



# MANAGEMENT OF THE **CALIFORNIA** **STATE WATER** **PROJECT**

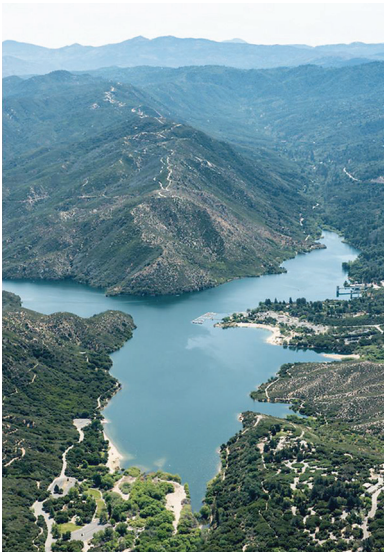
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**Bulletin 132-16**

# **Management of the California State Water Project**

*Covers Calendar Year 2015 Activities*



*Published June 2017*

**Edmund G. Brown Jr.** *Governor*  
*State of California*

**John Laird** *Secretary for Natural Resources*  
*California Natural Resources Agency*

**William A. Croyle** *Acting Director*  
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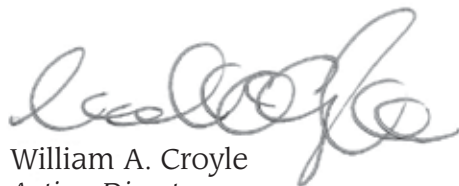
## Foreword

*B*ulletin 132-16, Management of the California State Water Project, continues the Bulletin 132 annual series begun in 1963. Bulletin 132-16 reports water supply planning, construction, financing, management, and operation activities of the State Water Project (SWP). Appendix B contains data and computations used to determine the SWP water contractors' Statements of Charges for 2017. Appendix B was previously printed and distributed to SWP water contractors to document and support calculation of contractors' annual charges.

The Bulletin discusses significant events and issues that affected SWP management and operations from January 1, 2015, through December 31, 2015.

Bulletin 132-16 also discusses water supply and delivery, Delta resources and environmental issues, local assistance programs, power resources, recreation, and financial analysis of the SWP.

Please note that the water delivery figures listed are accurate at the time of this publication, but small volumes of water may be reclassified over time pursuant to long-term water supply contract provisions. If your research requires more current data than were available at the time of publication, please consult the most recent edition of Bulletin 132, or contact Department of Water Resources staff in the State Water Project Analysis Office.



William A. Croyle  
*Acting Director*



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**Appendix B** Data and Computations Used to Determine 2017 Water  
Charges (included in this bulletin)

**Appendix C** The California State Water Project Summary  
(discontinued)

**Appendix D** Costs of Recreation and Fish and Wildlife Enhancement  
(discontinued)

**Appendix E** Water Operations in the Sacramento-San Joaquin Delta  
(discontinued)

**Appendix F** San Joaquin Valley Post-Project Economic Impact  
(discontinued)

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## California Water Commission

The California Water Commission consists of nine members appointed by the Governor and confirmed by the Senate. Seven members are chosen for their expertise related to the control, storage, and beneficial use of water, and two are chosen for their knowledge of the environment. The commission advises the Director of the Department of Water Resources (DWR) on matters within DWR's jurisdiction, approves rules and regulations, and monitors and reports on the construction and operation of the State Water Project (SWP).

The roles and responsibilities of the California Water Commission are defined in the Water Code, Government Code, and Code of Civil Procedure.

The commission's SWP-specific responsibilities are to:

- conduct an annual review of the construction and operation of the SWP and report to DWR and the Legislature with any recommendations (Water Code Section 165);
- hold public hearings on all additional facilities proposed to be added to the SWP and name any new facilities (Water Code Sections 161.5 and 166); and
- adopt a resolution of necessity, and give each affected person a venue to be heard, before DWR may commence an eminent domain proceeding (Code of Civil Procedure Section 1245.210).

The California Water Commission's Executive Officer is Joseph Yun, and the Commission members at the time of publication are:

Carol Baker, Vice-Chair

Andrew Ball

Joseph Byrne

Daniel Curtin

Joe Del Bosque

Maria Herrera

Catherine Keig

David Orth

Armando Quintero, Chair

## Acronyms and Abbreviations

### *Symbols*

**µg/L** micrograms per liter  
**µS/cm** microsiemens per centimeter

### *A*

**AB** Assembly Bill  
**af** acre-feet/acre-foot  
**AWMP** Agricultural Water Management Plan

### *B*

**Bay-Delta Estuary** San Francisco Bay/Sacramento-San Joaquin Delta Estuary  
**Bay-Delta Plan** Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary  
**BDCP** Bay Delta Conservation Plan  
**BiOp** biological opinion

### *C*

**CAISO** California Independent System Operator  
**California State Parks** California Department of Parks and Recreation  
**C.A.S.T.** Catch A Special Thrill  
**CDPH** California Department of Public Health  
**CEQA** California Environmental Quality Act  
**CESA** California Endangered Species Act  
**CFR** Comprehensive Facility Review  
**cfs** cubic feet per second  
**CIMIS** California Irrigation Management Information System  
**Corps** U.S. Army Corps of Engineers  
**CVC** Cross Valley Canal  
**CVP** Central Valley Project  
**CWC** California Water Code

### *D*

**D-1641** State Water Resources Control Board, Water Right Decision 1641  
**DCP** drought contingency plan  
**DDA** Davis-Dolwig Act  
**Delta** Sacramento-San Joaquin Delta Sacramento-San Joaquin Delta Estuary  
**DFW** Department of Fish and Wildlife

**DO** dissolved oxygen  
**DOE** Division of Engineering  
**DSB** Dam Safety Branch  
**DSC** Delta Stewardship Council  
**DSM2** Delta Simulation Model 2  
**DSOD** Division of Safety of Dams  
**DSRB** Director's Safety Review Board  
**DWR** Department of Water Resources

**E**

**EC** electrical conductivity, specific conductance, or specific conductivity  
**EIR** environmental impact report  
**EIS** environmental impact statement  
**EO** Executive Order  
**EPA** U.S. Environmental Protection Agency  
**ESA** federal Endangered Species Act

**F**

**FERC** Federal Energy Regulatory Commission  
**FRFH** Feather River Fish Hatchery  
**FRP** Fish Restoration Program  
**ft** feet

**G**

**GHG** greenhouse gas  
**GLC** Glorious Land Company

**H**

**HEA** Habitat Expansion Agreement  
**Hyatt-Thermalito** Hyatt Pumping-Generating Plant and Robie Thermalito Pumping-Generating Plant

**I**

**IRWM** Integrated Regional Water Management

**K**

**kV** kilovolt  
**kWh** kilowatt hour

**L**

**LADWP** Los Angeles Department of Water and Power  
**LTMS** Long-Term Management Strategy

**M**

**m** meters  
**maf** million acre-feet  
**MCL** maximum contaminant level  
**MeHg** methylmercury  
**mg/L** milligrams per liter  
**MIB** 2-methylisoborneol  
**MIDS** Morrow Island Distribution System  
**MME** Mercury Monitoring and Evaluation  
**MRTU** Market Redesign and Technology Upgrade  
**mS/cm** millisiemens per centimeter  
**MW** megawatt  
**MWh** megawatt hour  
**MWQI** Municipal Water Quality Investigations  
**MWQP** Municipal Water Quality Program  
**MWT** McCormack-Williamson Tract

**N**

**NDOI** Net Delta Outflow Index  
**NEPA** National Environmental Policy Act  
**NERC** North American Electric Reliability Corporation  
**NOAA Fisheries** National Marine Fisheries Service  
**NVE** NV Energy

**O**

**O&M** Division of Operations and Maintenance  
**OMP&R** operations, maintenance, power, and replacement  
**OM&R** operations, maintenance, and replacement

**P**

**PAO** Public Affairs Office  
**PFMA** Potential Failure Mode Analysis  
**PFR** Periodic Facility Review  
**PG&E** Pacific Gas & Electric Company  
**PSP** proposal solicitation package

**Q**

**QSA** Quantification Settlement Agreement

**R**

**Reclamation** Bureau of Reclamation  
**RETI** Renewable Energy Transmission Initiative  
**RFWE** recreation and fish and wildlife enhancement

**RIMPR** Renewable Integration Market and Product Review  
**RM** River Mile  
**RST** rotary screw traps  
**RWQCB** Regional Water Quality Control Board

**S**

**Sacramento Valley 40-30-30 Index** Sacramento Valley Water Year Hydrologic Classification  
**San Joaquin Valley 60-20-20 Index** San Joaquin Valley Water Year Hydrologic Classification  
**SARMP** Settlement Agreement Recreation Management Plan  
**SB** Senate Bill  
**SBA** South Bay Aqueduct  
**SCE** Southern California Edison  
**SDIP** South Delta Improvements Program  
**SJR** San Joaquin 4 Rivers  
**SMPA** Suisun Marsh Preservation Agreement  
**SMSCG** Suisun Marsh Salinity Control Gates  
**SRR** Sacramento River Region  
**SWP** State Water Project  
**SWPAO** State Water Project Analysis Office  
**SWRCB** State Water Resources Control Board

**T**

**THg** total mercury  
**TLR** Tulare Lake Region  
**TUCP** temporary urgency change petition

**U**

**USFWS** U.S. Fish and Wildlife Service

**W**

**WQCP** water quality control plan

**Y**

**Yuba Accord** Lower Yuba River Accord

## SWP Long-term Water Contractors

The State Water Project long-term water supply contractors are listed below, followed by shortened forms of their names that are used in Bulletin 132.

