CALFED Bay-Delta Program
CALFED Water Management Modeling

A Status Report on System Modeling Using DWRSIM

Hydrology and Operations Section
Modeling Support Branch
Office of State Water Project Planning
Department of Water Resources, Sacramento
California
July 30, 1999

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Modeling Support Branch
George W. Barnes, Chief

This report was prepared under the direction of
Sushil K. Arora, Chief
Hydrology and Operations Section

By

Tirath Pal Sandhu, Operation Studies Unit Chief
With Contribution from
Hamid Kharazi, Engineer, W.R.
Solomon Mesghina, Engineer, W.R.
Amarjot K. Bindra, Assistant Engineering Specialist

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A Status Report on DWRSIM Model Studies

1. Introduction

The main objective of the water management model studies is to determine ways to enhance water supply reliability and also provide for other beneficial uses of water including environmental and water quality needs in the Bay-Delta system. Several DWRSIM Modeling studies have been completed for the Calfed Bay-Delta Program. These studies were conducted for either the initial PEIS/EIR impact analysis or other Calfed activities, such as Interagency Development Team or the Diversion Effects on Fisheries Team discussions. New modeling studies presented in this report have been conducted to update and expand the Calfed impact analysis for short term and long term solutions. Calfed program alternatives have been evaluated under two water management options, low or high Delta export management. Also, several supporting studies have been conducted to enhance water quality of drinking water supplies, assess implications of changes in demand and environmental requirements and ecosystem restoration program. Preferred Program Alternative has been studied to allow for more efficient use of water for environmental purposes and decrease the conflict in uses of the Bay-Delta supplies. In this alternative, additional operational flexibility has been applied to system operations to enhance water supply reliability and also meet other water management objectives in the Delta. Results of these studies have been incorporated in the June, 1999 Calfed Revised Programmatic Environmental Impact Statement/Environmental Impact Report.

This brief report presents status of DWRSIM model studies activities since last report of November 24, 1998. The following information is included in this report.

1. Recent changes to the DWRSIM Model required to meet low and high water management criteria.

2. List of Completed DWRSIM Model studies along with key assumptions.

3. Evaluation of Impacts for No Action, Alternatives 1, 2 and 3, Preferred Alternative, Demand Reduction and Environmental Requirements studies, Water Quality enhancement studies and ERP studies.

4. Summary Tables with information on effects on Delta exports, system deliveries, reservoir storages and Delta outflows.

Details of study assumptions, inputs and results for these studies are also available on the DWR's Hydrology and Operations Section home page at the URL;

http://www.hydro.water.ca.gov/calfed.html

Study results in terms of water supply benefits to State Water Project and Central Valley Project deliveries, are presented in Tables 1 and 2. Impacts on reservoir storages and Delta outflows are given in Tables 3 and 4. Water Supply Impacts in terms of changes in exports and storages for these studies, are presented in Tables 8 to 49 in a Delta water balance format, both for critically dry period of 1928-1934 and long-term period of 1922-1994. Key results from selected studies are also presented in several graphs and charts. An updated DWRSIM Network Diagram is included in Figures 30 to 34.

2. DWRSIM MODEL CHANGES

The following changes have been made in the DWRSIM model.

2.1 Network Schematic

Network Schematic has been updated with changes to the American River and Sacramento River configuration. These changes include the latest American River Water Forum Agreement changes in demand and revisions to hydrology.

2.2 Water Management Criteria

New DWRSIM Version includes Low and High Water Management Criteria. Model updates for new criteria are as follows.

Prescriptive Actions

Under the Low Water Management operations, new prescriptive actions related to 61 day Vernalis Adaptive Management Plan export restrictions, Qwest and 10 day reductions in export, have been modelled. 61 day VAMP imposes export restrictions for all of April and May instead of April 15 – May 15. The VAMP flow requirement implementation is unchanged. In Qwest standard implementation, a new user option has been added to modify the Qwest standard based on the 4 and 8 River Index values. 10 day February export reduction user option allows restriction based on January Vernalis flow.

Transfer Facility Operation

The Isolated Facility or Through Delta Transfer Hood Diversion Facility can be operated to maximize water quality for Low Water Management option or maximize water supply for High Water Management option. If operated for maximum water quality, the maximum amount will be diverted into the through Delta Facility regardless of the increase in additional upstream release required to meet Rio Vista and other Delta Standards.

2.3 Water Quality Criteria

A special water quality operation was developed for Water Quality studies. Pumping restrictions are imposed on Banks and Tracy based on salinity of the Delta waters.

2.4 San Joaquin River Operations

Revisions to San Joaquin operations were done for pulse flow requirements, water quality and ERP flows modeling. Tuolumne minimum pulse flow requirements per FERC Agreement, have been coincided with VAMP flows during the April and May pulse period.

2.5 Power Operations

New subroutines have been added for CVP and SWP Power Operations related to energy consumption and power generation.

3. DWRSIM MODEL STUDIES AND ASSUMPTIONS

3.1 General

The following assumptions apply to all studies.

1. Meet 1995 WQCP Bay-Delta Accord Standards, no minimum flows at Vernalis, including the pulse flows, are imposed. Instead, alternative flow and export requirements are imposed as discussed under CVPIA(b)(2) Delta Action 1. Assumptions for the WQCP Bay-Delta Accord are given in Appendix A.

2. The following AFRP CVPIA(b)(2) Actions per November 20, 1997 AFRP Document are included.

   A. AFRP Upstream Flows
   - Clear Creek
   - Keswick
   - Nimbus

   B. AFRP Delta Actions
   - Delta Action 1 - Vernalis Adaptive Management Plan Flows (VAMP) and export reduction.
   - Delta Action 3 - Additional X2 days at Chipps Island from March to June.
   - Delta Action 4 - Maintain Sacramento River flows at Freeport from 9,000 to 15,000 cfs.
   - Delta Action 5 - Ramping of Delta Exports during May.
   - Delta Action 6 - Close Delta Cross Channel gates in October through January in all water year types.
   - Delta Action 7 - July flows and exports based on X2 position in June.

Stanislaus River operations have changed with the New Melones Interim Operation Plan. Tuolumne minimum pulse flow requirements per FERC Agreement, have been coincided with VAMP flows during the April and May pulse period.

3.2 EXISTING CONDITIONS STUDY

1. Existing Conditions Study: 1995d06e-calfed-771

   A. 1995 Level of Hydrology HYD-D06E with updated American River demands from Sacramento Water Forum.

   B. 1995 Level of Development Water Demands.

- South of Delta SWP Demand varies from 2,644 to 3,529 TAF/year.
- Maximum SWP Interruptible Demand is 84 TAF/month.
- South of Delta CVP demand including Level II Refuge demand of 288 TAF/year is 3,433 TAF/year.

C. No SWP Wheeling for CVP.

D. Trinity River Minimum Fish flows below Lewiston Dam are maintained at 340 TAF/year.

3.3 NO ACTION STUDIES

1. No Action - Low Water Management Criteria Study 2020d09c-calfed-785

A. 2020 Level of Hydrology HYD-D09C with updated American River demands from Sacramento water Forum.

B. 1995 Level of Development Water Demands.
- South of Delta SWP Demand varies from 2,644 to 3,529 TAF/year.
- Maximum SWP Interruptible Demand is 84 TAF/month.
- South of Delta CVP demand including Level II Refuge demand of 288 TAF/year is 3,433 TAF/year.
- 128 TAF/year SWP Wheeling for CVP.
- New EBMUD American River Diversion as a Supplemental Water supply of 115 TAF/year is included.

C. Prescriptive Delta Actions:
- If the January SJR flow at Vernalis is greater than the upper 25 percentile (about 4,150 cfs), reduce exports for 10 days in February to 1,100 cfs.
- In February and March a minimum Qwest of 1,000 cfs is maintained if the January 8 River runoff is < 1.0 MAF. If the January 8 River runoff is > 1.0 MAF, a minimum Qwest of 0 cfs is maintained.
- A minimum Qwest of 0 cfs is maintained in December and January if the Nov. 4 - River runoff is > 1.1 MAF. Additionally, if the Dec. 4 - River runoff is between 0.75 and 1.3 MAF, a minimum Qwest of 0 cfs is maintained in January.
- In April through June, a minimum Qwest of 1,000 cfs is maintained.
- VAMP exports criteria is extended to 61 days in April and May.

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D. Additional Prescriptive Action (Upstream of Delta):

- Trinity River Minimum Fish flows below Lewiston Dam are modeled per USBR Draft CVPIA PEIS (390-750 TAF/year).

2. No Action - Low Water Management Criteria Study 2020d09c-calfed-785S

Study 785 No Action - Low Water Management Criteria is modified.

- CVP unmet demand is included as Surrogate Demand for SWP.

3. No Action - High Water Management Criteria Study 2020d09c-calfed-786

A. 2020 Level of Hydrology HYD-D09C with updated American River demands from Sacramento Water Forum.

B. 2020 Level of Development Water Demands

- South of Delta SWP Demand varies from 3.4 to 4.2 MAF/year. Maximum SWP Interruptible Demand is 134 TAF/month.
- South of Delta CVP demand is 3.5 MAF/year including Level II Refuge demand of 288 TAF/year.
- New EBMUD American River Diversion as a Supplemental Water supply of 115 TAF/year is not included.
- 128 TAF/year SWP Wheeling for CVP.

4. No Action - High Water Management Criteria Study 2020d09c-calfed-786S

Study 786 No Action - High Water Management Criteria is modified.

- CVP unmet demand is included as Surrogate Demand for SWP.

3.4 ALTERNATIVE 1 STUDIES

Common Assumptions to Alternatives 1, 2, 3 and Preferred Alternatives

- CVP unmet demand is included as Surrogate Demand for SWP.
- All Program Alternatives include Ecosystem Restoration Program (ERP) flow targets assumed in the CALFED System Operation Modeling Plan Report dated August 21, 1997. Flow targets are showing in the following table.

Sacramento-San Joaquin Delta Outflow (CFS)-March-10 Days					
Year Type	Wet	Above Normal	Below Normal	Dry	Critical
40-30-30	0	40,000	30,000	20,000	0
Sacramento-San Joaquin Delta Outflow (CFS)-May-10 Days					
Year Type	Wet	Above Normal	Below Normal	Dry	Critical
60-20-20	0	40,000	30,000	20,000	0
Sacramento-Freeport Flow (CFS)-May-All Days					
Year Type	Wet	Above Normal	Below Normal	Dry	Critical
40-30-30	13,000	13,000	13,000	13,000	0
Sacramento-Knights Landing (CFS)-March-10 Days					
Year Type	Wet	Above Normal	Below Normal	Dry	Critical
40-30-30	0	17,500	17,500	7,500	0
Feather-Gridley (CFS)-March-10 Days					
Year Type	Wet	Above Normal	Below Normal	Dry	Critical
40-30-30	0	9,000	7,000	5,000	0
Yuba-Marysville (CFS)-March-10 Days					
Year Type	Wet	Above Normal	Below Normal	Dry	Critical
40-30-30	0	3,500	3,500	2,500	0
American-Nimbus Dam (CFS)-March-10 Days					
Year Type	Wet	Above Normal	Below Normal	Dry	Critical
40-30-30	7,000	5,000	5,000	3,500	0
Stanislaus-Goodwin Dam (CFS)-May-10 Days					
Year Type	Wet	Above Normal	Below Normal	Dry	Critical
60-20-20	3,500	2,750	2,750	0	0
Tuolumne-La Grange (CFS)-May-10 Days					
Year Type	Wet	Above Normal	Below Normal	Dry	Critical
60-20-20	5,500	3,750	3,750	2,750	0
Merced-Shaffer Bridge (CFS)-May-10 Days					
Year Type	Wet	Above Normal	Below Normal	Dry	Critical
60-20-20	3,750	2,250	2,250	1,250	0

All Alternative 1 studies assume South Delta Improvements in place.

1. Alternative 1 - Low Water Management Criteria with no Storage Study 2020d09c-calfed-789

   Study 785S No Action - Low Water Management criteria is modified.
   - JPOD: Assume full and unlimited joint point of diversion. SWP wheels for the CVP whenever unused capacity at Banks Pumping Plant is available.
   - Banks Pumping capacity increased to 10,300 cfs (ISDP) in accordance with USACE October 31, 1981 Public Notice criteria modified from an existing 8,500 maximum to 10,300 cfs maximum from December 15 to March 15.

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2. Alternative 1 - High Water Management Criteria with Storage Study 2020d09c-calfed-801

Study 786S - High Water Management criteria is modified.

A. JPOD: Assume full and unlimited joint point of diversion. SWP wheels for the CVP whenever unused capacity at Banks Pumping Plant is available.

B. Banks Pumping capacity increased to 10,300 cfs (ISDP). No restriction related to the USACE October 31, 1981 Public Notice criteria.

C. New storages north and south of Delta are as follows:
- North of Delta Groundwater storage is 250 TAF with inlet and outlet capacities of 500 cfs.
- South of Delta Groundwater storage is 500 TAF with inlet and outlet capacities of 500 cfs.
- Sacramento River tributary storage for North Delta Surface Storage (NDSS) is 2 MAF and North Delta Environmental Storage (NDES) is 1 MAF. There is no minimum Sacramento River flow condition restriction for diversion. Inflow and outflow channel capacities are limited to 5,000 cfs.
- San Joaquin Basin Surface Storage (SBJSS) is 260 TAF. Diversion capacity for Merced River is 2,000 cfs and is 1,000 cfs for Tuolumne River.
- Off Aqueduct surface storage for LBG is 2.0 MAF with inlet and outlet capacities of 3,500 cfs.

3. Alternative 1 - Low Water Management Criteria with Storage Study 2020d09c-calfed-808

Alternative 1 (South Delta Improvements) - Low Water Management Criteria with no storage Study 789 is modified.

A. New storages north and south of Delta are as follows.
- North of Delta Groundwater storage is 250 TAF with inlet and outlet capacities of 500 cfs.
- South of Delta Groundwater storage is 500 TAF with inlet and outlet capacities of 500 cfs.
- Sacramento River tributary storage for North Delta Surface Storage (NDSS) is 2 MAF and North Delta Environmental Storage (NDES) is 1 MAF. Sacramento River minimum flow of 20,000 cfs is a condition restriction for diversion. Inflow and outflow channel capacities are limited to 5,000 cfs.

- San Joaquin Basin Surface Storage (SBJSS) is 260 TAF. Diversion capacity for Merced River is 2,000 cfs and is 1,000 cfs for Tuolumne River.
- Off Aqueduct surface storage for LBG is 2.0 MAF with inlet and outlet capacities of 3,500 cfs.

4. Alternative 1 - High Water Management Criteria with no Storage Study 2020d09c-calfed-809

No Action - High Water Management Criteria Study 786S is modified.

- JPOD: Assume full and unlimited joint point of diversion. SWP wheels for the CVP whenever unused capacity at Banks Pumping Plant is available.
- Banks Pumping capacity increased to 10,300 cfs (ISDP). No restriction related to the USACE October 31, 1981 Public Notice criteria.

3.5 ALTERNATIVE 2 STUDIES

All Alternative 2 studies assume through Delta transfer Hood Diversion facility.

1. Alternative 2 (10K Hood) - Low Water Management Criteria with no Storage Study 2020d09c-calfed-790

Study 789 for Alternative 1- Low Water Management Criteria with South Delta Improvements and no Storage is modified.

A. Diversion into the 10,000 cfs Hood Facility is governed by the following operations criteria.
   - Maximum Hood Diversion of 5,000 cfs in May.
   - In March of all years the allowable diversion is 35% of Sacramento River flow.
   - Maximum allowable diversion in April and May for wet, above normal and below normal years is 15% of Sacramento River flow.
   - Maximum Hood Diversion for June is 35% of Sacramento River flow for all years.
   - In all other months maximum diversion is 65% of Sacramento River flow.
   - Maximum diversion through Hood are also limited to 50% of the south of Delta export.

B. Rio Vista flow criteria of 3,000 cfs in July and August.

C. Delta Cross Channel gates are closed for all months except in June for dry, critical and below normal year types when gates are open.

2. Alternative 2 (10K Hood) - High Water Management Criteria with Storage Study 2020d09c-calfed-803

Alternative 1 - High Water Management Criteria with Storage Study 801 is modified.

A. Diversion into the 10,000 cfs Hood Facility is governed by the following operations criteria.
   - Maximum Hood Diversion of 5,000 cfs in May.
   - Maximum diversions through Hood are also limited to 100% of the south of Delta exports.
   - The Hood Diversion is included in export ratio.
   - In addition Hood is operated to maximize water supply.

B. Rio Vista flow criteria of 3,000 cfs in July and August.

C. Delta Cross Channel gates are closed, except for July and August.

D. A minimum through Delta conveyance is 1,000 cfs for October through March and July through September and no diversion from April to June.

Alternative 2 (10K Hood) - Low Water Management Criteria with Storage Study 2020d09c-calfed-810

Alternative 2 (10K Hood) - Low Water Management Criteria with no Storage Study 790 is modified.

A. New storages north and south of Delta are as follows.
   - North of Delta Groundwater storage is 250 TAF with inlet and outlet capacities of 500 cfs.
   - South of Delta Groundwater storage is 500 TAF with inlet and outlet capacities of 500 cfs.
   - Sacramento River tributary storage for North Delta Surface Storage (NDSS) is 2 MAF and North Delta Environmental Storage (NDES) is 1 MAF. Sacramento River minimum flow of 20,000 cfs is a condition restriction for diversion. Inflow and outflow channel capacities are limited to 5,000 cfs.
   - San Joaquin Basin Surface Storage (SBJSS) is 260 TAF. Diversion capacity for Merced River is 2,000 cfs and is 1,000 cfs for Tuolumne River.
   - Off Aqueduct surface storage for LBG is 2.0 MAF with inlet and outlet capacities of 3,500 cfs.

Alternative 2 (10K Hood) - High Water Management Criteria with no Storage Study 2020d09c-calfed-811

Alternative 1 - High Water Management Criteria with no Storage Study 809 is modified.

A. Diversion into the 10,000 cfs Hood Facility is governed by the following operations.
   - Maximum Hood Diversion of 5,000 cfs in May.
   - Maximum diversions through Hood are also limited to 100% of the south of Delta exports.
   - The Hood Diversion is included in export ratio.
   - In addition Hood is operated to maximize water supply.

B. Rio Vista flow criteria of 3,000 cfs in July and August.

C. Delta Cross Channel gates are closed, except for July and August.

3.6 ALTERNATIVE 3 STUDIES

All Alternative 3 studies assume Isolated Facility (IF) in place.

1. Alternative 3 (5K IF) - High Water Management Criteria with Storage Study 2020d09c-calfed-791

Study 786S No Action - High Water Management Criteria is modified.

A. JPOD: Assume full and unlimited joint point of diversion. SWP wheels for the CVP whenever unused capacity at Banks Pumping Plant is available.

B. Banks Pumping capacity increased to 10,300 cfs. No restriction related to the USACE October 31, 1981 Public Notice criteria.

C. Diversion into the 5,000 cfs IF is governed by the following operations criteria.
   - In March of all years, allowable diversion is 35% of Sacramento River flow.
   - In April and May of wet, above normal and below normal years, maximum is 15% of Sacramento River flow.
   - In June for all years maximum diversion is 35% of Sacramento River flow.
   - In all other months maximum diversion is 65% of Sacramento River flow.
   - IF is not included in export restrictions.
   - In addition IF is operated to maximize water supply.

D. Rio Vista flow criteria of 3,000 cfs in July and August.

E. Delta Cross Channel gates are closed, except for July and August.

F. A minimum through Delta conveyance is 1,000 cfs for October through March and July through September and no diversion from April to June.

G. New storages north and south of Delta are as follows:
- North of Delta Groundwater storage is 250 TAF with inlet and outlet capacities of 500 cfs.
- South of Delta Groundwater storage is 500 TAF with inlet and outlet capacities of 500 cfs.
- Sacramento River tributary storage for North Delta Surface Storage (NDSS) is 2 MAF and North Delta Environmental Storage (NDES) is 1 MAF. There is no minimum Sacramento River flow condition restriction for diversion. Inflow and outflow channel capacities are limited to 5,000 cfs.
- San Joaquin Basin Surface Storage (SBJSS) is 260 TAF. Diversion capacity for Merced River is 2,000 cfs and is 1,000 cfs for Tuolumne River.
- Off Aqueduct surface storage at LBG is 2.0 MAF with inlet and outlet capacities of 3,500 cfs.

2. Alternative 3 (10K IF) - Low Water Management Criteria with no Storage Study 2020d09c-calfed-794

Study 790 10K Hood with Low Water Management criteria is modified.

A. Diversion into the 10,000 cfs IF is governed by the following criteria.
- Maximum IF Diversion of 5,000 cfs in May.
- In all other months maximum diversion is 65% of Sacramento River flow.
- The IF conveyance is included in export restrictions.
- A minimum through Delta conveyance is 1,000 cfs for October through March and July through September and no diversion from April to June.

B. Delta Cross Channel gates are closed, except for June in below normal, dry and critical year types and July and August for all years.

3. Alternative 3 (15K IF) - Low Water Management Criteria with no Storage Study 2020d09c-calfed-804

Isolated Facility capacity in Alternative 3 (10K IF) - Low Water Management Criteria with no Storage Study 794 is modified to 15,000 cfs. In addition, Level II Delta Agriculture Diversions are delivered from Isolated Facility.

4. Alternative 3 (15K IF) - High Water Management Criteria with Storage Study 2020d09c-calfed-805

Alternative 3 (5K IF) - High Water Management Criteria with Storage

Study 791 is modified for the 15,000 cfs Isolated Facility Diversion.

5. Alternative 3 (10K IF) - High Water Management Criteria with Storage Study 2020d09c-calfed-806

Alternative 3 (5K IF) - High Water Management Criteria with Storage Study 791 is modified for the 10,000 cfs Isolated Facility Diversion.

6. Alternative 3 (5K IF) - Low Water Management Criteria with no Storage Study 2020d09c-calfed-807

Alternative 3 (10K IF) - Low Water Management Criteria with No Storage Study 794 is modified for the 5,000 cfs Isolated Facility Diversion.

7. Alternative 3 (15K IF) - Low Water Management Criteria with Storage Study 2020d09c-calfed-812

Alternative 3 (15K IF) - Low Water Management Criteria with no Storage Study 804 is modified.

A. New storages north and south of Delta are as follows.
- North of Delta Groundwater storage is 250 TAF with inlet and outlet capacities of 500 cfs.
- South of Delta Groundwater storage is 500 TAF with inlet and outlet capacities of 500 cfs.
- Sacramento River tributary storage for North Delta Surface Storage (NDSS) is 2 MAF and North Delta Environmental Storage (NDES) is 1 MAF. Sacramento River minimum flow of 20,000 cfs is a condition restriction for diversion. Inflow and outflow channel capacities are limited to 5,000 cfs.
- San Joaquin Basin Surface Storage (SBJSS) is 260 TAF. Diversion capacity for Merced River is 2,000 cfs and is 1,000 cfs for Tuolumne River.
- Off Aqueduct surface storage for LBG is 2.0 MAF with inlet and outlet capacities of 3,500 cfs.

8. Alternative 3 (15K IF) - High Water Management Criteria with no Storage Study 2020d09c-calfed-813

Alternative 1 - High Water Management Criteria with no Storage Study 809 is modified.

A. Diversion into the 15,000 cfs IF is governed by the following operations criteria.
- In March of all years, allowable diversion is 35% of Sacramento River flow.

- In April and May of wet, above normal and below normal years, maximum is 15% of Sacramento River flow.
- In June for all years maximum diversion is 35% of Sacramento River flow.
- In all other months maximum diversion is 65% of Sacramento River flow.
- IF is not included in export restrictions.
- In addition IF is operated to maximize water supply.

B. Rio Vista flow criteria of 3,000 cfs in July and August.

C. Delta Cross Channel gates are closed, except for July and August.

D. A minimum through Delta conveyance is 1,000 cfs for October through March and July through September and no diversion from April to June.

9. Alternative 3 (10K IF) - Low Water Management Criteria with Storage Study 2020d09c-calfed-817

Isolated Facility capacity in Alternative 3 (15K IF) - Low Water Management Criteria with Storage Study 812 is modified to 10,000 cfs. In addition, Delta Agricultural Use requirements are met from through Delta channels and not from IF.

10. Alternative 3 (10K IF) - High Water Management Criteria with no Storage Study 2020d09c-calfed-818

Isolated Facility capacity in Alternative 3 (15K IF) - High Water Management Criteria with no Storage Study 813 is modified to 10,000 cfs.

11. Alternative 3 (5K IF) - Low Water Management Criteria with Storage Study 2020d09c-calfed-819

Isolated Facility capacity in Alternative 3 (10K IF) - Low Water Management Criteria with Storage Study 817 is modified to 5,000 cfs.

12. Alternative 3 (5K IF) - High Water Management Criteria with no Storage Study 2020d09c-calfed-820

Isolated Facility capacity in Alternative 3 (10K IF) - High Water Management Criteria with no Storage Study 818 is modified to 5,000 cfs.

3.7 Preferred Alternative Studies

1. Preferred Alternative (4K Hood) - High Water Management Criteria with Storage Study 2020d09c-calfed-792

Study 791 Alternative 3 (5K IF) - High Water Management Criteria with storage study is modified.

Diversion into the 4,000 cfs Hood Facility is governed by the following criteria.

- There is no limit on maximum Hood diversion related to the Sacramento River flow.
- The Hood diversions is limited to 100% of the south of Delta exports.
- The Hood diversion is included in export ratio.
- In addition Hood is operated to maximize water supply.

2. Preferred Alternative (2K Hood) - Low Water Management Criteria with no Storage Study 2020d09c-calfed-793

In Study 790 Alternative 2 - Low Water Management Criteria Hood Facility capacity is modified to 2,000 cfs.

3. Preferred Alternative (2K Hood) - Low Water Management Criteria with Storage Study 2020d09c-calfed-821

Preferred Alternative (2K Hood) - Low Water Management Criteria with no Storage Study 793 is modified.

A. New storages north and south of Delta are as follows:

- North of Delta Groundwater storage is 250 TAF with inlet and outlet capacities of 500 cfs.
- South of Delta Groundwater storage is 500 TAF with inlet and outlet capacities of 500 cfs.
- Sacramento River tributary storage for North Delta Surface Storage (NDSS) is 2 MAF and North Delta Environmental Storage (NDES) is 1 MAF. Sacramento River minimum flow of 20,000 cfs is a condition restriction for diversion. Inflow and outflow channel capacities are limited to 5,000 cfs.
- San Joaquin Basin Surface Storage (SBJSS) is 260 TAF. Diversion capacity for Merced River is 2,000 cfs and is 1,000 cfs for Tuolumne River.
- Off Aqueduct surface storage for LBG is 2.0 MAF with inlet and outlet capacities of 3,500 cfs.

4. Preferred Alternative (4K Hood) - High Water Management Criteria with no Storage Study 2020d09c-calfed-822

Alternative 3 (5K IF) - High Water Management Criteria with no Storage Study 820 is modified by replacing 5,000 cfs Isolated Facility Diversion with 4,000 cfs Hood Diversion. Hood Diversion is included in export ratio.

3.8 NO ERP STUDIES

1. Alternative 1 - High Water Management Criteria with Storage Study 2020d09c-calfed-839

   Alternative 1 High Water Management criteria Study 801 is modified with no ERP.

2. Alternative 1 - High Water Management Criteria with no Storage Study 2020d09c-calfed-840

   Alternative 1 High Water Management Criteria with no Storage Study 809 is modified with no ERP

3. Alternative 1 - Low Water Management Criteria with no Storage Study 2020d09c-calfed-841

   Alternative 1 Low Water Management Criteria with no Storage Study 789 is modified with no ERP

4. Alternative 1 - Low Water Management Criteria with Storage Study 2020d09c-calfed-842

   Alternative 1 Low Water Management Criteria with Storage Study 808 is modified with no ERP

3.9 WATER QUALITY STUDIES

1. Existing Conditions with Water Supply Measures Study 1995d06e-calfedwq-848

   Existing conditions Study 771 is modified as follows:
   - JPOD: Assume full and unlimited joint point of diversion. SWP wheels for the CVP whenever unused capacity at Banks Pumping Plant is available.
   - Banks Pumping capacity increased to 8500 cfs.
   - South of Delta 300 TAF Kern Water Bank with 20 TAF/month recharge and extraction capability.

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2. Existing Conditions with Water Supply Measures and Increased MRDO Study 1995d06e-calfedwq-852

Study 848 is modified as follows:

- Minimum required Delta outflow increased by 1300 cfs from August to October and increased by 1000 cfs from November to December.

3. Existing Conditions with Water Supply Measures, Increased MRDO & Hood Diversion Study 1995d06e-calfedwq-853

Study 852 is modified as follows:

- Through Delta Facility 2000 cfs Hood Diversion operation
- No changes to Delta Cross Channel operations
- Maintain a 3000 cfs minimum Rio Vista flow
- No diversion limitations due to CVP/SWP exports.

4. Existing Conditions with Water Supply Measures and Hood Diversion Study 1995d06e-calfedwq-870

Study 848 is modified to include 2000 cfs Hood Diversion.

3.10 DEMAND REDUCTION AND ENVIRONMENTAL REQUIREMENTS STUDIES

1. Existing Conditions 6 MAF Study 1995d06e-calfed-857

Study 771 is modified with total CVP plus SWP demand of 6.0 MAF. Demand reduction to be distributed equally among all water usres.

2. Existing Conditions 6 MAF Demand with Prescriptive Actions Study 1995d06e-calfed-858

Study 857 is modified to include all Delta prescriptive standards.

3. Existing Conditions 6 MAF Demand with Prescriptive Actions and Storage Study 1995d06e-calfed-859

Study 858 is modified with addition of 4.75 MAF storage facilities.

4. Existing Conditions with New Trinity Flow Requirements Study 1995d06e-calfed-860

Existing conditions Study 771 is modified to include new Trinity minimum flow requirements of maximum 750 TAF.

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5. Existing Conditions with New EBMUD Demand Requirements Study 1995d06e-calfed-861

Existing conditions Study 771 is modified to include new EBMUD American River Diversion as a Supplemental Water supply of 115 TAF/year.

6. Existing Conditions with Prescriptive Standards Study 1995d06e-calfed-862

Existing conditions Study 771 is modified to include Delta Prescriptive Standards.

7. Existing Conditions 4 MAF Study 1995d06e-calfed-881

Study 771 is modified with total CVP plus SWP demand of 4.0 MAF. Demand reduction to be distributed equally among all water users.

8. Existing Conditions 2 MAF Study 1995d06e-calfed-882

Study 771 is modified with total CVP plus SWP demand of 2.0 MAF. Demand reduction to be distributed equally among all water users.

4. EVALUATION OF IMPACTS

Impacts are presented under each group of studies based on the study objective. Low Water Management Studies had prescriptive actions imposed to increase flows in the Delta and new Delta operations cause reduction of exports in February, increase Qwest flows and reduce South of Delta exports by extending the VAMP exports criteria to 61 days in April and May. High Water Management Studies were conducted to maximize water supply benefits to both the SWP and CVP systems South of the Delta. In Water Quality Studies operation rules were specifically designed to enhance water quality mainly for urban contractors. Export operations were curtailed during high salinity periods and newly proposed water supply measures such as JPOD, increased Banks capacity and Kern Water Bank, were used to offset impacts to water supply. Implications of changes in system demand and environmental requirements were assessed in Demand Reduction and Environmental Requirement Studies. To evaluate impacts of including ERP in previous studies, a set of studies without ERP were conducted.

Using a specified study criteria, No Action, three alternatives and the Preferred Alternative were evaluated in comparison to the assumed base condition depending on the level of development. The following effects on the SWP and CVP systems and the Delta were considered as a result of implementation of changes in existing system operations or addition of new facilities.

1. Change in Delta conditions such as Delta inflow, Qwest, minimum required Delta outflow, the total Delta outflow and salinity position (X2 location)

2. End of September carryover storage in reservoirs North and South of the Delta

3. Impacts on stream flows

4. Changes in water supply in terms of effect on SWP and CVP south of Delta exports and system deliveries including long-term reliability of water supplies.

5. Water supply Impacts for overall system response for North and South of Delta, Delta and the San Joaquin River.

Water Supply Impacts for all studies in terms of changes in exports and storages, are presented in Tables 8 to 49 in a Delta water balance format, both for critically dry period of 1928-1934 and long-term period of 1922-1994. All other evaluations are discussed as follows.

4.1 LOW AND HIGH WATER MANAGEMENT STUDIES

1. Existing and No Action studies Impacts

A comparison of total SWP and CVP system deliveries for Existing and No Action conditions under Low and High Water Management scenarios are given in Tables 1 and 2. Reliability of water supplies for these conditions is also presented as a variation of deliveries percent of the time below or above a certain value as illustrated in Figure 1. The results indicate higher reliability of supplies for High Water Management No Action Study 786 than Low Water Management No Action Study 785.

Effect of prescriptive actions namely Qwest, reduction in February exports, 61 days VAMP criteria and additional Rio Vista flow standards, are shown as percent of the time these actions impact exports during the months of December to June (Figure 2). Other times there are additional controls such as export ratio, pumping limitations, storage space available in san Luis, surplus and aqueduct capacity. Impact of prescriptive actions during December to January is indicated by increase in delta outflows for Study 785 under Low Water Management criteria shown on year type graphs in Figure 3. Critical and dry years indicate larger change in Delta outflow.

2. Impacts of Future Facilities

Low and High Water Management conditions were evaluated with new facilities. Water supply impacts in terms of system deliveries are presented in Tables 1 and 2. As presented in tables 10 to 33, water supply impacts are given in comparison to studies 785s and 786s. Comparison of system operations under Low and High Water management scenarios are given in Tables 3 and 4. With prescriptive actions, CVP exports are generally lower than the base. Qwest results indicate High Water Management studies overall show negative Qwset values, whereas, the prescriptive actions result in Positive Qwest. Changes in minimum required Delta outflow are more pronounced with prescriptive actions than High Water management studies. Also, water supply maximization studies provide more Delta outflow which is clear from changes to Delta outflow given in Table 4 for High Water Management studies.

Total system exports for Alternative 3 with Isolated facility capacities of 5,000 cfs, 10,000 cfs and 15,000 cfs, with and without storages are shown in Figure 4. The variation of exports for different sizes for both critaria is small. The same is true in case of system deliveries as shown in Figure 5. Isolated Facility diversion impact on minimum required Delta outflow for High and Low criteria is shown in Figures 6 and 7. In prescriptive action studies, minimum required Delta outflow increases with size of the facility. However, under High criteria, size has no or minimal effect as shown in Figure 7. On the other hand, Hood diversion size with both high and low conditions and irrespective of whether for Alternative 2 or the Preferred Alternative, has little impact on the minimum required Delta outflow as shown in Figures 8 and 9.

Water supply reliability of the Preferred Alternative under high and low conditions shown in Figure 10 indicates higher level of system delivery is possible with water supply maximization. However, prescriptive actions increase Delta outflow for the Preferred Alternative and this is demonstrated by graphs for different year types in Figure 11.

4.2 Ecosystem Restoration Program (ERP)

The Ecosystem Restoration Program (ERP) sets flow targets on various rivers in the Sacramento – San Joaquin River Basins and the Delta. These targets may be met either by purchasing water from willing sellers or environmental water may be released from the proposed North of Delta Environmental Storage (NDES), and the San Joaquin River Surface Storage (SJRSS) facilities.

