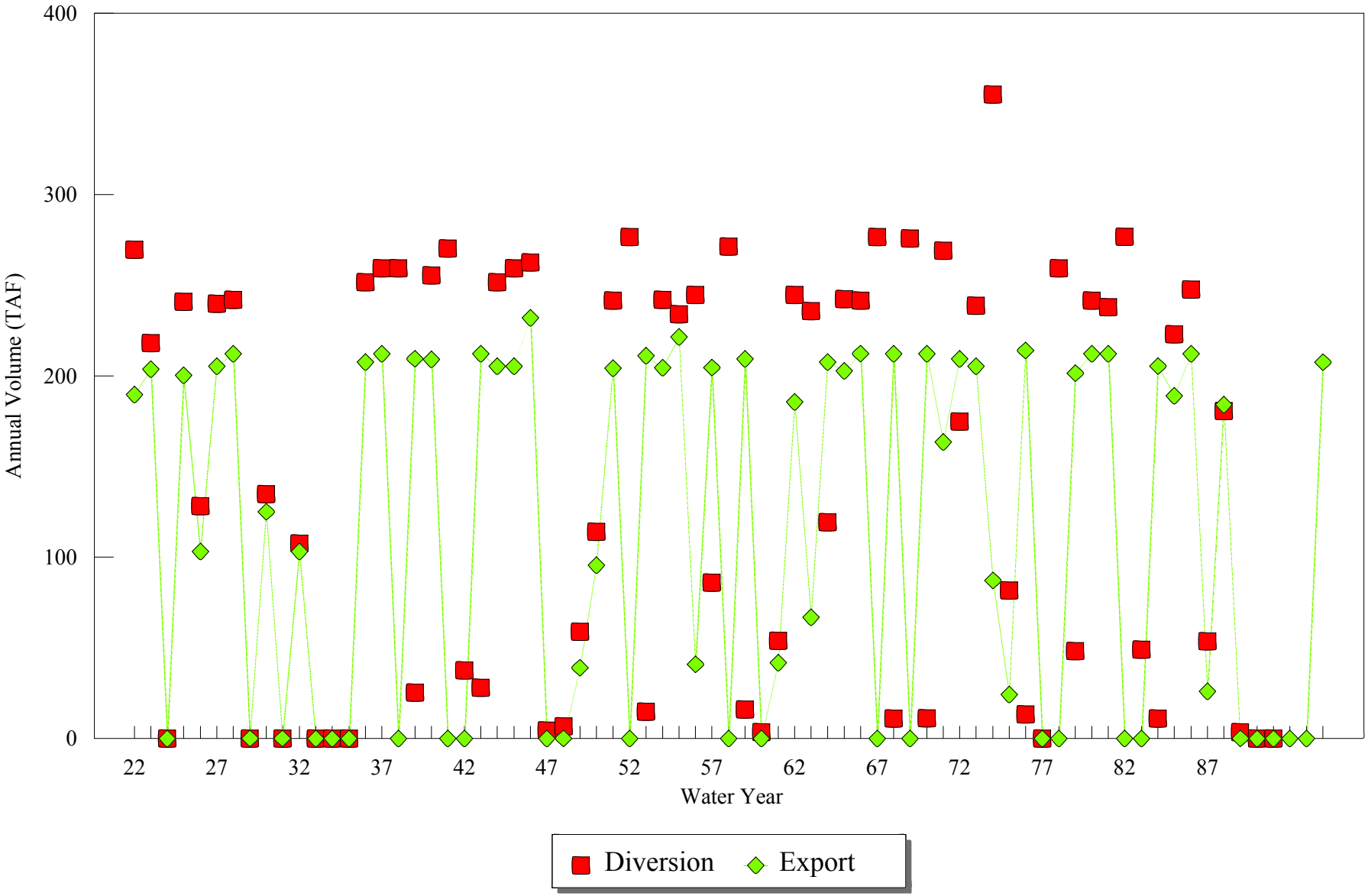

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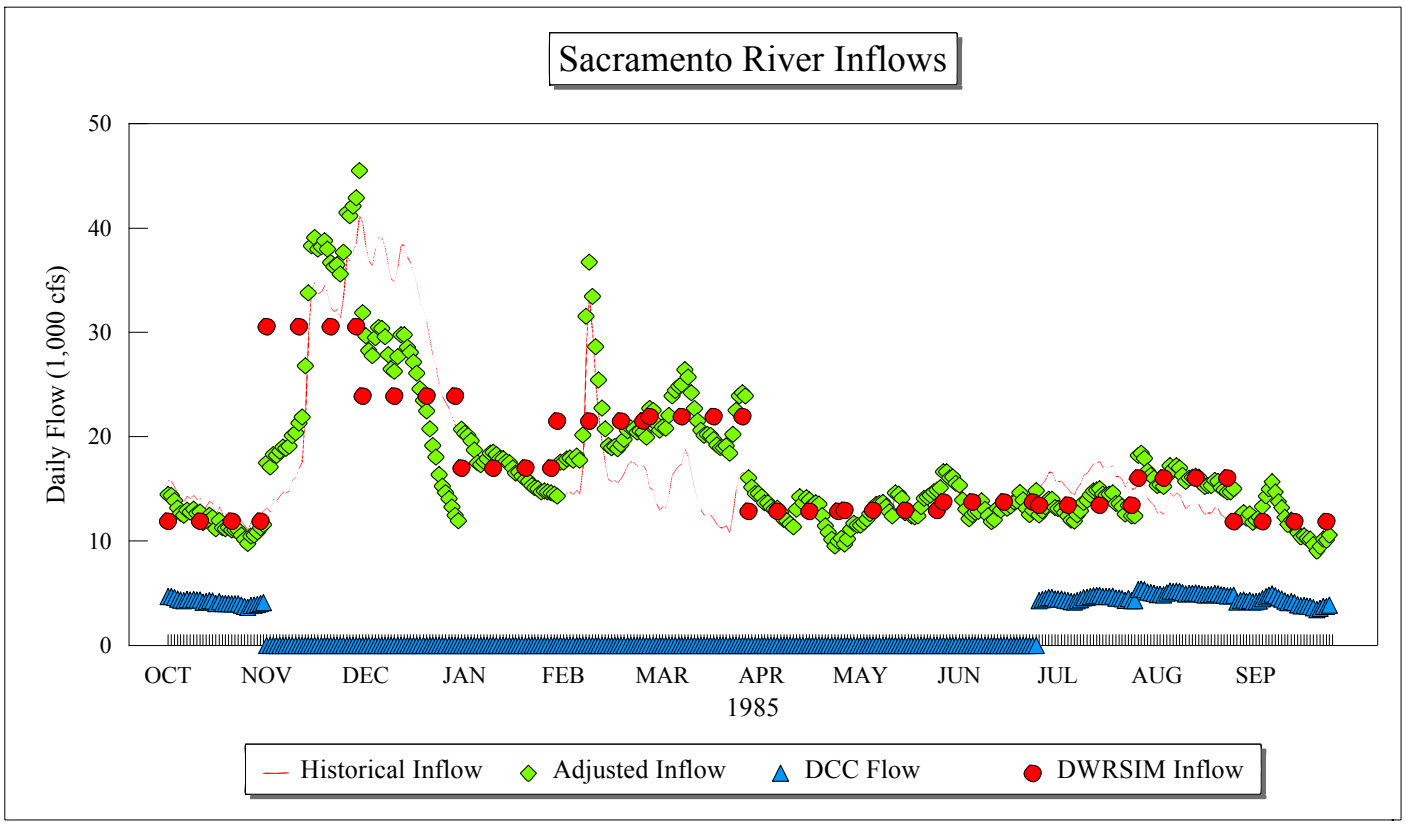
Figure 3A-30