Alameda County Flood Control and Water Conservation District, Zone 7	Alameda-Zone 7
Alameda County Water District	Alameda County
Antelope Valley-East Kern Water Agency	AVEK
Castaic Lake Water Agency	Castaic Lake
City of Yuba City	Yuba City
Coachella Valley Water District	Coachella
County of Butte	Butte
County of Kings	Kings
Crestline-Lake Arrowhead Water Agency	Crestline
Desert Water Agency	Desert
Dudley Ridge Water District	Dudley Ridge
Empire West Side Irrigation District	Empire
Kern County Water Agency	Kern
Littlerock Creek Irrigation District	Littlerock
The Metropolitan Water District of Southern California	Metropolitan
Mojave Water Agency	Mojave
Napa County Flood Control and Water Conservation District	Napa
Oak Flat Water District	Oak Flat
Palmdale Water District	Palmdale
Plumas County Flood Control and Water Conservation District	Plumas
San Bernardino Valley Municipal Water District	San Bernardino
San Gabriel Valley Municipal Water District	San Gabriel
San Geronio Pass Water Agency	San Geronio
San Luis Obispo County Flood Control and Water Conservation District	San Luis Obispo
Santa Barbara County Flood Control and Water Conservation District	Santa Barbara
Santa Clara Valley Water District	Santa Clara
Solano County Water Agency	Solano
Tulare Lake Basin Water Storage District	Tulare
Ventura County Watershed Protection District	Ventura







## State Water Project Highlights

*The Cordelia Pumping Plant Forebay, part of the North Bay Aqueduct.*



The annual Bulletin 132 series began in 1963 and reported the first deliveries of water by the new State Water Project (SWP). Bulletin 132-16, *Management of the California State Water Project*, continues this series as the fifty-fourth edition. It reports on SWP planning, construction, finance, management, and operations during calendar year 2015. The SWP is operated and maintained by the California Department of Water Resources (DWR).

The SWP is one of the world's largest water, power, and conveyance systems. In the past decade it has conveyed an annual average of 2.9 million acre-feet (maf) of water. SWP facilities—pumping and power plants; reservoirs, lakes, and storage tanks; canals, tunnels, and pipelines—capture, store, and convey water to public water agencies and local water districts.

## Drought

In January 2014, the Governor declared a state of emergency due to severe drought conditions and directed State and local agencies to take all necessary actions to conserve water, enhance and protect water supplies, and reduce harmful effects of the drought. Subsequent proclamations and executive orders extended provisions and added new provisions. On November 13, 2015, the Governor issued Executive Order B-36-15, which requires the orders and provisions contained in the January 17, 2014 Proclamation; the April 25, 2014 Proclamation; and Executive Orders B-28-14 (December 22, 2014) and B-29-15 (April 1, 2015) to remain in full force and effect.

To address the effects of the historic drought in 2015, the Bureau of Reclamation (Reclamation), DWR, U.S. Fish and Wildlife Service, National Marine Fisheries Service, Department of Fish and Wildlife, and State Water Resources Control Board (SWRCB) continued coordinated and extensive water operations and regulatory adjustments. The adjustments to existing water quality and federal Endangered Species Act requirements of SWRCB's Water Right Decision 1641 and the U.S. Fish and Wildlife Service and National Marine Fisheries Service biological opinions allowed the Central Valley Project (CVP) and SWP to

support water deliveries and transfers and to maximize upstream water storage while minimizing adverse effects on listed fish species and protecting water quality.

DWR and Reclamation continued to work in close coordination with the fish and wildlife agencies and the SWRCB to produce and update a 2015 drought contingency plan for CVP and SWP operations.

During 2015, DWR and Reclamation submitted a number of temporary urgency change petitions to the SWRCB requesting modification of requirements to meet Water Right Decision 1641 objectives. The SWRCB issued orders allowing temporary changes to some of the water quality and flow objectives.

For more information about SWRCB drought-related actions, see Chapter 4, Water Quality.

## Emergency Drought Barrier

In 2015, in response to drought conditions, a temporary, emergency salinity/drought barrier was constructed in the Delta on West False River between Jersey and Bradford islands and just east of the confluence with the San Joaquin River. The purpose of the barrier was to limit the tidal push of saltwater from San Francisco Bay into the Central and South Delta, allowing Delta



water quality to be maintained and water in upstream reservoirs to be conserved. The barrier successfully allowed the SWP and the CVP to operate with reduced Sacramento River/Delta outflow, as approved by the SWRCB, while maintaining control of salinity in the Central Delta.

## SWP Allocations

DWR approved delivery of 0.42 maf on December 1, 2014, resulting in initial Table A amounts of 10 percent of SWP water contractor requests. On March 2, 2015, DWR increased the 2015 Table A amounts to 0.83 maf, for a final allocation of 20 percent.

## Water Supply Contract Extension Program

In May 2013, DWR and the SWP contractors began negotiations in a public forum to develop contract amendments to extend the term and change certain financial provisions of the water supply contracts. In June 2014, the negotiators for DWR and the SWP contractors reached a general agreement on principles for such an amendment. In 2015, DWR continued preparing a draft environmental impact report for the proposed contract extension amendment. For more information see Chapter 9, Water Contracts and Deliveries.

## Yearly Activities Summary

### 2015 Precipitation and Water Storage

#### *Precipitation and Mountain Snowpack in Water Year 2014–2015*

Water year 2014–2015 proved to be another dry year, the fourth consecutive year with less than average precipitation and mountain snowpack. The State received precipitation at 74 percent of average in water year 2014–2015 compared to 56 and 79 percent of average in water years

2013–2014 and 2012–2013, respectively. Though a below-average water year, the Northern Sierra 8-Station Precipitation Index had 37.2 inches of precipitation, which was 74 percent of average. The San Joaquin 5-Station Precipitation Index was 19 inches (47 percent of average), and the Tulare Basin 6-Station Precipitation Index was 13.6 inches (47 percent of average). The statewide mountain snowpack on April 1 was only 5 percent of average.

### *River Runoff*

Statewide river runoff totaled 46 percent of average in the 2014–2015 water year. Runoff in the Sacramento River Region, the San Joaquin 4 Rivers, and the Tulare Lake Region was 51, 24, and 19 percent of average, respectively.

### *Water Supply Indices*

The Sacramento Valley Water Year Hydrologic Classification and the San Joaquin Valley Water Year Hydrologic Classification were both “critical,” based on observed data for water year 2014–2015.

### *Water Year 2014–2015 Statewide Storage Totals*

Monthly storage totals for the major Sierra Nevada reservoirs began at 56 percent of average reservoir storage following a dry 2013–2014 water year. The percent of average storage dipped slightly in the fall and then rose through the winter, peaking at 71 percent of average at the end of February. During the next 5 months, storage dropped gradually to 54 percent of average in July where it remained through September.

### *2015 Storage Totals in Major SWP Reservoirs*

End-of-year storage on December 31, 2015, in major SWP reservoirs and the State's share of joint-use reservoirs was 1.6 maf or 30 percent of maximum storage, compared to 2.3 maf or 43 percent of maximum storage

at the end of 2014. The average end-of-month total storage in major SWP reservoirs for 2015 was 2.2 maf.

## Diversions from the Delta

In 2015, the SWP diverted 837,421 acre-feet (af) at Banks Pumping Plant. There was no pumping for the Cross Valley Canal, and 8,380 af of CVP water was wheeled at Banks Pumping Plant by DWR during 2015.

Maximum daily Delta exports occurred on February 12 at 13,797 af. Combined SWP and CVP monthly Delta exports in 2015 varied from a high of 318,941 af in January to a low of 42,300 af in July. Delta exports totaled approximately 1.6 maf in 2015.

For more information, see Chapter 8, Water Supply.

## 2015 Water Supplies, Contracts, and Deliveries

### 2015 Water Deliveries

In 2015, a total of 2,104,264 af of SWP and non-SWP water was delivered to 29 long-term SWP water contractors and 20 non-SWP agencies. The SWP portion totaled 1,336,889 af, and the non-SWP portion totaled 767,375 af.

The 1,336,889 af delivered to SWP water contractors was categorized as follows:

- 640,444 af of Table A water;
- 37,011 af of transfers and exchanges of Table A water;
- 3,000 af of Turn-Back or Multiyear Water Pool Program water;
- 131,990 af of carryover water;
- 690 af of Article 21 water;
- 347,852 af of water bank recovery;
- 128,871 af of delivery of backup water;
- 728 af of settlement water;
- 2 af of SWP water for parks and recreation;

- 12,025 af of 2013 Yuba Accord Dry Year Purchase Program water;
- 7,716 af of local water;
- 4,870 af of permit water; and
- 21,690 af of other non-SWP programs.