When additional flows are needed to meet ERP targets, they will come first from upstream ERP storage releases and then water available from willing sellers. ERP water can not be used for any other purpose; the water must flow to the ocean as Delta outflow.

The following items as listed below are re-computed after the ERP requirements are imposed.

- Environmental NDSS and SJRSS storage, fill and releases.
- Stream flows upstream of the Delta affected by ERP operations.
- Interior Delta flows such as Cross Channel, QWEST, etc.
- Final computed Delta salinity at various locations.
- X2 position.
- Vernalis salinity.

The recent studies indicate that implementation of ERP impacts the salinity and X2 position in the Delta by increasing the total Delta outflow. After conducting more detailed investigations by comparing DWRSIM studies with and without ERP, it was found that in ERP studies with all storages, the differences in total Delta outflow for dry period and long-term period increased by about 200TAF. Whereas with ERP and no storages, the differences in the outflow for dry period was about 200 TAF and long-term increase was about 300 TAF (Table 5). As a result of an increase in the total Delta outflow from ERP implementation, X2 position moves further downstream by near 0.2 KM (Table 5). This may be the reason for slight decrease in the salinity in the Delta channel. The minimum required Delta outflow remains relatively unchanged among alternatives. ERP implementation is not supposed to change SWP/CVP operations. However, combined total SWP/CVP frequency delivery charts show small changes in SWP/CVP exports and deliveries (Figures 12 and 13).

4.3 Water Quality Impact Evaluations

Water quality studies were conducted by a specially created DWRSIM model version. To evaluate Delta water quality and South of Delta water supply changes, alternative studies were conducted with changes to the existing conditions Base Study 771, using the criteria developed by Calfed Water Quality Operations Rule Development Group. The main purpose of water quality enhencement studies is to improve water quality for urban water users and look for alternatives, in terms of additional water supply and ecosystem supply either through the alteration of operation rules or by new facility additions. There are many ways that will tend to reduce salinity caused by seawater intrusion in the Delta and improve water quality available to contractors. Among these are increasing outflow, shifting exports to periods of lower salinity, and increasing the percentage of Sacramento River water reaching the South Delta. Two types of scenarios were evaluated for water quality enhancement.

In Study 852, water quality operation featured an increase to minimum required Delta outflow as a method of forcing a reduction in seawater intrusion. Minimum required Delta outflow is a standard set to maintain salinity or water quality balance in the Delta. Operation of SWP and CVP export facilities in the Delta and reservoirs were modified to enhance water quality. In return water supply measures such as JPOD, increased Banks capacity and Kern Water Bank were operated to compensate for water supply reduction as a result of increased Delta outflow.

Delta outflow controls the operation with relation to X2 requirements, that is when outflow increases X2 reduces and as result water quality to pumps improves. Comparison of the base case DWRSIM Study 771 results with MRDO Study 852 show that the long term average X2 reduced from 75.6 Km to 75.2 Km. The results show that increase of Delta outflow impact salinity and X2 position in the Delta and thus improve water quality. As shown in Table 6, system deliveries with water supply measures were increased by 123 TAF/year over the base case.

Water quality Study 853 included water supply measures, increased MRDO and Hood through Delta Transfer facility. Figure 14 shows the mean monthly minimum required Delta outflow increased in four months from September to December. Corresponding change in mean monthly exports with new water supply measures is shown in Figure 15. System deliveries comparisons for the Base case Study 771 and water quality studies 852 and 853 given in Table 6, show a minor reduction in deliveries from 123 TAF/year to 119 TAF/year with the inclusion of Hood Diversion in Study in Study 853. Figures 16 and 17 show minor changes to the end of September storages in Study 853 compared to the Base Case, indicating that the most of the compensation for exports came from new water supply measures and not from storage.

4.4 DEMAND REDUCTION AND ENVIRONMENTAL REQUIREMENT STUDIES

1. Impacts of Demand Reduction

To determine the implications of reduced demand for the CVP/SWP system and the Delta, three studies were conducted. Three levels of total system demand, 6.0 MAF, 4.0 MAF and 2.0 MAF, were considered for evaluation. In two additional studies, impacts of prescriptive actions and new 4.75 MAF storage, were evaluated for 6.0 MAF demand only. Total system deliveries for all five studies are shown in Table 7. As shown in Figure 18, reliability of water supply is enhanced with demand reduction because less water is required for delivery for the lower demand. Comparison of Delta exports for different demand reduction studies is shown in Figure 19. With reduced demand system ends up pumping less water. It is not possible to store all this extra water due to CVPIA's AFRP minimum flow requirements. The reservoirs are unable to hold back water as releases have to be made to meet the minimum flow requirements. As a result Delta outflow increases as illustrated in Figure 20. Variation in Delta outflow and storage for different levels of demand is shown in Figure 21. As the demand reduces from 6.0 MAF to 2.0 MAF, Delta outflow increases by about 3.0 MAF and about 1.0 MAF goes to the storage in reservoirs.

Results of the reduced 6.0 MAF demand study with prescriptive standards and new storages shown in Figure 22, indicate reliability of CVP/SWP water supplies is much higher with new upstream storage in comparison to the prescriptive standards.

2. Impacts of Environmental Requirements

To analyze the impact of each new environmental requirement separately on the SWP/CVP system, three environmental studies were conducted to see the effects of Prescriptive Standards, EBMUD American River Diversion and New Trinity Flows. Total system deliveries for these three studies are presented in Table 7. individual impacts of these actions are discussed as follows.

A. Impacts of Prescriptive Standards

There are three actions under new prescriptive standards, which cause changes in Delta outflows and exports. Due to extended 61 day VAMP flow criteria, Vernalis flow is increased during April and May for survival of San Joaquin chinook salmon smolts migrating through the Delta. This pulse flow causes increase in Delta Outflow. Both SWP and CVP exports are reduced during these months. Additional Qwest requirement causes San Joaquin River flows to be higher than the base case. Average annual Qwest increases from 853 TAF/year in base case existing conditions to 1328 TAF/year in Study 862 with prescriptive standards. As water is diverted to meet Qwest requirement, Banks and Tracy pumping is reduced. Impact of the third prescriptive action for exports reduction in February is presented in Figure 23.

Increase in average monthly Delta outflow occurs due to protective Delta

water management criteria, both over long-term and dry period. On the other hand, SWP/CVP deliveries are reduced due to reduction in exports as a result of all new prescriptive delta standards. As prescriptive actions are implemented during December to May time period, effect on exports and increase in Delta outflows is clearly evident during these months as shown in Figures 24 and 25. As shown in Table 7, and also In Figure 26, impact on CVP deliveries is more severe than SWP. Deliveries frequency graph shown for SWP in Figure 27, reflects minor changes in reliability due to these actions.

B. Impacts of New Trinity River Flows (750 TAF/yr.)

Trinity River Diversion primarily transfers water from the Clair Engle Lake to the Sacramento River for irrigation and other beneficial uses in the central valley. On DFG's request, a Secretarial Decision was signed on January 16, 1981 which provided for a minimum flow requirement of 340 TAF/year at Lewiston Dam on the Trinity River. This is mainly to restore declining salmon and steelhead runs in the Trinity River. Proposals are under consideration to increase these minimum flow requirements to 750 TAF/year. Impacts of this proposed increase on the imports to Sacramento Valley were evaluated.

A comparison of the Trinity River imports to the Sacramento Valley under base condition of 340 TAF/year Lewiston minimum flow and the new 750 TAF/year flow, is shown in Figure 28. As demonstrated by this graph, imports decrease. As a result Delta inflow decreases due to less water being diverted from Trinity River to Sacramento River Basin. As shown in Impact Table 44, both CVP and SWP Delta exports decrease due to New Trinity flows as Delta inflow is less. CVP deliveries are impacted more than SWP deliveries.

C. Impacts of East Bay Municipal Utility District (EBMUD) American River Diversion

The existing EBMUD/USBR contractual obligations allow 150 TAF/year from Folsom Canal at a location turnout structure near Grant Line Road in the Sacramento County. EBMUD has not made use of its full contractual entitlement. Newly proposed withdrawl of 115 TAF has been included in this new diversion and impacts on the American River system are being assessed.

American River flows just downstream of the proposed diversion point were compared. Figure 29, shows a plot of flows before and after diversion which are lower than before. This also affects inflows to the Delta and exports from the Delta. As presented in impact Table 45, both the Delta outflow and the exports decrease as a result of this diversion.

TABLE 1

DWRSIM STUDIES FOR REVISED DRAFT PEIS/EIR IMPACT TEAM ANALYSIS
WATER SUPPLY DELIVERIES OF CALFED STORAGE AND CONVEYANCE FACILITIES
(Low Water Management Studies)

ID	ALTERNATIVE CONFIGURATION	VER	DATE	COMPONENT	SWP DELIVERIES		CVP DELIVERIES		INTER. DELIVERIES		SWP+CVP+INTER. DELIVERIES	
					CR.	73YRS	CR.	73YRS	CR.	73YRS	CR.	73YRS
771	EXISTING CONDITIONS	9.06Y	03/03/99	EXISTING CONDITIONS-1995 LEVEL HYDROLOGY & DEMANDS+NO WHEELING+340TAF/YR TRINITY RIVER MIN FISH FLOWS	2117	2773	1790	2434	0	124	3907	5331
785	NO ACTION	9.06Y	03/05/99	NO ACTION-2020 LEVEL HYDROLOGY+1995 LEVEL DEMANDS +PRESCRIPTIVE DELTA ACTIONS+TRINITY RIVER IMPORTS	2004	2672	1446	2036	0	104	3450	4812
785s	NO ACTION	9.10A	03/24/99	S.785+SURROGATE	2001	2877	1425	2032	0	79	3426	4988
789	ALTERNATIVE 1	9.10A	03/18/99	S.785s+ISDP+JPOD+ERPP	2013	2875	1435	2042	0	160	3448	5077
790	ALTERNATIVE 2	9.10A	04/08/99	S.789+10k HOOD DIV+ RIO VISTA FLOW CRITERIA+DXC GATES CLOSED IN ALL MONTHS BUT OPEN IN JUNE DRY, CRT & BN YEARS	2024	2877	1407	2017	0	149	3431	5043
793	PREFERRED ALTERNATIVE	9.10A	04/08/99	S.789+2K HOOD DIV+RIO VISTA FLOW CRITERIA+DXC GATES CLOSED IN ALL MONTHS BUT OPEN I JUN IN DRY, CRT & BN YEARS	2044	2881	1413	2023	0	154	3457	5058
794	ALTERNATIVE 3	9.10A	04/08/99	S.789+10k ISOLATED FACILITY+DXC GATES CLOSED ALL MONTHS BUT OPEN IN JUL & AUG	2026	2859	1251	1952	40	178	3317	4989
804	ALTERNATIVE 3	9.10A	04/09/99	S.789+15k ISOLATED FACILITY+DXC GATES CLOSED IN ALL MONTHS BUT OPEN IN JULY & AUG+LEVEL II DELTA AG DIV. DELIVERED FROM ISOLATED FACILITY	1999	2843	1202	1930	42	169	3243	4942
807	ALTERNATIVE 3	9.10A	04/08/99	S.789+5k ISOLATED FACILITY+DXC GATES CLOSED IN ALL MONTHS BUT OPEN IN JUL AND AUG	2055	2896	1280	1974	27	170	3362	5040
808	ALTERNATIVE 1	9.10A1	04/02/99	S.789+DXC GATES POSITIONS ACCORDING TO ACCORD+20k MIN FLOW REQUIREMENT IN SACRAMENTO RIVER+STORAGES	2330	3257	1314	2029	0	77	3644	5363

DWRSIM STUDIES FOR REVISED DRAFT PEIS/EIR IMPACT TEAM ANALYSIS
WATER SUPPLY DELIVERIES OF CALFED STORAGE AND CONVEYANCE FACILITIES
(Low Water Management Studies)

ID	ALTERNATIVE CONFIGURATION	VER	DATE	COMPONENT	SWP DELIVERIES		CVP DELIVERIES		INTER. DELIVERIES		SWP+CVP+INTER. DELIVERIES	
					CR.	73YRS	CR.	73YRS	CR.	73YRS	CR.	73YRS
810	ALTERNATIVE 2	9.10A1	04/01/99	S.790+20k MIN FLOW REQUIREMENT IN SACRAMENTO RIVER +STORAGES+10k HOOD	2280	3238	1287	1994	0	68	3567	5300
812	ALTERNATIVE 3	9.10A1	04/13/99	S.789+15k ISOLATED FACILITY+DXC GATES CLOSED IN ALL MONTHS BUT OPEN IN JUL & AUG+LEVEL II DELTA AG DIV. DELIVERED FROM ISOLATED FACILITY+STORAGES	2331	3251	1117	1864	2	79	3450	5194
817	ALTERNATIVE 3	9.10A1	04/12/99	S.789+10k ISOLATED FACILITY+DXC GATES CLOSED IN ALL MONTHS BUT OPEN IN JUL & AUG+DELTA AG REQUIREMENTS MET THROUGH DELTA CHANNELS+STORAGES	2428	3274	1131	1898	2	81	3561	5253
819	ALTERNATIVE 3	9.10A1	04/12/99	S.789+5k ISOLATED FACILITY+DXC GATES CLOSED IN ALL MONTHS BUT OPEN IN JUL & AUG+DELTA AG REQUIREMENTS MET THRU DELTA CHANNELS+STORAGES	2463	3290	1176	1922	2	84	3641	5296
821	PREFERRED ALTERNATIVE	9.10A1	04/01/99	S.793+20k MIN FLOW REQUIREMENT IN SACRAMENTO RIVER +STORAGES+2k HOOD	2330	3252	1285	2006	0	71	3615	5329

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TABLE 2

DWRSIM STUDIES FOR REVISED DRAFT PEIS/EIR IMPACT TEAM ANALYSIS
WATER SUPPLY DELIVERIES OF CALFED STORAGE AND CONVEYANCE FACILITIES
(High Water Management Studies)

ID	ALTERNATIVE CONFIGURATION	VER	DATE	COMPONENT	SWP DELIVERIES		CVP DELIVERIES		INTER. DELIVERIES		SWP+CVP+INTER. DELIVERIES	
					CR.	73YRS	CR.	73YRS	CR.	73YRS	CR.	73YRS
771	EXISTING CONDITIONS	9.06Y	03/03/99	EXISTING CONDITIONS-1995 LEVEL HYDROLOGY & DEMANDS+NO WHEELING+340TAF/YR TRINITY RIVER MIN FISH FLOWS	2117	2773	1790	2434	0	124	3907	5331
786	NO ACTION	9.06Y	03/04/99	NO ACTION-2020 LEVEL HYDROLOGY & DEMANDS+128TAF/YR SWP WHEELING FOR CVP	2137	3226	1748	2433	0	84	3885	5743
786s	NO ACTION	9.06Y	03/09/99	S.786+SURROGATE	2131	3278	1748	2430	0	77	3879	5785
791	ALTERNATIVE 3	9.10A	04/08/99	S.809+5k ISOLATED FACILITY+DXC OPEN ONLY JUL, AUG+STORAGE	3297	4190	1667	2710	5	87	4969	6987
792	PREFERRED ALTERNATIVE	9.10A	04/08/99	S.809+4k HOOD(E/I)+DXC OPEN ONLY JUL, AUG+STORAGE	2915	4069	1657	2544	2	36	4574	6987
801	ALTERNATIVE 1	9.10A	03/26/99	S.809+STORAGE	2938	4058	1673	2426	2	42	4613	6526
803	ALTERNATIVE 2	9.10A	04/08/99	S.809+10k HOOD(E/I)+DXC OPEN ONLY JUL, AUG+ALL STORAGE	2995	4067	1634	2418	2	43	4631	6528
805	ALTERNATIVE 3	9.10A	04/12/99	S.791+15k ISOLATED FACILITY	3346	4199	1623	2701	4	92	4973	6992
806	ALTERNATIVE 3	9.10A	04/12/99	S.791+10k ISOLATED FACILITY	3346	4198	1622	2704	4	91	4972	6993
809	ALTERNATIVE 1	9.10A	03/31/99	S.786s+ISDP+JPOD	2162	3350	1760	2552	66	229	3988	6131

DWRSIM STUDIES FOR REVISED DRAFT PEIS/EIR IMPACT TEAM ANALYSIS
WATER SUPPLY DELIVERIES OF CALFED STORAGE AND CONVEYANCE FACILITIES
(High Water Management Studies)

ID	ALTERNATIVE CONFIGURATION	VER	DATE	COMPONENT	SWP DELIVERIES		CVP DELIVERIES		INTER. DELIVERIES		SWP+CVP+INTER. DELIVERIES	
					CR.	73YRS	CR.	73YRS	CR.	73YRS	CR.	73YRS
811	ALTERNATIVE 2	9.10A	04/09/99	S.809+10k HOOD(E/I)+DXC OPEN ONLY JUL, AUG	2171	3306	1756	2602	66	240	3993	6148
813	ALTERNATIVE 3	9.10A	04/09/99	S.809+15k ISOLATED FACILITY+DXC OPEN ONLY JUL, AUG	2256	3359	1764	2634	121	317	4141	6310
818	ALTERNATIVE 3	9.10A	04/09/99	S.809+10k ISOLATED FACILITY+DXC OPEN ONLY JUL, AUG	2256	3359	1764	2634	121	317	4141	6310
820	ALTERNATIVE 3	9.10A	04/08/99	S.809+5k ISOLATED FACILITY+DXC OPEN ONLY JUL, AUG	2261	3358	1743	2632	122	315	4126	6305
822	PREFERRED ALTERNATIVE	9.10A	04/08/99	S.809+4k HOOD (E/I)+DXC OPEN ONLY JUL, AUG	2180	3311	1748	2564	59	239	3988	6114

D-013215

TABLE 3

COMPARISON OF SYSTEM OPERATIONS UNDER LOW WATER MANAGEMENT SCENARIO

DESCRIPTION	2020D09C-CALFED-785s*	2020D09C-CALFED-789	2020D09C-CALFED-790	2020D09C-CALFED-793	2020D09C-CALFED-794	2020D09C-CALFED-804	2020D09C-CALFED-807	2020D09C-CALFED-808	2020D09C-CALFED-810	2020D09C-CALFED-812	2020D09C-CALFED-817	2020D09C-CALFED-819	2020D09C-CALFED-821
ALTERNATIVE CONFIGURATION	NO ACTION	ALT. 1	ALT. 2	PREF. ALT.	ALT. 3	ALT. 3	ALT. 3	ALT. 1	ALT. 2	ALT. 3	ALT. 3	ALT. 3	PREF. ALT.
FACILITY	NONE	NONE	HOOD	HOOD	I.F.	I.F.	I.F.	NONE	HOOD	I.F.	I.F.	I.F.	HOOD
CAPACITY	-	-	10K	2K	10K	15K	5K	-	10K	15K	10K	5K	2K
NORTH & SOUTH OF DELTA STORAGE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	YES	YES	YES	YES	YES	YES
DRY PERIOD (May 1928-Oct 1934)													
CHANGE IN SWP EXPORTS	(2018)	6	16	36	61	38	74	219	207	260	288	329	238
CHANGE IN CVP EXPORTS	(1702)	-9	-41	-36	-133	-228	-96	-52	-96	-229	-244	-159	-96
SHASTA-Oct 1934	870	876	854	873	116	116	145	359	394	116	116	116	400
OROVILLE-Oct 1934	769	952	872	878	845	842	898	969	876	1093	980	1030	911
CVP-SAN LUIS-Oct 1934	38	38	38	38	400	419	454	246	150	457	257	427	164
SWP-SAN LUIS-Oct 1934	42	42	42	42	42	42	42	50	50	50	50	50	50
73 YEARS (Oct 1921-Sep 1994)													
CHANGE IN SWP EXPORTS	(3087)	82	72	80	83	58	110	410	375	409	432	449	394
CHANGE IN CVP EXPORTS	(2280)	13	-14	-7	-77	-104	-55	0	-40	-170	-131	-106	-26
SWP SHORTAGES	48	23	39	38	40	40	44	25	27	26	30	30	28
CVP SHORTAGES	19	14	32	30	32	32	36	22	44	34	35	34	38
AVERAGE QWEST	1229	1149	121	290	303	343	478	805	-145	33	-22	189	26
CHANGE IN MRDO	(5585)	-2	-4	-4	+209	+384	+66	-19	-2	+351	+218	+42	-21
CHANGE IN TOTAL DELTA OUTFLOW	(14942)	194	+237	+221	+307	+385	+244	-202	-130	+20	-69	-132	-162

* NO ACTION-2020 LEVEL OF HYDROLOGY + 1995 LEVEL OF DEVELOPMENT WATER DEMANDS + PRESCRIPTIVE DELTA ACTIONS + NEW TRINITY RIVER FLOWS(390-750 TAF/YR) + NEW EBMUD DIVERSION(115 TAF/YR) + SURROGATE DEMAND + SWP WHEELING FOR CVP (128TAF/YR)

D-013216

TABLE 4

COMPARISON OF SYSTEM OPERATIONS UNDER HIGH WATER MANAGEMENT SCENARIO

DESCRIPTION	2020D09C-CALFED-786s*	2020D09C-CALFED-791	2020D09C-CALFED-792	2020D09C-CALFED-801	2020D09C-CALFED-803	2020D09C-CALFED-805	2020D09C-CALFED-806	2020D09C-CALFED-809	2020D09C-CALFED-811	2020D09C-CALFED-813	2020D09C-CALFED-818	2020D09C-CALFED-820	2020D09C-CALFED-822
ALTERNATIVE CONFIGURATION	NO ACTION	ALT. 3	PREF. ALT.	ALT. 1	ALT. 2	ALT. 3	ALT. 3	ALT. 1	ALT. 2	ALT. 3	ALT. 3	ALT. 3	PREF. ALT.
FACILITY	NONE	I.F	HOOD	NONE	HOOD	I.F.	I.F.	NONE	HOOD	I.F.	I.F.	I.F.	HOOD
CAPACITY	-	5K	4K	-	10K	15K	10K	-	10K	15K	10K	5K	4K
NORTH & SOUTH OF DELTA STORAGE	NONE	YES	YES	YES	YES	YES	YES	NONE	NONE	YES	YES	YES	NONE
DRY PERIOD (May 1928-Oct 1934)													
CHANGE IN SWP EXPORTS	(2144)	830	566	586	643	891	892	90	101	235	235	240	103
CHANGE IN CVP EXPORTS	(2015)	-80	-35	-81	-121	-125	-125	0	19	23	23	1	11
SHASTA-Oct 1934	829	577	584	644	570	620	618	782	642	625	625	608	639
OROVILLE-Oct 1934	863	825	767	837	879	886	887	882	893	923	923	921	892
CVP-SAN LUIS-Oct 1934	112	198	249	118	103	210	210	105	237	259	259	249	236
SWP-SAN LUIS-Oct 1934	42	50	50	50	50	64	64	42	42	70	70	70	42
73 YEARS (Oct 1921-Sep 1994)													
CHANGE IN SWP EXPORTS	(3487)	986	766	767	777	1009	1008	230	198	341	341	338	203
CHANGE IN CVP EXPORTS	(2690)	284	106	-3	-11	275	278	118	166	210	210	209	130
SWP SHORTAGES	9	15	24	14	14	15	15	6	3	1	1	1	3
CVP SHORTAGES	9	6	46	5	6	7	6	15	28	0	0	1	18
AVERAGE QWEST	486	-1599	-1142	-260	-1452	-1993	-1923	141	-965	-1170	-1133	-888	-581
CHANGE IN MRDO	(5584)	+45	-36	-38	-38	+40	+40	-18	-39	-35	-35	-37	-34
CHANGE IN TOTAL DELTA OUTFLOW	(14458)	-1061	-727	-618	-624	-1063	-1066	-40	-49	-213	-213	-209	-21

* NO ACTION-2020 LEVEL OF HYDROLOGY & WATER DEMANDS + SURROGATE DEMAND + SWP WHEELING FOR CVP (128 TAF/YR)

TABLE 5

COMPARISON OF DWRSIM STUDIES WITH OR WITHOUT ERPP

STUDY	DATE	COMPONENT	ERPP	TOTAL DELTA EXPORTS (TAF)		DELIVERIES SWP+CVP+INTER. (TAF)		SALINITY (X2) (KM)		MRDO (TAF)		TOTAL DELTA OUTFLOW (TAF)	
				CR.	73YRS	CR.	73YRS	CR.	73YRS	CR.	73YRS	CR.	73YRS
HIGH WATER MANAGEMENT													
801	03/26/99	S.786+ERPP+JPOD+ISDP+STORAGES	YES	4665	6941	4613	6526	82.3	76.5	4377	5546	5067	13715
839	05/12/99	S.801+NO ERPP	NO	4685	6979	4637	6562	82.5	76.7	4394	5560	4870	13492
809	03/31/99	S.786+ERPP+JPOD+ISDP	YES	4250	6525	3988	6131	82.1	76.2	4366	5566	5212	14294
840	04/28/99	S.809+NO ERPP	NO	4240	6516	3976	6121	82.3	76.4	4382	5570	5015	14002
LOW WATER MANAGEMENT													
789	03/18/99	S.785+ISDP+JPOD+ERPP	YES	3718	5465	3448	5077	81.7	75.5	4343	5583	5477	15012
841	04/28/99	S.789+NO ERPP	NO	3710	5467	3440	5079	81.9	76.6	4360	5607	5276	14722
808	04/02/99	S.789+ACCORD DXC GATE POSITIONS +20k MIN FLOW REQ. IN SACRAMENTO RIVER+STORAGES	YES	3888	5779	3644	5363	81.8	75.7	4351	5566	5438	14615
842	05/11/99	S.808+NO ERPP	NO	3915	5785	3670	5371	82	75.9	4368	5578	5228	14401

TABLE 6

WATER QUALITY STUDIES
WATER SUPPLY IMPACT (DELIVERY DIFFERENCES)

	SWP Deliveries					CVP Deliveries					Total SWP+CVP Deliveries				
	771	852	853	852-771	853-771	771	852	853	852-771	853-771	771	852	853	852-771	853-771
Oct.	195	194	194	-1	-1	185	192	191	7	6	380	386	385	6	5
Nov.	171	169	169	-2	-2	101	105	105	4	4	272	274	274	2	2
Dec.	158	157	157	-1	-1	78	84	84	6	6	236	241	241	5	5
Jan.	98	96	96	-2	-2	93	103	103	10	10	191	199	199	8	8
Feb.	126	124	124	-2	-2	81	84	83	3	2	207	208	207	1	0
Mar.	154	153	153	-1	-1	153	161	160	8	7	307	314	313	7	6
Apr.	211	210	210	-1	-1	227	241	241	14	14	438	451	451	13	13
May	283	283	282	0	-1	280	296	296	16	16	563	579	578	16	15
Jun	371	370	370	-1	-1	344	367	367	23	23	715	737	737	22	22
Jul	381	379	379	-2	-2	372	391	391	19	19	753	770	770	17	17
Aug	371	370	370	-1	-1	314	333	333	19	19	685	703	703	18	18
Sep	271	271	271	0	0	203	211	211	8	8	474	482	482	8	8
Total	2790	2776	2775	-14	-15	2431	2568	2565	137	134	5221	5344	5340	123	119
*															
Critical	2084	2038	2034	-46	-50	1699	1683	1677	-16	-22	3783	3721	3711	-62	-72
Dry	2969	2923	2923	-46	-46	2457	2567	2565	110	108	5426	5490	5488	64	62
B. Normal	2945	2950	2948	5	3	2414	2492	2489	78	75	5359	5442	5437	83	78
A. Normal	2951	2969	2967	18	16	2596	2784	2782	188	186	5547	5753	5749	206	202
Wet	2957	2962	2962	5	5	2769	3011	3011	242	242	5726	5973	5973	247	247
May1928-Oct1934	2121	2069	2062	-52	-59	1787	1717	1712	-70	-75	3908	3786	3774	-122	-134
Oct.1975-Sep.1977	2302	2356	2356	54	54	1537	1583	1583	46	46	3839	3939	3939	100	100
Jun.1986-Sep.1992	2136	2144	2137	8	1	1849	1819	1806	-30	-43	3985	3963	3943	-22	-42
Oct.1975-Sep.1991	2557	2564	2563	7	6	2271	2344	2341	73	70	4828	4908	4904	80	76

*year type according to ag and mi classification

TABLE 7

DWRSIM STUDIES FOR THE IMPLICATIONS OF REDUCTION AND ENVIRONMENTAL REQUIREMENTS SUMMARY OF WATER DELIVERIES

ID	VER	DATE	COMPONENT	SWP DELIVERIES		CVP DELIVERIES		INTER. DELIVERIES		SWP+CVP+INT DELIVERIES	
				CR.	73YRS	CR.	73YRS	CR.	73YRS	CR.	73YRS
771	9.06Y	3/3/99	EXISTING CONDITIONS-1995 LEVEL HYDROLOGY & DEMANDS + NO SWP WHEELING FOR CVP+340TAF/YR TRINITY RIVER MIN FISH FLOWS	2117	2773	1790	2434	0	124	3907	5331
Demand Reduction Studies											
857	9.10A	6/28/99	S.771+6.0 MAF TOTAL CVP/SWP DEMAND - DISTRIBUTE DEMAND REDUCTION EQUALLY AMONG ALL WATER USERS.	2140	2684	1766	2373	0	152	3906	5209
858	9.10A	6/28/99	S.771+6.0 MAF TOTAL CVP/SWP DEMAND + PRESCRIPTIVE STANDARDS	2035	2642	1505	2018	0	125	3540	4785
859	9.10A1kvd	6/29/99	S.771+6.0 MAF TOTAL CVP/SWP DEMAND + PRESCRIPTIVE + 4.75 MAF STORAGE	2769	2869	1504	2027	0	82	4273	4978
881	9.10A1	6/28/99	S.771+4.0 MAF TOTAL CVP/SWP DEMAND - DISTRIBUTE DEMAND REDUCTION EQUALLY AMONG ALL WATER USERS.	1946	1798	1653	1730	30	355	3629	3883
882	9.10A1	7/7/99	S.771+2.0 MAF TOTAL CVP/SWP DEMAND - DISTRIBUTE DEMAND REDUCTION EQUALLY AMONG ALL WATER USERS.	1007	984	776	771	277	589	2060	2344
Environmental Requirements Studies											
860	9.10A	6/2/99	S.771 + NEW TRINITY (750 MAX.)	2114	2783	1731	2412	0	133	3845	5328
861	9.10A	6/4/99	S.771 + EBMUD AMERICAN RIVER STANDARDS	2086	2776	1766	2426	0	132	3852	5334
862	9.10A	6/8/99	S.771 + PRESCRIPTIVE STANDARDS	2041	2722	1522	2041	0	102	3563	4865

D—013220

TABLE 8

SUMMARY OF WATER SUPPLY IMPACTS
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	1995D06E-CALFED-771 TOTAL	CVP	SWP	2020D09C-CALFED-785 TOTAL		CVP		SWP	
A. (i) Total Delta Exports	4169	2049	2120	3721	[-447]	1700	[-348]	2020	[-99]
(ii) Net Storage Used	1262	932	329	1224	[37]	883	[49]	340	[-11]
(a) Existing North-of-Delta		932	329			883	[49]	340	[-11]
(b) New North-of-Delta			0					0	[0]
WATER SUPPLY IMPACT (i+ii)					[-410]				
(iii) Additional water to meet required Vernalis flows	56			56	[0]				
(iv) Other Storage Used	184	76	108	172	[12]	81	[-4]	91	[16]
(b) New In-Delta			0					0	[0]
(a) Existing South-of-Delta		76	108			81	[-4]	91	[16]
(b) New South-of-Delta			0					0	[0]
B. Total Delta Outflow	5030			5292	[261]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	5746	2682	3063	5200	[-546]	2287	[-394]	2912	[-151]
WATER SUPPLY IMPACT					[-546]				
B. Additional water to meet required Vernalis flows	49			49	[0]				
C. EOM SEPT SACTO BASIN STORAGE	7003	4742	2261	6818	[-185]	4604	[-137]	2213	[-48]
(i) Existing Sacto Basin		4742	2261			4604	[-137]	2213	[-48]
(ii) New Sacto Basin			0					0	[0]
D. EOM SEPT NEW MELONES STORAGE	1232			1232	[0]				
E. Total Delta Outflow	14761			14985	[223]				

D-013221

TABLE 9

SUMMARY OF WATER SUPPLY IMPACTS
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	1995D06E-CALFED-771 TOTAL	CVP	SWP	2020D09C-CALFED-786 TOTAL	CVP	SWP
A. (i) Total Delta Exports	4169	2049	2120	4160 [-9]	2016 [-32]	2144 [23]
(ii) Net Storage Used	1262	932	329	1279 [-17]	952 [-19]	326 [2]
(a) Existing North-of-Delta		932	329		952 [-19]	326 [2]
(b) New North-of-Delta			0			0 [0]
WATER SUPPLY IMPACT (i+ii)				-26		
(iii) Additional water to meet required Vernalis flows	56			55 [1]		
(iv) Other Storage Used	184	76	108	170 [14]	69 [7]	101 [6]
(b) New In-Delta			0			0 [0]
(a) Existing South-of-Delta		76	108		69 [7]	101 [6]
(b) New South-of-Delta			0			0 [0]
B. Total Delta Outflow	5030			5093 [62]		
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)						
A. Total Delta Exports	5746	2682	3063	6137 [390]	2693 [10]	3443 [380]
WATER SUPPLY IMPACT				390		
B. Additional water to meet required Vernalis flows	49			47 [1]		
C. EOM SEPT SACTO BASIN STORAGE	7003	4742	2261	6792 [-210]	4660 [-81]	2131 [-129]
(i) Existing Sacto Basin		4742	2261		4660 [-81]	2131 [-129]
(ii) New Sacto Basin			0			0 [0]
D. EOM SEPT NEW MELONES STORAGE	1232			1224 [-7]		
E. Total Delta Outflow	14761			14375 [-386]		

D-013222

TABLE 10

SUMMARY OF WATER SUPPLY IMPACTS
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09B-CALFED-785s TOTAL	CVP	SWP	2020D09B-CALFED-789 TOTAL		CVP		SWP	
A. (i) Total Delta Exports	3721	1702	2018	3718	[-2]	1692	[-9]	2025	[6]
(ii) Net Storage Used	1224	882	341	1194	[29]	883	[0]	311	[30]
(a) Existing North-of-Delta		882	341			883	[0]	311	[30]
(b) New North-of-Delta			0					0	[0]
WATER SUPPLY IMPACT (i+ii)				27					
(iii) Additional water to meet required Vernalis flows	56			56	[0]				
(iv) Other Storage Used	149	59	89	173	[-24]	79	[-19]	94	[-5]
(b) New In-Delta			0					0	[0]
(a) Existing South-of-Delta		59	89			79	[-19]	94	[-5]
(b) New South-of-Delta			0					0	[0]
B. Total Delta Outflow	5291			5477	[185]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	5368	2280	3087	5465	[96]	2294	[13]	3170	[82]
WATER SUPPLY IMPACT				96					
B. Additional water to meet required Vernalis flows	48			48	[0]				
C. EOM SEPT SACTO BASIN STORAGE	6733	4603	2129	6703	[-30]	4578	[-25]	2124	[-4]
(i) Existing Sacto Basin		4603	2129			4578	[-25]	2124	[-4]
(ii) New Sacto Basin			0					0	[0]
D. EOM SEPT NEW MELONES STORAGE	1223			1223	[0]				
E. Total Delta Outflow	14817			15012	[194]				