Simulated Annual Delta Wetlands Diversion and Export Volumes Limited by South-of-Delta Delivery Deficits



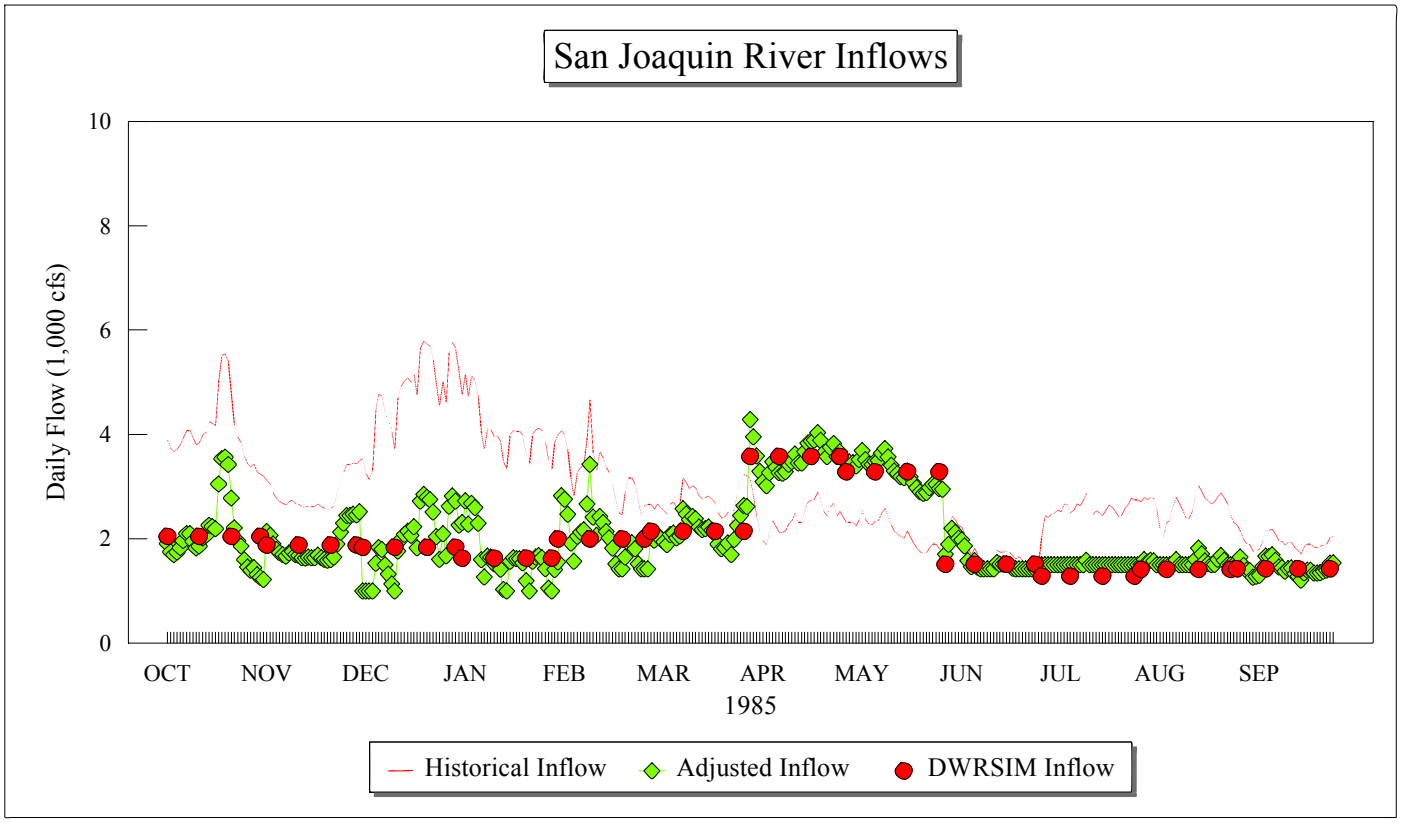


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