The 767,375 af portion delivered to 19 non-SWP agencies was categorized accordingly:

- 39,058 af of SWP contracted supply;
- 26,181 af of water bank recovery;
- 689,930 af of regulated delivery of local supply;
- 211 af for parks and recreation;
- 877 af for fish and wildlife;
- 10,455 af for Kern National Wildlife Refuge; and
- 663 af for annual contracts.

For more information, see Chapter 9, Water Contracts and Deliveries.

## Power Resources

SWP generation totaled 1,274,706 megawatt hours of energy in 2015. The SWP received a total of 2,780,640 megawatt hours of energy from other power resources and firm purchases under agreements and exchanges. There were no bilateral sales of energy in 2015. For detailed information, see Chapter 10, Power Resources.

The sidebar, State Water Project Power Generation and Consumption in 2015, summarizes amounts of power generated and consumed by the SWP.

## Greenhouse Gas Management

In 2015, DWR reported its pump load, sulfur hexafluoride emissions, and generation for 2014 to the California Air Resources Board. DWR's sulfur hexafluoride emissions were below the maximum allowable limit; however, because the allowable limit will be lower in future years, DWR is developing plans to reduce its sulfur hexafluoride emissions. DWR also reported its greenhouse

## State Water Project Power Generation and Consumption in 2015

Power Generation and Consumption	Megawatt Hours
Energy generation by SWP facilities	1,274,706
Energy sources and firm purchases under agreements and exchanges	2,780,640
<b>Total Energy Available to the SWP</b>	<b>4,055,346</b>
Energy sales <sup>a</sup>	(566,888)
<b>Net SWP Power Consumption<sup>b</sup></b>	<b>3,488,457</b>

<sup>a</sup> Received under the Lodi Energy Center Power Sales Agreement as a purchase credit.

<sup>b</sup> Totals may not sum as expected due to rounding.

gas emissions for 2014 to The Climate Registry and submitted its fossil fuel report for 2014 to the Governor's Office.

For more information regarding DWR's management of greenhouse gas emissions, and its efforts to add renewable, greenhouse gas emission-free energy to the SWP's energy portfolio, see Chapter 10, Power Resources.

### Hydropower License Planning and Compliance

DWR holds three hydropower licenses and two conduit exemptions issued by the Federal Energy Regulatory Commission (FERC): Oroville Facilities, FERC Project No. 2100; South SWP Hydropower, FERC Project No. 2426; Pine Flat Transmission Line, FERC Project No. 2876; Alamo Powerplant Project, FERC Project No. 14579; and Mojave Siphon Powerplant Project, FERC Project No. 14580.

### Oroville Facilities Relicensing

On January 26, 2005, DWR filed an application with FERC requesting a new license for the Oroville Facilities (FERC Project No. 2100). The existing 50-year hydropower license expired January 31, 2007; FERC is issuing annual licenses under the same terms and conditions as the expired license until the new license is issued. Issuance of the new license has been delayed pending issuance of the National Marine Fisheries Service biological opinion.

For more information regarding events associated with Oroville Facilities relicensing in 2015, see Chapter 3, Environmental Programs; Chapter 6, Legislation and Litigation; Chapter 10, Power Resources; and Chapter 13, Recreation.

### South SWP Hydropower

In 2015, DWR initiated an extensive information gathering effort for the

pre-application document for the FERC relicensing of South SWP Hydropower. As a part of this effort, DWR mailed a notice and a questionnaire to agencies and potential stakeholders who may have an interest in the relicensing process. The questionnaire solicited information pertaining to the existing environment and potential effects of continued operation and maintenance of the South SWP Hydropower facilities. This information will be included in the pre-application document. The pre-application document and notice of intent for relicensing are due to FERC by January 31, 2017.

For more information about hydropower relicensing activities, see Chapter 10, Power Resources.

## Financial Analysis

In 2015, DWR continued to pay bondholders as scheduled. The SWP was financially viable and was indirectly paid for by the approximately 25 million water users served by the project. Direct payment was through the 29 long-term water contractors. In 2015, the SWP handled approximately \$993 million in revenues and \$993 million in expenses. The 2015 Income Statement for the State Water Project sidebar presents a summary of the year's revenues and expenses. For detailed information, see Chapter 14, Financial Analysis.

### 2015 Income Statement for the State Water Project

Revenues	Thousands of Dollars
Water Contract Payments	1,077,327
Revenue Bond Cover Adjustments	(58,832)
Rate Management Adjustments	(40,470)
Other Revenues	15,093
<b>Total Operating Revenues</b>	<b>993,118</b>
<b>Expenses</b>	
Project Operations, Maintenance, Power, and Replacement	637,202
Deposits to Reserves	53,047
Water Bond Principal	186,252
Water Bond Interest	116,616
<b>Total Operating Expenses and Debt Service</b>	<b>993,118</b>
<b>Net System Revenues</b>	<b>0</b>

## Engineering, Construction, and Real Estate

In 2015, engineering, construction, and real estate work to enhance, expand, repair, and protect the SWP and other facilities within the State continued. Significant projects included the Perris Dam remediation, the East Branch Extension Phase I Improvements and Phase II projects, Clifton Court Forebay radial gate repairs, the Emergency Drought Barriers Project, and the seismic retrofit of 23 bridges in the San Luis, San Joaquin, and Southern field divisions.

DWR worked on 65 construction contracts in various SWP construction divisions in 2015. Projects included pipeline repair, control system upgrades, fire systems modernization, equipment refurbishments and upgrades, seismic upgrades of bridges, maintenance facility improvements at dam and reservoir sites, and the addition of new pumping units and a reservoir.

DWR processed a net total of \$7.02 million in payments in 2015 in support of right-of-way activities required for the construction, operation, and maintenance of the SWP. DWR also conducted real estate activities related to SWP acquisitions, temporary permits, property management, and appraisals.

For more information, see Chapter 12, Engineering, Construction, and Real Estate.

## Delta Resources and Environmental Issues

### *California WaterFix and California EcoRestore*

In April, DWR announced a new alternative that would replace the proposed Bay Delta Conservation Plan as the State's proposed project. The conveyance facility and habitat restoration measures proposed in the Bay Delta Conservation Plan would be separated into two distinct efforts—California

WaterFix and California EcoRestore. Throughout the rest of the year, a number of regulatory processes were underway for California WaterFix.

### *Fish Restoration Program*

Pursuant to the U.S. Fish and Wildlife Service and National Marine Fisheries Service biological opinions and the Department of Fish and Wildlife Longfin Smelt incidental take permit, the Fish Restoration Program continued to make progress towards fulfilling its restoration requirements.

For more information about Delta resources and environmental issues, see Chapter 2, Delta Resources; Chapter 3, Environmental Programs; and Chapter 4, Water Quality Programs.

## Recreation

In 2015, SWP facilities supported an estimated 4.4 million recreation days of use, up 12.9 percent from the 3.9 million recorded in 2014. Most of the SWP recreation use was concentrated at the major reservoirs, with approximately 47 percent occurring in the Oroville Field Division and 38 percent occurring in the Southern Field Division. For more information, see Chapter 13, Recreation.

## SWP Security Measures

Security and protection of the SWP remain primary goals for DWR. SWP facilities are closely monitored, and DWR staff are vigilant in maintaining a secure environment. Security patrols of SWP facilities are frequent and ongoing, and plans are in place to address potential or actual acts of terrorism. Security system improvements continue in conjunction with Reclamation and other federal and State agencies.



## SWP Milestones through the Decades

### 50 Years Ago—1965

Construction began on Little Panoche Detention Dam and Reservoir.

Construction of Los Banos Detention Dam and Reservoir was completed.

Construction of the South Bay Aqueduct was completed in June and water deliveries began to Santa Clara County.

### 40 Years Ago—1975

An earthquake of magnitude 5.8 occurred in the Oroville area on August 1, 1975. A thorough earthquake safety investigation of the Oroville facilities was conducted, and the results were eventually published in Bulletin 203, "The August 1, 1975 Oroville Earthquake Investigations."

### 30 Years Ago—1985

Water deliveries to SWP long-term water contractors totaled 2,001,053 acre-feet, the largest amount delivered since the SWP began operating.

Construction of Alamo Powerplant was completed.

In March, a groundbreaking ceremony was held for the North Bay Aqueduct, Phase II.

### 20 Years Ago—1995

DWR relocated operational headquarters for the SWP from the Resources Building in downtown Sacramento to a renovated building north of downtown. The new Joint Operations Center would be shared with Reclamation, operators of the CVP, and the National Weather Service.

DWR began fishery studies on the lower Feather River to support the renewal

of DWR's FERC license to operate the Oroville Facilities.

### 10 Years Ago—2005

On January 26, 2005, DWR submitted its application to FERC to renew the license for the Oroville Facilities.





## Chapter 1

# The State Water Project

*The California Aqueduct near Palmdale, California.*



*T*his chapter primarily provides background on the State Water Project (SWP), including brief descriptions of SWP facilities, planning, construction, power operations, financing, contracting agencies, water deliveries, and the project's many uses and functions. It also provides a glimpse of California history, with a look at the processes and decisions that went into the creation of the largest state-built water project in the country.