D-013223

TABLE 11

SUMMARY OF WATER SUPPLY IMPACTS
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09B-CALFED-785s TOTAL	CVP	SWP	2020D09B-CALFED-790 TOTAL	CVP	SWP
A. (i) Total Delta Exports	3721	1702	2018	3697 [-24]	1661 [-41]	2035 [16]
(ii) Net Storage Used	1224	882	341	1209 [14]	885 [-2]	324 [17]
(a) Existing North-of-Delta		882	341		885 [-2]	324 [17]
(b) New North-of-Delta			0			0 [0]
WATER SUPPLY IMPACT (i+ii)				-10		
(iii) Additional water to meet required Vernalis flows	56			56 [0]		
(iv) Other Storage Used	149	59	89	177 [-28]	82 [-22]	95 [-6]
(b) New In-Delta			0			0 [0]
(a) Existing South-of-Delta		59	89		82 [-22]	95 [-6]
(b) New South-of-Delta			0			0 [0]
B. Total Delta Outflow	5291			5513 [222]		
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)						
A. Total Delta Exports	5368	2280	3087	5426 [57]	2266 [-14]	3160 [72]
WATER SUPPLY IMPACT				57		
B. Additional water to meet required Vernalis flows	48			48 [0]		
C. EOM SEPT SACTO BASIN STORAGE	6733	4603	2129	6707 [-25]	4592 [-11]	2114 [-14]
(i) Existing Sacto Basin		4603	2129		4592 [-11]	2114 [-14]
(ii) New Sacto Basin			0			0 [0]
D. EOM SEPT NEW MELONES STORAGE	1223			1223 [0]		
E. Total Delta Outflow	14817			15050 [232]		

D-013224

TABLE 12

SUMMARY OF WATER SUPPLY IMPACTS
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09B-CALFED-786s TOTAL	CVP	SWP	2020D09B-CALFED-791 TOTAL		CVP		SWP	
A. (i) Total Delta Exports	4160	2015	2144	4909	[-2]	1934	[-9]	2975	[6]
(ii) Net Storage Used	1279	952	327	1595	[29]	984	[0]	610	[30]
(a) Existing North-of-Delta		952	327			984	[0]	335	[30]
(b) New North-of-Delta			0					274	[0]
WATER SUPPLY IMPACT (i+ii)				434					
(iii) Additional water to meet required Vernalis flows	55			45	[10]				
(iv) Other Storage Used	164	69	94	504	[-339]	69	[0]	434	[-5]
(b) New In-Delta			0					0	[0]
(a) Existing South-of-Delta		69	94			69	[0]	110	[-5]
(b) New South-of-Delta			0					0	[0]
B. Total Delta Outflow	5094			4849	[-244]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	6177	2690	3487	7447	[1270]	2974	[284]	4473	[986
WATER SUPPLY IMPACT				96					
B. Additional water to meet required Vernalis flows	47			48	[0]				
C. EOM SEPT SACTO BASIN STORAGE	6784	4662	2122	7787	[1003]	4329	[-332]	3458	[133
(i) Existing Sacto Basin		4662	2122			4329	[-332]	2351	[228
(ii) New Sacto Basin			0					1107	[-110
D. EOM SEPT NEW MELONES STORAGE	1224			1226	[0]				
E. Total Delta Outflow	14334			13273	[-1061]				

TABLE 13

SUMMARY OF WATER SUPPLY IMPACTS
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09B-CALFED-786s TOTAL	CVP	SWP	2020D09B-CALFED-792 TOTAL	CVP	SWP
A. (i) Total Delta Exports	4160	2015	2144	4691 [530]	1979 [-35]	2711 [566]
(ii) Net Storage Used	1279	952	327	1598 [-318]	977 [-25]	620 [-292
(a) Existing North-of-Delta		952	327		977 [-25]	342 [-14]
(b) New North-of-Delta			0			278 [-278
WATER SUPPLY IMPACT (i+ii)				212		
(iii) Additional water to meet required Vernalis flows	55			55 [0]		
(iv) Other Storage Used	164	69	94	329 [-165]	14 [54]	314 [-220
(b) New In-Delta			0			0 [0]
(a) Existing South-of-Delta		69	94		14 [54]	83 [11]
(b) New South-of-Delta			0			231 [-231
B. Total Delta Outflow	5094			5069 [-24]		
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)						
A. Total Delta Exports	6177	2690	3487	7050 [873]	2796 [106]	4253 [766]
WATER SUPPLY IMPACT				873		
B. Additional water to meet required Vernalis flows	47			47 [0]		
C. EOM SEPT SACTO BASIN STORAGE	6784	4662	2122	8026 [1242]	4494 [-167]	3532 [1410
(i) Existing Sacto Basin		4662	2122		4494 [-167]	2437 [314]
(ii) New Sacto Basin			0			1095 [-109
D. EOM SEPT NEW MELONES STORAGE	1224			1225 [0]		
E. Total Delta Outflow	14334			13611 [-722]		

D-013226

TABLE 14

SUMMARY OF WATER SUPPLY IMPACTS
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09B-CALFED-785s TOTAL	CVP	SWP	2020D09B-CALFED-793 TOTAL		CVP		SWP	
A. (i) Total Delta Exports	3721	1702	2018	3721	[0]	1666	[-36]	2055	[36]
(ii) Net Storage Used	1224	882	341	1205	[18]	882	[0]	323	[18]
(a) Existing North-of-Delta		882	341			882	[0]	323	[18]
(b) New North-of-Delta			0					0	[0]
WATER SUPPLY IMPACT (i+ii)					18				
(iii) Additional water to meet required Vernalis flows	56			56	[0]				
(iv) Other Storage Used	149	59	89	177	[-28]	82	[-22]	95	[-6]
(b) New In-Delta			0					0	[0]
(a) Existing South-of-Delta		59	89			82	[-22]	95	[-6]
(b) New South-of-Delta			0					0	[0]
B. Total Delta Outflow	5291			5486	[194]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	5368	2280	3087	5442	[73]	2273	[-7]	3168	[80]
WATER SUPPLY IMPACT					73				
B. Additional water to meet required Vernalis flows	48			48	[0]				
C. EOM SEPT SACTO BASIN STORAGE	6733	4603	2129	6711	[-21]	4593	[-10]	2118	[-10]
(i) Existing Sacto Basin		4603	2129			4593	[-10]	2118	[-10]
(ii) New Sacto Basin			0					0	[0]
D. EOM SEPT NEW MELONES STORAGE	1223			1223	[0]				
E. Total Delta Outflow	14817			15035	[217]				

D-013227

TABLE 15

SUMMARY OF WATER SUPPLY IMPACTS
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09B-CALFED-785s TOTAL	CVP	SWP	2020D09B-CALFED-794 TOTAL	CVP	SWP
A. (i) Total Delta Exports	3721	1702	2018	3648 [-72]	1568 [-133]	2080 [61]
(ii) Net Storage Used	1224	882	341	1390 [-165]	1060 [-178]	329 [12]
(a) Existing North-of-Delta		882	341		1060 [-178]	329 [12]
(b) New North-of-Delta			0			0 [0]
WATER SUPPLY IMPACT (i+ii)				-238		
(iii) Additional water to meet required Vernalis flows	56			57 [0]		
(iv) Other Storage Used	149	59	89	112 [36]	19 [40]	93 [-3]
(b) New In-Delta			0			0 [0]
(a) Existing South-of-Delta		59	89		19 [40]	93 [-3]
(b) New South-of-Delta			0			0 [0]
B. Total Delta Outflow	5291			5750 [459]		
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)						
A. Total Delta Exports	5368	2280	3087	5375 [6]	2203 [-77]	3171 [83]
WATER SUPPLY IMPACT				6		
B. Additional water to meet required Vernalis flows	48			48 [0]		
C. EOM SEPT SACTO BASIN STORAGE	6733	4603	2129	6383 [-349]	4304 [-299]	2078 [-50]
(i) Existing Sacto Basin		4603	2129		4304 [-299]	2078 [-50]
(ii) New Sacto Basin			0			0 [0]
D. EOM SEPT NEW MELONES STORAGE	1223			1223 [0]		
E. Total Delta Outflow	14817			15122 [305]		

D-013228

TABLE 16

SUMMARY OF WATER SUPPLY IMPACTS
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09B-CALFED-786s TOTAL	CVP	SWP	2020D09C-CALFED-801 TOTAL	CVP	SWP
A. (i) Total Delta Exports	4160	2015	2144	4665 [504]	1933 [-81]	2731 [240]
(ii) Net Storage Used	1279	952	327	1576 [-296]	961 [-9]	614 [7]
(a) Existing North-of-Delta		952	327		961 [-9]	328 [7]
(b) New North-of-Delta			0			285 [0]
WATER SUPPLY IMPACT (i+ii)				208		
(iii) Additional water to meet required Vernalis flows	55			55 [0]		
(iv) Other Storage Used	164	69	94	393 [-229]	76 [-6]	316 [-222]
(b) New In-Delta			0			0 [0]
(a) Existing South-of-Delta		69	94		76 [-6]	83 [11]
(b) New South-of-Delta			0			233 [-233]
B. Total Delta Outflow	5094			5067 [-26]		
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)						
A. Total Delta Exports	6177	2690	3487	6941 [763]	2686 [-3]	4254 [767]
WATER SUPPLY IMPACT				763		
B. Additional water to meet required Vernalis flows	47			47 [0]		
C. EOM SEPT SACTO BASIN STORAGE	6784	4662	2122	8109 [1324]	4526 [-135]	3583 [1460]
(i) Existing Sacto Basin		4662	2122		4526 [-135]	2466 [344]
(ii) New Sacto Basin			0			1116 [-1116
D. EOM SEPT NEW MELONES STORAGE	1224			1224 [0]		
E. Total Delta Outflow	14334			13715 [-618]		

D-013229

TABLE 17

SUMMARY OF WATER SUPPLY IMPACTS
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09B-CALFED-786s TOTAL	CVP	SWP	2020D09C-CALFED-803 TOTAL	CVP	SWP
A. (i) Total Delta Exports	4160	2015	2144	4682 [522]	1893 [-121]	2788 [643]
(ii) Net Storage Used	1279	952	327	1588 [-308]	983 [-31]	605 [-277]
(a) Existing North-of-Delta		952	327		983 [-31]	322 [4]
(b) New North-of-Delta			0			282 [-282]
WATER SUPPLY IMPACT (i+ii)				213		
(iii) Additional water to meet required Vernalis flows	55			55 [0]		
(iv) Other Storage Used	164	69	94	394 [-230]	78 [-8]	316 [-222]
(b) New In-Delta			0			0 [0]
(a) Existing South-of-Delta		69	94		78 [-8]	84 [9]
(b) New South-of-Delta			0			232 [-232]
B. Total Delta Outflow	5094			5067 [-26]		
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)						
A. Total Delta Exports	6177	2690	3487	6943 [765]	2678 [-11]	4264 [777]
WATER SUPPLY IMPACT				765		
B. Additional water to meet required Vernalis flows	47			47 [0]		
C. EOM SEPT SACTO BASIN STORAGE	6784	4662	2122	8090 [1305]	4502 [-159]	3587 [1465]
(i) Existing Sacto Basin		4662	2122		4502 [-159]	2466 [344]
(ii) New Sacto Basin			0			1116 [-1116]
D. EOM SEPT NEW MELONES STORAGE	1224			1224 [0]		
E. Total Delta Outflow	14334			13714 [-620]		

TABLE 18

SUMMARY OF WATER SUPPLY IMPACTS

All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09B-CALFED-785s TOTAL	CVP	SWP	2020D09C-CALFED-804 TOTAL	CVP	SWP
A. (i) Total Delta Exports	3721	1702	2018	3530 [-190]	1473 [-228]	2057 [38]
(ii) Net Storage Used	1224	882	341	1390 [-166]	1060 [-177]	330 [11]
(a) Existing North-of-Delta		882	341		1060 [-177]	330 [11]
(b) New North-of-Delta			0			0 [0]
WATER SUPPLY IMPACT (i+ii)				-357		
(iii) Additional water to meet required Vernalis flows	56			57 [0]		
(iv) Other Storage Used	149	59	89	107 [42]	15 [44]	91 [-1]
(b) New In-Delta			0			0 [0]
(a) Existing South-of-Delta		59	89		15 [44]	91 [-1]
(b) New South-of-Delta			0			0 [0]
B. Total Delta Outflow	5291			5888 [596]		
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)						
A. Total Delta Exports	5368	2280	3087	5323 [-45]	2176 [-104]	3146 [58]
WATER SUPPLY IMPACT				-45		
B. Additional water to meet required Vernalis flows	48			48 [0]		
C. EOM SEPT SACTO BASIN STORAGE	6733	4603	2129	6145 [-587]	4077 [-525]	2068 [-61]
(i) Existing Sacto Basin		4603	2129		4077 [-525]	2068 [-61]
(ii) New Sacto Basin			0			0 [0]
D. EOM SEPT NEW MELONES STORAGE	1223			1223 [0]		
E. Total Delta Outflow	14817			15201 [383]		

D-013231

TABLE 19

SUMMARY OF WATER SUPPLY IMPACTS

All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09B-CALFED-786ns TOTAL	CVP	SWP	2020D09C-CALFED-805 TOTAL	CVP	SWP
A. (i) Total Delta Exports	4160	2015	2144	4926 [766]	1890 [-125]	3036 [891
(ii) Net Storage Used	1279	952	327	1574 [-249]	975 [-23]	598 [-271
(a) Existing North-of-Delta		952	327		975 [-23]	327 [0]
(b) New North-of-Delta			0			271 [-271
WATER SUPPLY IMPACT (i+ii)				472		
(iii) Additional water to meet required Vernalis flows	55			45 [10]		
(iv) Other Storage Used	164	69	94	491 [-327]	69 [0]	422 [-327
(b) New In-Delta			0			0 [0]
(a) Existing South-of-Delta		69	94		69 [0]	103 [-8]
(b) New South-of-Delta			0			318 [-318
B. Total Delta Outflow	5094			4806 [-287]		
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)						
A. Total Delta Exports	6177	2690	3487	7462 [1284]	2965 [275]	4496 [1009
WATER SUPPLY IMPACT				1284		
B. Additional water to meet required Vernalis flows	47			45 [2]		
C. EOM SEPT SACTO BASIN STORAGE	6784	4662	2122	7777 [993]	4304 [-358]	3473 [1351
(i) Existing Sacto Basin		4662	2122		4304 [-358]	2362 [239
(ii) New Sacto Basin			0			1111 [-111
D. EOM SEPT NEW MELONES STORAGE	1224			1226 [1]		
E. Total Delta Outflow	14334			13269 [-1065]		

D-013232

TABLE 20

SUMMARY OF WATER SUPPLY IMPACTS
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09C-CALFED-786n TOTAL	CVP	SWP	2020D09C-CALFED-806 TOTAL		CVP		SWP	
A. (i) Total Delta Exports	4160	2015	2144	4927	[767]	1889	[-125]	3037	[89
(ii) Net Storage Used	1279	952	327	1576	[-296]	976	[-23]	599	[-27
(a) Existing North-of-Delta		952	327			976	[-23]	327	[0
(b) New North-of-Delta			0					272	[-27
WATER SUPPLY IMPACT (i+ii)					471				
(iii) Additional water to meet required Vernalis flows	55			45	[10]				
(iv) Other Storage Used	164	69	94	491	[-327]	69	[0]	422	[-32
(b) New In-Delta			0					0	[0
(a) Existing South-of-Delta		69	94			69	[0]	103	[-8
(b) New South-of-Delta			0					318	[-31
B. Total Delta Outflow	5094			4809	[-284]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	6177	2690	3487	7464	[1287]	2968	[0]	4495	[10C
WATER SUPPLY IMPACT					1287				
B. Additional water to meet required Vernalis flows	47			45	[2]				
C. EOM SEPT SACTO BASIN STORAGE	6784	4662	2122	7773	[988]	4300	[-361]	3472	[134
(i) Existing Sacto Basin		4662	2122			4300	[-361]	2362	[23
(ii) New Sacto Basin			0					1100	[-11
D. EOM SEPT NEW MELONES STORAGE	1224			1226	[1]				
E. Total Delta Outflow	14334			13266	[-1068]				

TABLE 21

SUMMARY OF WATER SUPPLY IMPACTS

All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09C-CALFED-785s			2020D09C-CALFED-807					
	TOTAL	CVP	SWP	TOTAL		CVP		SWP	
A. (i) Total Delta Exports	3721	1702	2018	3698	[-22]	1605	[-96]	2093	[74]
(ii) Net Storage Used	1224	882	341	1369	[-145]	1050	[-167]	319	[21]
(a) Existing North-of-Delta		882	341			1050	[-167]	319	[21]
(b) New North-of-Delta			0					0	[0]
WATER SUPPLY IMPACT (i+ii)					-167				
(iii) Additional water to meet required Vernalis flows	56			57	[0]				
(iv) Other Storage Used	149	59	89	105	[43]	10	[49]	95	[-5]
(b) New In-Delta			0					0	[0]
(a) Existing South-of-Delta		59	89			10	[49]	95	[-5]
(b) New South-of-Delta			0					0	[0]
B. Total Delta Outflow	5291			5681	[389]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	5368	2280	3087	5424	[55]	2225	[-55]	3198	[110]
WATER SUPPLY IMPACT					55				
B. Additional water to meet required Vernalis flows	48			48	[0]				
C. EOM SEPT SACTO BASIN STORAGE	6733	4603	2129	6577	[-155]	4445	[-158]	2131	[2]
(i) Existing Sacto Basin		4603	2129			4445	[-158]	2131	[2]
(ii) New Sacto Basin			0					0	[0]
D. EOM SEPT NEW MELONES STORAGE	1223			1223	[0]				
E. Total Delta Outflow	14817			15058	[240]				

TABLE 22

SUMMARY OF WATER SUPPLY IMPACTS

All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09C-CALFED-785s TOTAL	CVP	SWP	2020D09C-CALFED-808 TOTAL		CVP		SWP	
A. (i) Total Delta Exports	3721	1702	2018	3888	[167]	1650	[-52]	2238	[219]
(ii) Net Storage Used	1224	882	341	1329	[-104]	968	[-85]	360	[-19]
(a) Existing North-of-Delta		882	341			968	[-85]	360	[-19]
(b) New North-of-Delta			0					51	[-51]
WATER SUPPLY IMPACT (i+ii)					63				
(iii) Additional water to meet required Vernalis flows	56			56	[0]				
(iv) Other Storage Used	149	59	89	201	[-51]	0	[59]	200	[-111]
(b) New In-Delta			0					0	[0]
(a) Existing South-of-Delta		59	89			0	[59]	41	[47]
(b) New South-of-Delta			0					159	[-159]
B. Total Delta Outflow	5291			5438	[147]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	5368	2280	3087	5779	[410]	2280	[0]	3498	[410]
WATER SUPPLY IMPACT					410				
B. Additional water to meet required Vernalis flows	48			48	[0]				
C. EOM SEPT SACTO BASIN STORAGE	6733	4603	2129	7320	[587]	4212	[-391]	3108	[979]
(i) Existing Sacto Basin		4603	2129			4212	[-391]	2311	[182]
(ii) New Sacto Basin			0					796	[-796]
D. EOM SEPT NEW MELONES STORAGE	1223			1223	[0]				
E. Total Delta Outflow	14817			14615	[-202]				

TABLE 23

SUMMARY OF WATER SUPPLY IMPACTS
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09B-CALFED-786s TOTAL	CVP	SWP	2020D09C-CALFED-809 TOTAL	CVP	SWP
A. (i) Total Delta Exports	4160	2015	2144	4250 [89]	2014 [0]	2235 [90]
(ii) Net Storage Used	1279	952	327	1277 [2]	952 [0]	324 [2]
(a) Existing North-of-Delta		952	327		952 [0]	324 [2]
(b) New North-of-Delta			0			0 [0]
WATER SUPPLY IMPACT (i+ii)				91		
(iii) Additional water to meet required Vernalis flows	55			55 [0]		
(iv) Other Storage Used	164	69	94	183 [-18]	82 [-12]	100 [-6]
(b) New In-Delta			0			0 [0]
(a) Existing South-of-Delta		69	94		82 [-12]	100 [-6]
(b) New South-of-Delta			0			0 [0]
B. Total Delta Outflow	5094			5212 [118]		
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)						
A. Total Delta Exports	6177	2690	3487	6525 [348]	2808 [118]	3717 [230]
WATER SUPPLY IMPACT				348		
B. Additional water to meet required Vernalis flows	47			47 [0]		
C. EOM SEPT SACTO BASIN STORAGE	6784	4662	2122	6589 [-194]	4622 [-39]	1967 [-155]
(i) Existing Sacto Basin		4662	2122		4622 [-39]	1967 [-155]
(ii) New Sacto Basin			0			0 [0]
D. EOM SEPT NEW MELONES STORAGE	1224			1225 [0]		
E. Total Delta Outflow	14334			14294 [-40]		

D-013236

TABLE 24

SUMMARY OF WATER SUPPLY IMPACTS
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09C-CALFED-785s TOTAL	CVP	SWP	2020D09C-CALFED-810 TOTAL		CVP		SWP	
A. (i) Total Delta Exports	3721	1702	2018	3832	[110]	1606	[-96]	2225	[207
(ii) Net Storage Used	1224	882	341	1328	[-103]	960	[-78]	367	[-25
(a) Existing North-of-Delta		882	341			960	[-78]	323	[18]
(b) New North-of-Delta			0					43	[-43
WATER SUPPLY IMPACT (i+ii)					7				
(iii) Additional water to meet required Vernalis flows	56			56	[0]				
(iv) Other Storage Used	149	59	89	168	[-18]	8	[51]	159	[-70
(b) New In-Delta			0					0	[0]
(a) Existing South-of-Delta		59	89			8	[51]	32	[57]
(b) New South-of-Delta			0					127	[-127
B. Total Delta Outflow	5291			5494	[203]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	5368	2280	3087	5704	[335]	2240	[-40]	3463	[375
WATER SUPPLY IMPACT					335				
B. Additional water to meet required Vernalis flows	48			48	[0]				
C. EOM SEPT SACTO BASIN STORAGE	6733	4603	2129	7364	[631]	4219	[-384]	3145	[101
(i) Existing Sacto Basin		4603	2129			4212	[-384]	2311	[201
(ii) New Sacto Basin			0					814	[-814
D. EOM SEPT NEW MELONES STORAGE	1223			1223	[0]				
E. Total Delta Outflow	14817			14687	[-130]				

D-013237

TABLE 25

SUMMARY OF WATER SUPPLY IMPACTS

All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09B-CALFED-786s TOTAL	CVP	SWP	2020D09C-CALFED-811 TOTAL	CVP	SWP
A. (i) Total Delta Exports	4160	2015	2144	4281 [121]	2035 [19]	2246 [101]
(ii) Net Storage Used	1279	952	327	1301 [21]	978 [-25]	323 [4]
(a) Existing North-of-Delta		952	327		978 [-25]	323 [4]
(b) New North-of-Delta			0			0 [0]
WATER SUPPLY IMPACT (i+ii)				100		
(iii) Additional water to meet required Vernalis flows	55			45 [10]		
(iv) Other Storage Used	164	69	94	157 [6]	57 [12]	99 [-5]
(b) New In-Delta			0			0 [0]
(a) Existing South-of-Delta		69	94		57 [12]	99 [-5]
(b) New South-of-Delta			0			0 [0]
B. Total Delta Outflow	5094			5220 [126]		
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)						
A. Total Delta Exports	6177	2690	3487	6541 [364]	2856 [166]	3685 [198]
WATER SUPPLY IMPACT				364		
B. Additional water to meet required Vernalis flows	47			46 [1]		
C. EOM SEPT SACTO BASIN STORAGE	6784	4662	2122	6568 [-215]	4588 [-73]	1980 [-142]
(i) Existing Sacto Basin		4662	2122		4588 [-73]	1980 [-142]
(ii) New Sacto Basin			0			0 [0]
D. EOM SEPT NEW MELONES STORAGE	1224			1225 [0]		
E. Total Delta Outflow	14334			14281 [-53]		

TABLE 26

SUMMARY OF WATER SUPPLY IMPACTS
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09C-CALFED-785s TOTAL	CVP	SWP	2020D09C-CALFED-812 TOTAL		CVP		SWP	
A. (i) Total Delta Exports	3721	1702	2018	3752	[30]	1472	[-229]	2279	[260
(ii) Net Storage Used	1224	882	341	1388	[-163]	1040	[-157]	348	[-6]
(a) Existing North-of-Delta		882	341			1040	[-157]	289	[51]
(b) New North-of-Delta			0					58	[-58
WATER SUPPLY IMPACT (i+ii)					-133				
(iii) Additional water to meet required Vernalis flows	56			56	[0]				
(iv) Other Storage Used	149	59	89	114	[34]	-42	[102]	157	[-67
(b) New In-Delta			0					0	[0]
(a) Existing South-of-Delta		59	89			-42	[102]	47	[41]
(b) New South-of-Delta			0					109	[-10
B. Total Delta Outflow	5291			5649	[358]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	5368	2280	3087	5607	[238]	2110	[-170]	3497	[40
WATER SUPPLY IMPACT					238				
B. Additional water to meet required Vernalis flows	48			48	[0]				
C. EOM SEPT SACTO BASIN STORAGE	6733	4603	2129	6842	[109]	3852	[-750]	2989	[85
(i) Existing Sacto Basin		4603	2129			3852	[-750]	2279	[14
(ii) New Sacto Basin			0					710	[-71
D. EOM SEPT NEW MELONES STORAGE	1223			1222	[0]				
E. Total Delta Outflow	14817			14837	[19]				

TABLE 27

SUMMARY OF WATER SUPPLY IMPACTS
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09C-CALFED-785s TOTAL	CVP	SWP	2020D09C-CALFED-813 TOTAL		CVP		SWP	
A. (i) Total Delta Exports	4160	2015	2144	4419	[259]	2039	[23]	2380	[235]
(ii) Net Storage Used	1279	952	327	1305	[-25]	984	[-32]	348	[7]
(a) Existing North-of-Delta		952	327			984	[-32]	320	[7]
(b) New North-of-Delta			0					0	[0]
WATER SUPPLY IMPACT (i+ii)					234				
(iii) Additional water to meet required Vernalis flows	55			49	[5]				
(iv) Other Storage Used	164	69	94	167	[-3]	62	[7]	105	[-10]
(b) New In-Delta			0					0	[0]
(a) Existing South-of-Delta		69	94			62	[7]	105	[-10]
(b) New South-of-Delta			0					0	[0]
B. Total Delta Outflow	5094			5067	[-26]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	6177	2690	3487	6729	[551]	2901	[210]	3828	[341]
WATER SUPPLY IMPACT					551				
B. Additional water to meet required Vernalis flows	47			47	[0]				
C. EOM SEPT SACTO BASIN STORAGE	6784	4662	2122	6558	[-225]	4548	[-113]	2009	[-112]
(i) Existing Sacto Basin		4662	2122			4548	[-113]	2009	[-112]
(ii) New Sacto Basin			0					0	[0]
D. EOM SEPT NEW MELONES STORAGE	1224			1225	[0]				
E. Total Delta Outflow	14334			14120	[-214]				

TABLE 28

SUMMARY OF WATER SUPPLY IMPACTS
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09C-CALFED-785s TOTAL	CVP	SWP	2020D09C-CALFED-817 TOTAL		CVP		SWP	
A. (i) Total Delta Exports	3721	1702	2018	3765	[44]	1457	[-244]	2307	[288]
(ii) Net Storage Used	1224	882	341	1409	[-185]	1037	[-154]	372	[-30]
(a) Existing North-of-Delta		882	341			1037	[-154]	307	[34]
(b) New North-of-Delta			0					65	[-65]
WATER SUPPLY IMPACT (i+ii)					-141				
(iii) Additional water to meet required Vernalis flows	56			56	[0]				
(iv) Other Storage Used	149	59	89	221	[-72]	-10	[70]	232	[-143]
(b) New In-Delta			0					0	[0]
(a) Existing South-of-Delta		59	89			-10	[70]	62	[27]
(b) New South-of-Delta			0					170	[-170]
B. Total Delta Outflow	5291			5652	[360]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	5368	2280	3087	5669	[300]	2149	[-131]	3520	[432]
WATER SUPPLY IMPACT					300				
B. Additional water to meet required Vernalis flows	48			48	[0]				
C. EOM SEPT SACTO BASIN STORAGE	6733	4603	2129	7072	[339]	4053	[-550]	3018	[889]
(i) Existing Sacto Basin		4603	2129			4053	[-550]	2291	[162]
(ii) New Sacto Basin			0					727	[-727]
D. EOM SEPT NEW MELONES STORAGE	1223			1223	[0]				
E. Total Delta Outflow	14817			14747	[-70]				

D-013241

TABLE 29

SUMMARY OF WATER SUPPLY IMPACTS
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09B-CALFED-786s TOTAL	CVP	SWP	2020D09C-CALFED-818 TOTAL	CVP	SWP
A. (i) Total Delta Exports	4160	2015	2144	4419 [259]	2039 [23]	2380 [235]
(ii) Net Storage Used	1279	952	327	1305 [-25]	984 [-32]	320 [7]
(a) Existing North-of-Delta		952	327		984 [-32]	320 [7]
(b) New North-of-Delta			0			0 [0]
WATER SUPPLY IMPACT (i+ii)				234		
(iii) Additional water to meet required Vernalis flows	55			49 [5]		
(iv) Other Storage Used	164	69	94	167 [-3]	62 [7]	105 [-10]
(b) New In-Delta			0			0 [0]
(a) Existing South-of-Delta		69	94		62 [7]	105 [-10]
(b) New South-of-Delta			0			0 [0]
B. Total Delta Outflow	5094			5067 [-26]		
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)						
A. Total Delta Exports	6177	2690	3487	6729 [551]	2901 [210]	3828 [341]
WATER SUPPLY IMPACT				551		
B. Additional water to meet required Vernalis flows	47			47 [0]		
C. EOM SEPT SACTO BASIN STORAGE	6784	4662	2122	6558 [-225]	4548 [-73]	2009 [-112]
(i) Existing Sacto Basin		4662	2122		4548 [-73]	2009 [-112]
(ii) New Sacto Basin			0			0 [0]
D. EOM SEPT NEW MELONES STORAGE	1224			1225 [0]		
E. Total Delta Outflow	14334			14120 [-214]		

TABLE 30

SUMMARY OF WATER SUPPLY IMPACTS
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09B-CALFED-785s TOTAL	CVP	SWP	2020D09C-CALFED-819 TOTAL	CVP	SWP
A. (i) Total Delta Exports	3721	1702	2018	3891 [170]	1542 [-159]	2348 [329]
(ii) Net Storage Used	1224	882	341	1406 [-182]	1035 [-152]	371 [-29]
(a) Existing North-of-Delta		882	341		1035 [-152]	298 [43]
(b) New North-of-Delta			0			72 [-72]
WATER SUPPLY IMPACT (i+ii)				-12		
(iii) Additional water to meet required Vernalis flows	56			57 [0]		
(iv) Other Storage Used	149	59	89	192 [-43]	-30 [90]	223 [-133]
(b) New In-Delta			0			0 [0]
(a) Existing South-of-Delta		59	89		-30 [90]	64 [24]
(b) New South-of-Delta			0			158 [-158]
B. Total Delta Outflow	5291			5519 [227]		
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)						
A. Total Delta Exports	5368	2280	3087	5711 [342]	2174 [-106]	3537 [449]
WATER SUPPLY IMPACT				342		
B. Additional water to meet required Vernalis flows	48			48 [0]		
C. EOM SEPT SACTO BASIN STORAGE	6733	4603	2129	7310 [577]	4178 [-425]	3132 [1002]
(i) Existing Sacto Basin		4603	2129		4178 [-425]	2361 [232]
(ii) New Sacto Basin			0			770 [-770]
D. EOM SEPT NEW MELONES STORAGE	1223			1223 [0]		
E. Total Delta Outflow	14817			14682 [-19]		

TABLE 31

SUMMARY OF WATER SUPPLY IMPACTS
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09B-CALFED-786s TOTAL	CVP	SWP	2020D09C-CALFED-820 TOTAL	CVP	SWP
A. (i) Total Delta Exports	4160	2015	2144	4401 [241]	2016 [1]	2385 [240]
(ii) Net Storage Used	1279	952	327	1308 [-28]	988 [-36]	320 [7]
(a) Existing North-of-Delta		952	327		988 [-36]	320 [7]
(b) New North-of-Delta			0			0 [0]
WATER SUPPLY IMPACT (i+ii)				213		
(iii) Additional water to meet required Vernalis flows	55			49 [5]		
(iv) Other Storage Used	164	69	94	169 [-4]	63 [5]	105 [-10]
(b) New In-Delta			0			0 [0]
(a) Existing South-of-Delta		69	94		63 [5]	105 [-10]
(b) New South-of-Delta			0			0 [0]
B. Total Delta Outflow	5094			5088 [-5]		
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)						
A. Total Delta Exports	6177	2690	3487	6725 [547]	2899 [209]	3825 [338]
WATER SUPPLY IMPACT				547		
B. Additional water to meet required Vernalis flows	47			47 [0]		
C. EOM SEPT SACTO BASIN STORAGE	6784	4662	2122	6556 [-228]	4547 [-114]	2008 [-114]
(i) Existing Sacto Basin		4662	2122		4547 [-114]	2008 [-114]
(ii) New Sacto Basin			0			0 [0]
D. EOM SEPT NEW MELONES STORAGE	1224			1225 [0]		
E. Total Delta Outflow	14334			14124 [-210]		

D-013244

TABLE 32

SUMMARY OF WATER SUPPLY IMPACTS
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09B-CALFED-785s TOTAL	CVP	SWP	2020D09C-CALFED-821 TOTAL	CVP	SWP
A. (i) Total Delta Exports	3721	1702	2018	3864 [142]	1606 [-96]	2257 [238]
(ii) Net Storage Used	1224	882	341	1320 [-96]	960 [-152]	360 [-18]
(a) Existing North-of-Delta		882	341		960 [-152]	318 [23]
(b) New North-of-Delta			0			41 [-41]
WATER SUPPLY IMPACT (i+ii)				46		
(iii) Additional water to meet required Vernalis flows	56			56 [0]		
(iv) Other Storage Used	149	59	89	187 [-38]	10 [49]	177 [-87]
(b) New In-Delta			0			0 [0]
(a) Existing South-of-Delta		59	89		-30 [90]	39 [49]
(b) New South-of-Delta			0			137 [-137]
B. Total Delta Outflow	5291			5453 [162]		
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)						
A. Total Delta Exports	5368	2280	3087	5737 [368]	2254 [-26]	3482 [394]
WATER SUPPLY IMPACT				368		
B. Additional water to meet required Vernalis flows	48			48 [0]		
C. EOM SEPT SACTO BASIN STORAGE	6733	4603	2129	7370 [637]	4222 [-381]	3148 [1019]
(i) Existing Sacto Basin		4603	2129		4222 [-381]	2332 [202]
(ii) New Sacto Basin			0			816 [-816]
D. EOM SEPT NEW MELONES STORAGE	1223			1223 [0]		
E. Total Delta Outflow	14817			14655 [-162]		