Figure 3A-31
Daily Adjusted Sacramento and San Joaquin River Inflows for Simulating Delta Wetlands Final Operations Criteria for 1985

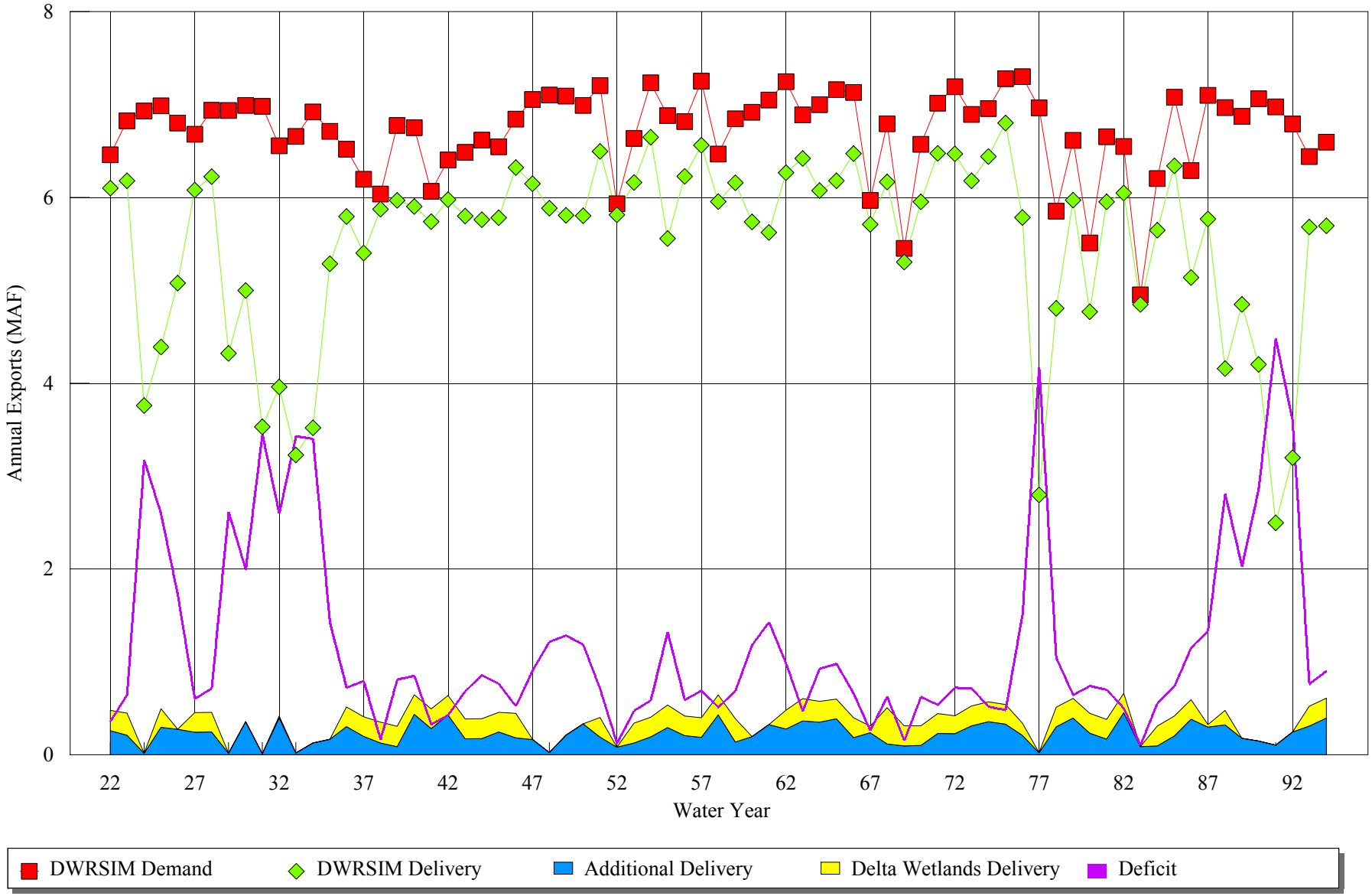

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Figure 3A-32
Simulated Annual Delta Demands and Deliveries under Cumulative Conditions