Chapters 2 through 15 provide more detail on significant events and specific topics related to management of the SWP in calendar year 2015. At the end of the bulletin, Appendix B presents data and computations used to determine the SWP water contractors' Statements of Charges for 2017.

*Information in this chapter was contributed by the Division of Operations and Maintenance and the State Water Project Analysis Office.*

California's diverse geography contains both the highest and lowest elevations in the coterminous United States, with a resulting diversity of climate that ranges from desert to alpine to subtropical. In a typical year, some areas receive as little as 2 inches of rain, while others receive more than 100 inches. This diversity of geography and climate creates an intricate and constantly changing pattern of water supplies, which, in turn, creates enormous challenges in managing this vital resource.

## The State Water Project

Like present-day Californians, the earliest settlers faced the problem of how best to conserve, control, and deliver water. Remains of aqueducts, canals, and dams are still found near some of California's original missions. The first recorded aqueduct, built in 1770 to serve the San Diego mission, was 6 miles long. In the early twentieth century, several cities, including San Francisco and Los Angeles, built aqueducts to convey water from the Sierra Nevada to other parts of the State.

In 1951, after many years of discussion and study, the Legislature authorized construction of a water storage and supply system to capture and store rainfall and snowmelt runoff in Northern California and deliver it to areas of need throughout the State. Eight years later, the Legislature passed the Burns-Porter Act, which provided the mechanism for obtaining funds necessary to construct the initial State Water Project (SWP) facilities. In 1960, California voters approved issuance of \$1.75 billion in general obligation bonds, as authorized in the act, thereby securing funds to build the SWP. In 1962, the first water was delivered through a portion of the South Bay Aqueduct to two long-term contracting agencies in Alameda County.

Today the SWP, built, operated, and managed by the Department of Water Resources (DWR), is the largest state-built, multipurpose, user-financed water project

in the country. It was designed and built to deliver water, control flooding, generate power, provide recreational opportunities, and enhance habitat for fish and wildlife. SWP water irrigates about 750,000 acres of farmland, mainly in the southern San Joaquin Valley. Approximately 25 million of California's estimated 39 million residents benefit from SWP water.

## Precipitation and Runoff

The water stored and delivered by the SWP originates as rainfall and snowmelt runoff in Northern and Central California's watersheds, where most of the State's precipitation occurs. The precipitation, snowpack, and the rate and amount of snowmelt help determine how much water the SWP can deliver in any given year.

Since 1968, DWR has monitored and recorded annual precipitation and runoff for each water year, which begins on October 1 and ends on the following September 30.

## Water Delivery Facilities

The SWP depends on a complex system of dams, reservoirs, power plants, pumping plants, canals, and aqueducts to deliver water. Although initial water transportation facilities were essentially completed in 1973, other facilities have since been built, and still others are either under construction or are planned to be built, as needed.



The SWP facilities include 30 dams (29 of which impound water), 20 reservoirs, 29 pumping and generating plants, and approximately 700 miles of aqueducts and pipelines. Figure 1-1 shows the names and locations of primary water delivery facilities. For more information about existing long-term SWP water supply contracts and annual water deliveries, see Table 1-6 (at the end of this chapter) and Chapter 9, Water Contracts and Deliveries.

Changes have occurred since the long-term SWP water supply contracts were signed in the 1960s, including population growth, differences in local water use, local water conservation programs, conjunctive-use programs, and environmental issues. Demands for SWP water are expected to increase and change as California's population continues to grow and as the potentially serious effects of climate change impact the State's water resources.

## Project Design

Water from rainfall and snowmelt runoff is stored in SWP conservation facilities and delivered via SWP transportation facilities to water agencies and districts in the Upper Feather River, North Bay, South Bay, San Joaquin, Central Coastal, and Southern California areas.

Three small reservoirs—Antelope Lake, Lake Davis, and Frenchman Lake—are the northernmost SWP facilities. Situated on Feather River tributaries in Plumas County, these lakes are used primarily for recreation. They also provide water to the City of Portola and local agencies that have water rights agreements with DWR.

Downstream from these lakes lies Lake Oroville, which conserves water from the Feather River watershed. Created by Oroville Dam, the tallest earthfill dam in the Western Hemisphere, Lake Oroville is the project's

largest storage facility with a capacity of approximately 3.5 million acre-feet (af).

Releases from Lake Oroville flow down the Feather River into the Sacramento River, which drains the northern portion of California's great Central Valley. The Sacramento River flows into the Sacramento-San Joaquin Delta, comprising 738,000 acres of land interlaced with channels that receive runoff from 40 percent of the State's land area. The SWP, federal Central Valley Project (CVP), and local agencies all divert water from the Delta.

From the northern Delta, Barker Slough Pumping Plant diverts water for delivery to Napa and Solano counties through the North Bay Aqueduct, which was completed in 1988. Near Byron, in the southern Delta, the SWP diverts water into Clifton Court Forebay for delivery south of the Delta. Banks Pumping Plant lifts water from Clifton Court Forebay into the California Aqueduct, which flows to Bethany Reservoir. From Bethany Reservoir, the South Bay Pumping Plant lifts water into the South Bay Aqueduct to supply Alameda and Santa Clara counties. The South Bay Aqueduct provided initial deliveries in 1962 and has been fully operational since 1965.

Most of the water delivered to Bethany Reservoir from Banks Pumping Plant flows into the California Aqueduct. This 443-mile-long main aqueduct conveys water to the agricultural lands of the San Joaquin Valley and to the urban regions of Southern California.

The California Aqueduct winds along the west side of the San Joaquin Valley. It transports water to O'Neill Forebay, Gianelli Pumping-Generating Plant, and San Luis Reservoir. San Luis Reservoir has a storage capacity of more than 2 million af and is jointly owned by DWR and the Bureau of Reclamation (Reclamation). DWR's share of gross storage in the reservoir is 1,062,183 af. Generally, water is pumped into San Luis



**Figure 1-1** Names and Locations of Primary Water Delivery Facilities, December 31, 2015

Reservoir from late fall through early spring, where it is temporarily stored for release back to the California Aqueduct to meet summertime peaking demands of SWP and CVP water contractors.

SWP water not stored in San Luis Reservoir and water released from San Luis flows south through the San Luis Canal, a portion of the California Aqueduct jointly owned by DWR and Reclamation.

As the water flows through the San Joaquin Valley, numerous turnouts convey it to farmlands within the service areas of the SWP and CVP. Along its journey, this water is lifted more than 1,000 feet by four pumping plants—Dos Amigos, Buena Vista, Teerink, and Chrisman—before reaching the foot of the Tehachapi Mountains.

In the southern San Joaquin Valley, near Kettleman City, Phase I of the Coastal Branch Aqueduct serves agricultural areas west of the California Aqueduct. In August 1997, completion of Phase II extended the Coastal Branch Aqueduct to serve municipal and industrial water users in San Luis Obispo and Santa Barbara counties.

The remaining water conveyed by the California Aqueduct is delivered to Southern California, home to roughly two-thirds of California's population. Before it can be delivered, the water must first cross the Tehachapi Mountains. Fourteen 80,000-horsepower pumps at Edmonston Pumping Plant, situated at the foot of the mountains, raise the water 1,926 feet—the highest single lift of any pumping plant in the world. The water enters 8.5 miles of tunnels and siphons as it flows into Antelope Valley, where the California Aqueduct divides into two branches: the East Branch and the West Branch.

The East Branch carries water through Alamo Powerplant, Pearblossom Pumping Plant, and Mojave Siphon Powerplant into

Silverwood Lake in the San Bernardino Mountains. From Silverwood Lake, water flows through the San Bernardino Tunnel to Devil Canyon Powerplant. Water continues down the East Branch through the Santa Ana Pipeline to Lake Perris, the southernmost SWP reservoir.

The East Branch Extension is a nearly 33-mile pipeline linking parts of service areas for San Bernardino Valley Municipal Water District and San Geronimo Pass Water Agency to the California Aqueduct. The East Branch Extension, Phase I, carries water from Devil Canyon Powerplant Afterbay to Cherry Valley, bringing water to Yucaipa, Calimesa, Beaumont, Banning, and other communities. Phase II, when completed, will assist with this delivery.

Water in the West Branch flows through Oso Pumping Plant, Quail Lake, and then from the Peace Valley Pipeline through Warne Powerplant into Pyramid Lake in Los Angeles County. From there it flows through the Angeles Tunnel, Castaic Powerplant, Elderberry Forebay, and into Castaic Lake, terminus of the West Branch. Castaic Powerplant is operated by the Los Angeles Department of Water and Power.

The energy needed to operate the SWP, the largest single user of electrical power in California, comes from a combination of its own hydroelectric generating plants and power purchased from and exchanged with other utilities. The project's eight hydroelectric power plants, including four pumping-generating plants, produce enough electricity in a normal year to supply about two-thirds of the SWP's necessary operating power.

Tables 1-1 through 1-5, on the following pages, present statistical information about primary storage facilities, primary dams, pumping plants, power plants, and aqueducts.