TABLE 33

SUMMARY OF WATER SUPPLY IMPACTS
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09B-CALFED-786s TOTAL	CVP	SWP	2020D09C-CALFED-822 TOTAL		CVP		SWP	
A. (i) Total Delta Exports	4160	2015	2144	4274	[114]	2026	[11]	2247	[103]
(ii) Net Storage Used	1279	952	327	1303	[-23]	979	[-26]	323	[3]
(a) Existing North-of-Delta		952	327			979	[-26]	323	[3]
(b) New North-of-Delta			0					0	[0]
WATER SUPPLY IMPACT (i+ii)				91					
(iii) Additional water to meet required Vernalis flows	55			55	[0]				
(iv) Other Storage Used	164	69	94	158	[5]	59	[9]	98	[-4]
(b) New In-Delta			0					0	[0]
(a) Existing South-of-Delta		69	94			59	[5]	98	[-4]
(b) New South-of-Delta			0					0	[0]
B. Total Delta Outflow	5094			5214	[120]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	6177	2690	3487	6510	[333]	2820	[130]	3690	[203]
WATER SUPPLY IMPACT				333					
B. Additional water to meet required Vernalis flows	47			47	[0]				
C. EOM SEPT SACTO BASIN STORAGE	6784	4662	2122	6574	[-210]	4593	[-68]	1981	[-141]
(i) Existing Sacto Basin		4662	2122			4593	[-68]	1981	[-141]
(ii) New Sacto Basin			0					0	[0]
D. EOM SEPT NEW MELONES STORAGE	1224			1225	[0]				
E. Total Delta Outflow	14334			14309	[-24]				

TABLE 34

SUMMARY OF WATER SUPPLY IMPACTS
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09C-CALFED-801 TOTAL	CVP	SWP	2020D09C-CALFED-839 TOTAL		CVP		SWP	
A. (i) Total Delta Exports	4665	1933	2731	4685	[20]	1928	[-5]	2756	[25]
(ii) Net Storage Used	1576	961	614	1585	[-8]	963	[-1]	621	[-7]
(a) Existing North-of-Delta		961	328			963	[-1]	329	[0]
(b) New North-of-Delta			285					292	[-6]
WATER SUPPLY IMPACT (i+ii)				12					
(iii) Additional water to meet required Vernalis flows	55			55	[0]				
(iv) Other Storage Used	393	76	316	397	[-3]	79	[3]	317	[0]
(b) New In-Delta			0					0	[0]
(a) Existing South-of-Delta		76	83			79	[-3]	83	[0]
(b) New South-of-Delta			233					233	[0]
B. Total Delta Outflow	5067			4870	[-196]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	6941	2686	4254	6979	[38]	2684	[-1]	4294	[40]
WATER SUPPLY IMPACT				38					
B. Additional water to meet required Vernalis flows	47			47	[0]				
C. EOM SEPT SACTO BASIN STORAGE	8109	4526	3583	8159	[50]	4496	[-30]	3663	[80]
(i) Existing Sacto Basin		4526	2466			4496	[-30]	2513	[46]
(ii) New Sacto Basin			1116					1149	[-33]
D. EOM SEPT NEW MELONES STORAGE	1224			1224	[0]				
E. Total Delta Outflow	13715			13492	[-223]				

TABLE 35

SUMMARY OF WATER SUPPLY IMPACTS
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09C-CALFED-809 TOTAL	CVP	SWP	2020D09C-CALFED-840 TOTAL		CVP		SWP	
A. (i) Total Delta Exports	4250	2014	2235	4240	[-9]	2007	[-6]	2232	[-2]
(ii) Net Storage Used	1277	952	324	1281	[-4]	955	[-3]	325	[0]
(a) Existing North-of-Delta		952	324			955	[-3]	325	[0]
(b) New North-of-Delta			0					0	[0]
WATER SUPPLY IMPACT (i+ii)				-13					
(iii) Additional water to meet required Vernalis flows	55			55	[0]				
(iv) Other Storage Used	183	82	100	182	[1]	81	[0]	100	[0]
(b) New In-Delta			0					0	[0]
(a) Existing South-of-Delta		82	100			81	[0]	100	[0]
(b) New South-of-Delta			0					0	[0]
B. Total Delta Outflow	5212			5015	[-197]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	6525	2808	3717	6516	[-9]	2807	[0]	3708	[-8]
WATER SUPPLY IMPACT				-9					
B. Additional water to meet required Vernalis flows	47			47	[0]				
C. EOM SEPT SACTO BASIN STORAGE	6589	4622	1967	6559	[-30]	4609	[-12]	1949	[-17]
(i) Existing Sacto Basin		4622	1967			4609	[-12]	1949	[-17]
(ii) New Sacto Basin			0					0	[0]
D. EOM SEPT NEW MELONES STORAGE	1225			1225	[0]				
E. Total Delta Outflow	14294			14002	[-291]				

TABLE 36

SUMMARY OF WATER SUPPLY IMPACTS
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09C-CALFED-789 TOTAL	CVP	SWP	2020D09C-CALFED-841 TOTAL		CVP		SWP	
A. (i) Total Delta Exports	3718	1692	2025	3710	[-8]	1693	[0]	2016	[-9]
(ii) Net Storage Used	1194	883	311	1197	[-2]	884	[-1]	312	[-1]
(a) Existing North-of-Delta		883	311			884	[-1]	312	[-1]
(b) New North-of-Delta			0					0	[0]
WATER SUPPLY IMPACT (i+ii)				-10					
(iii) Additional water to meet required Vernalis flows	56			56	[0]				
(iv) Other Storage Used	173	79	94	173	[0]	79	[0]	94	[0]
(b) New In-Delta			0					0	[0]
(a) Existing South-of-Delta		79	94			79	[0]	94	[0]
(b) New South-of-Delta			0					0	[0]
B. Total Delta Outflow	5477			5276	[-201]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	5465	2294	3170	5467	[1]	2294	[0]	3172	[1]
WATER SUPPLY IMPACT				1					
B. Additional water to meet required Vernalis flows	48			48	[0]				
C. EOM SEPT SACTO BASIN STORAGE	6703	4578	2124	6682	[-20]	4568	[-9]	2114	[-10]
(i) Existing Sacto Basin		4578	2124			4568	[-9]	2114	[-10]
(ii) New Sacto Basin			0					0	[0]
D. EOM SEPT NEW MELONES STORAGE	1223			1223	[0]				
E. Total Delta Outflow	15012			14722	[-290]				

D-013249

TABLE 37

SUMMARY OF WATER SUPPLY IMPACTS
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	2020D09C-CALFED-808 TOTAL	CVP	SWP	2020D09C-CALFED-842 TOTAL	CVP	SWP
A. (i) Total Delta Exports	3900	1656	2243	3915 [+15]	1643 [-12]	2271 [+27]
(ii) Net Storage Used	1330	965	365	1351 [-21]	973 [-8]	378 [-13]
(a) Existing North-of-Delta		965	314		973 [-8]	314 [0]
(b) New North-of-Delta			51			64 [-13]
WATER SUPPLY IMPACT (i+ii)				-6		
(iii) Additional water to meet required Vernalis flows	56			56 [0]		
(iv) Other Storage Used	190	-9	200	200 [-10]	0 [-10]	200 [0]
(b) New In-Delta			0			0 [0]
(a) Existing South-of-Delta		-9	42		0 [-10]	41 [0]
(b) New South-of-Delta			158			158 [0]
B. Total Delta Outflow	5429			5228 [-200]		
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)						
A. Total Delta Exports	5876	2390	3486	5785 [-90]	2282 [-107]	3502 [16]
WATER SUPPLY IMPACT				-90		
B. Additional water to meet required Vernalis flows	48			48 [0]		
C. EOM SEPT SACTO BASIN STORAGE	7283	4194	3088	7446 [163]	4195 [1]	3250 [161]
(i) Existing Sacto Basin		4194	2297		4195 [1]	2361 [64]
(ii) New Sacto Basin			791			889 [-97]
D. EOM SEPT NEW MELONES STORAGE	1224			1224 [0]		
E. Total Delta Outflow	14523			14401 [-122]		

TABLE 38

SUMMARY OF WATER SUPPLY IMPACTS
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	1995D06E-CALFED-771 TOTAL	CVP	SWP	1995D06E-CALFEDWQ-848 TOTAL		CVP		SWP	
A. (i) Total Delta Exports	4169	2049	2120	4196	[27]	2035	[-14]	2161	[4
(ii) Net Storage Used	1262	932	329	1262	[0]	933	[-1]	328	[1
(a) Existing North-of-Delta		932	329			933	[-1]	328	[0
(b) New North-of-Delta			0					0	[0
WATER SUPPLY IMPACT (i+ii)					[27]				
(iii) Additional water to meet required Vernalis flows	56			56	[0]				
(iv) Other Storage Used	184	76	108	206	[-22]	87	[-11]	118	[-1(
(b) New In-Delta			0					0	[0
(a) Existing South-of-Delta		76	108			87	[-11]	112	[-4
(b) New South-of-Delta			0					5	[-5
B. Total Delta Outflow	5030			5004	[-26]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	5746	2682	3063	5829	[83]	2714	[32]	3115	[52
WATER SUPPLY IMPACT					[83]				
B. Additional water to meet required Vernalis flows	49			49	[0]				
C. EOM SEPT SACTO BASIN STORAGE	7003	4742	2261	6997	[-6]	4707	[-34]	2289	[2E
(i) Existing Sacto Basin		4742	2261			4707	[-34]	2289	[2E
(ii) New Sacto Basin			0					[0]	[0
D. EOM SEPT NEW MELONES STORAGE	1232			1232	[0]				
E. Total Delta Outflow	14761			14680	[-81]				

D-013251

TABLE 39

SUMMARY OF WATER SUPPLY IMPACTS
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	1995D06E-CALFED-771 TOTAL	CVP	SWP	1995D06E-CALFEDWQ-852 TOTAL		CVP		SWP	
A. (i) Total Delta Exports	4169	2049	2120	3989	[-180]	1959	[-89]	2029	[90]
(ii) Net Storage Used	1262	932	329	1283	[-20]	948	[-16]	334	[-4]
(a) Existing North-of-Delta		932	329			948	[-16]	334	[-4]
(b) New North-of-Delta			0					0	[0]
WATER SUPPLY IMPACT (i+ii)					[-200]				
(iii) Additional water to meet required Vernalis flows	56			57	[0]				
(iv) Other Storage Used	184	76	108	250	[-66]	94	[-17]	156	[-48
(b) New In-Delta			0					0	[0]
(a) Existing South-of-Delta		76	108			94	[-17]	110	[-2]
(b) New South-of-Delta			0					46	[-46
B. Total Delta Outflow	5030			5228	[198]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	5746	2682	3063	5890	[143]	2818	[136]	3071	[7]
WATER SUPPLY IMPACT					[143]				
B. Additional water to meet required Vernalis flows	49			48	[0]				
C. EOM SEPT SACTO BASIN STORAGE	7003	4742	2261	6805	[-197]	4609	[-132]	2196	[-65
(i) Existing Sacto Basin		4742	2261			4609	[-132]	2196	[-65
(ii) New Sacto Basin			0					0	[0]
D. EOM SEPT NEW MELONES STORAGE	1232			1232	[0]				
E. Total Delta Outflow	14761			14629	[-132]				

TABLE 40

SUMMARY OF WATER SUPPLY IMPACTS
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	1995D06E-CALFED-771 TOTAL	CVP	SWP	1995D06E-CALFEDWQ-853 TOTAL		CVP		SWP	
A. (i) Total Delta Exports	4169	2049	2120	3976	[-193]	1954	[-95]	2022	[-9
(ii) Net Storage Used	1262	932	329	1284	[-22]	950	[-18]	334	[-5
(a) Existing North-of-Delta		932	329			950	[-18]	334	[-5
(b) New North-of-Delta			0					0	[0
WATER SUPPLY IMPACT (i+ii)					[-215]				
(iii) Additional water to meet required Vernalis flows	56			56	[0]				
(iv) Other Storage Used	184	76	108	250	[-66]	94	[-18]	156	[-4
(b) New In-Delta			0					0	[0
(a) Existing South-of-Delta		76	108			94	[-18]	156	[-4
(b) New South-of-Delta			0					46	[-4
B. Total Delta Outflow	5030			5242	[212]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	5746	2682	3063	5886	[140]	2816	[134]	3069	[6
WATER SUPPLY IMPACT					[140]				
B. Additional water to meet required Vernalis flows	49			49	[0]				
C. EOM SEPT SACTO BASIN STORAGE	7003	4742	2261	6791	[-212]	4597	[-145]	2193	[-6
(i) Existing Sacto Basin		4742	2261			4597	[-145]	2193	[-6
(ii) New Sacto Basin			0					0	[0
D. EOM SEPT NEW MELONES STORAGE	1232			1232	[0]				
E. Total Delta Outflow	14761			14633	[-128]				

D-013253

TABLE 41

SUMMARY OF WATER SUPPLY IMPACTS
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	1995D06E-CALFED-771 TOTAL	CVP	SWP	1995D06E-CALFED-857 TOTAL		CVP		SWP	
A. (i) Total Delta Exports	4169	2049	2120	4162	[-7]	2026	[-22]	2135	[15
(ii) Net Storage Used	1262	932	329	1260	[1]	931	[1]	328	[0]
(a) Existing North-of-Delta		932	329			931	[1]	328	[0]
(b) New North-of-Delta			0					0	[0]
WATER SUPPLY IMPACT (i+ii)					-6				
(iii) Additional water to meet required Vernalis flows	56			57	[0]				
(iv) Other Storage Used	184	76	108	186	[-1]	76	[0]	110	[-2]
(b) New In-Delta			0					0	[0]
(a) Existing South-of-Delta		76	108			76	[0]	110	[-2]
(b) New South-of-Delta			0					0	[0]
B. Total Delta Outflow	5030			5027	[-2]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	5746	2682	3063	5613	[-132]	2634	[-47]	2978	[-85
WATER SUPPLY IMPACT					-132				
B. Additional water to meet required Vernalis flows	49			48	[0]				
C. EOM SEPT SACTO BASIN STORAGE	7003	4742	2261	7062	[59]	4745	[3]	2317	[56]
(i) Existing Sacto Basin		4742	2261			4745	[3]	2317	[56]
(ii) New Sacto Basin			0					0	[0]
D. EOM SEPT NEW MELONES STORAGE	1232			1231	[0]				
E. Total Delta Outflow	14761			14889	[127]				

TABLE 42

SUMMARY OF WATER SUPPLY IMPACTS
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	1995D06E-CALFED-771 TOTAL	CVP	SWP	1995D06E-CALFED-858 TOTAL		CVP		SWP	
A. (i) Total Delta Exports	4169	2049	2120	3834	[-335]	1785	[-263]	2049	[-71
(ii) Net Storage Used	1262	932	329	1219	[42]	890	[42]	329	[0]
(a) Existing North-of-Delta		932	329			890	[42]	329	[0]
(b) New North-of-Delta			0					0	[0]
WATER SUPPLY IMPACT (i+ii)					-293				
(iii) Additional water to meet required Vernalis flows	56			58	[-1]				
(iv) Other Storage Used	184	76	108	148	[35]	56	[20]	92	[15]
(b) New In-Delta			0					0	[0]
(a) Existing South-of-Delta		76	108			56	[20]	92	[15]
(b) New South-of-Delta			0					0	[0]
B. Total Delta Outflow	5030			5302	[272]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	5746	2682	3063	5175	[-571]	2272	[-410]	2903	[-16(
WATER SUPPLY IMPACT					-571				
B. Additional water to meet required Vernalis flows	49			48	[0]				
C. EOM SEPT SACTO BASIN STORAGE	7003	4742	2261	7192	[188]	4875	[133]	2317	[55]
(i) Existing Sacto Basin		4742	2261			4875	[133]	2317	[55]
(ii) New Sacto Basin			0					0	[0]
D. EOM SEPT NEW MELONES STORAGE	1232			1230	[0]				
E. Total Delta Outflow	14761			15307	[545]				

TABLE 43

SUMMARY OF WATER SUPPLY IMPACTS
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	1995D06E-CALFED-771 TOTAL	CVP	SWP	1995D06E-CALFED-859 TOTAL		CVP		SWP	
A. (i) Total Delta Exports	4169	2049	2120	4481	[311]	1823	[-226]	2658	[537]
(ii) Net Storage Used	1262	932	329	1535	[-272]	940	[-7]	594	[-265]
(a) Existing North-of-Delta		932	329			940	[-7]	313	[15]
(b) New North-of-Delta			0					281	[-281]
WATER SUPPLY IMPACT (i+ii)					-39				
(iii) Additional water to meet required Vernalis flows	56			57	[-1]				
(iv) Other Storage Used	184	76	108	234	[-49]	17	[59]	216	[-108]
(b) New In-Delta			0					0	[0]
(a) Existing South-of-Delta		76	108			17	[59]	49	[59]
(b) New South-of-Delta			0					167	[-167]
B. Total Delta Outflow	5030			4971	[-58]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	5746	2682	3063	5380	[-366]	2284	[-397]	3095	[31]
WATER SUPPLY IMPACT					-366				
B. Additional water to meet required Vernalis flows	49			48	[0]				
C. EOM SEPT SACTO BASIN STORAGE	7003	4742	2261	9199	[2196]	4821	[78]	4378	[2117]
(i) Existing Sacto Basin		4742	2261			4821	[78]	2875	[613]
(ii) New Sacto Basin			0					1503	[-1503]
D. EOM SEPT NEW MELONES STORAGE	1232			1230	[0]				
E. Total Delta Outflow	14761			15039	[277]				

TABLE 44

SUMMARY OF WATER SUPPLY IMPACTS
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	1995D06E-CALFED-771 TOTAL	CVP	SWP	1995D06E-CALFED-860 TOTAL		CVP		SWP	
A. (i) Total Delta Exports	4169	2049	2120	4108	[-61]	1995	[-53]	2112	[-8]
(ii) Net Storage Used	1262	932	329	1235	[26]	905	[26]	329	[0]
(a) Existing North-of-Delta		932	329			905	[26]	329	[0]
(b) New North-of-Delta			0					0	[0]
WATER SUPPLY IMPACT (i+ii)					-35				
(iii) Additional water to meet required Vernalis flows	56			57	[-1]				
(iv) Other Storage Used	184	76	108	179	[5]	71	[5]	107	[0]
(b) New In-Delta			0					0	[0]
(a) Existing South-of-Delta		76	108			71	[5]	107	[0]
(b) New South-of-Delta			0					0	[0]
B. Total Delta Outflow	5030			4995	[-35]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	5746	2682	3063	5717	[-28]	2661	[-21]	3056	[-7]
WATER SUPPLY IMPACT					-28				
B. Additional water to meet required Vernalis flows	49			50	[-1]				
C. EOM SEPT SACTO BASIN STORAGE	7003	4742	2261	6778	[-224]	4527	[-214]	2251	[-10
(i) Existing Sacto Basin		4742	2261			4527	[-214]	2251	[-10
(ii) New Sacto Basin			0					0	[0]
D. EOM SEPT NEW MELONES STORAGE	1232			1231	[0]				
E. Total Delta Outflow	14761			14611	[-150]				

D-013257

TABLE 45

SUMMARY OF WATER SUPPLY IMPACTS
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	1995D06E-CALFED-771 TOTAL	CVP	SWP	1995D06E-CALFED-861 TOTAL		CVP		SWP	
A. (i) Total Delta Exports	4169	2049	2120	4106	[-63]	2022	[-26]	2083	[-37
(ii) Net Storage Used	1262	932	329	1272	[-10]	939	[-6]	332	[-3]
(a) Existing North-of-Delta		932	329			939	[-6]	332	[-3]
(b) New North-of-Delta			0					0	[0]
WATER SUPPLY IMPACT (i+ii)					-73				
(iii) Additional water to meet required Vernalis flows	56			56	[0]				
(iv) Other Storage Used	184	76	108	187	[-2]	79	[-2]	108	[0]
(b) New In-Delta			0					0	[0]
(a) Existing South-of-Delta		76	108			79	[-2]	108	[0]
(b) New South-of-Delta			0					0	[0]
B. Total Delta Outflow	5030			5006	[-23]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	5746	2682	3063	5723	[-22]	2675	[-7]	3048	[-15
WATER SUPPLY IMPACT					-22				
B. Additional water to meet required Vernalis flows	49			48	[0]				
C. EOM SEPT SACTO BASIN STORAGE	7003	4742	2261	6962	[-41]	4719	[-22]	2242	[-18
(i) Existing Sacto Basin		4742	2261			4719	[-22]	2242	[-18
(ii) New Sacto Basin			0					0	[0]
D. EOM SEPT NEW MELONES STORAGE	1232			1231	[0]				
E. Total Delta Outflow	14761			14677	[-84]				

TABLE 46

SUMMARY OF WATER SUPPLY IMPACTS
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	1995D06E-CALFED-771 TOTAL	CVP	SWP	1995D06E-CALFED-862 TOTAL		CVP		SWP	
A. (i) Total Delta Exports	4169	2049	2120	3858	[-311]	1804	[-244]	2053	[-66
(ii) Net Storage Used	1262	932	329	1232	[29]	899	[33]	333	[-3]
(a) Existing North-of-Delta		932	329			899	[33]	333	[-3]
(b) New North-of-Delta			0					0	[0]
WATER SUPPLY IMPACT (i+ii)					-282				
(iii) Additional water to meet required Vernalis flows	56			57	[0]				
(iv) Other Storage Used	184	76	108	146	[38]	53	[23]	92	[15]
(b) New In-Delta			0					0	[0]
(a) Existing South-of-Delta		76	108			53	[23]	92	[15]
(b) New South-of-Delta			0					0	[0]
B. Total Delta Outflow	5030			5299	[269]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	5746	2682	3063	5244	[-502]	2286	[-396]	2957	[-10
WATER SUPPLY IMPACT					-502				
B. Additional water to meet required Vernalis flows	49			48	[0]				
C. EOM SEPT SACTO BASIN STORAGE	7003	4742	2261	7174	[171]	4875	[133]	2298	[37]
(i) Existing Sacto Basin		4742	2261			4875	[133]	2298	[37]
(ii) New Sacto Basin			0					0	[0]
D. EOM SEPT NEW MELONES STORAGE	1232			1230	[-1]				
E. Total Delta Outflow	14761			15241	[479]				

TABLE 47

SUMMARY OF WATER SUPPLY IMPACTS
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	1995D06E-CALFED-771			1995D06E-CALFEDWQ-870					
	TOTAL	CVP	SWP	TOTAL		CVP		SWP	
A. (i) Total Delta Exports	4169	2049	2120	4187	[18]	2033	[-16]	2153	[33]
(ii) Net Storage Used	1262	932	329	1262	[0]	932	[0]	329	[0]
(a) Existing North-of-Delta		932	329			932	[0]	329	[0]
(b) New North-of-Delta			0					0	[0]
WATER SUPPLY IMPACT (i+ii)					[18]				
(iii) Additional water to meet required Vernalis flows	56			56	[0]				
(iv) Other Storage Used	184	76	108	245	[-61]	88	[-12]	156	[-48]
(b) New In-Delta			0					0	[0]
(a) Existing South-of-Delta		76	108			88	[-12]	156	[-48]
(b) New South-of-Delta			0					46	[-46]
B. Total Delta Outflow	5030			5011	[-19]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	5746	2682	3063	5833	[87]	2710	[28]	3122	[59]
WATER SUPPLY IMPACT					[87]				
B. Additional water to meet required Vernalis flows	49			49	[0]				
C. EOM SEPT SACTO BASIN STORAGE	7003	4742	2261	6977	[-26]	4718	[-24]	2258	[-3]
(i) Existing Sacto Basin		4742	2261			4718	[-24]	2258	[-3]
(ii) New Sacto Basin			0					0	[0]
D. EOM SEPT NEW MELONES STORAGE	1232			1232	[0]				
E. Total Delta Outflow	14761			14677	[-84]				

TABLE 48

SUMMARY OF WATER SUPPLY IMPACTS
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	1995D06E-CALFED-771 TOTAL	CVP	SWP	1995D06E-CALFED-881 TOTAL		CVP		SWP	
A. (i) Total Delta Exports	4169	2049	2120	3863	[-306]	1889	[-160]	1974	[-146]
(ii) Net Storage Used	1262	932	329	1152	[110]	931	[1]	221	[108]
(a) Existing North-of-Delta		932	329			931	[1]	221	[108]
(b) New North-of-Delta			0					0	[0]
WATER SUPPLY IMPACT (i+ii)					[-196]				
(iii) Additional water to meet required Vernalis flows	56			54	[2]				
(iv) Other Storage Used	184	76	108	208	[-24]	100	[-24]	107	[1]
(b) New In-Delta			0					0	[0]
(a) Existing South-of-Delta		76	108			100	[-24]	107	[1]
(b) New South-of-Delta			0					0	[0]
B. Total Delta Outflow	5030			5189	[158]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	5746	2682	3063	4322	[-1424]	2024	[-658]	2297	[-766]
WATER SUPPLY IMPACT					[-1424]				
B. Additional water to meet required Vernalis flows	49			47	[2]				
C. EOM SEPT SACTO BASIN STORAGE	7003	4742	2261	7699	[696]	4861	[119]	2837	[576]
(i) Existing Sacto Basin		4742	2261			4861	[119]	2837	[576]
(ii) New Sacto Basin			0					0	[0]
D. EOM SEPT NEW MELONES STORAGE	1232			1227	[-5]				
E. Total Delta Outflow	14761			16141	[1380]				

D-013261

TABLE 49

SUMMARY OF WATER SUPPLY IMPACTS
All values in Thousand Acre-Feet/Year

I. HISTORIC DRY PERIOD AVERAGES (May 1928 - Oct 1934)	1995D06E-CALFED-771			1995D06E-CALFED-882					
	TOTAL	CVP	SWP	TOTAL		CVP		SWP	
A. (i) Total Delta Exports	4169	2049	2120	2494	[-1675]	1130	[-918]	1364	[-756]
(ii) Net Storage Used	1262	932	329	934	[327]	870	[62]	64	[264]
(a) Existing North-of-Delta		932	329			870	[62]	64	[264]
(b) New North-of-Delta			0					0	[0]
WATER SUPPLY IMPACT (i+ii)					-1348				
(iii) Additional water to meet required Vernalis flows	56			57	[0]				
(iv) Other Storage Used	184	76	108	10	[174]	-17	[94]	28	[79]
(b) New In-Delta			0					0	[0]
(a) Existing South-of-Delta		76	108			-17	[94]	28	[79]
(b) New South-of-Delta			0					0	[0]
B. Total Delta Outflow	5030			6288	[1258]				
II. 73-YEAR (1922-1994) AVERAGES (Oct 1921 - Sep 1994)									
A. Total Delta Exports	5746	2682	3063	2835	[-2911]	1104	[-1577	1730	[-1333]
WATER SUPPLY IMPACT					-2911				
B. Additional water to meet required Vernalis flows	49			47	[1]				
C. EOM SEPT SACTO BASIN STORAGE	7003	4742	2261	7983	[979]	5014	[272]	2968	[707]
(i) Existing Sacto Basin		4742	2261			5014	[272]	2968	[707]
(ii) New Sacto Basin			0					0	[0]
D. EOM SEPT NEW MELONES STORAGE	1232			1224	[-7]				
E. Total Delta Outflow	14761			17595	[2834]				

FIGURE 1

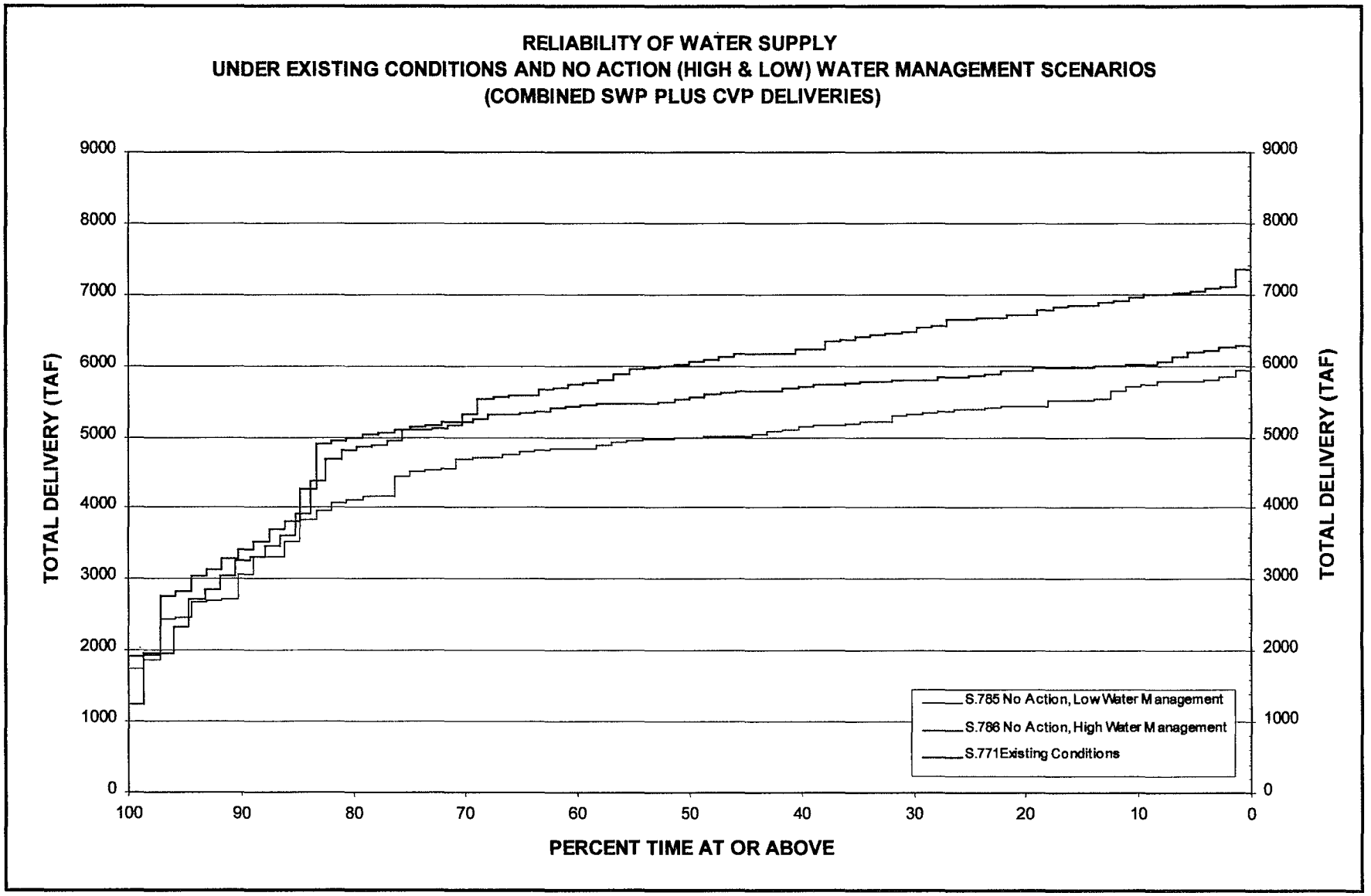


FIGURE 2

APPLICATION OF NEW DELTA PRESCRIPTIONS FOR EXPORT CONTROL (STUDY 785)

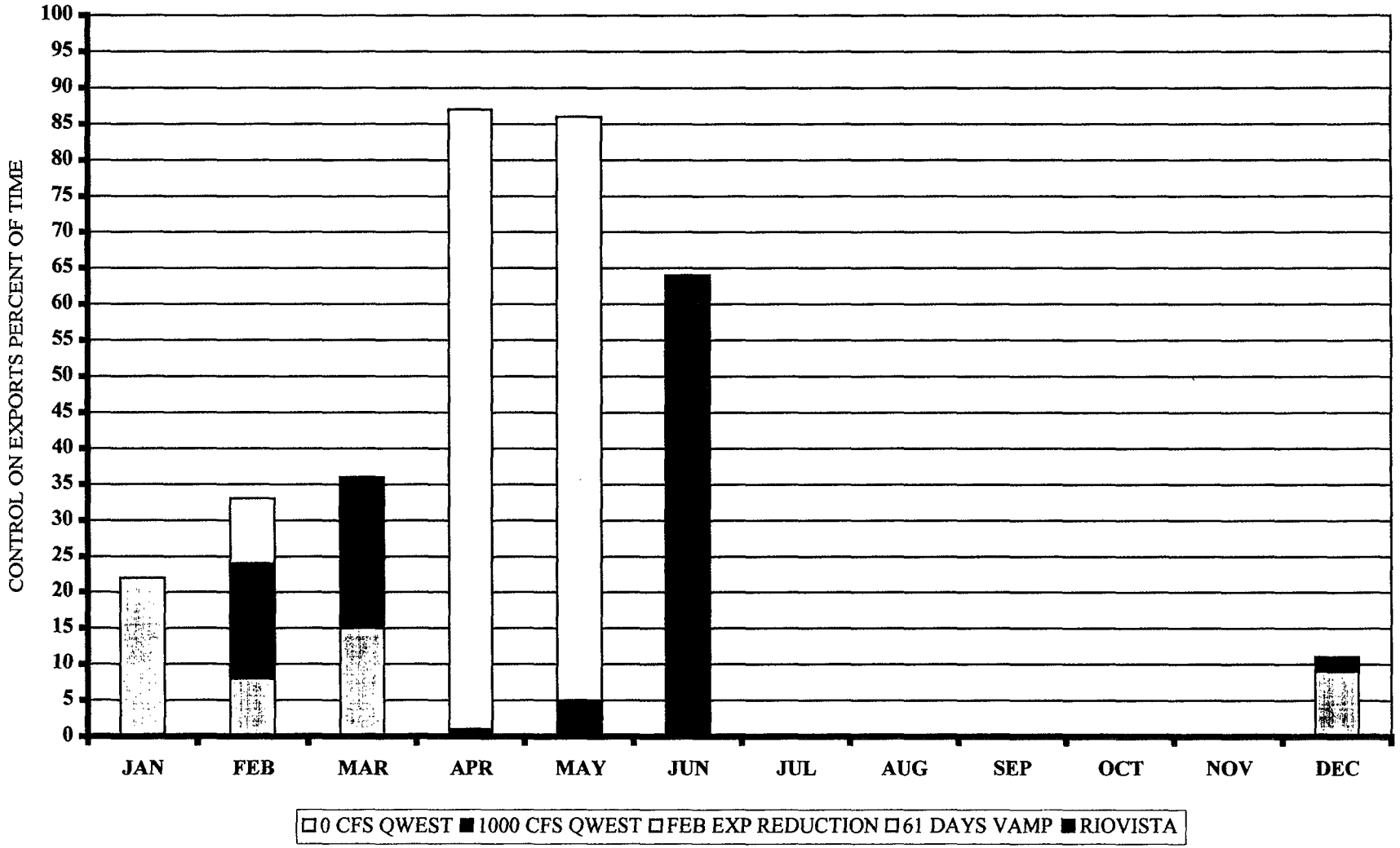
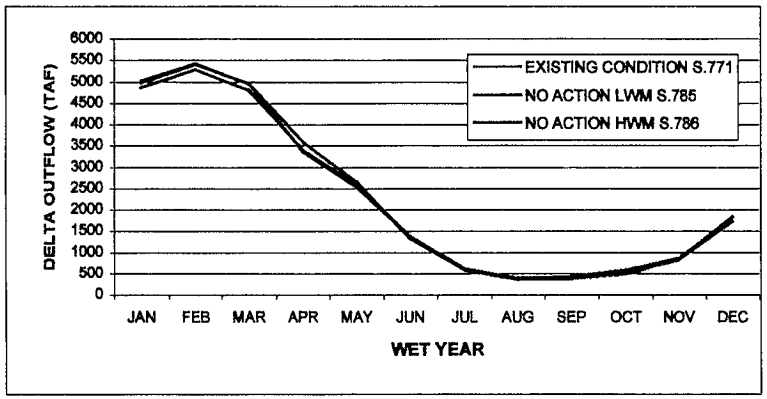
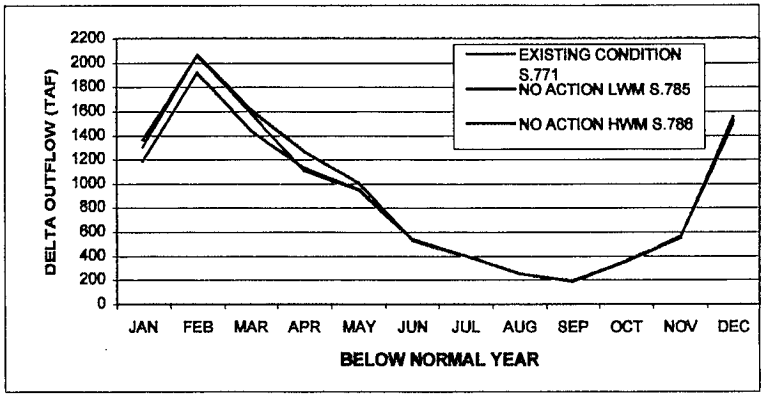
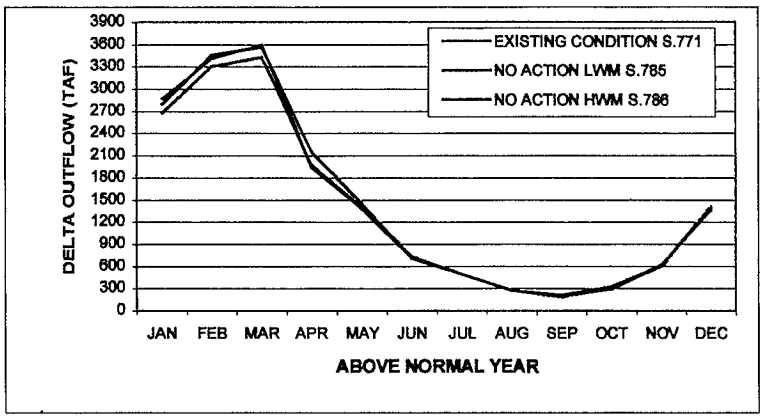
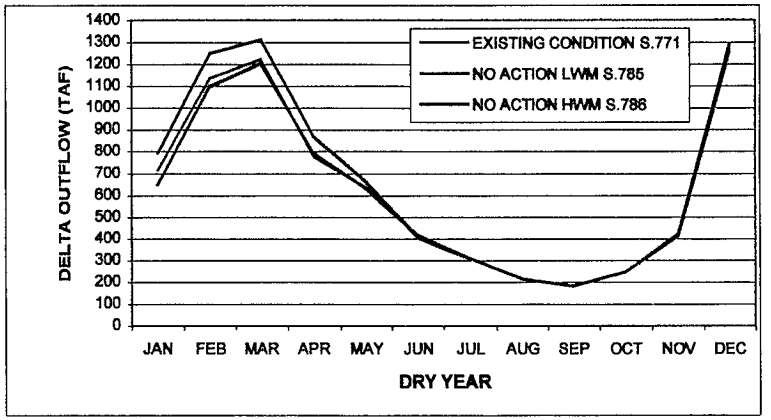