## Future Planning and Construction

The planning, design, and construction of SWP facilities were based on studies and analyses that projected SWP water contractor annual water delivery needs. To meet these projected needs, water conservation reservoirs, storage facilities, and delivery facilities were planned to be constructed in stages as demands for water increased. Lake Oroville and San Luis Reservoir were the first SWP conservation reservoir facilities constructed. Additional facilities were scheduled to meet increased demands. It was anticipated that population growth in delivery service areas and water supply areas of origin would influence the final schedule for SWP facilities. Increasingly, issues such as escalating costs, environmental concerns, and increased non-SWP demand for limited water supplies have become important factors affecting the planning and construction of new facilities.

In response to changes in water management policy, DWR continues to reassess plans for additional facilities that will incorporate increased environmental safeguards, while also increasing SWP delivery yield. Developing these plans involves the time-consuming process of finding technically suitable projects and satisfying many complex and dynamic environmental procedures, laws, and regulations.

For more information about current SWP planning and construction, see Chapter 12, Engineering, Construction, and Real Estate. Information about prior construction activities can be found in previous issues of Bulletin 132.

## Climate Change

Planners are also concerned about climate change and its potentially serious effects on water resources. Temperature increases

**Table 1-1 Physical Characteristics of Primary Storage Facilities**

Facility	Gross Capacity (acre-feet)	Surface Area (acres)	Shoreline (miles)
Antelope Lake	22,600	930	15
Frenchman Lake	55,500	1,580	21
Lake Davis	84,400	4,030	32
Lake Oroville	3,537,600	15,810	167
Thermalito Forebay	11,800	630	10
Thermalito Afterbay	57,000	4,300	26
Thermalito Diversion Pool	13,400	320	10
Clifton Court Forebay	31,300	2,180	8
Bethany Reservoir	5,100	180	6
Lake del Valle	77,100	1,060	16
San Luis Reservoir <sup>a</sup>	2,027,800	12,520	65
O'Neill Forebay <sup>b</sup>	56,400	2,700	12
Los Banos Reservoir	34,600	620	12
Little Panoche Reservoir	5,600	190	6
Quail Lake	7,600	290	3
Pyramid Lake	171,200	1,300	21
Elderberry Forebay	32,500	500	7
Castaic Lake	323,700	2,240	29
Silverwood Lake	75,000	980	13
Lake Perris	131,500	2,320	10

<sup>a</sup> DWR's share of storage in San Luis Reservoir, jointly owned with Reclamation, is 1,062,183 af.

<sup>b</sup> DWR's share of storage in O'Neill Forebay is 29,500 af.

may affect water demand and aquatic ecosystems. Projected increases in air temperature may lead to changes in the amount, timing, and form of precipitation—rain or snow; changes in the volume and timing of runoff; Delta water quality changes due to sea-level rise; and changes in the amount of irrigation water needed due to modified evapotranspiration rates.

The ability of the SWP and CVP to meet the water demands of their customers and the environment depends on the accumulation of mountain snowpack and subsequent spring and summer snowmelt runoff. A warming climate may reduce this natural water storage mechanism.

**Table 1-2 Physical Characteristics of Primary Dams**

Facility	Crest Elevation (feet)	Structural Height (feet)	Crest Length (feet)	Structural Volume (thousand cubic yards)
Antelope	5,025	120	1,320	380
Frenchman	5,607	139	720	537
Grizzly Valley	5,785	132	800	253
Oroville	922	770	6,920	80,000
Thermalito Diversion	233	143	1,300	154
Thermalito Forebay	231	91	15,900	1,840
Thermalito Afterbay	142	39	42,000	5,020
Clifton Court Forebay	14	30	36,500	2,440
Bethany	250	121	3,940	1,400
Del Valle	773	235	880	4,150
Sisk	544	385	18,600	77,664
O'Neill Forebay	233	88	14,300	2,877
Los Banos Detention	384	167	1,370	2,100
Little Panoche Detention	676	152	1,440	1,210
Pyramid	2,606	400	1,090	6,860
Elderberry Forebay	1,550	200	1,990	6,000
Castaic	1,535	425	4,900	46,000
Cedar Springs	3,378	249	2,230	7,600
Perris	1,600	128	11,600	20,000
Crafton Hills	2,932	95	500	144

**Table 1-3 Pumping Plant Characteristics**

Facility	Number of Units	Normal Static Head (ft) <sup>a</sup>	Total Flow at Design Head (cfs) <sup>a</sup>	Total Motor Rating (hp) <sup>a</sup>
Robie Thermalito	3 (p-g) <sup>b</sup>	85-102	9,120	120,000
Hyatt	3 (p-g) <sup>b</sup>	500-625	5,610	519,000
Barker Slough	9	95-120	228	4,800
Cordelia	11	138		
Banks	11	236-252	10,670	333,000
South Bay	9	566	330	27,750
Del Valle	4	0-38	120	1,000
Gianelli	8 (p-g) <sup>b</sup>	99-327	11,000	504,000
Dos Amigos	6	107-125	15,450	240,000
Las Perillas	6	55	461	4,050
Badger Hill	6	151	454	11,750
Devil's Den <sup>c</sup>	6	521	134	10,500
Bluestone <sup>c</sup>	6	484	134	10,500
Polonio Pass <sup>c</sup>	6	533	134	10,500
Buena Vista <sup>c</sup>	10	205	5,405	144,500
Teerink <sup>c</sup>	9	233	5,445	150,000
Chrisman <sup>c</sup>	9	518	4,995	330,000
Edmonston <sup>c</sup>	14	1,926	4,480	1,120,000
Oso	8	231	3,252	93,800
Pearblossom	9	540	2,575	203,200
Greenspot	4	382	50	3,900
Crafton Hills	3	613	40	4,000
Cherry Valley	2	130	75	300

<sup>a</sup>Feet=ft; cubic feet per second=cfs; horse power=hp.<sup>b</sup>The term p-g indicates pumping-generating units.<sup>c</sup>These plants have one unit in reserve.

**Table 1-4 Power Plant Characteristics, by Facility**

Hydroelectric Facility	Number of Units	Normal Static Head (ft) <sup>a</sup>	Total Flow at Design Head (cfs) <sup>a</sup>	Net Dependable Capacity (MW) <sup>a</sup>	Nameplate Capacity (MW) <sup>a</sup>
Thermalito Diversion Dam	1	63-77	615	3	3
Robie Thermalito	4 (3 p-g) <sup>b</sup>	85-102	17,400	114	114
Hyatt	6 (3 p-g) <sup>b</sup>	410-676	16,950	645	645
Gianelli (total)	8 p-g <sup>b</sup>	99-327	16,960	363	424
Warne	2	719-739	1,600	67	74
Castaic <sup>c</sup>	7 (6 p-g) <sup>b</sup>	900-1,050	20,820	1,128	1,254
Alamo	1	115-141	1,740	15	17
Mojave Siphon	3	81-136	2,880	29	30
Devil Canyon	4	1,406	2,940	235	276

<sup>a</sup> Feet=ft; cubic feet per second=cfs; megawatts=MW.<sup>b</sup> The term p-g indicates pumping-generating units.<sup>c</sup> Castaic Pumping-Generating Plant is owned and operated by the Los Angeles Department of Water and Power.**Table 1-5 Total Miles of Aqueducts**

Facility	Channel and Reservoir	Canal and Siphon	Pipeline and Discharge Line	Tunnel	Total
Grizzly Valley Pipeline	0.0	0.0	6.0	0.0	6.0
Thermalito Power Canal and Tail Channel	1.5	1.9	0.0	0.0	3.4
North Bay Aqueduct	0.0	0.0	27.6	0.0	27.6
South Bay Aqueduct (including Del Valle Branch)	0.3	10.7	31.9	1.7	44.6
<i>Subtotal</i>	<i>1.8</i>	<i>12.6</i>	<i>65.5</i>	<i>1.7</i>	<i>81.6</i>
California Aqueduct					
Clifton Court Forebay to O'Neill Forebay	4.5	61.9	0.3	0.0	66.7
O'Neill Forebay to Kettleman City	4.1	101.4	0.2	0.0	105.7
Kettleman City to Edmonston Pumping Plant	0.0	120.1	0.9	0.0	121.0
Edmonston Pumping Plant to Tehachapi Afterbay	0.0	0.2	1.9	7.9	10.0
Tehachapi Afterbay to Lake Perris	4.0	97.8	34.3	3.9	140.0
<i>Subtotal</i>	<i>12.6</i>	<i>381.4</i>	<i>37.6</i>	<i>11.8</i>	<i>443.4</i>
California Aqueduct Branches					
Coastal Branch	0.0	14.1	98.7	2.7	115.5
West Branch	9.7	9.3	5.8	7.1	31.9
East Branch Extension					
Devil Canyon Powerplant to Greenspot Pump Station	0.0	0.0	16.2	0.0	16.2
Greenspot Pump Station to Noble Creek Terminus	0.0	0.0	16.4	0.0	16.4
<i>Subtotal</i>	<i>9.7</i>	<i>23.4</i>	<i>137.1</i>	<i>9.8</i>	<i>180.0</i>
<b>Total</b>	<b>24.1</b>	<b>417.4</b>	<b>240.2</b>	<b>23.3</b>	<b>705.0</b>

To address these concerns, DWR and Reclamation are coordinating with federal, State, and local agencies and nongovernmental organizations to provide qualitative and quantitative assessments of the potential risks and effects of climate change on California's water resources and update decision makers on climate change impacts, the ability of existing facilities to accommodate these impacts, and available mitigation measures.

In response to changes brought about by population growth, environmental concerns, climate change, and other factors, DWR continues to plan, design, and construct transportation and power-producing facilities for the SWP.

For more information on climate change, see Chapter 3, Environmental Programs.

## Methods of Financing

Project facilities have been constructed with several general types of financing: general obligation bonds and tideland oil revenues (under the Burns-Porter Act, which was approved by the Legislature in 1959, and the bond issue approved by voters in 1960); revenue bonds; and capital resources revenues. Repayment of these funds, and the operations, maintenance, power, and replacement costs associated with water supply, are paid by the 29 agencies and districts that have long-term contracts with DWR for the delivery of SWP water.

## Long-term Contracting Agencies

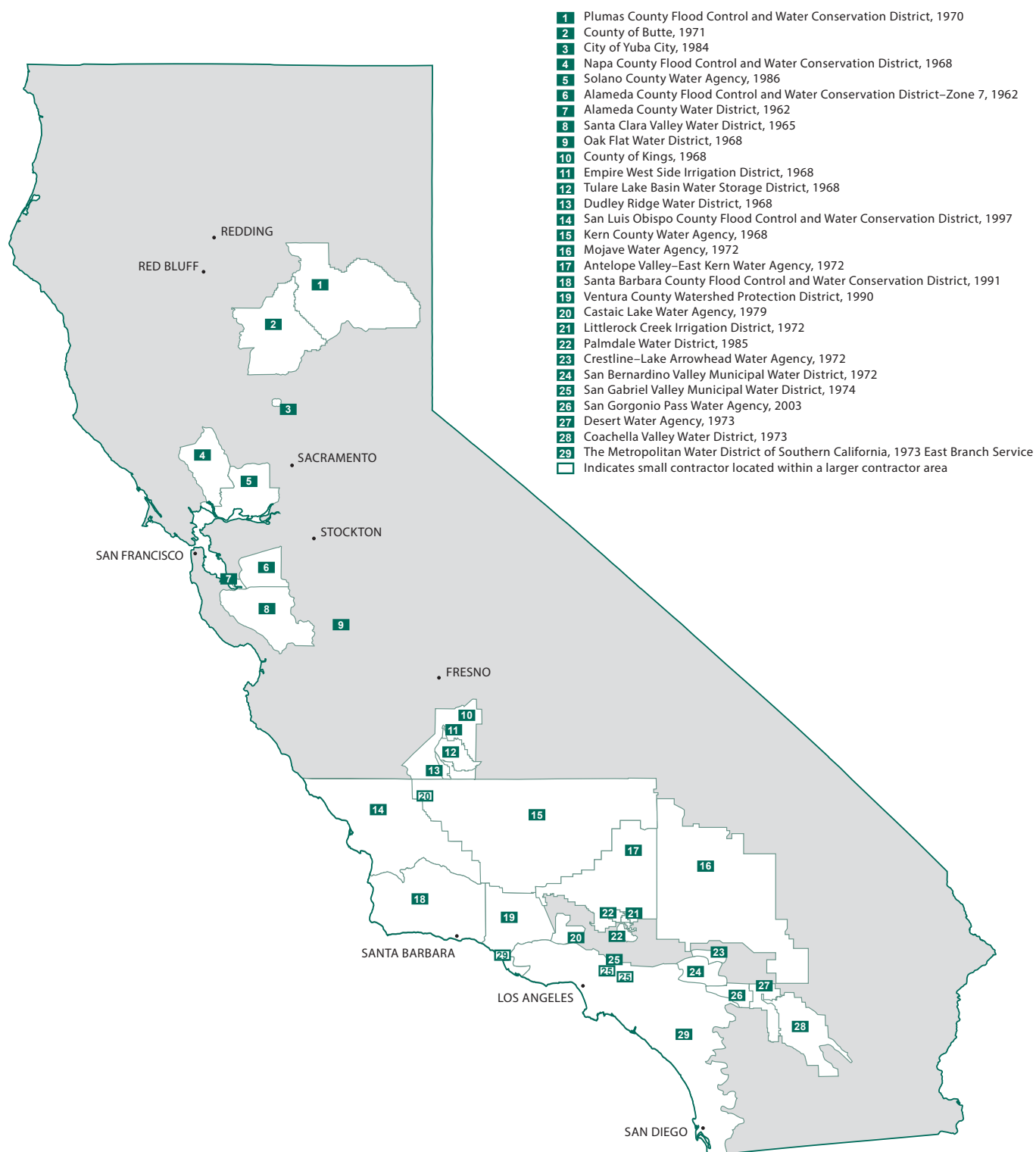
From 1963 through 1967, 32 agencies or districts signed long-term water supply contracts with DWR. However, in 1965, the City of West Covina was annexed to The Metropolitan Water District of Southern California, and in 1981, Hacienda Water District was assigned to Tulare Lake Basin

Water Storage District. On January 1, 1992, Castaic Lake Water Agency assumed all rights and obligations granted to Devil's Den Water District in accordance with its long-term water supply contract. Therefore, only 29 agencies and districts have long-term contracts with DWR as of December 31, 2015.

The contracts initially provided for a combined maximum annual Table A amount of 4,230,000 af of water supply. As a result of contract amendments in the 1980s and the Monterey Amendment, the current combined maximum annual Table A amount by 2016 totals 4,172,786 af (see Appendix B, Table B-4 for details). The contracts are in effect for the longest of the following periods:

- the project repayment period, which extends to the year 2035;
- 75 years from the date of the contract; or
- the period ending with the latest maturity date of any bond used to finance the construction costs of project facilities.

Figure 1-2 shows the name and location of each contracting agency and district and lists the first year of SWP delivery service for each. Table 1-6 presents more detailed information about each contracting agency.



**Figure 1-2 Names, Locations, and First Year of Service of SWP Long-term Contracting Agencies, December 31, 2015**

**Table 1-6 Long-term Water Supply Contracting Agencies, by Area, as of December 31, 2015**

Contracting Agency	Cumulative Deliveries (acre-feet) <sup>a</sup>	Annual Table A (acre-feet)	Payments (in dollars) <sup>b</sup>	Gross Area (acres)	Assessed Valuation (in dollars) <sup>b</sup>	Estimated Population
<b>Upper Feather River Area</b>						
City of Yuba City	48,278	9,600	7,873,848	9,813	4,644,427,541	68,379
County of Butte	71,336	27,500	9,052,441	1,049,280	18,070,400,000	204,000
Plumas County Flood Control and WCD	12,682	2,600	2,446,628	1,676,056 <sup>c</sup>	2,060,744,342	21,200
<i>Subtotal</i>	<i>132,296</i>	<i>39,700</i>	<i>19,372,917</i>	<i>2,735,149</i>	<i>24,775,571,883</i>	<i>293,579</i>
<b>North Bay Area</b>						
Napa County Flood Control and WCD	330,766	29,025	131,748,551	510,010	32,556,091,444	139,099
Solano County Water Agency	864,171	47,756	177,496,682	581,760	38,800,000	415,913
<i>Subtotal</i>	<i>1,194,937</i>	<i>76,781</i>	<i>309,245,233</i>	<i>1,091,770</i>	<i>32,594,891,444</i>	<i>555,012</i>
<b>South Bay Area</b>						
Alameda County Flood Control and WCD—Zone 7	1,627,505	80,619	343,053,094	275,900	49,415,658,709	238,600
Alameda County Water District	1,323,944	42,000	147,793,517	67,200	52,665,888,864	343,499
Santa Clara Valley Water District	4,228,293	100,000	442,718,304	835,098	357,340,668,642	1,889,638
<i>Subtotal</i>	<i>7,179,742</i>	<i>222,619</i>	<i>933,564,915</i>	<i>1,178,198</i>	<i>459,422,216,215</i>	<i>2,471,737</i>
<b>San Joaquin Valley Area</b>						
County of Kings	160,675	9,305	11,237,460	893,300	9,125,193,927	149,942
Castaic Lake Water Agency	452,315	0		8,700 <sup>e</sup>	4,532,936	0
Dudley Ridge Water District	2,403,862	45,350	103,582,401	37,600	54,549,134	36
Empire West Side Irrigation District	123,459	3,000	5,141,959	7,500	<sup>d</sup>	12
Kern County Water Agency	37,640,496	982,730	2,313,522,906	5,224,000	97,800,000,000	874,589
Oak Flat Water District	214,165	5,700	8,501,545	4,500	<sup>d</sup>	10
Tulare Lake Basin Water Storage District	4,940,659	87,471	198,766,489	189,519	194,000,000	23
<i>Subtotal</i>	<i>45,935,631</i>	<i>1,133,556</i>	<i>2,640,752,760</i>	<i>6,365,119</i>	<i>107,178,275,997</i>	<i>1,024,612</i>
<b>Central Coastal Area</b>						
San Luis Obispo County Flood Control and WCD	82,005	25,000	104,992,994	2,122,240	45,457,307,011	279,083
Santa Barbara County Flood Control and WCD	384,956	45,486	707,417,165	193,391	29,732,075,614	373,719
<i>Subtotal</i>	<i>466,961</i>	<i>70,486</i>	<i>812,410,159</i>	<i>2,315,631</i>	<i>75,189,382,625</i>	<i>652,802</i>
<b>Southern California Area</b>						
Antelope Valley-East Kern Water Agency	2,092,783	144,844	602,366,100	1,525,120	26,661,474,279	397,634
Castaic Lake Water Agency	1,070,977	95,200	392,719,453	124,800	36,211,395,525	274,000
Coachella Valley Water District	1,424,027	138,350	581,721,838	639,857	56,981,130,446	318,000
Crestline-Lake Arrowhead Water Agency	60,972	5,800	31,630,110	54,900	2,249,739,339	29,000
Desert Water Agency	1,282,170	55,750	335,592,519	209,760	9,131,393,000	72,000
Littlerock Creek Irrigation District	18,881	2,300	7,724,225	10,000	388,056,000	2,900
The Metropolitan WD of Southern California	36,677,626	1,911,500	11,950,174,613	3,315,238 <sup>f</sup>	2,435,000,264,069	18,800,000
Mojave Water Agency	411,813	85,800	337,983,933	3,136,000	30,898,552,936	469,000
Palmdale Water District	282,683	21,300	96,384,919	119,680	1,414,494,581	114,533
San Bernardino Valley Municipal Water District	983,488	102,600	725,351,822	225,577	42,950,247,633	661,546
San Gabriel Valley Municipal Water District	433,656	28,800	184,087,092	18,297	16,850,589,307	197,636
San Geronio Pass Water Agency	66,687	17,300	188,877,795	140,800	5,708,130,719	78,268
Ventura County Watershed Protection District	69,905	20,000	73,836,389	308,252	25,483,476,833	464,600
<i>Subtotal</i>	<i>44,875,668</i>	<i>2,629,544</i>	<i>15,508,450,808</i>	<i>9,828,281</i>	<i>2,689,928,944,667</i>	<i>21,879,117</i>
<b>Total</b>	<b>99,785,235</b>	<b>4,172,686</b>	<b>20,223,796,792</b>	<b>23,514,148<sup>g</sup></b>	<b>3,389,089,282,831</b>	<b>26,876,859</b>