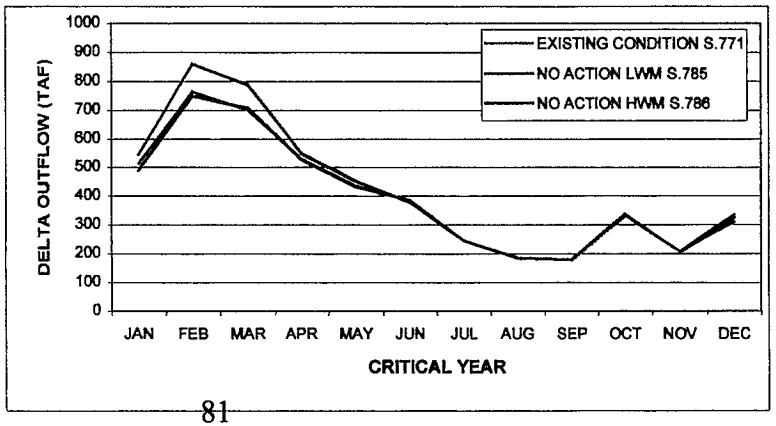
FIGURE 3





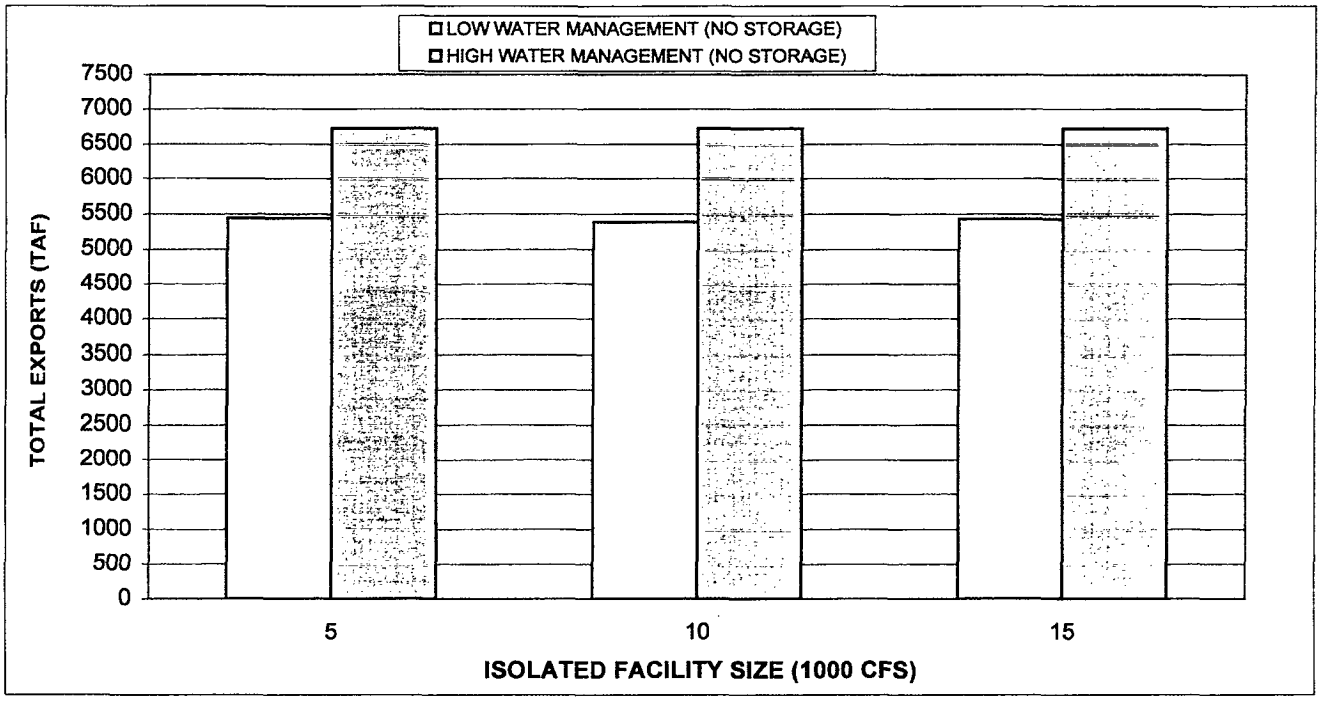


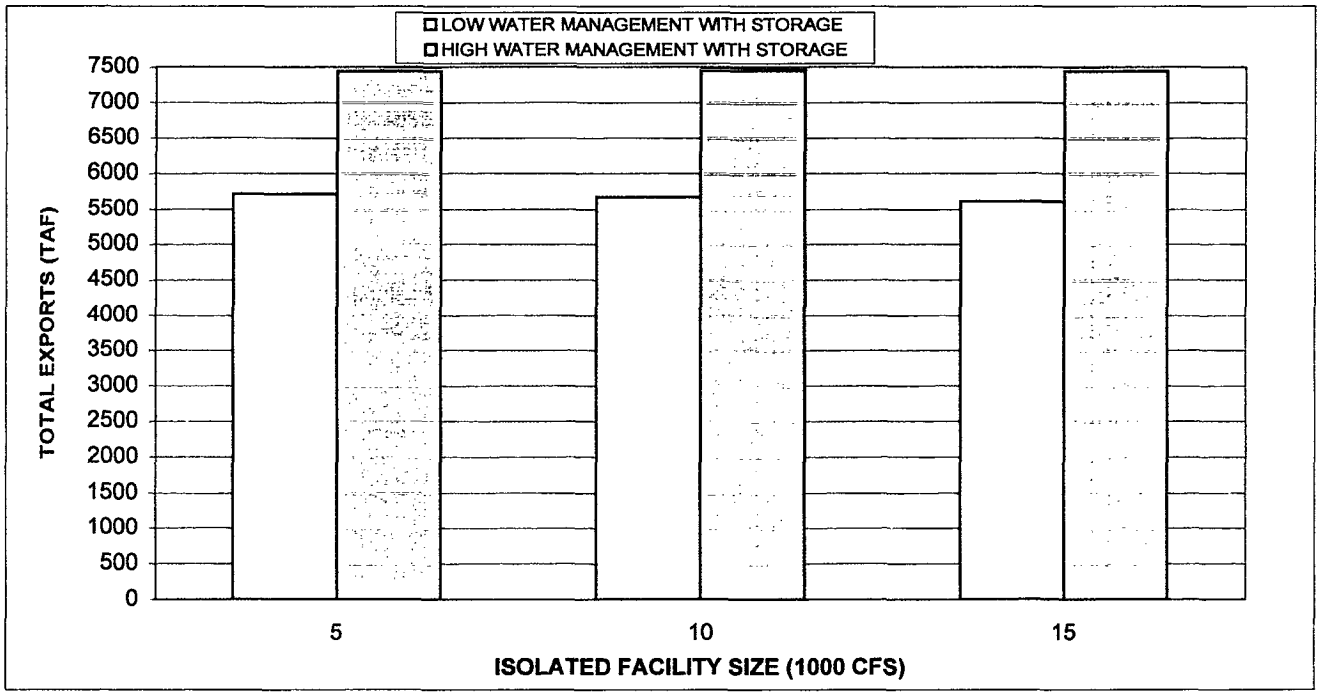




COMPARISON OF DELTA OUTFLOW UNDER EXISTING AND NO ACTION (HIGH + LOW) WATER MANAGEMENT SCENARIOS

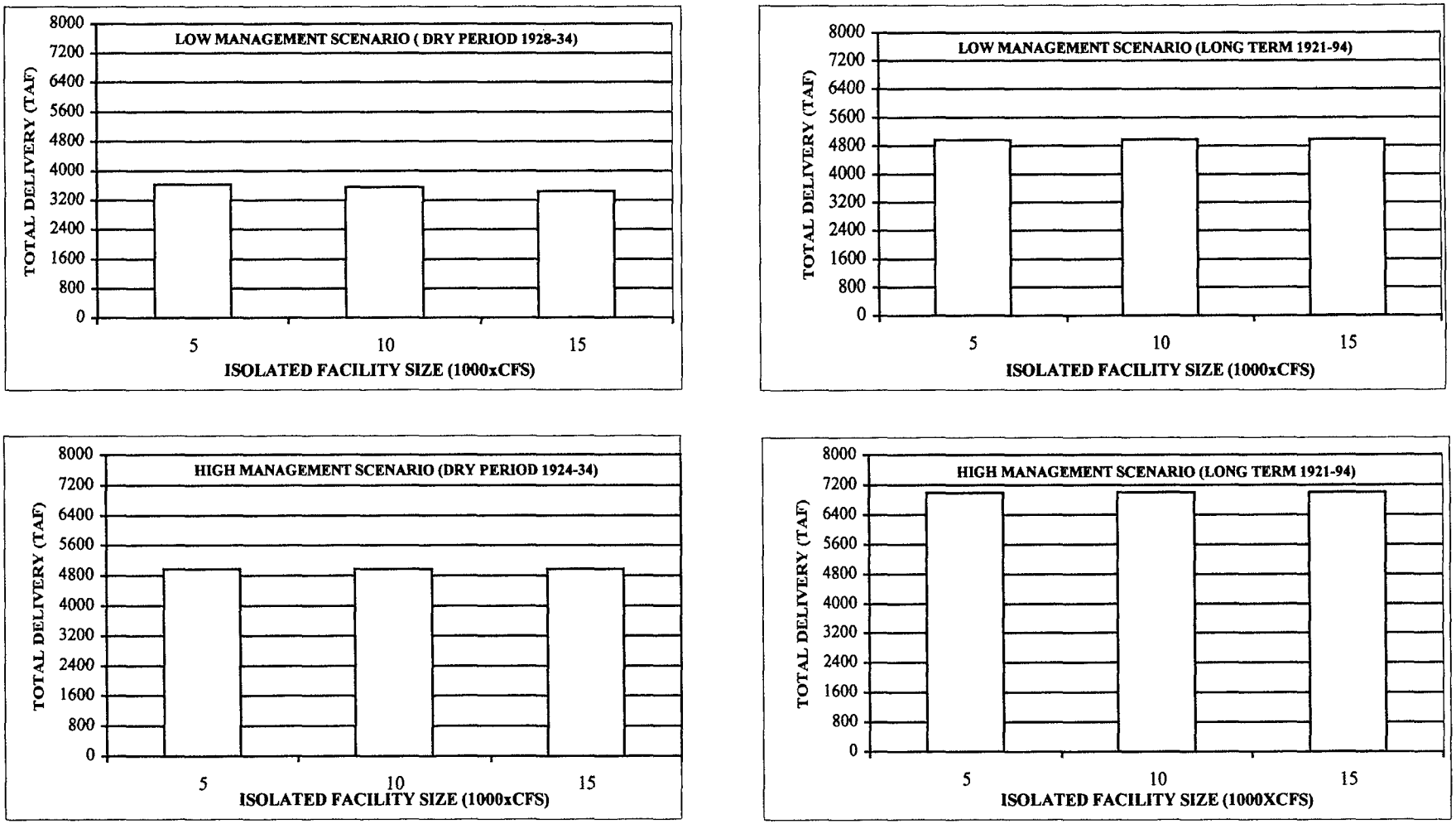
FIGURE 4





VARIATION OF TOTAL EXPORTS WITH ISOLATED FACILITY UNDER HIGH AND LOW MANAGEMENT SCENARIO

FIGURE 5



DRY PERIOD AND LONG TERM DELIVERY WITH ISOLATED FACILITY AND STORAGE UNDER LOW AND HIGH WATER MANAGEMENT SCENAR

FIGURE 6

ISOLATED FACILITY DIVERSION IMPACT ON MINIMUM REQUIRED DELTA OUTFLOW UNDER LOW WATER MANAGEMENT SCENARIO

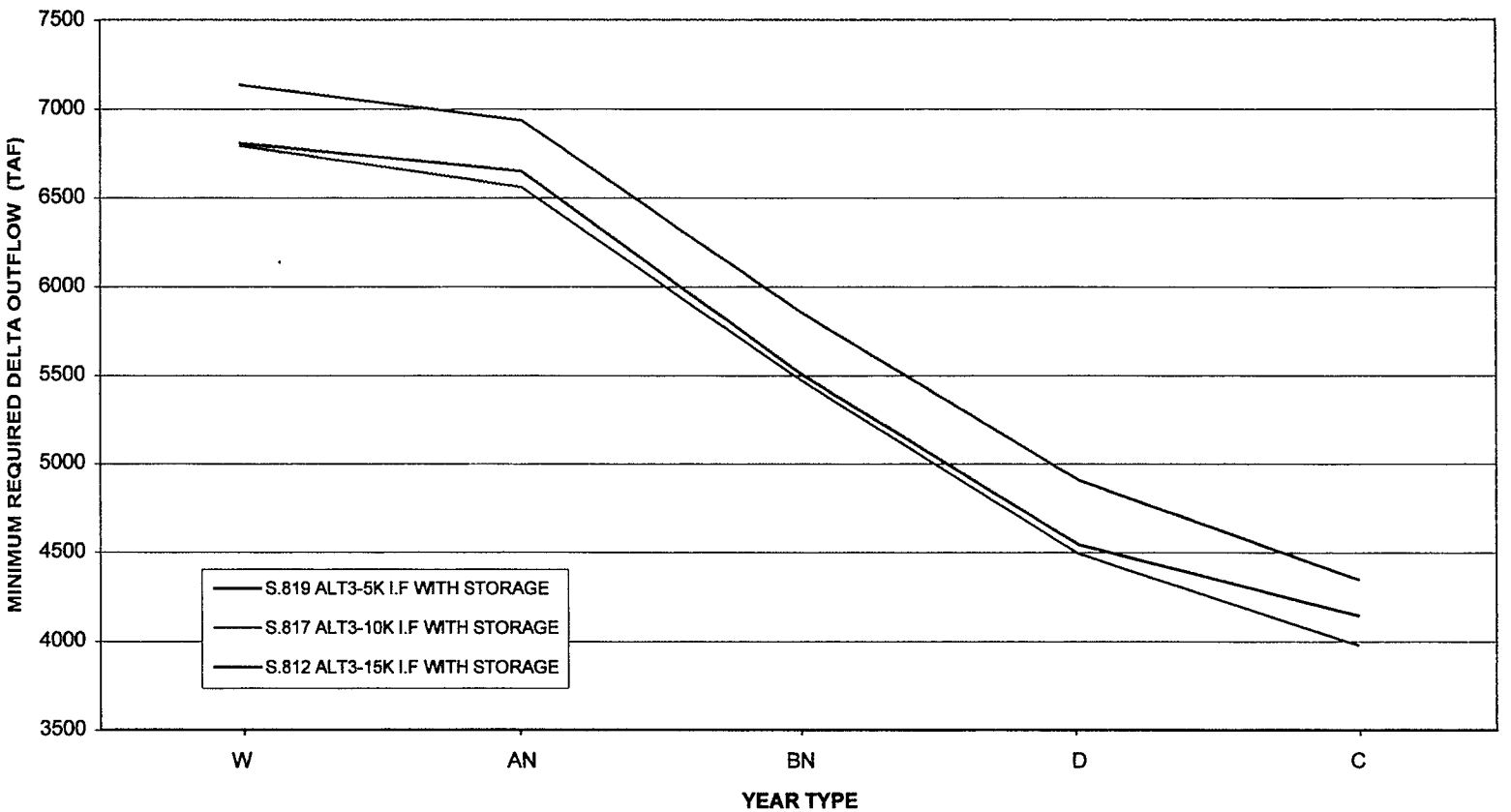


FIGURE 7

ISOLATED FACILITY DIVERSION IMPACT ON MINIMUM REQUIRED DELTA OUTFLOW UNDER HIGH WATER MANAGEMENT SCENARIO

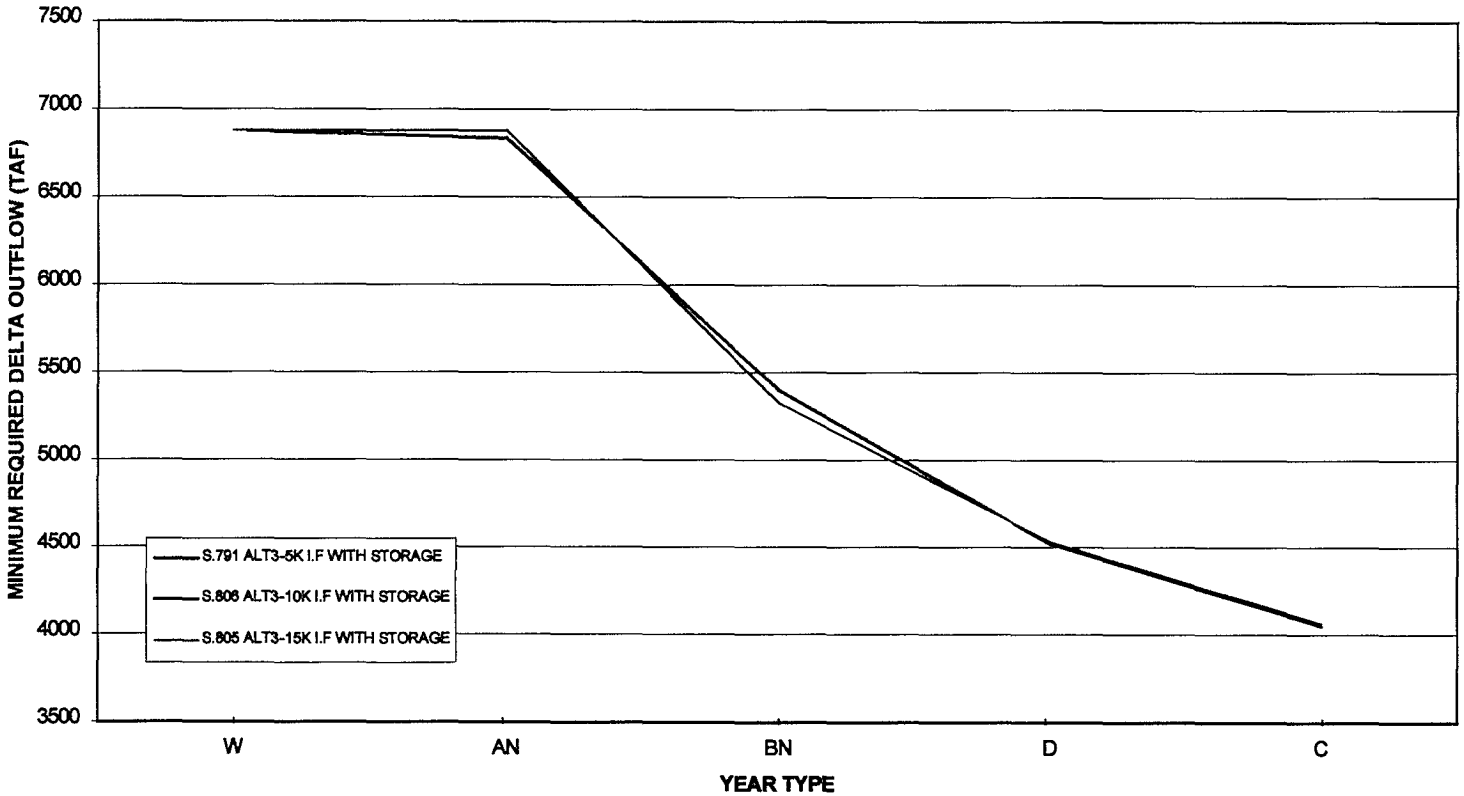


FIGURE 8

HOOD FACILITY DIVERSION IMPACT ON MINIMUM REQUIRED DELTA OUTFLOW FOR ALTERNARIVE 2 UNDER LOW AND HIGH WATER MANAGEMENT SCENARIOS

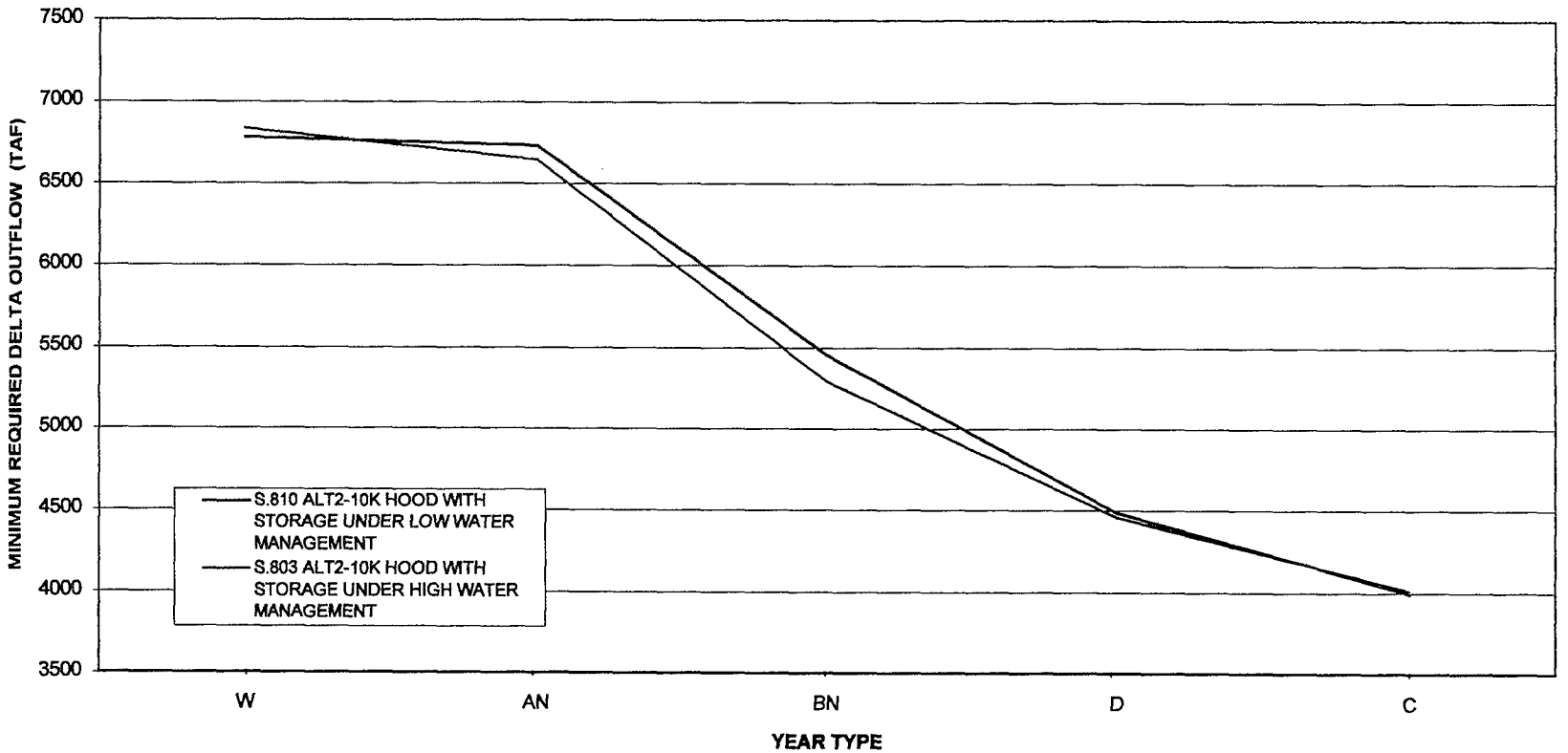


FIGURE 9

HOOD FACILITY DIVERSION IMPACT ON MINIMUM REQUIRED DELTA OUTFLOW FOR PREFERRED ALTERNATIVE UNDER LOW AND HIGH WATER MANAGEMENT SCENARIOS

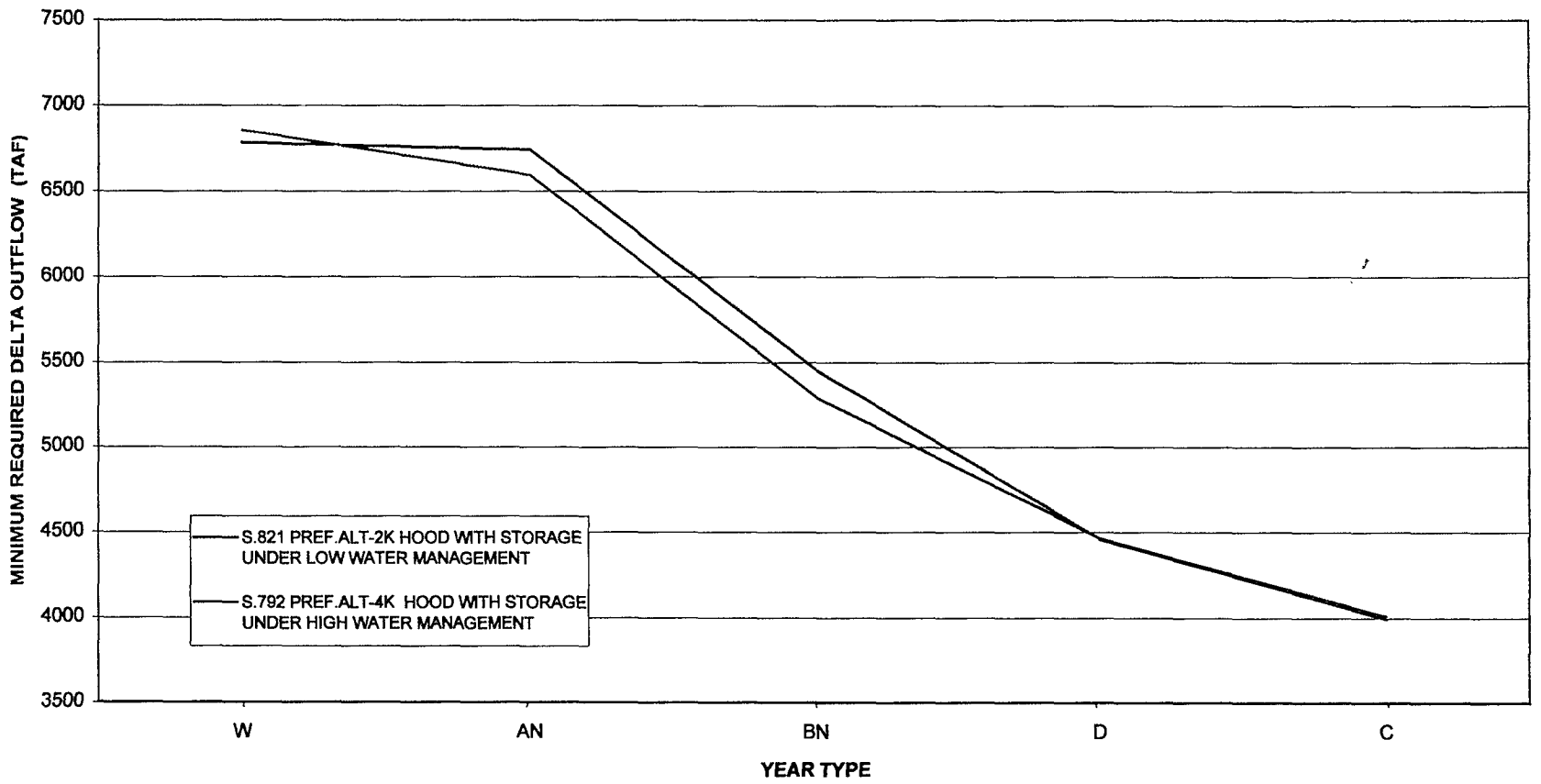


FIGURE 10

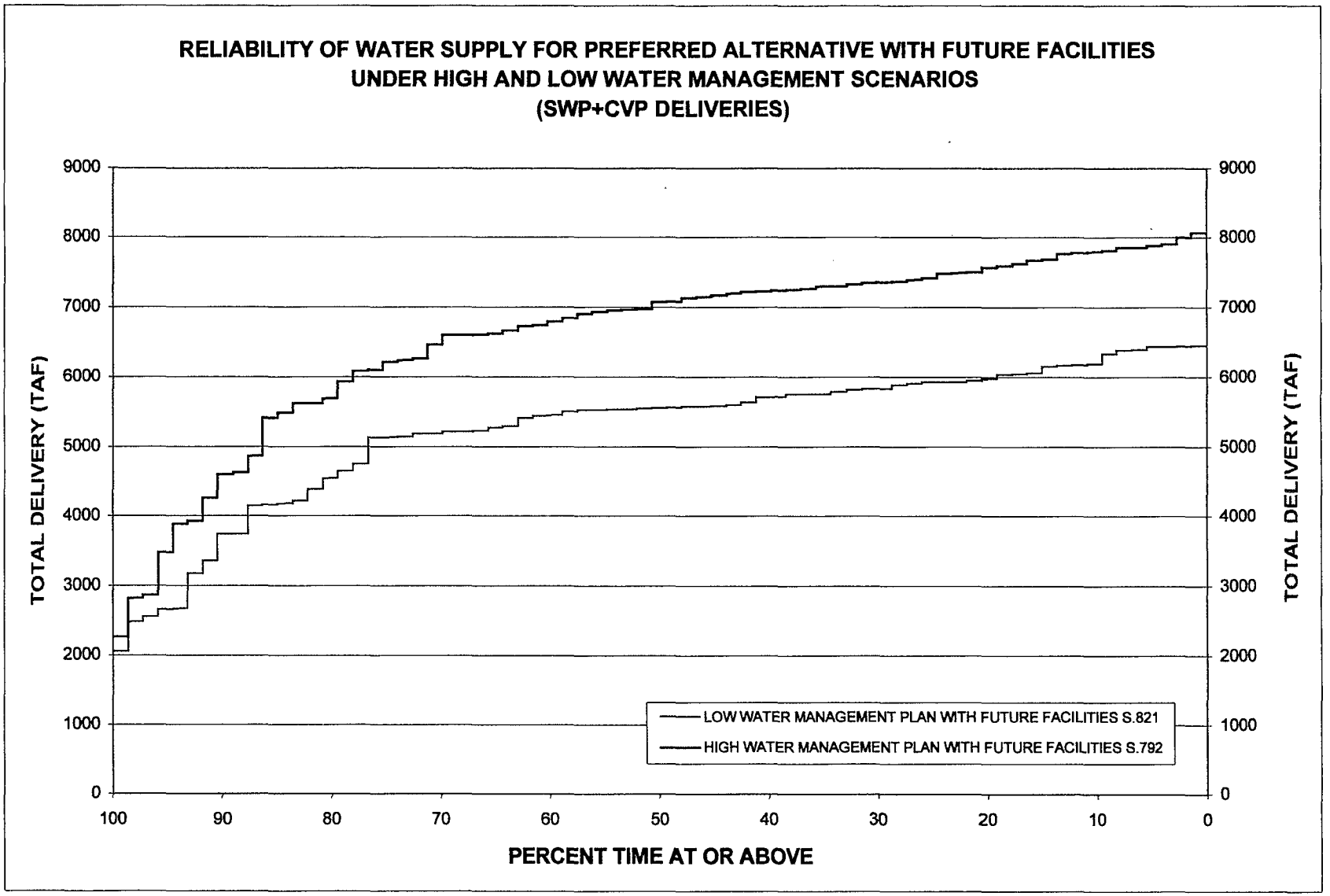
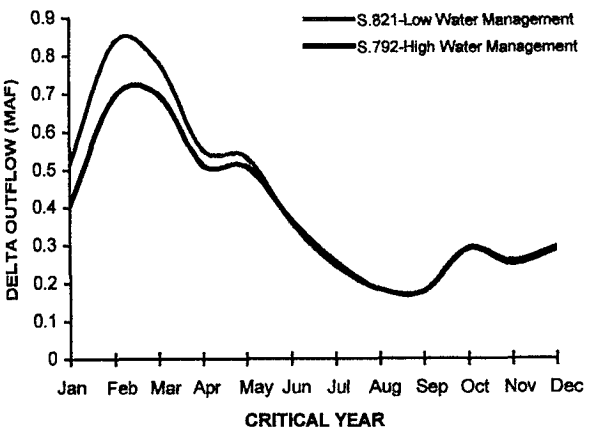
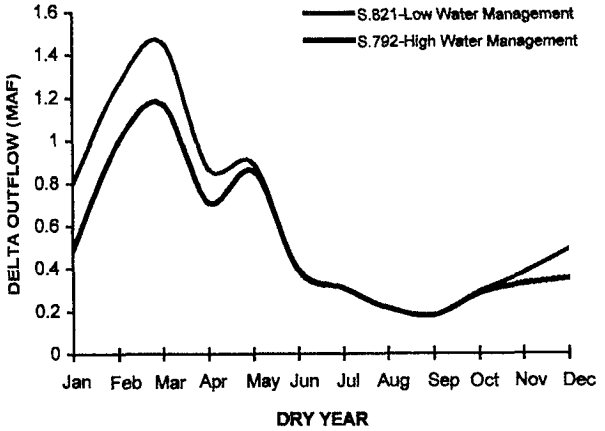
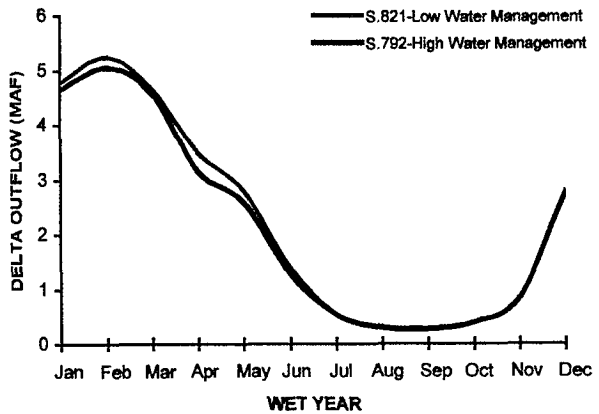
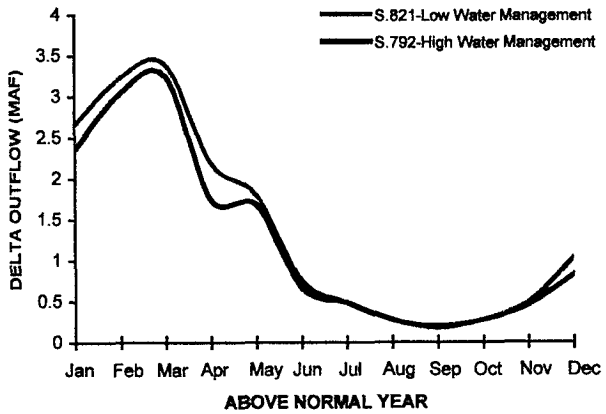


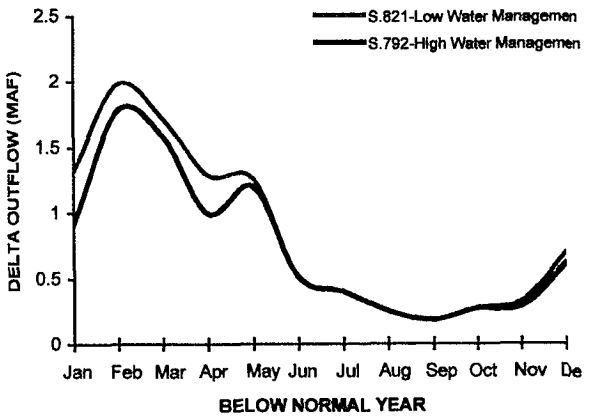
FIGURE 11











COMPARISON OF DELTA OUTFLOW WITH FUTURE FACILITIES UNDER LOW AND HIGH WATER MANAGEMENT SCENARIOS

FIGURE 12

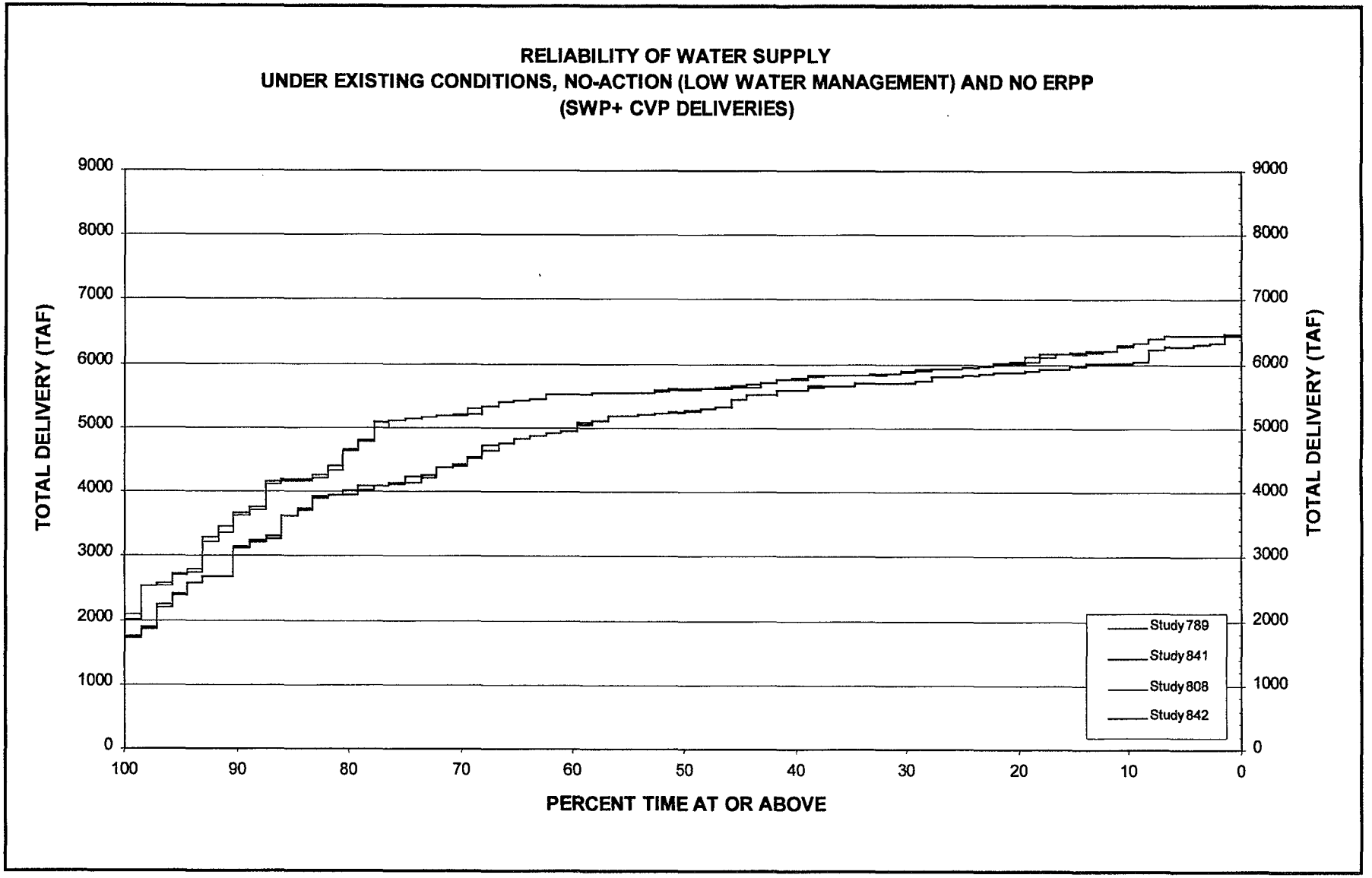


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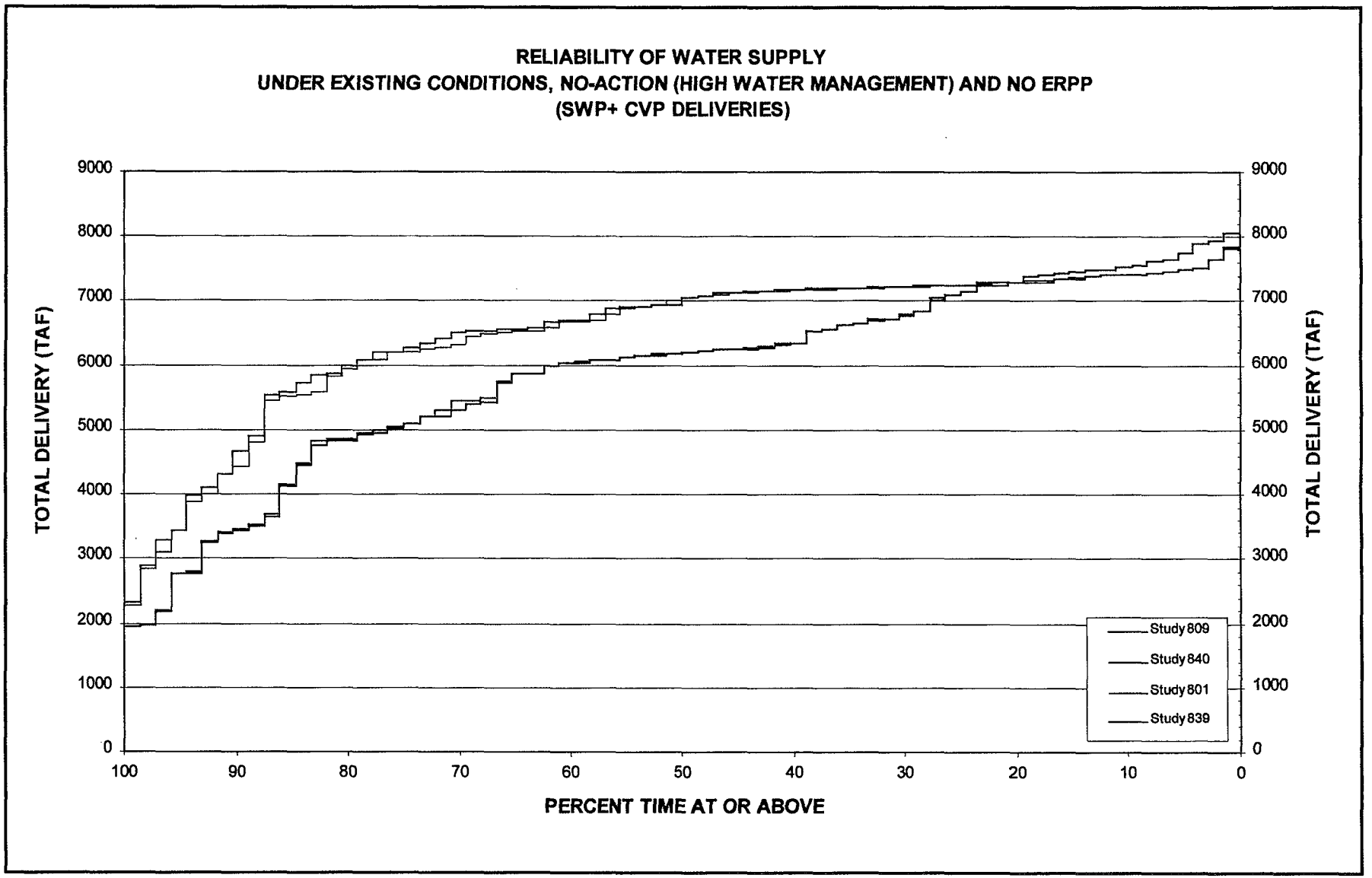
FIGURE 13



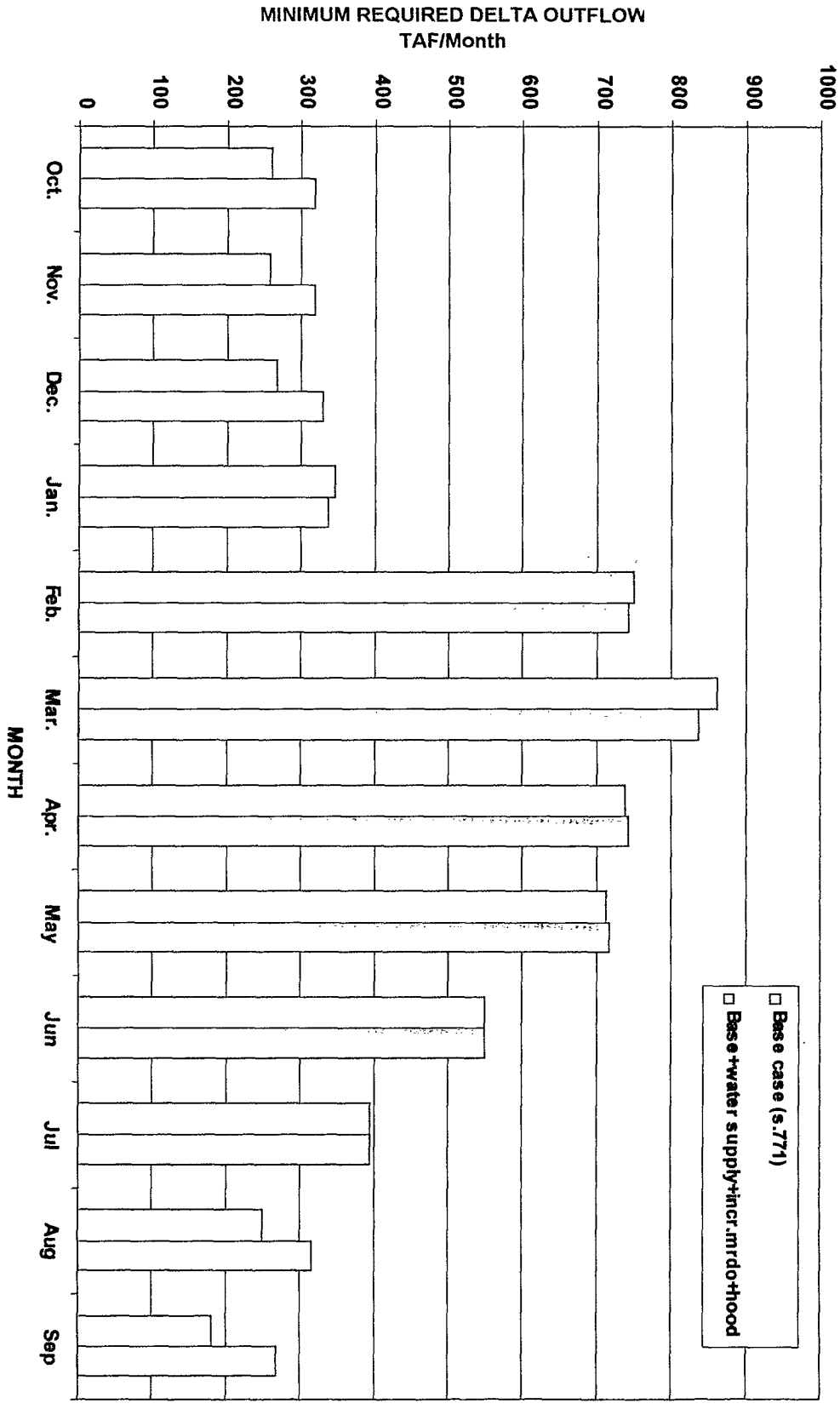
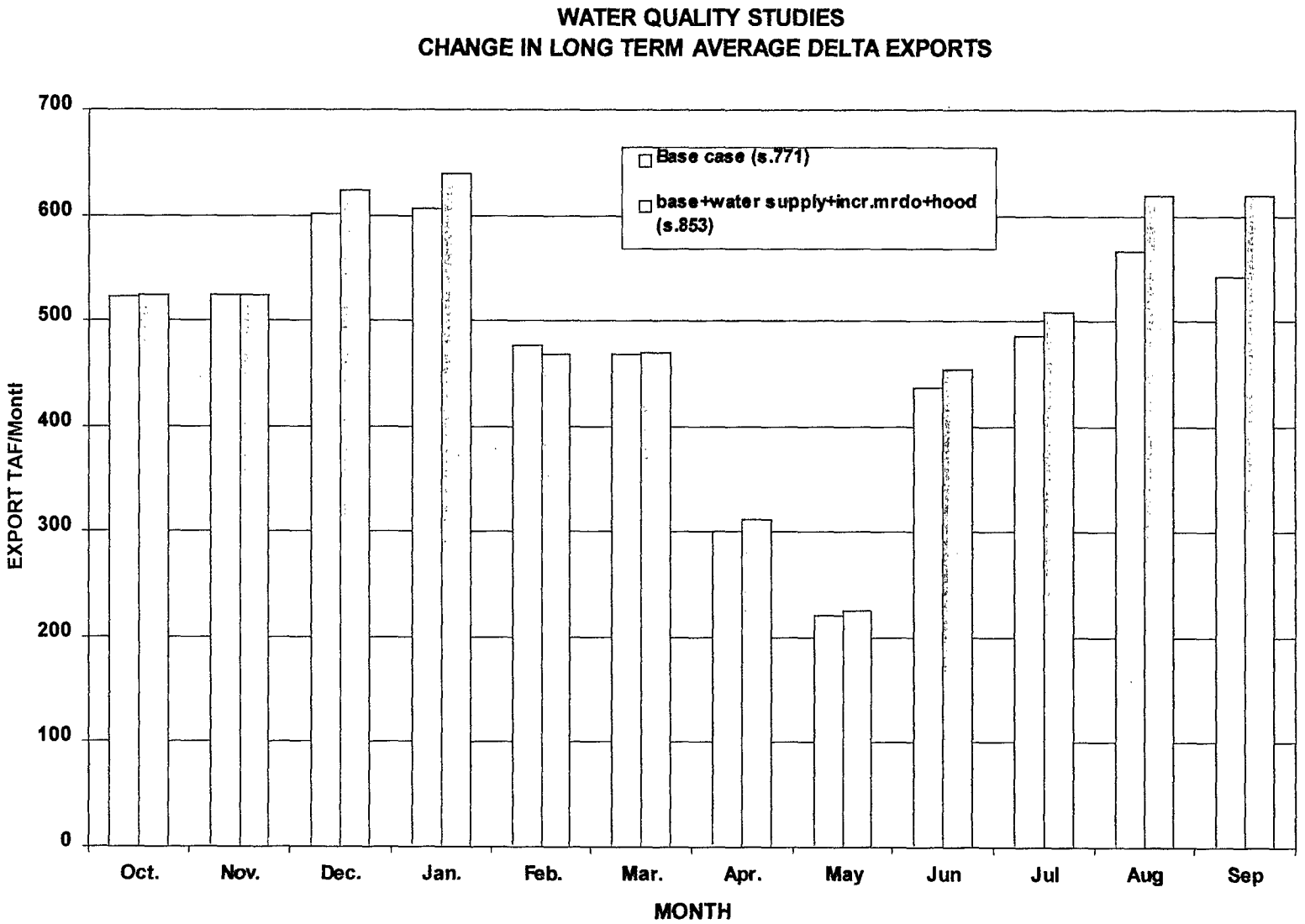


FIGURE 14

FIGURE 15



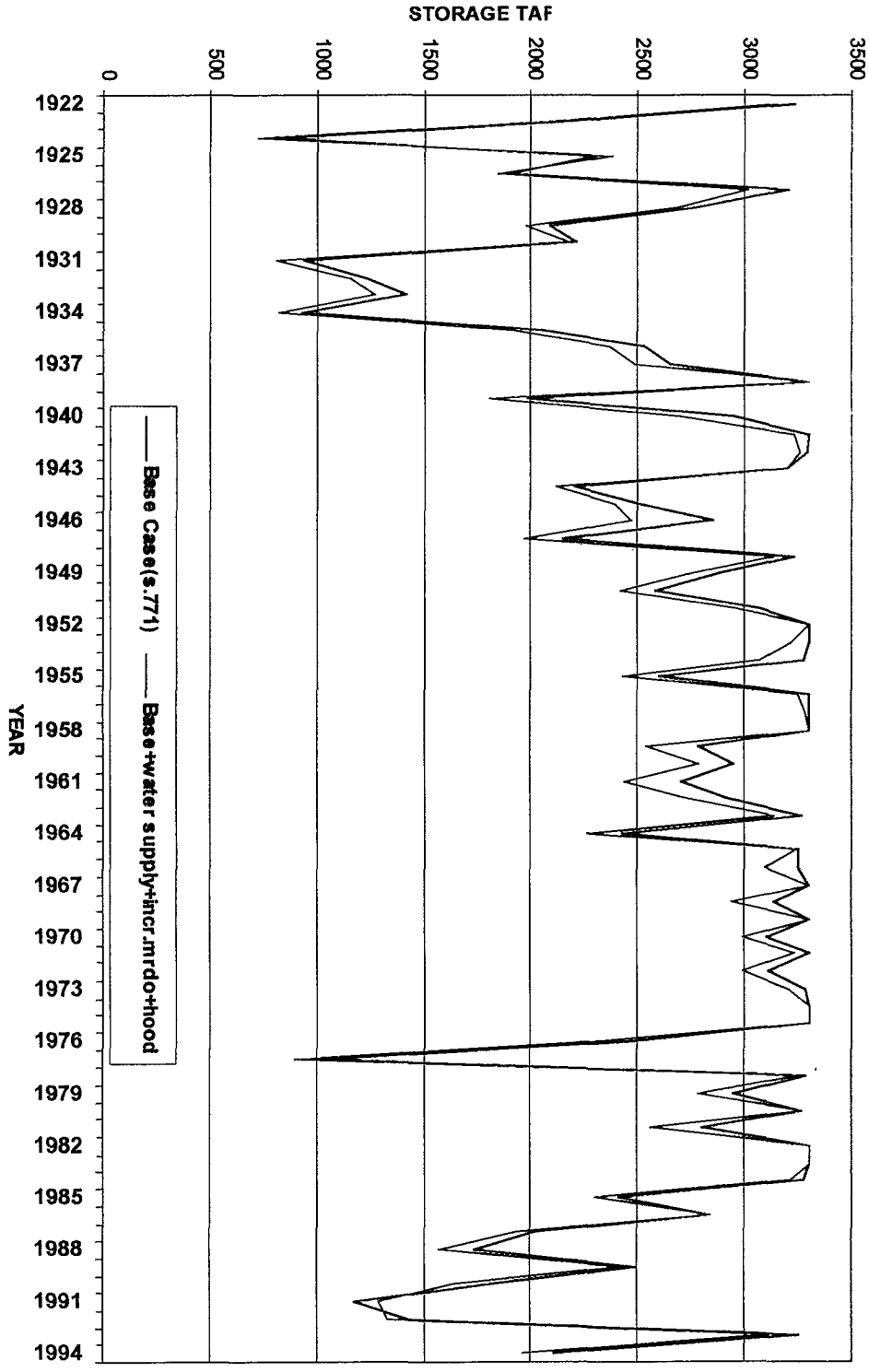
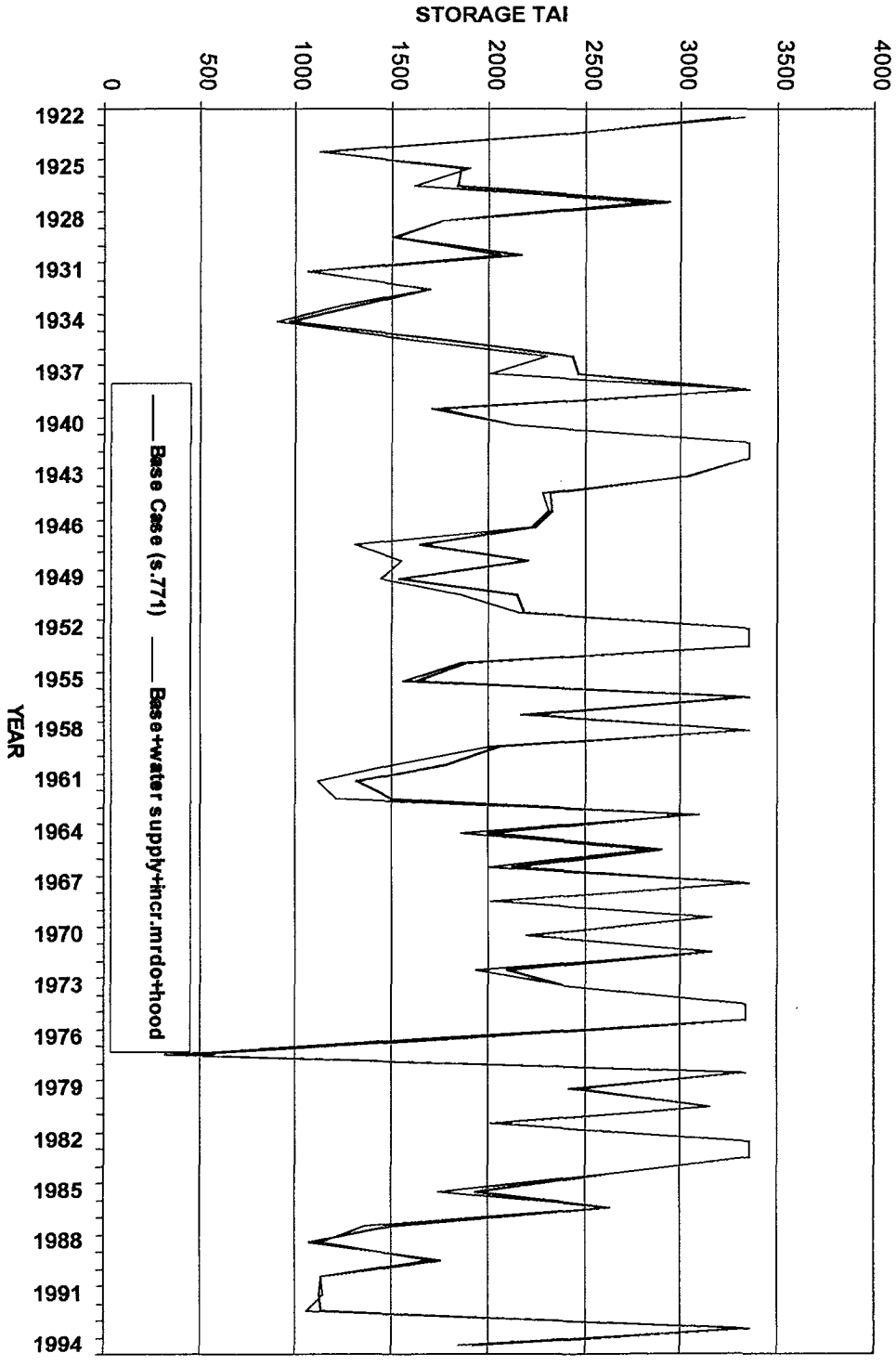


FIGURE 16



WATER QUALITY STUDIES
END OF SEPTEMBER STORAGE IN OROVILLE

FIGURE 17

FIGURE 18

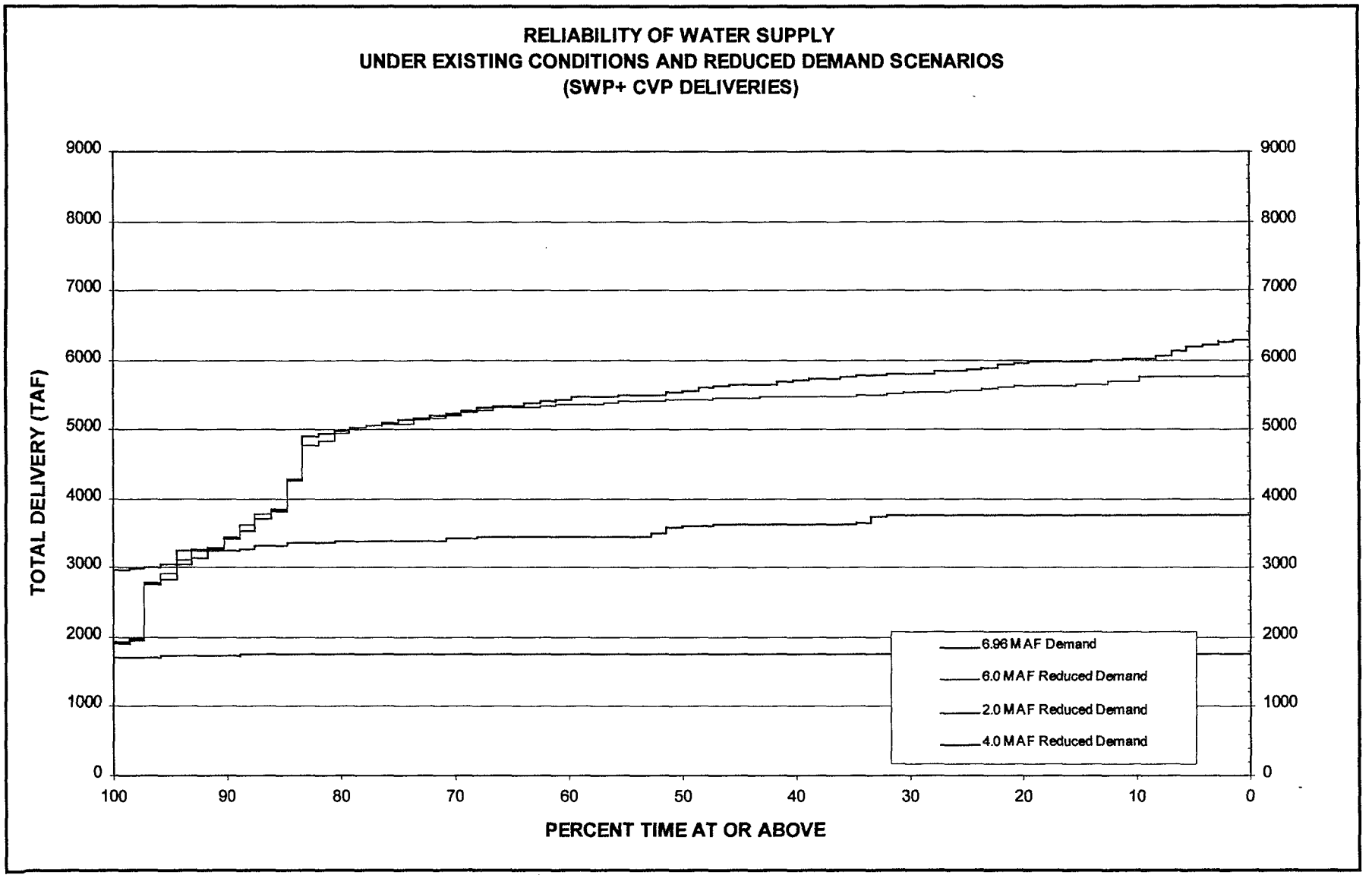
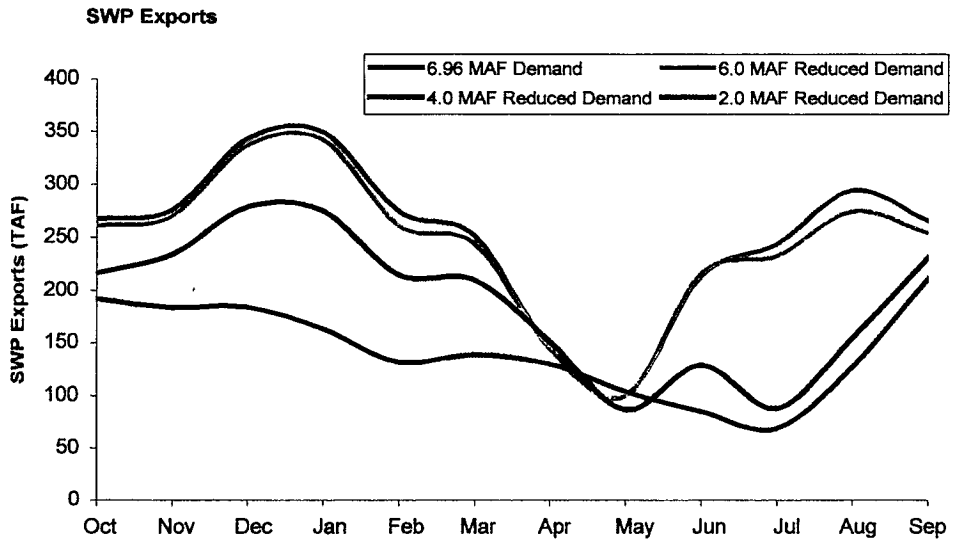
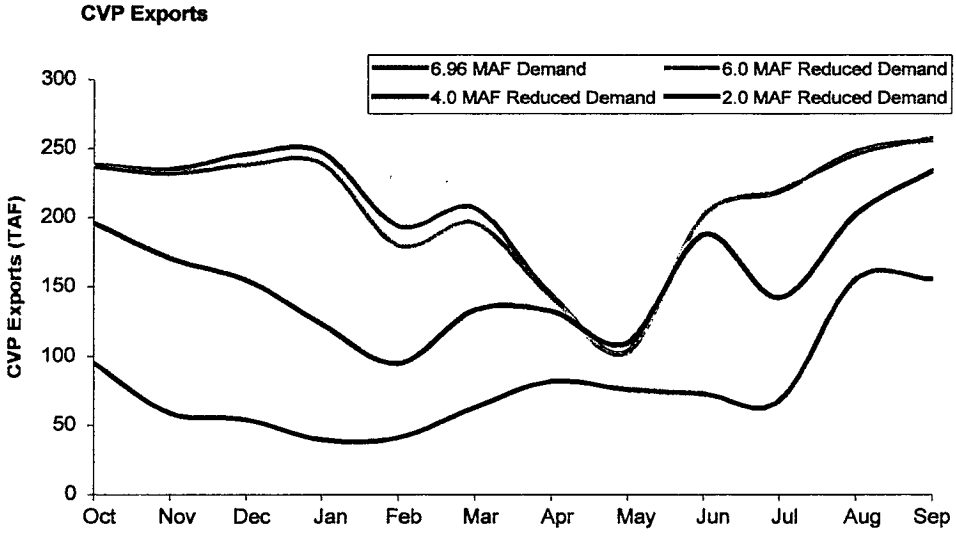