<sup>a</sup>All water delivered to long-term SWP water contractors, including carryover, Article 21, surplus, unscheduled, exchange, permit, purchased, local, and non-SWP water.

<sup>b</sup>Statutes of 1978, Chapter 1207, added Section 135 to the Revenue and Taxation Code, requiring assessment at 100 percent of full value for the 1981–1982 fiscal year and fiscal years thereafter.

<sup>c</sup>Total of all Plumas County Flood Control and Water Conservation District, including Last Chance Creek Water District.

<sup>d</sup>Assessed valuation not available on an agency area breakdown.

<sup>e</sup>Castaic Lake Water Agency (Southern California Area) includes land in the San Joaquin Valley Area formerly known as Devil's Den Water District.

<sup>f</sup>Total for Metropolitan, including Calleguas Municipal Water District, which is common to Metropolitan and Ventura County Watershed Protection District.

<sup>g</sup>Includes duplicate values. Some areas that are within two or more agencies are included in each agency's total.

<sup>h</sup>Includes all payments pursuant to the repayment provisions of the Water Supply Contracts. Transportation and Conservation Replacement Accounting System payments are also included in this table.  
WD = Water District; WCD = Water Conservation District





## Chapter 2

# Delta Resources

*Waterways and wetlands of the Sacramento-San Joaquin Delta at Sherman Island.*

## Significant Events in 2015

In April, the Governor announced a major change for the project known as the Bay Delta Conservation Plan (BDCP). A new preferred alternative (Alternative 4A) proposed to construct water conveyance facilities through an initiative called California WaterFix.

In response to drought conditions, a temporary, emergency salinity/drought barrier was constructed in the Delta on West False River between Jersey and Bradford islands to limit saltwater intrusion into the Central and South Delta from San Francisco Bay.

The West Delta Program completed construction of the Sherman Island Whale's Mouth Wetland Restoration Project, a 650-acre wetland on the lower southwest side of Sherman Island.

*Information for this chapter was contributed by the FloodSAFE Environmental Stewardship and Statewide Resources Office, the Bay-Delta Office, and the Division of Flood Management.*



The Sacramento-San Joaquin Delta (Delta) is a unique environmental resource and a major source of water for millions of Californians. Since the 1950s, the Department of Water Resources (DWR) and other State and federal agencies have developed and implemented numerous programs to manage the Delta.

## Delta Water Management Programs

Future water deliveries to millions of Californians throughout the State will be affected by many factors, including two significant changes: Delta pumping restrictions and climate change. Ongoing planning activities and regulatory actions continue to influence DWR activities in the Delta. As a result of the efforts associated with the California Water Fix and California EcoRestore (these two programs replaced the Bay Delta Conservation Plan [BDCP]), and the Delta Stewardship Council's (DSC) *Delta Plan*, many of DWR's proposed projects were suspended as staff continued to work on the State Water Project (SWP) Delta Compliance Program.

### BDCP/California WaterFix

In April 2015, the Governor announced a major change for the project known as the BDCP. A new preferred alternative (Alternative 4A) to the BDCP would not complete BDCP as a Natural Community Conservation Plan, but instead construct water conveyance facilities through an initiative called California WaterFix. A parallel effort called California EcoRestore proposes to implement habitat restoration actions in the Delta. California WaterFix is being developed in compliance with the federal Endangered Species Act.

For more information regarding BDCP/California WaterFix, see Chapter 3, Environmental Programs.

## Emergency Drought Barrier

In 2015, in response to drought conditions, a temporary, emergency salinity/drought barrier was constructed in the Delta on West False River between Jersey and Bradford islands and just east of the confluence with the San Joaquin River. The barrier would limit saltwater intrusion into the Central and South Delta from San Francisco Bay, allowing Delta water quality to be maintained and water in upstream reservoirs to be conserved. The barrier, built with large rocks, measured approximately 750 feet long and 12 feet wide at the top. Installation started in May and was completed in June, and removal started in September and was completed in November. The barrier successfully allowed the SWP and CVP to operate with reduced Sacramento River/Delta outflow, as approved by the SWRCB, while maintaining control of salinity in the Central Delta. A comprehensive efficacy report is being prepared by DWR and is planned to be completed by January 2017.

For more information see Chapter 4, Water Quality Programs, and Chapter 7, Water Supply Development & Reliability.

## Delta Plan

The *Delta Plan*, adopted by the DSC in May 2013 in compliance with the Delta Reform Act of 2009, is a comprehensive, long-term management plan for the Delta. It became effective with legally enforceable regulations in September 2013. (For more information, see the sidebar, Delta Stewardship Council.)

## Delta Stewardship Council

Created by the Legislature under the Sacramento-San Joaquin Delta Reform Act of 2009 (Delta Reform Act), the Delta Stewardship Council (DSC) is an independent agency of the State of California composed of members who represent different parts of the State and offer diverse expertise in fields such as agriculture, science, the environment, and public service. Of the seven members, four are appointed by the Governor, one each is appointed by the Senate and by the Assembly, and the seventh is the Chair of the Delta Protection Commission. The council is the successor to the California Bay-Delta Authority and assumes all of its administrative rights, abilities, obligations, and duties.

The *Delta Plan* was adopted by the DSC on May 16, 2013. It became effective with legally enforceable regulations on September 1, 2013. The *Delta Plan* is a comprehensive, long-term management plan for the Sacramento-San Joaquin Delta. It establishes a set of integrated policies, strategies, and actions to guide State and local agencies to help achieve the coequal goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem. It will also guide protection and enhancement of the unique resources, culture, and values of the Delta as an evolving place (California Water Code Section 85054).

The Delta Reform Act specifies eight policy objectives that are “inherent” in the coequal goals (see California Water Code Section 85020). It also specifies a statewide policy to reduce reliance on the Delta in meeting the State’s future water supply needs through improved regional water self-reliance (California Water Code Section 85021) and identifies specific subjects and strategies that must be included in the *Delta Plan* (see generally, California Water Code Sections 85301–85309).

The Delta Reform Act also established the Delta Science Program and Delta Independent Science Board (ISB) to provide the scientific support and oversight the DSC needs to make decisions based on sound science. The Delta Science Program replaces the CALFED Bay-Delta Program Science Program, and the Delta ISB replaces the CALFED Bay-Delta Program ISB.

The Delta Science Program will develop scientific information and synthesis on issues critical to managing the Bay-Delta system. That body of knowledge must be unbiased, relevant, authoritative, integrated across State and federal agencies, and communicated to Bay-Delta decision makers, agency managers, stakeholders, the scientific community, and the public. The *Delta Science Plan* released by the DSC in December 2013, provides a guide for organizing, conducting, and integrating science in the Delta. A Science Action Agenda will be a key component of implementing the *Delta Science Plan*.