FIGURE 19





Comparison of SWP and CVP Exports under Reduced Demand Scenarios

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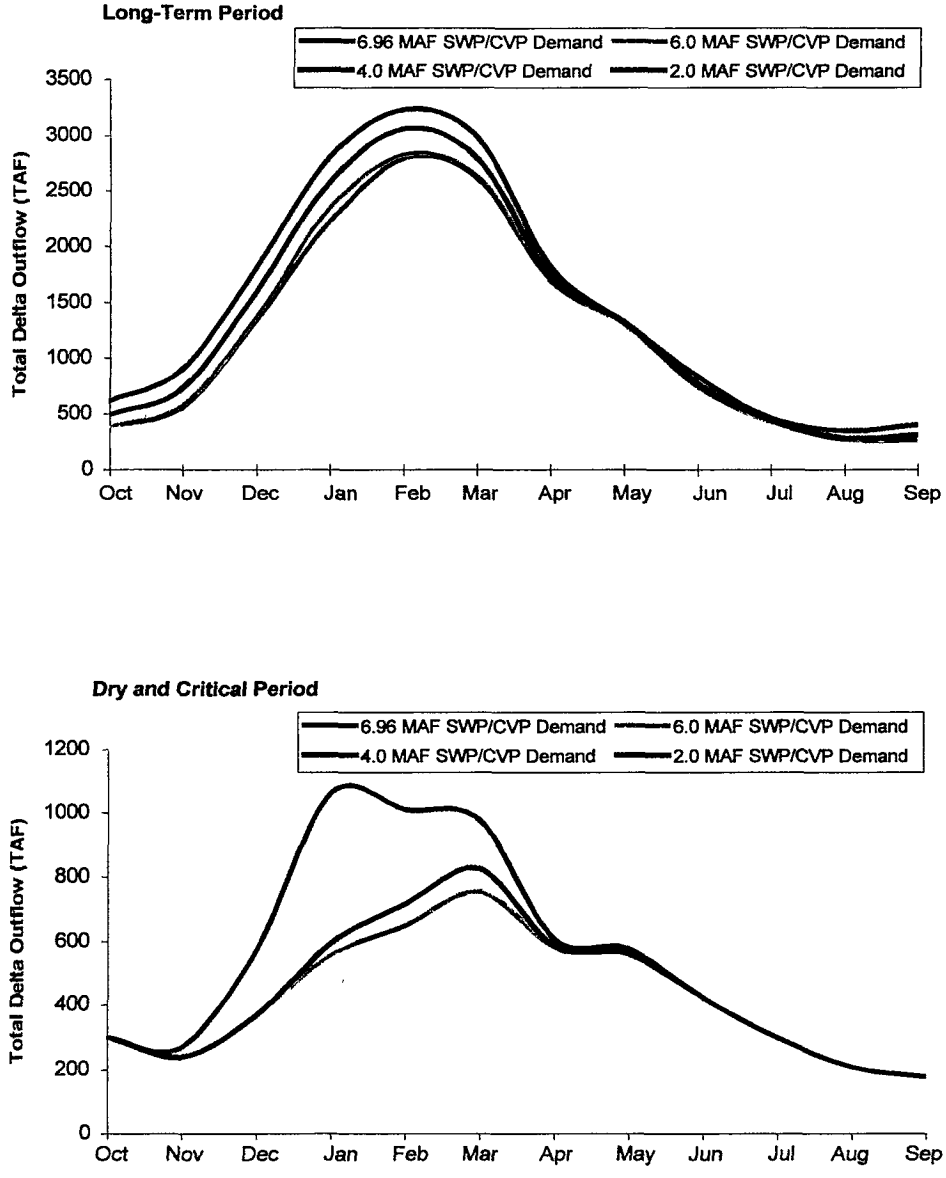
FIGURE 20



Comparison of Total Delta Outflow under Reduced Demand Scenarios

FIGURE 21

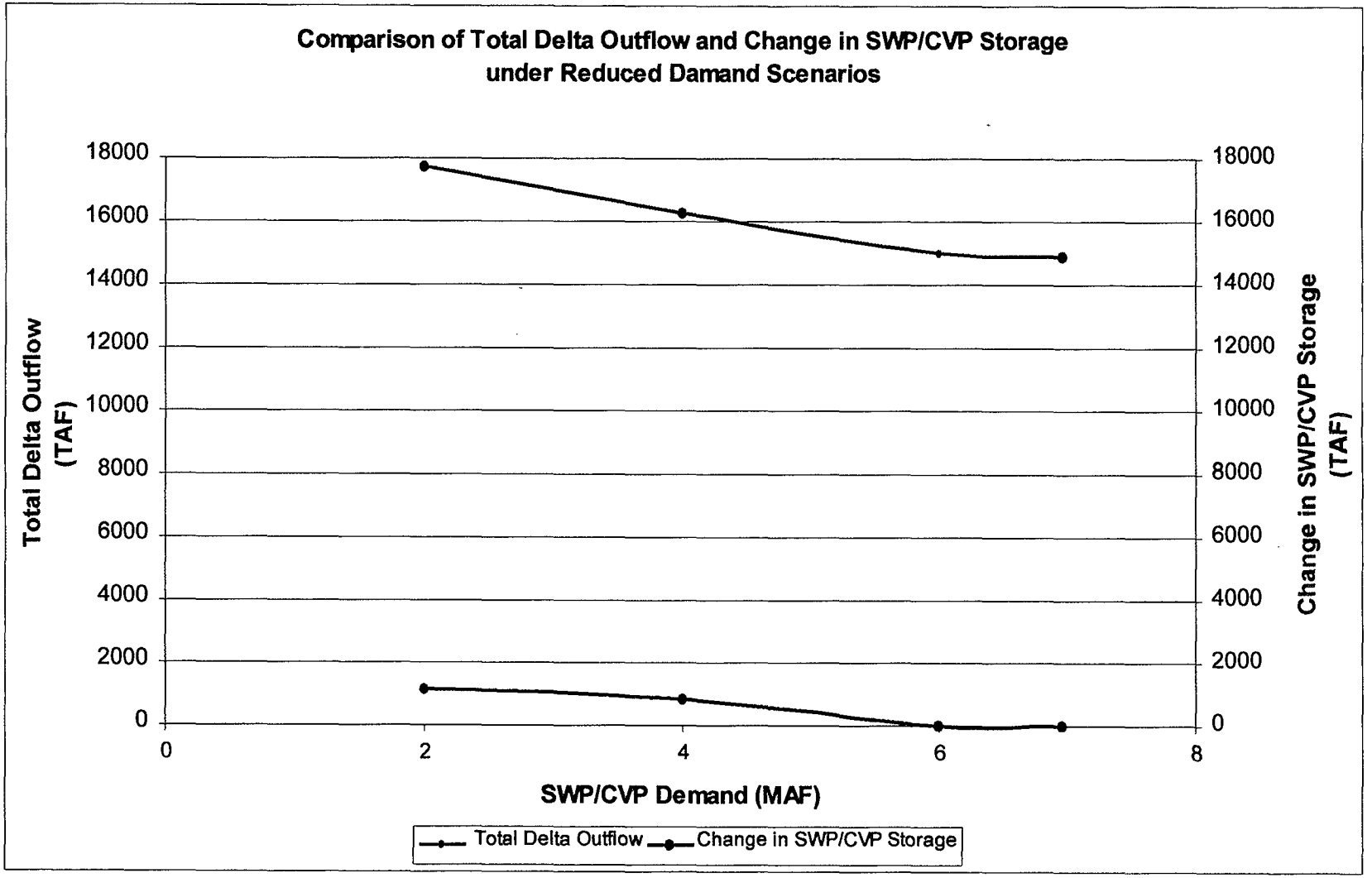
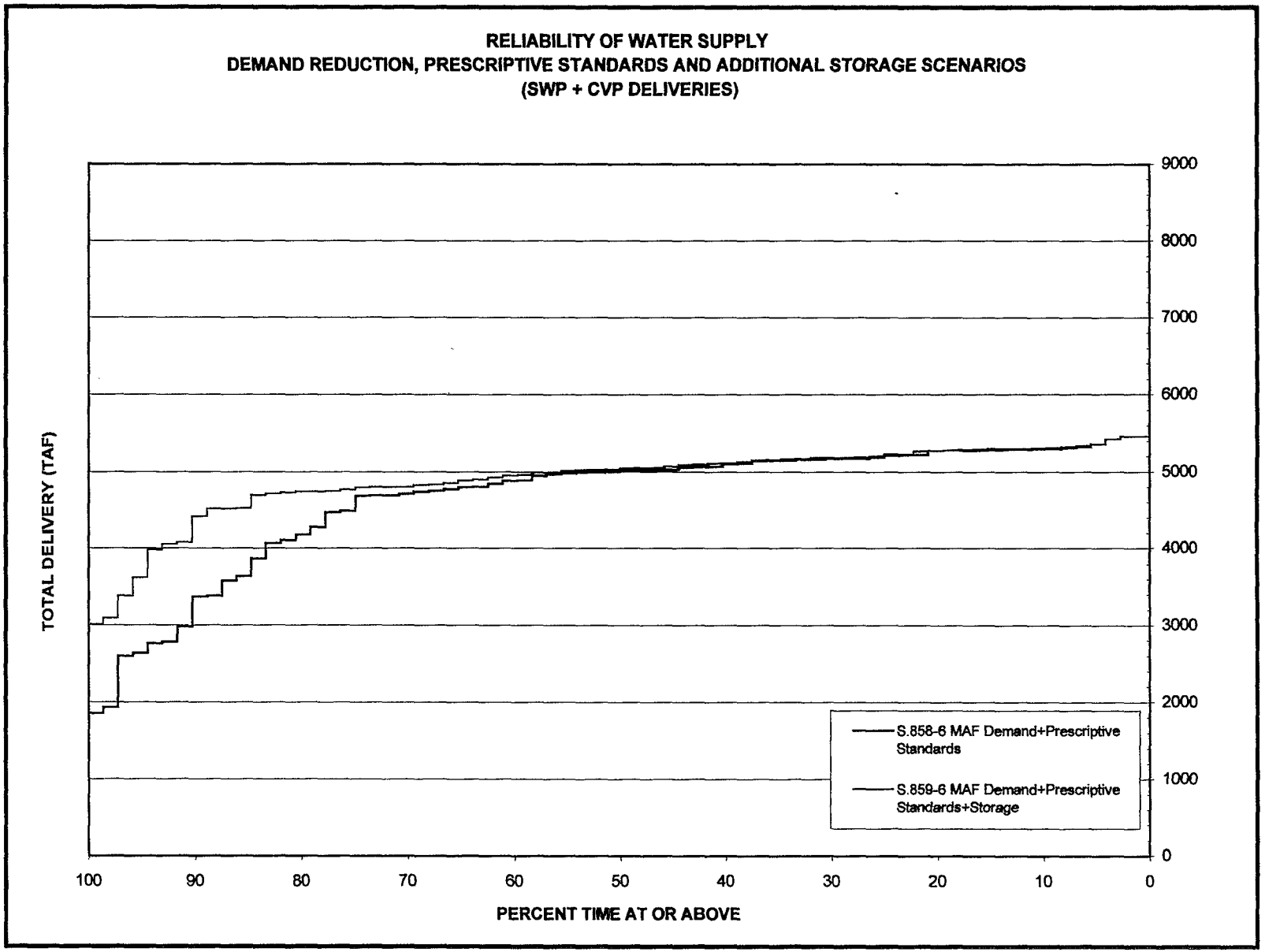


FIGURE 22



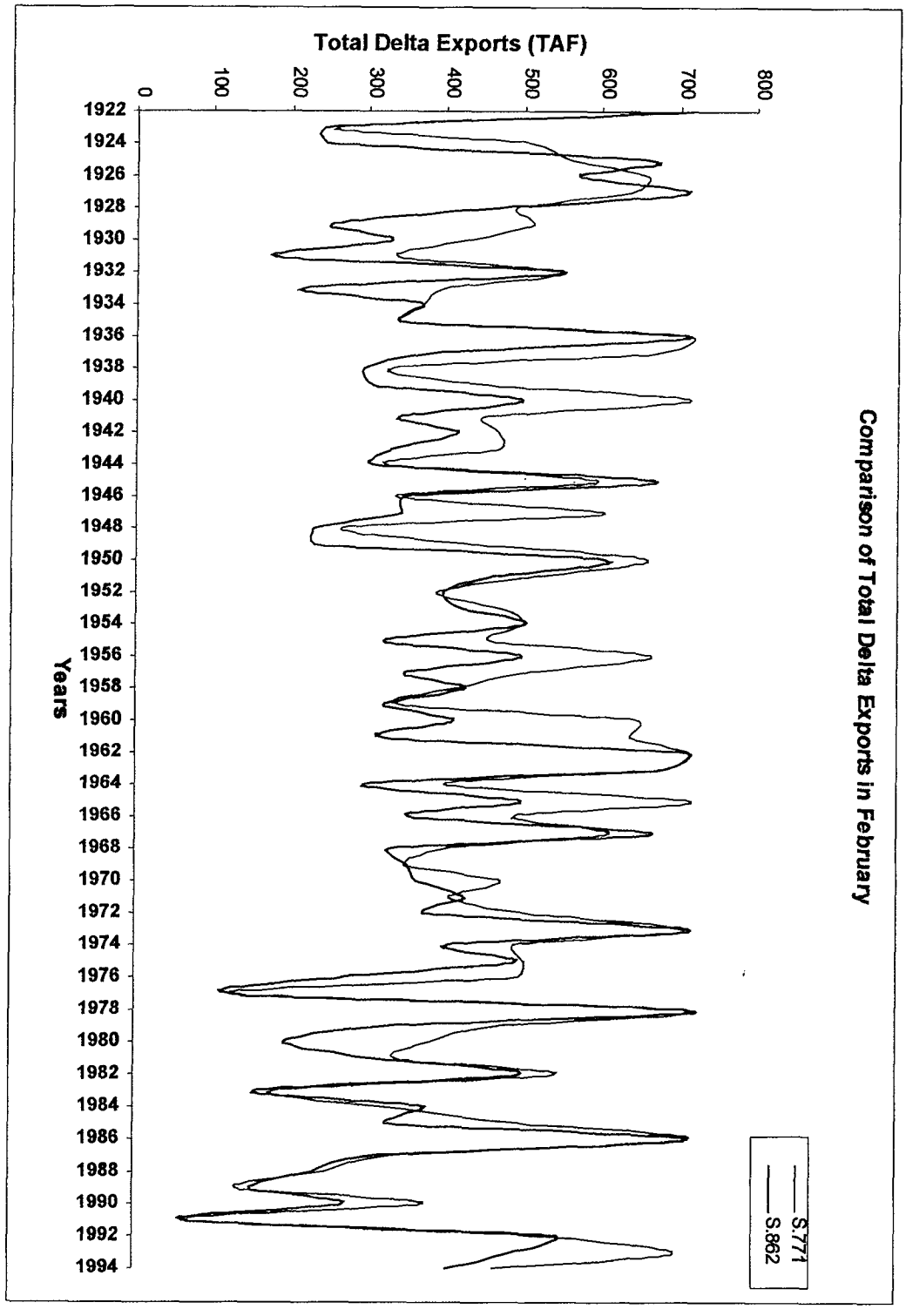
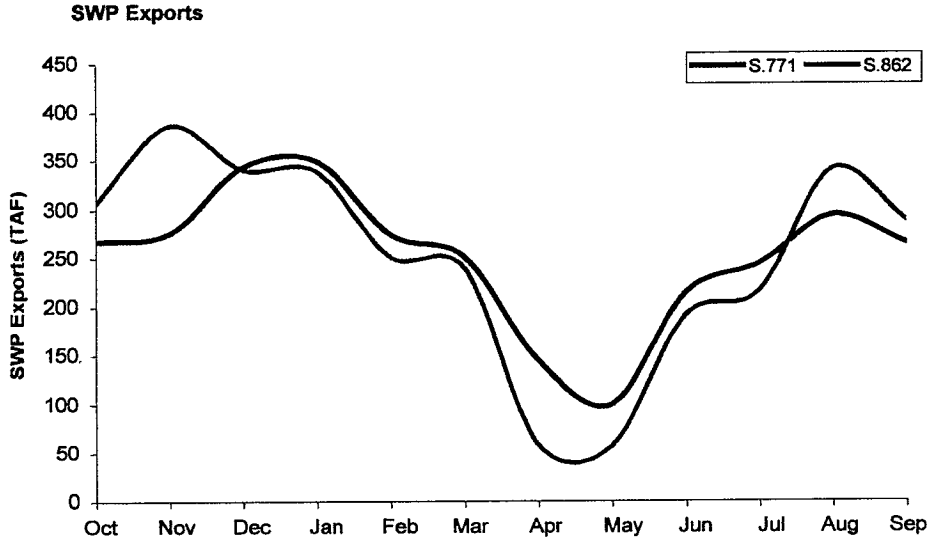
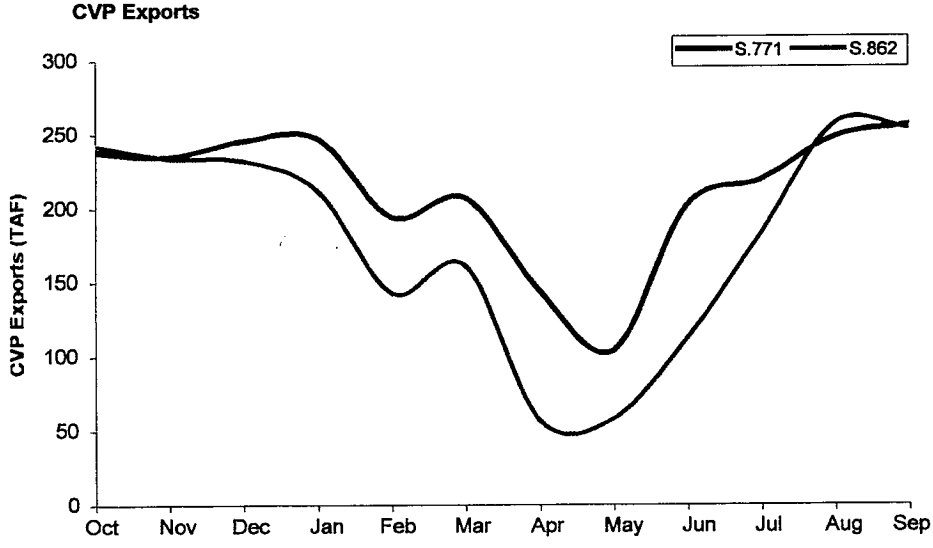


FIGURE 23

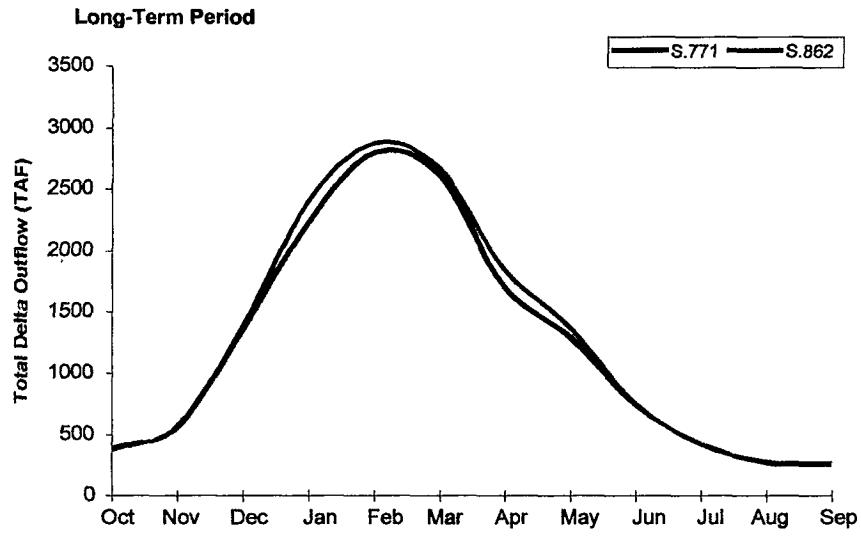
FIGURE 24

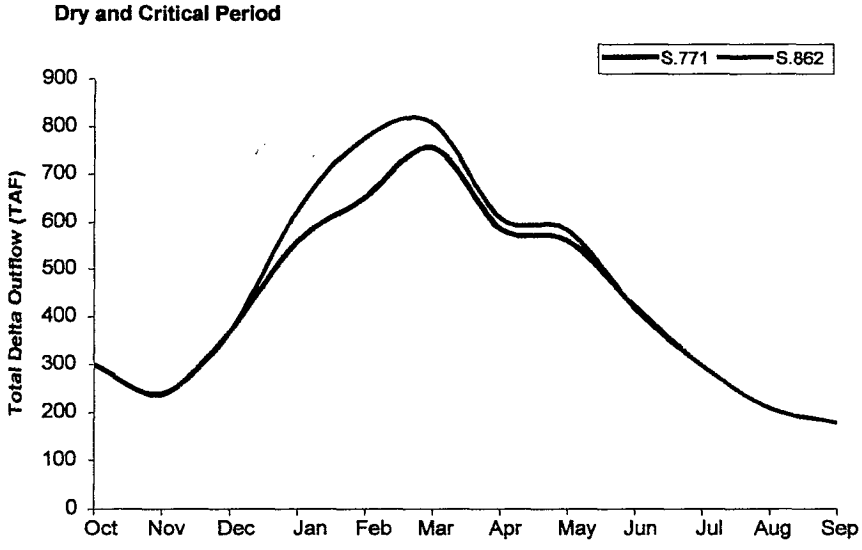




Comparison of SWP and CVP Exports with Prescriptive Actions

FIGURE 25





Comparioson of Delta Outflow with Prescriptive Standards

FIGURE 26

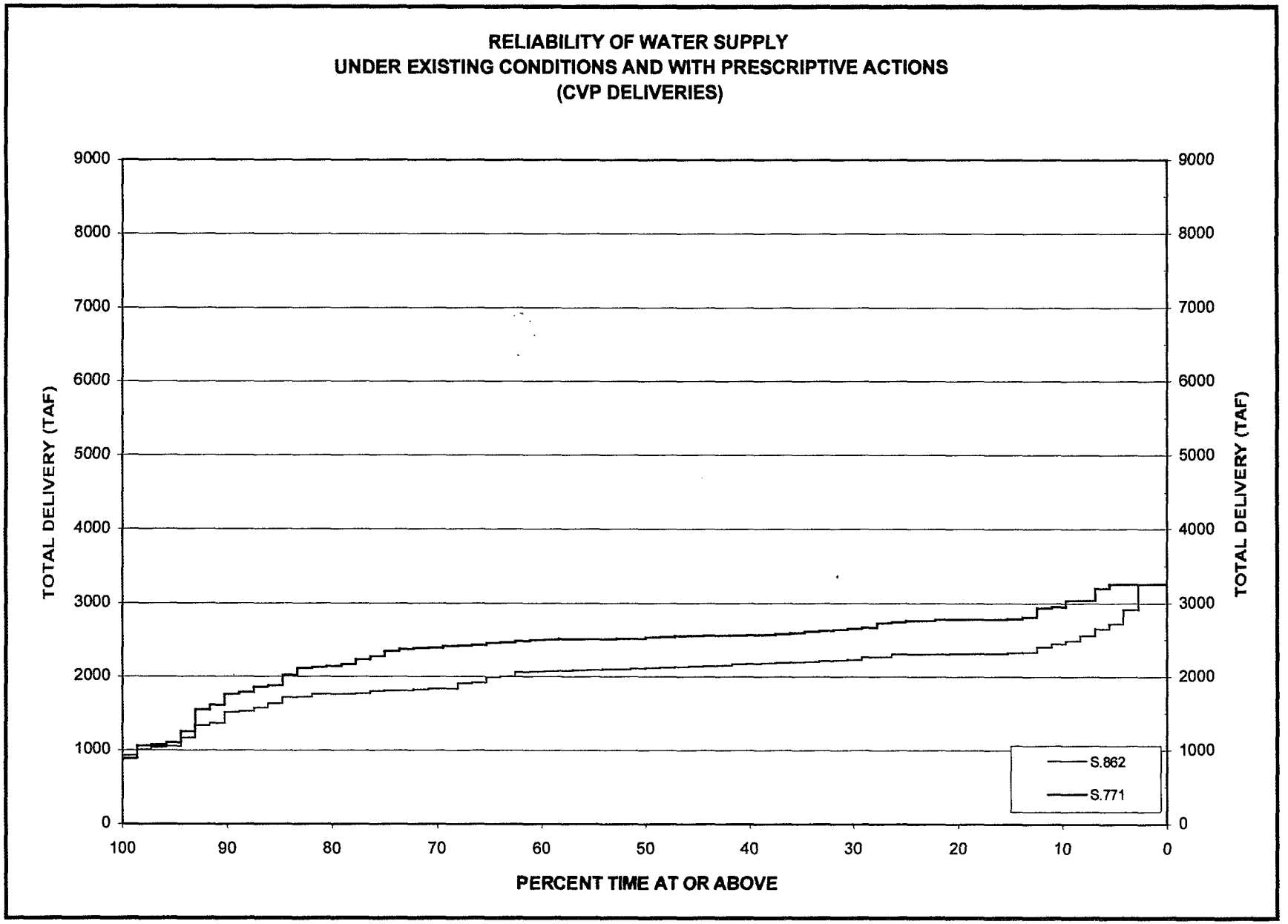


FIGURE 27

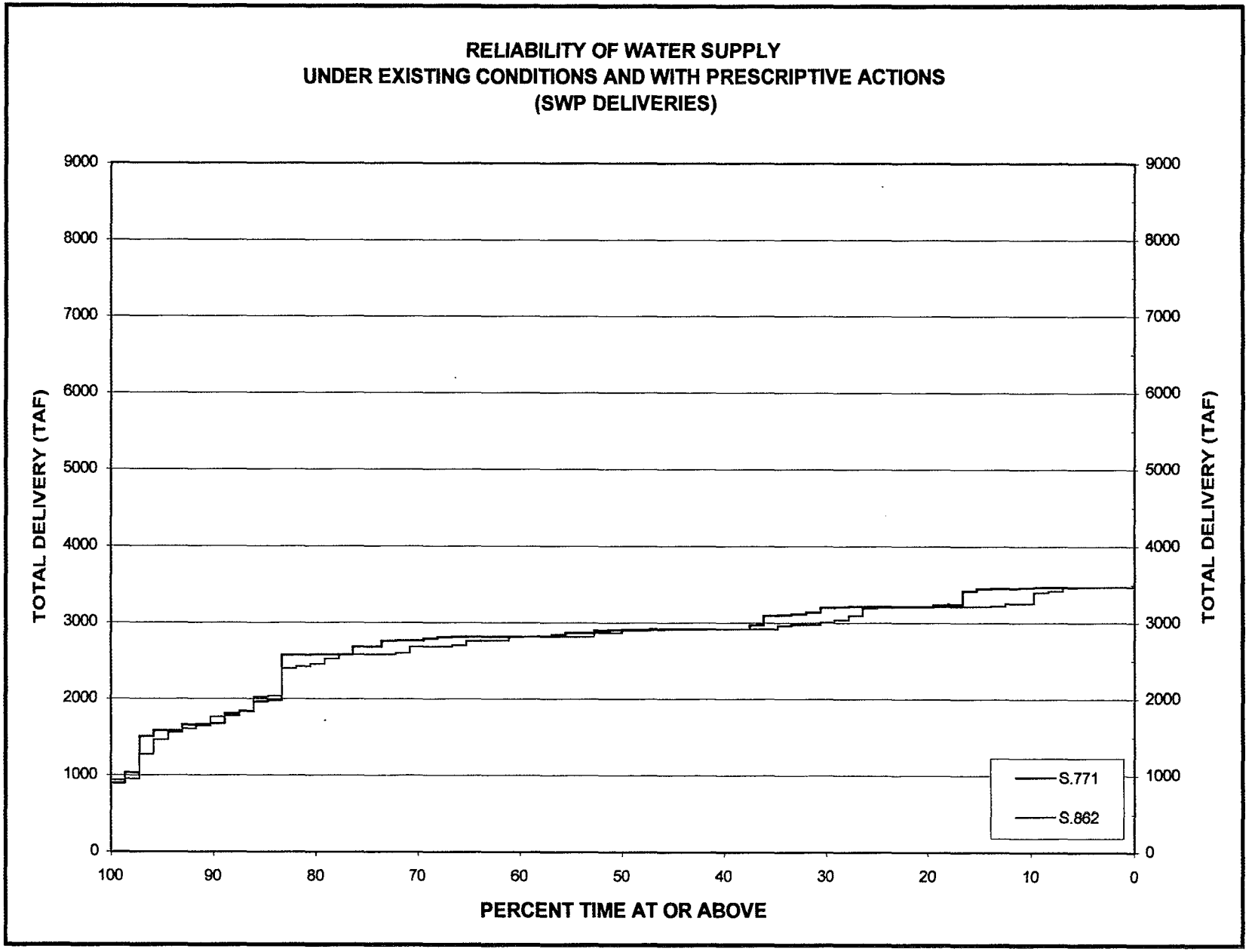


FIGURE 28

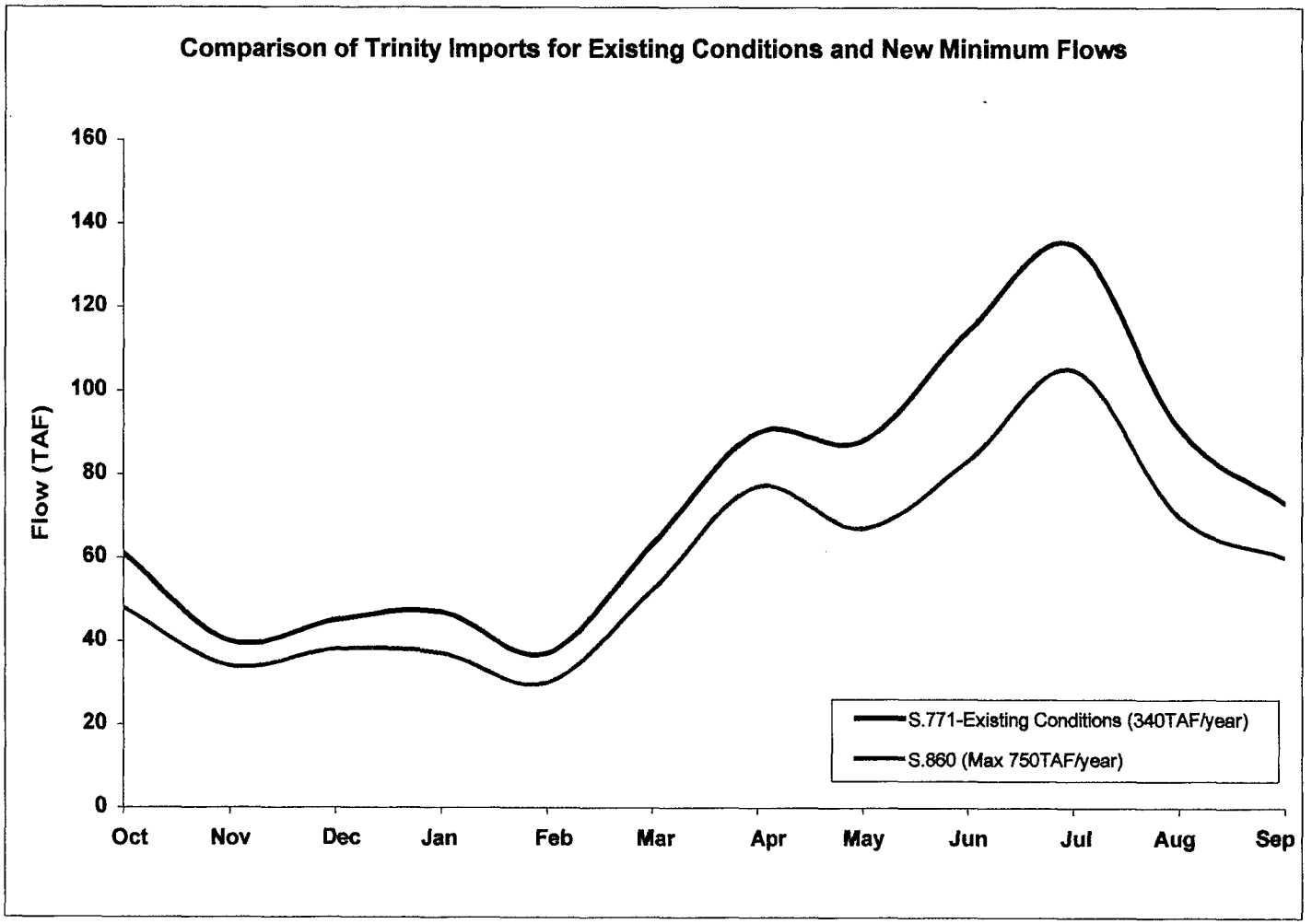


FIGURE 29

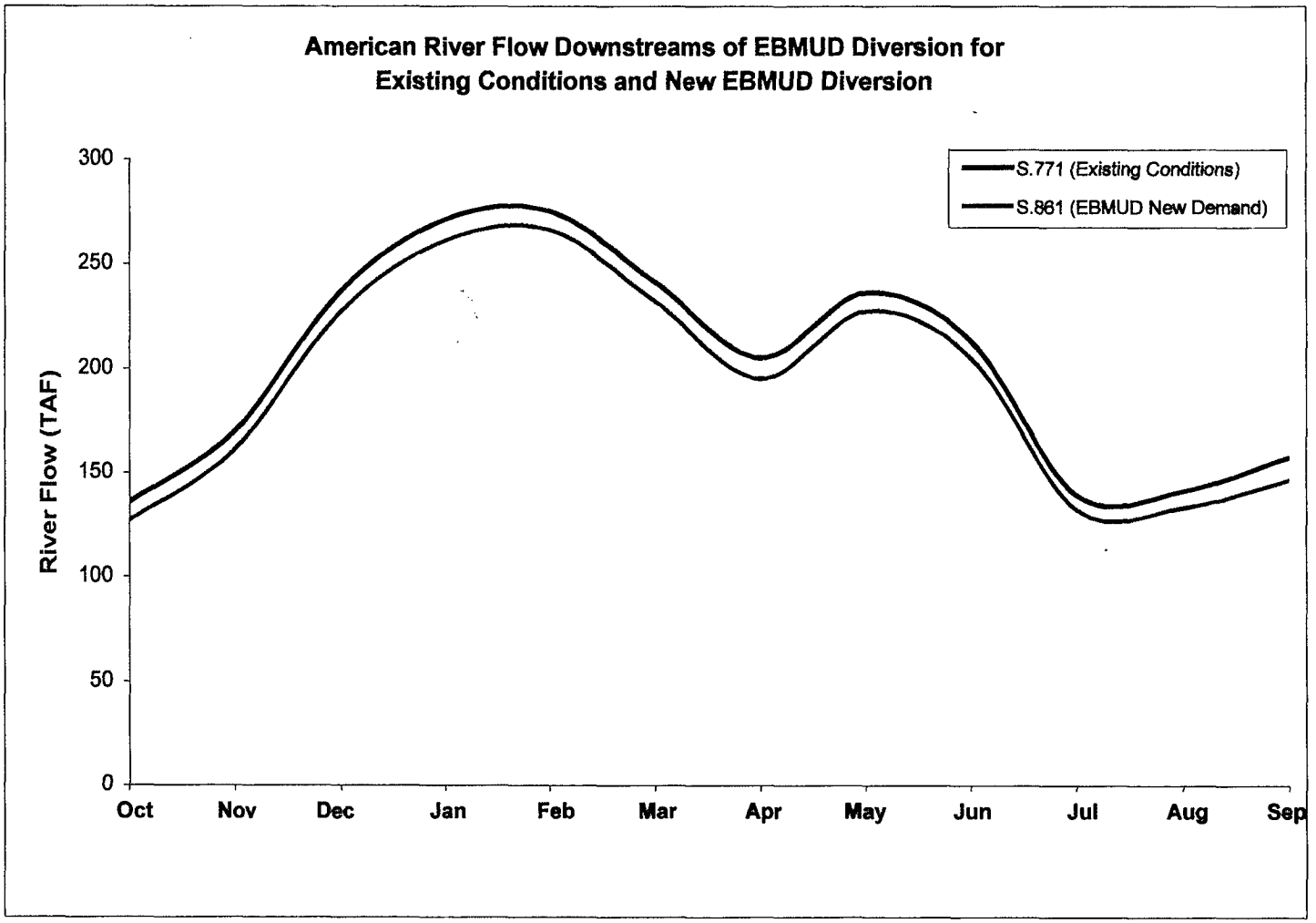


FIGURE 30

DWR PLANNING SIMULATION MODEL NETWORK REPRESENTATION

NORTH OF DELTA

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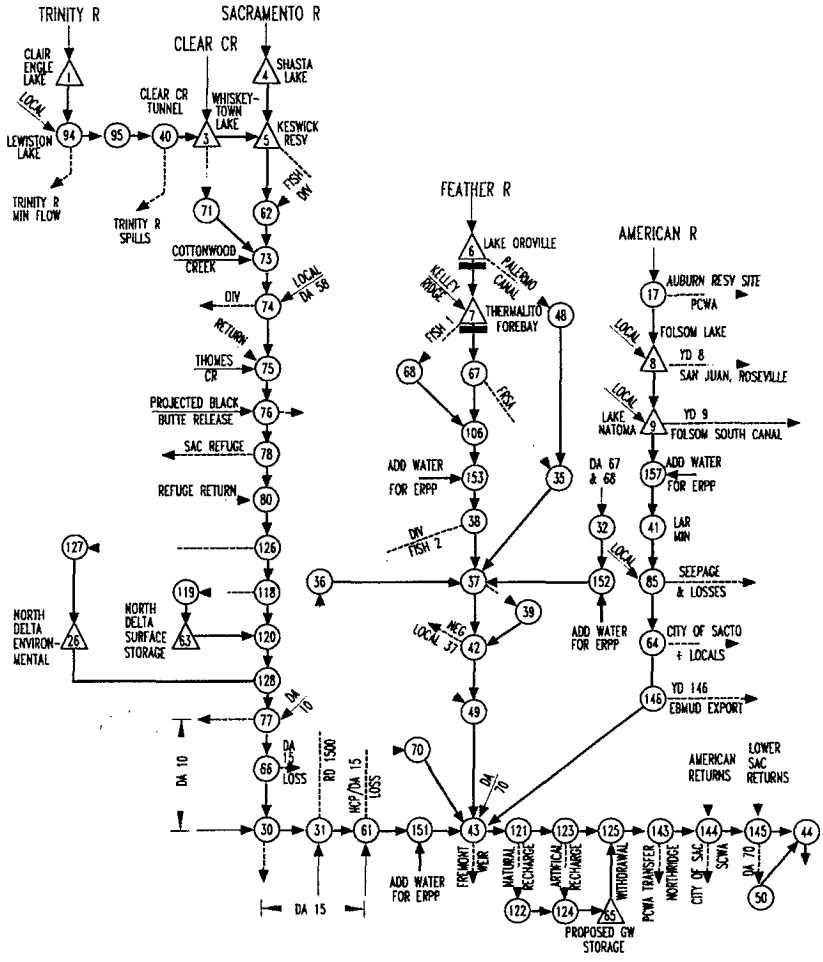

FIGURE 31

DWR PLANNING SIMULATION MODEL NETWORK REPRESENTATION

DELTA

CALFED - January 22, 1999 Edition (Page 2 of 5)

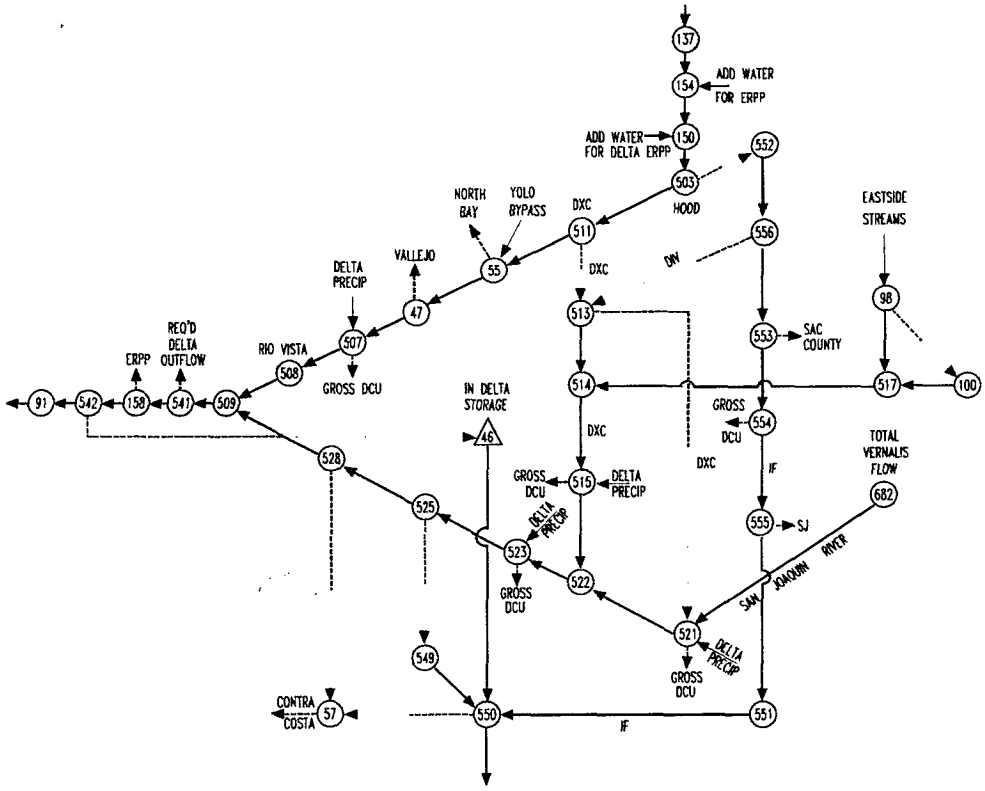

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FIGURE 32

DWR PLANNING SIMULATION MODEL NETWORK REPRESENTATION

SAN JOAQUIN BASIN

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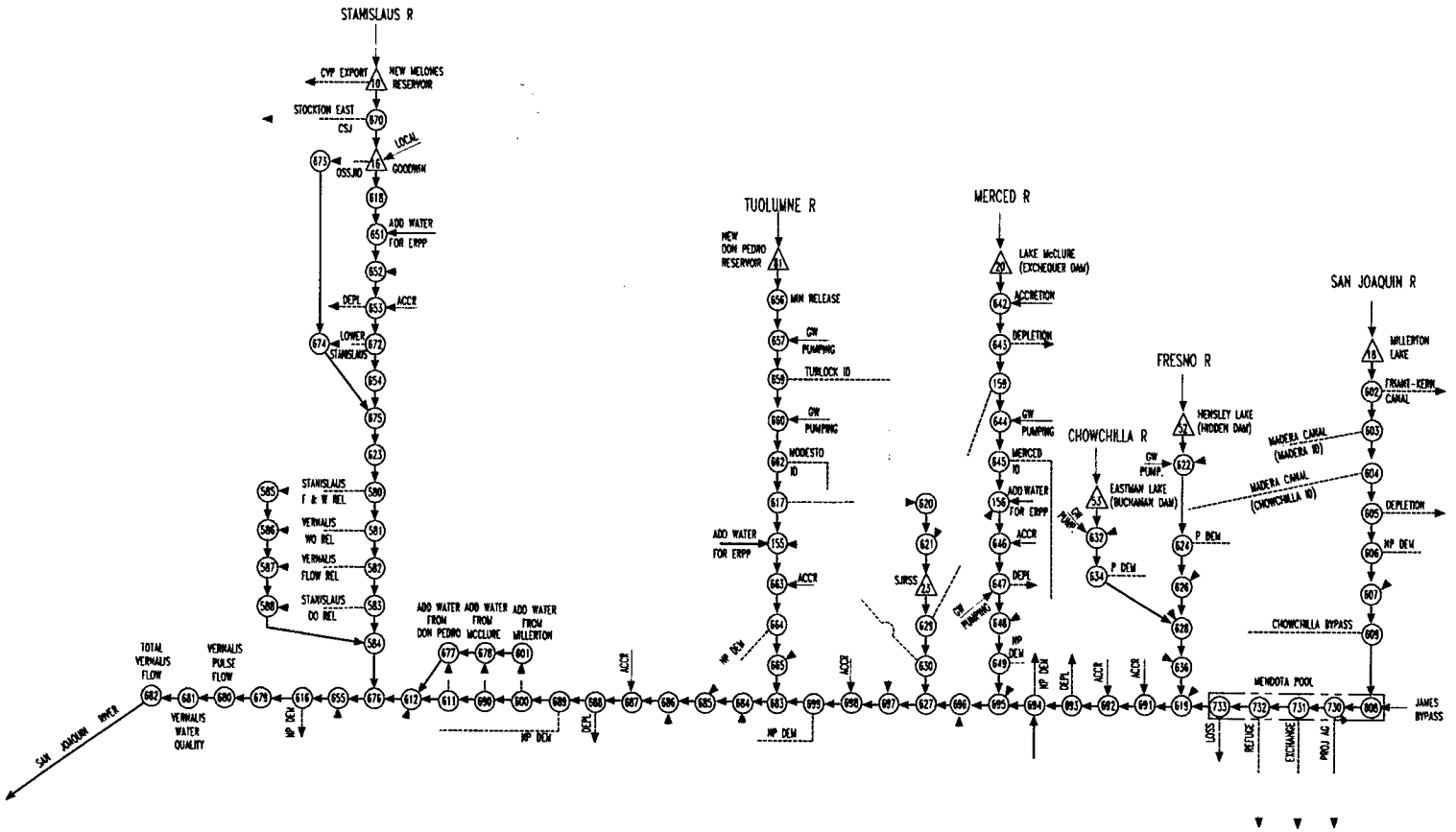

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FIGURE 33

DWR PLANNING SIMULATION MODEL NETWORK REPRESENTATION

AQUEDUCT AND DMC

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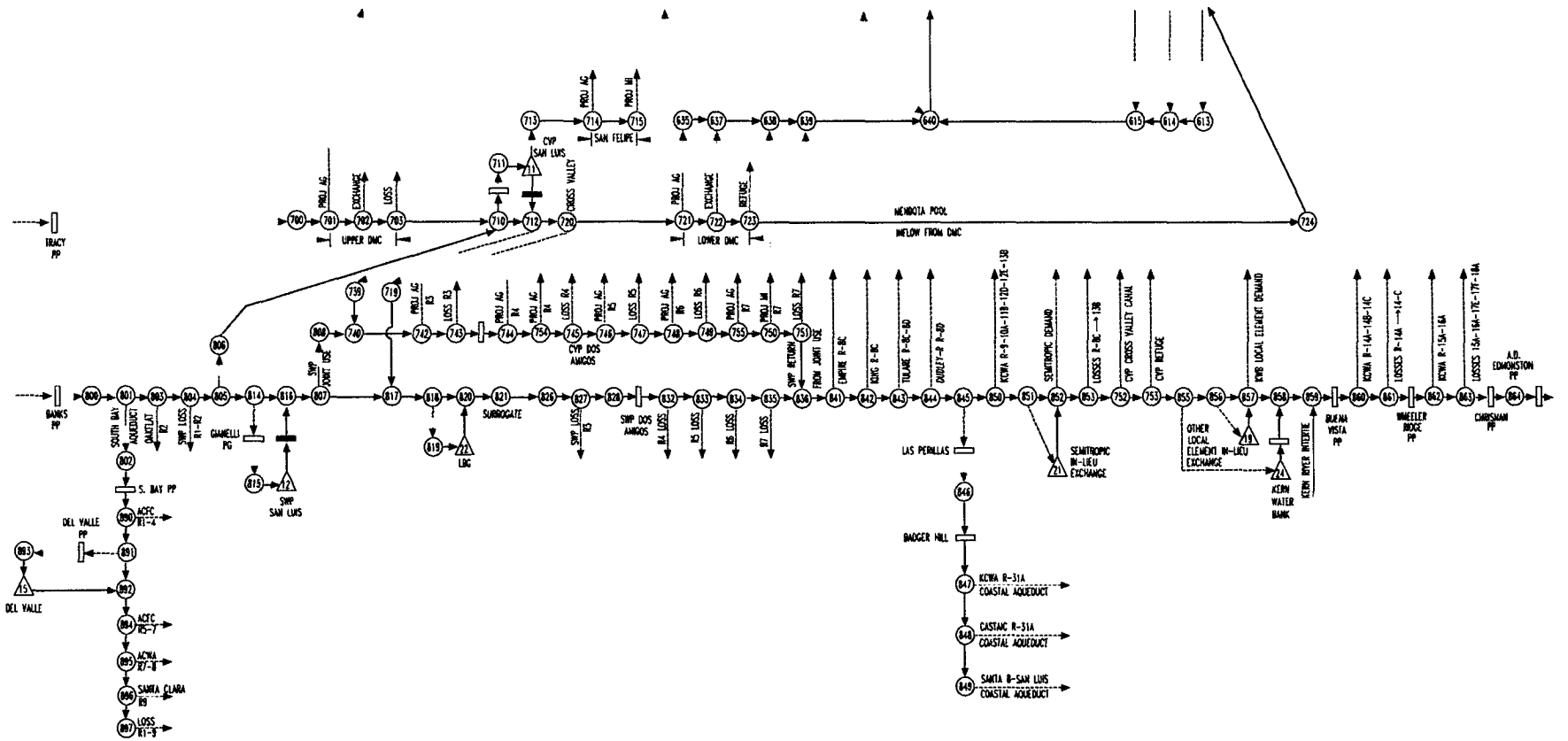

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FIGURE 34

DWR PLANNING SIMULATION MODEL NETWORK REPRESENTATION

AQUEDUCT EAST AND WEST BRANCH

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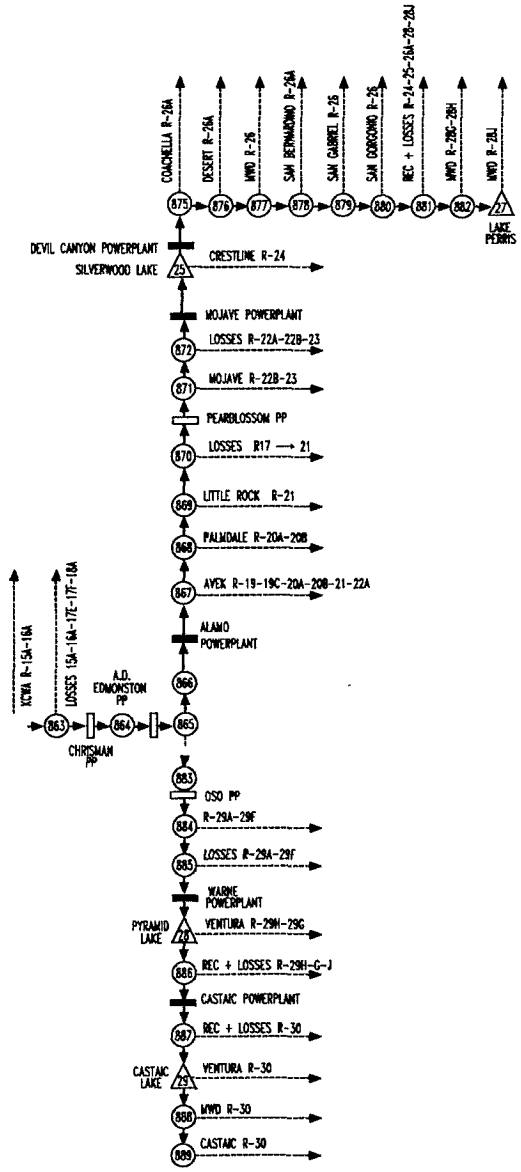

APPENDIX 'A'

STUDY ASSUMPTIONS FOR
1995 WATER QUALITY CONTROL PLAN
BAY - DELTA ACCORD STANDARDS

DWR PLANNING SIMULATION MODEL (DWRSIM) ASSUMPTIONS FOR 1995 SWRCB WATER QUALITY CONTROL PLAN BAY – DELTA ACCORD STANDARDS

1. Instream Flow Requirements

A. Trinity River minimum fish flows below Lewiston Dam are maintained at 340 TAF/year for all years, based on a May 1991 letter agreement between the USBR and the U.S. Fish and Wildlife Service.

B. Sacramento River navigation control point (NCP) flows are maintained at 5,000 cfs in wet and above normal water years and 4,000 cfs in all other years. This criterion is relaxed to 3,500 cfs when Shasta carryover storage drops below 1.9 MAF and is further relaxed to 3,250 cfs when Shasta carryover storage drops below 1.2 MAF.

C. Feather River fishery flows are maintained per an agreement between DWR and the Calif. Dept. of Fish & Game (August 26, 1983). In normal years these minimum flows are 1,700 cfs from October through March and 1,000 cfs from April through September. Lower minimum flows are allowed in low runoff years and when Oroville storage drops below 1.5 MAF. A maximum flow restriction of 2,500 cfs for October and November is maintained per the agreement criteria.

D. Stanislaus River required minimum fish flows below New Melones Reservoir are met as a function of New Melones Reservoir storage and range from 98 TAF/year up to 467 TAF/year, according to the interim Operations Plan provided by USBR Staff. The actual minimum fish flow for each year is based on the water supply available for that year. CVP contract demands above Goodwin Dam are met as a function of New Melones Reservoir storage and inflow per interim Operations Plan provided by USBR Staff.

E. Tuolumne River minimum fishery flows below New Don Pedro Dam are maintained per an agreement between Turlock and Modesto Irrigation Districts, City of San Francisco, Dept. of Fish & Game and others (FERC Agreement 2299). Base flows range from 50 cfs to 300 cfs. Base and pulse flow volumes depend on time of the year and water year type.

2. CVPIA AFRP Flow Criteria

The following AFRP flow criteria are in accordance with the November 27, 1997 USBR PEIS Report.

A. Flow objectives between 3,250 cfs and 5,500 cfs are maintained below Keswick Dam on the Sacramento River. Flow requirements during October through April are triggered by Shasta carryover storage.

B. Flow objectives between 52 cfs and 200 cfs are maintained below Whiskeytown Dam on Clear Creek, depending on month and year type.

C. Flow objectives between 250 cfs and 4,500 cfs are maintained below Nimbus Dam on the American River. Flow requirements during October through February are triggered by Folsom carryover storage. Flow requirements in other months are triggered by previous month storage plus remaining water year inflows.

3. Trinity River Imports

Imports from Clair Engle Reservoir to Whiskeytown Reservoir (up to a 3,300 cfs maximum) are specified according to USBR criteria. Imports vary according to month and previous month Clair Engle storage.

4. Hydrology

For existing conditions, a new hydrology, HYD-D06E has been developed. A new 2020 level hydrology, HYD-D09C, has been developed similar to hydrology HYD-C09b described in a June 1994 memorandum report titled A Summary of Hydrologies at the 1990, 1995, 2000, 2010, and 2020 Levels of Development for Use in DWRSIM Planning Studies published by DWR's Division of Planning (now Office of SWP Planning). HYD-D09C is based on DWR Bulletin 160-98 land use projections and simulates the 73 year period 1922 through 1994. Major assumptions in developing the hydrology compared to the 1995 level HYD-D06E are:

A. For areas upstream of the Delta (Sacramento River Basin and Eastside Stream area) land use projections at the 2020 level of development based on Bulletin 160-98 preliminary projections.

B. The stand-alone HEC-3 models of the American, Yuba, and Bear River systems were updated and extended through 1994.

C. A new EBMUD study (Study No. 5977) of the Camanche/Pardee reservoir system on the Mokelumne was used in the hydrology development process.

D. Net Delta water requirements were estimated based on variable crop ET values.

E. For the San Joaquin Valley, the hydrology was based on Bureau of Reclamation's SANJASM run NF1 used in the base case for the PEIS.

5. Pumping Plant Capacities, Coordinated Operation & Wheeling

A. SWP Banks Pumping Plant average monthly capacity with 4 new pumps is 6,680 cfs (or 8,500 cfs in some winter months) in accordance with USACE October 31, 1981 Public Notice criteria.

B. CVP Tracy Pumping Plant capacity is 4,600 cfs, but physical constraints along the Delta

Mendota Canal and at the relift pumps (to O'Neil Forebay) can restrict export capacity as low as 4,200 cfs.

C. CVP/SWP sharing of responsibility for the coordinated operation of the two projects is maintained per the Coordinated Operation Agreement (COA). Storage withdrawals for in-basin use are split 75 percent CVP and 25 percent SWP. Unstored flows for storage and export are split 55 percent CVP and 45 percent SWP. In months when the export-inflow ratio limits Delta exports, the allowable export is shared equally between the CVP and SWP. (The COA sharing formula is based on D-1485 operations, not on May 1995 Water Quality Control Plan operations. The sharing formula will likely be modified to conform with Water Quality Control Plan operations. Such a change has unknown, but potentially significant, operational implications.)

D. CVP water is wheeled to meet Cross Valley Canal demands when unused capacity is available in Banks Pumping Plant.

E. Enlarged East Branch aqueduct capacities are assumed from Alamo Powerplant to Devil Canyon Powerplant.

6. Target Reservoir Storage

A. Shasta Reservoir carryover storage is maintained at or above 1.9 MAF in all normal water years for winter-run salmon protection per the NMFS biological opinion. However, in critical years following critical years, storage is allowed to fall below 1.9 MAF.

B. Folsom Reservoir storage capacity was reduced from 1010 TAF down to 975 TAF due to sediment accumulation as calculated from a 1992 reservoir capacity survey.

C. Folsom flood control criteria are in accordance with the December 1993 USACE report "Folsom Dam And Lake Operation Evaluation". This criteria uses available storage in upstream reservoirs such that the maximum flood control reservation varies from 400 TAF to 670 TAF.

7. SWP Demands, Deliveries & Deficiencies

A. 2020 demand level is assumed to be variable at full entitlement of 4.2 MAF. MWDSC's monthly demand patterns assume an Eastside Reservoir and an Inland Feeder pipeline in accordance with a July 26, 1995 memorandum from MWDSC.

B. Deficiencies are imposed as needed per the draft "Monterey Agreement" criteria and are calculated from the following Table A entitlements for year 2020:

Agricultural Entitlements	1,150 TAF/year
M & I Entitlements	2,981
Recreation & Losses	64
Total Entitlements	4,195 TAF/year

C. Maximum SWP Contractor deliveries are designed to vary in response to local wetness indexes. As such, maximum deliveries are reduced in the wetter years, assuming greater availability of local water supplies.

1. Maximum deliveries to San Joaquin Valley agricultural contractors are reduced in wetter years using the following index developed from annual Kern River inflows to Lake Isabella:

	Dry/Avg/Above	Wet
Kern River flow (TAF/year)	<1,500	>1,500
Max. Ag delivery (TAF)	1,150	915

2. Maximum deliveries to Metropolitan Water District of Southern California (MWDSC) are varied annually in accordance with the July 11, 1997 transmittal from MWDSC to CALFED. These annual deliveries range between 1322 TAF/year to 2010 TAF/year.

3. Maximum deliveries to all other SWP M&I Contractors are NOT adjusted for a wetness index, and are set at 971 TAF/year in all years. As a result of the use of these wetness indexes and variable MWDASC demands, the total maximum delivery to all SWP Contractors varies by year as follows:

	Max	Min
Ag delivery	1,150	915
MWDSC delivery	2,010	1,322
Max. Other M&I delivery	971	971
Fixed Losses & Recreation	64	64
Total SWP Delivery	4,195	3,272

D. Maximum interruptible demand per month for SWP is assumed as follows.

MWDSC	50
Other	84
Total (Max)	134 TAF/month

In wet years when Kern River inflow to Lake Isabella is greater than 1500 TAF/year, there is no interruptible demand.

E. When available, "interruptible" water is delivered to SWP south-of-Delta contractors in accordance with the following assumptions based on the Monterey Amendment White Paper redraft dated September 28, 1995:

1. Interruptible water results from direct diversions from Banks Pumping Plant. It is not stored in San Luis Reservoir for later delivery to contractors.

2. A contractor may accept interruptible water in addition to its monthly scheduled entitlement water. Therefore, the contractor may receive water above its Table A amount for the year. Interruptible water deliveries do not impact entitlement water allocations.

3. If demand for interruptible water is greater than supply in any month, the supply is allocated in proportion to the Table A entitlements of those contractors requesting interruptible water.

8. CVP Demands, Deliveries & Deficiencies

A. 2020 level CVP demands, including canal losses but excluding San Joaquin Valley wildlife refuges are assumed as follows (see Item IX.B below for refuge demands):

Contra Costa Canal	202 TAF/year
DMC and Exchange	1,561
CVP San Luis Unit	1,447
San Felipe Unit	196
Cross Valley Canal	128
Total CVP Delta Exports	3,534 TAF/year

Including wildlife refuges, total CVP demand is 3,822 TAF/year. The Contra Costa Canal monthly demand pattern assumes Los Vaqueros operations in accordance with a July 11, 1994 e-mail from CCWD.

B. Sacramento Valley refuge demands are modeled implicitly in the hydrology through rice field and duck club operations. Sacramento Valley refuges include Gray Lodge, Modoc, Sacramento, Delevan, Colusa and Sutter. Level II refuge demands in the San Joaquin Valley are explicitly modeled at an assigned level of 288 TAF/year. San Joaquin Valley refuges include Grasslands, Volta, Los Banos, Kesterson, San Luis, Mendota, Pixley, Kern and those included in the San Joaquin Basin Action Plan.

C. CVP south-of-Delta deficiencies are imposed when needed by contract priority. Contracts are classified into four groups: agricultural (Ag), municipal and industrial (M&I), Exchange and Refuge. Deficiencies are imposed in accordance with the Shasta Index and sequentially according to the following rules:

1. Ag requests are reduced up to a maximum of 50 percent.
2. Ag, M&I and Exchange requests are reduced by equal percentages up to a maximum of 25 percent. At this point, cumulative Ag deficiencies are 75 percent.
3. Ag, M&I and Refuge requests are reduced by equal percentages up to a maximum of 25 percent. At this point, cumulative Ag and M&I deficiencies are 100 percent and 50 percent, respectively.
4. M&I requests are reduced until cumulative deficiencies are 100 percent.
5. Further reductions are imposed equally upon Exchange and Refuge.

D. Deficiencies in the form of "dedicated" water and "acquired" water to meet 800 TAF/year CVPIA demands are not imposed.

9. Delta Standards

In the following assumptions related to Delta standards, reference is made to the SWRCB's May 1995 Water Quality Control Plan (Plan):

A. Water Year Classifications

1. The Sacramento Valley 40-30-30 Index (as defined on page 23 of the Plan) is used to determine year types for Delta outflow criteria and Sacramento River system requirements unless otherwise specified in the Plan.

2. The San Joaquin Valley 60-20-20 Index (page 24) is used to determine year types for flow requirements at Vernalis.

3. The Sacramento River Index, or SRI (Footnote 6, page 20), is used to trigger relaxation criteria related to May-June Net Delta Outflow Index (NDOI) and salinity in the San Joaquin River and western Suisun Marsh.

4. The Eight River Index (Footnote 13, page 20) is used to trigger criteria related to (i) January NDOI, (ii) February-June X2 standards and (iii) February export ratio.

B. M&I Water Quality Objectives (Table 1, page 16)

1. The water quality objective at Contra Costa Canal intake is maintained in accordance with the Plan. A "buffer" was added to insure that the standard is maintained on a daily basis. Thus, DWRSIM uses a value of 130 mg/L for the 150 mg/L standard and a value of 225 mg/L for the 250 mg/L standard.

2. The M&I water quality objectives at Clifton Court Forebay, Tracy Pumping Plant, Barker Slough and Cache Slough are not modeled.

C. Agricultural Water Quality Objectives (Table 2, page 17)

1. Water quality objectives on the Sacramento River at Emmaton and on the San Joaquin River at Jersey Point are maintained in accordance with the Plan.

2. Plan water quality objectives on the San Joaquin River at Vernalis are 0.7 EC in April through August and 1.0 EC in other months. These objectives are maintained primarily by releasing water from New Melones Reservoir. A cap on water quality releases is imposed per criteria outlined in an April 26, 1996 letter from USBR to SWRCB. The cap varies between 70 TAF/year and 200 TAF/year, depending on New Melones storage and projected inflow.

3. The interior Delta standards on the Mokelumne River (at Terminous) and on the San Joaquin River (at San Andreas Landing) are not modeled.

4. The export area 1.0 EC standards at Clifton Court Forebay and Tracy Pumping Plant are not modeled.

D. Fish & Wildlife Water Quality Objectives: Salinity (Table 3, page 18)

1. The 0.44 EC standard is maintained at Jersey Point in April and May of all but critical years. Per Footnote 6 (page 20), this criteria is dropped in May if the projected SRI is less than 8.1 MAF. The salinity requirement at Prisoners Point is not modeled.

2. The following EC standards are maintained at Collinsville for eastern Suisun Marsh salinity control:

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
EC - Ave. High Tide	19.0	15.5	15.5	12.5	8.0	8.0	11.0	11.0

The corresponding EC standards for other locations in the eastern and western Suisun Marsh are not modeled.

E. Fish & Wildlife Water Quality Objectives: Delta Outflow (Table 3, page 19)

1. Minimum required NDOI (cfs) is maintained as follows:

Year Type	Oct	Nov	Dec	Jan	Feb-Jun	Jul	Aug	Sep
Wet	4,000	4,500	4,500	*	**	8,000	4,000	3,000
Above Normal	4,000	4,500	4,500	*	**	8,000	4,000	3,000
Below Normal	4,000	4,500	4,500	*	**	6,500	4,000	3,000
Dry	4,000	4,500	4,500	*	**	5,000	3,500	3,000
Critical	3,000	3,500	3,500	*	**	4,000	3,000	3,000

* January: Maintain either 4,500 cfs or 6,000 cfs if the December Eight River Index was greater than 800 TAF (per Footnote 13 page 20).

** February-June: Maintain 2.64 EC standards (X2) as described below.

2. For February through June, outflow requirements are maintained in accordance with the 2.64 EC criteria (also known as X2) using the required number of days at Chipps Island (74 km) and Roe Island (64 km). See Footnote 14 for Table 3 (Table A) page 26.

a. At the Confluence (81 km), the full 150 days (February 1 - June 30) of 2.64 EC is maintained in all years, up to a maximum required flow of 7,100 cfs. This requirement is dropped in May and June of any year for which the

projected SRI is less than 8.1 MAF. In those years when the criteria is dropped, a minimum outflow of 4,000 cfs is maintained in May and June.

b. The criteria -- "If salinity/flow objectives are met for a greater number of days than the requirements for any month, the excess days shall be applied to meeting the requirements for the following month" -- is not modeled. See Footnote "a" of Footnote 14 for Table 3 (Table A).

c. The Kimmerer-Monismith monthly equation is used to calculate outflow required (in cfs) to maintain the EC standard (average monthly position in kilometers). In this equation the EC position is given and Delta outflow is solved for.

EC position = 122.2 + [0.3278 * (previous month EC position in km)] [17.65 * $\log_{10}$(current month Delta outflow in cfs)]

In months when the EC standard is specified in more than one location (e.g. 19 days at the confluence and 12 days at Chipps Island), required outflow for the month is computed as a flow weighted average of the partial month standards.

3. Additional details on the 2.64 EC criteria are modeled as follows:

a. The trigger to activate the Roe Island standard is set at 66.3 km from the previous month, as an average monthly value.

b. The maximum required monthly outflows to meet the 2.64 EC standard are capped at the following limits: 29,200 cfs for Roe Island; 11,400 cfs for Chipps Island; and 7,100 cfs for the Confluence.

c. Relaxation criteria for the February Chipps Island standard is a function of the January Eight River Index as follows:

(i) X2 days = 0 if the Index is less than 0.8 MAF
(ii) X2 days = 28 if the Index is greater than 1.0 MAF
(iii) X2 days vary linearly between 0 and 28 if the Index is between 0.8 MAF and 1.0 MAF

F. Fish & Wildlife Water Quality Objectives: River Flows (Table 3, page 19)

1. Minimum Sacramento River flow requirements (cfs) at Rio Vista are maintained as follows:

Year Type	Sep	Oct	Nov	Dec
Wet	3,000	4,000	4,500	4,500
Above Normal	3,000	4,000	4,500	4,500
Below Normal	3,000	4,000	4,500	4,500
Dry	3,000	4,000	4,500	4,500
Critical	3,000	3,000	3,500	3,500

2. From February 1 through June 30, minimum flows on the San Joaquin River at Vernalis are maintained per the table below. For each period, the higher flow is required whenever the 2.64 EC Delta outflow position is located downstream of Chipps Island (<74 km). If the 2.64 EC Delta outflow position is upstream of Chipps Island (>74 km), then the lower flow requirement is used.

	Minimum Flows at Vernalis (cfs)	
	Feb1-Apr14 &	
Year Type	May16-June30	April15-May15
Wet	2,130 or 3,420	7,330 or 8,620
Above Normal	2,130 or 3,420	5,730 or 7,020
Below Normal	1,420 or 2,280	4,620 or 5,480
Dry	1,420 or 2,280	4,020 or 4,880
Critical	710 or 1,140	3,110 or 3,540

3. For the month of October, the minimum flow requirement at Vernalis is 1,000 cfs in all years PLUS a 28 TAF pulse flow (per Footnote 19, page 21). The 28 TAF pulse (equivalent to 455 cfs monthly) is added to the actual Vernalis flow, up to a maximum of 2,000 cfs. The pulse flow requirement is not imposed in a critical year following a critical year. These two components are combined as an average monthly requirement as follows:

October Minimum Flows at Vernalis (cfs)

Base Flow	Required Flow
<1,000	1,455
1,000-1,545	Base Flow + 455
>1,545	2000

4. The above flow requirements at Vernalis are maintained primarily by releasing additional water from New Melones Reservoir. In years when New Melones Reservoir drops to a minimum storage of 80 TAF (per April 26, 1996 letter from USBR to SWRCB), additional water is provided equally from the Tuolumne and Merced River systems to meet the Vernalis flow requirements. If these sources are insufficient to meet objectives at Vernalis, nominal deficiencies will be applied to upstream demands.

G. Fish & Wildlife Water Quality Objectives: Export Limits (Table 3, page 19)

1. Ratios for maximum allowable Delta exports are specified as a percentage of total Delta inflow as follows:

Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
65	65	65	65	45-35	35	35	35	35	65	65	65

a. In February the export ratio is a function of the January Eight River Index per Footnote 25, page 22 as follows:

(i) 45% if the Jan. 8-River Index is less than 1.0 MAF
(ii) 35% if the Jan. 8-River Index is greater than 1.5 MAF
(iii) Varies linearly between 45% and 35% if the January Eight River Index is between 1.0 MAF and 1.5 MAF.

b. For this ratio criteria, total Delta exports are defined as the sum of pumping at the SWP Banks and CVP Tracy Pumping Plants. Total Delta inflow is calculated as the sum of river flows from the Sacramento River, Yolo Bypass, total from the Eastside stream group, and San Joaquin River inflow. Delta area precipitation and consumptive uses are not used in this ratio.

2. Based on Footnote 22 page 21, April and May total Delta export limitations are modeled as follows:

a. April 15 - May 15 exports are limited to 1,500 cfs OR 100 percent of the San Joaquin River flow at Vernalis, whichever is greater.

b. April 1-14 and May 16-31 export limits are controlled by either the export/inflow ratio (35%) or pumping plant capacity, whichever is smaller.

H. Fish & Wildlife Water Quality Objectives: Delta Cross Channel (Table 3, page 19)

1. The Delta Cross Channel (DCC) is closed 10 days in November, 15 days in December and 20 days in January for a total closure of 45 days per Footnote 26, page 22.

2. The DCC is fully closed from February 1 through May 20 of all years and is closed an additional 14 days between May 21 and June 15 per Footnote 27, page 22.

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