The Delta ISB is a standing board of nationally and internationally prominent scientists with appropriate expertise to evaluate the broad range of scientific programs that support adaptive management of the Delta. The Delta ISB will provide oversight of the scientific research, monitoring, and assessment programs that support adaptive management of the Delta through periodic reviews of each of those programs. The overall objective of Delta ISB oversight is to ensure that the science supporting Bay-Delta programs, the application of that science, and the technical aspects of the Bay-Delta programs are optimally developed and implemented.

More information about the *Delta Plan* is available on the DSC's website.

## State Water Project Delta Compliance Program

The SWP and Central Valley Project (CVP) obtained take authorization for the federal Endangered Species Act and California Endangered Species Act listed fish species for coordinated operations in the Delta through a U.S. Fish and Wildlife Service biological opinion (BiOp) for Delta Smelt in December 2008, a Department of Fish and Wildlife incidental take permit for Longfin Smelt in February 2009, and a National Marine Fisheries Service (NOAA Fisheries) BiOp for salmon, steelhead, and Green Sturgeon in June 2009. Some of the requirements in these documents were implemented right away, while others needed development of studies and projects before being implemented.

In 2015, efforts continued under the SWP Delta Compliance Program to develop studies and construct projects to address regulatory requirements under the NOAA Fisheries and U.S. Fish and Wildlife Service BiOps and the Department of Fish and Wildlife incidental take permit.

## Predation, Release, and Efficiency Program

The predation, release, and efficiency program includes improving existing fish salvage release sites, developing additional fish salvage release sites, assessing predation reduction alternatives, continuing the associated predation study for Clifton Court Forebay, and evaluating the screening efficiency of the Skinner Fish Facility to comply with the requirements under the BiOps and incidental take permit. These requirements include:

- reducing prescreen loss of federal Endangered Species Act-protected

salmon and steelhead in Clifton Court Forebay to no more than 40 percent (Prescreen loss is the loss of fish as they move across the forebay that results from predation by fish and birds.);

- reducing predation by 50 percent at the fish release sites;
- implementing fish release site studies to develop methods to reduce predation following release of salvaged fish; and
- identifying salvage deficiencies and recommending actions to improve salvage efficiency in order to meet a required efficiency goal of 75 percent for salmonids.

## Fish Science Building

The addition of the Fish Science Building at the Skinner Fish Facility was essential to improve DWR's ability to conduct fish studies to meet regulatory requirements for operation of the SWP. The existing collection, handling, transport, and release building was too small and lacked the necessary equipment to hold and rear fish to carry out various studies and projects. The new building includes a small laboratory, fish rearing tanks, an office, and an area to store study gear and equipment. Construction of the Fish Science Building was initiated in 2013 and completed in 2014. It became fully operational in 2015, supporting numerous fishery studies related to the BiOps.

## Fish Salvage Release Sites

The predation reduction strategy for the release sites includes designing and constructing the Curtis Landing fish release site with minimal in-water structure to reduce predation and improve survival of released salvaged fish. Two new fish release sites will be built on Sherman Island so that more time can be allowed between releases at each site. Coordinated interagency use will occur at a total of six release sites.

Construction of the major components of the Curtis Landing fish release site was

completed in 2014, and the facility became fully operational in 2015. Design of the two new Sherman Island sites was completed in 2014, all permits were obtained, and construction was initiated in fall 2015. A cost-sharing agreement with DWR's Delta Levees Program for these two sites was also implemented for the levee construction portion of this project.

### **Clifton Court Forebay Fishing Facility**

The predation reduction strategy for Clifton Court Forebay was to increase public fishing opportunities in the forebay, with the intention of reducing the number of predatory fish and the prescreen loss of federal Endangered Species Act-protected salmon and steelhead. This strategy involved constructing a fishing pier to provide improved access to anglers.

During 2014, changes were made to Conservation Measure 1 of the BDCP that conflicted with the fishing pier project and would have effectively prevented public access to the fishing pier. The project was indefinitely suspended, and DWR, in close coordination with NOAA Fisheries, analyzed other predator reduction alternatives in 2015 (as described in the Ad Hoc Studies section below).

The predator study continued in 2015. The study is designed to gather as much information as possible, pre- and post-installation of the proposed fishing facility, to document the behavior and population demographics of predatory fish and birds, as well as salmonid survival. Full-scale predator sampling and acoustic tagging, avian surveys, creel surveys, and releases of marked salmon were conducted. Pilot-level genetic analysis of predator stomach contents also continued in 2015.

### **Ad Hoc Studies**

Subsequent to the suspension of the fishing facility project, and as a result of numerous

meetings with NOAA Fisheries and DWR's ongoing responsibility to reduce prescreen loss of listed fish species, DWR embarked on a study of more than 21 alternatives to reduce predation in the forebay. NOAA Fisheries identified six preferred alternatives and provided a ranking of these alternatives. In addition, NOAA Fisheries approved an extension for compliance with the BiOp requirement conditioned on DWR completing four interim measures to reduce predation in the forebay. DWR immediately initiated planning of the four interim measures:

- electrofishing the forebay;
- controlling aquatic weeds;
- establishing a fishing incentive program; and
- implementing operational changes to limit take.

DWR also initiated an in-depth study of various dredging proposals for the forebay that could contribute to the survival of listed fish species.

Additional information about CVP/SWP operations related to the BiOps can be found in Chapter 3, Environmental Programs.

### **Skinner Fish Facility**

The strategy for determining the screening efficiency of the Skinner Fish Facility includes evaluating:

- fish losses through primary louvers, secondary louvers, and holding tanks;
- hydraulics within the facility;
- relative abundance of predators within the primary louver channels; and
- fish behavior and movement patterns as they are entrained and guided through the facility.

During 2015, the technical team continued to evaluate and recommend revisions to the SWP and CVP fish loss equations used at the



respective facilities. Other efforts included construction and installation of new stainless steel fish transport and count buckets and initiation of a contract with the University of California, Davis, to conduct studies relative to Green Sturgeon behavior near structures similar to the louvers.

## Fish Screen Evaluations

Fish screens at Barker Slough Pumping Plant, Roaring River Slough Distribution System, and diversions around Sherman Island continued to be evaluated to comply with the requirements of the BiOps and the incidental take permit. The evaluations consisted of three components:

- fish screen cleanliness;
- fish screen hydraulics; and
- fish entrainment.

The evaluations were used to determine whether facility structural components are in sufficient condition to perform as designed; the effectiveness of fish screen cleaning practices; water approach velocities for various screen cleanliness conditions; and entrainment for various combinations of fish presence, pumping rates, times of day, and times of year.

During 2015, a number of evaluations were conducted for each facility. Final reports were prepared for the November 2013 through June 2014 evaluation period, and draft reports were prepared for the November 2014 through June 2015 evaluation period. In addition, some screens were repaired or replaced based on the results of these evaluations.

## Delta Knowledge Improvement Program

In response to Assembly Bill 1200 (Laird; Chapter 573, Statutes of 2005), which required DWR to provide a risk analysis

of the Delta and Suisun Marsh and to develop a set of improvement strategies to manage those risks, DWR created the Delta Risk Management Strategy to look at the sustainability of the Delta and assess major risks to Delta resources from floods, seepage, subsidence, and earthquakes (see Bulletins 132-08 through 132-13).

During the course of the Delta Risk Management Strategy project, a number of information gaps and information quality issues were identified. The limited amount of quality information prompted the creation of the Delta Knowledge Improvement Program, as a means to actively fund specific studies to fill the data gaps identified in the Delta Risk Management Strategy.

In 2015, the Delta Knowledge Improvement Program focused on studies to improve State levee investment decisions in the Delta. These studies included:

- an ongoing economic study to assist the DSC in developing a comprehensive investment strategy for the Delta levees;
- a feasibility study to assist the Delta Protection Commission with making recommendations on how to implement a Delta Flood Risk Management Assessment District; and
- an investigation to determine how Delta levees on peat soils respond under seismic loading.

As part of an effort to update determination of the 100-year water levels in the Delta, the Delta Knowledge Improvement Program funded a data quality analysis of historical water levels reported by gauge stations in the Delta.

More information about the Delta Knowledge Improvement Program is available on DWR's website.

## North Delta Flood Control and Ecosystem Restoration Project

The North Delta Flood Control and Ecosystem Restoration Project will provide flood control improvements and ecosystem restoration in the North Delta. The project will implement important flood control improvements in the area of the North Delta where the Mokelumne River, Cosumnes River, Dry Creek, and Morrison Creek converge (see Figure 2-1). Flood flows in the area threaten levees, bridges, and roadways when levees on McCormack-Williamson Tract (MWT) are overtopped and a flood surge occurs. The proposed project will help regulate peak flood flows and prevent flood surges. It will also provide substantial aquatic and terrestrial habitat benefits.

The final North Delta Flood Control and Ecosystem Restoration Project environmental impact report was certified in November 2010 and recommended the implementation of a preferred alternative (Alternative 1-A for the Group I actions and the No Action Alternative for the Group II actions [for details see Bulletin 132-11]). The project will create tidal, subtidal, aquatic, and terrestrial habitats benefiting a number of special status species such as Sacramento Splittail and Chinook Salmon. The project, as proposed, will provide contiguous habitat and a riparian corridor from the downstream portion of the Cosumnes River Preserve to the Delta.

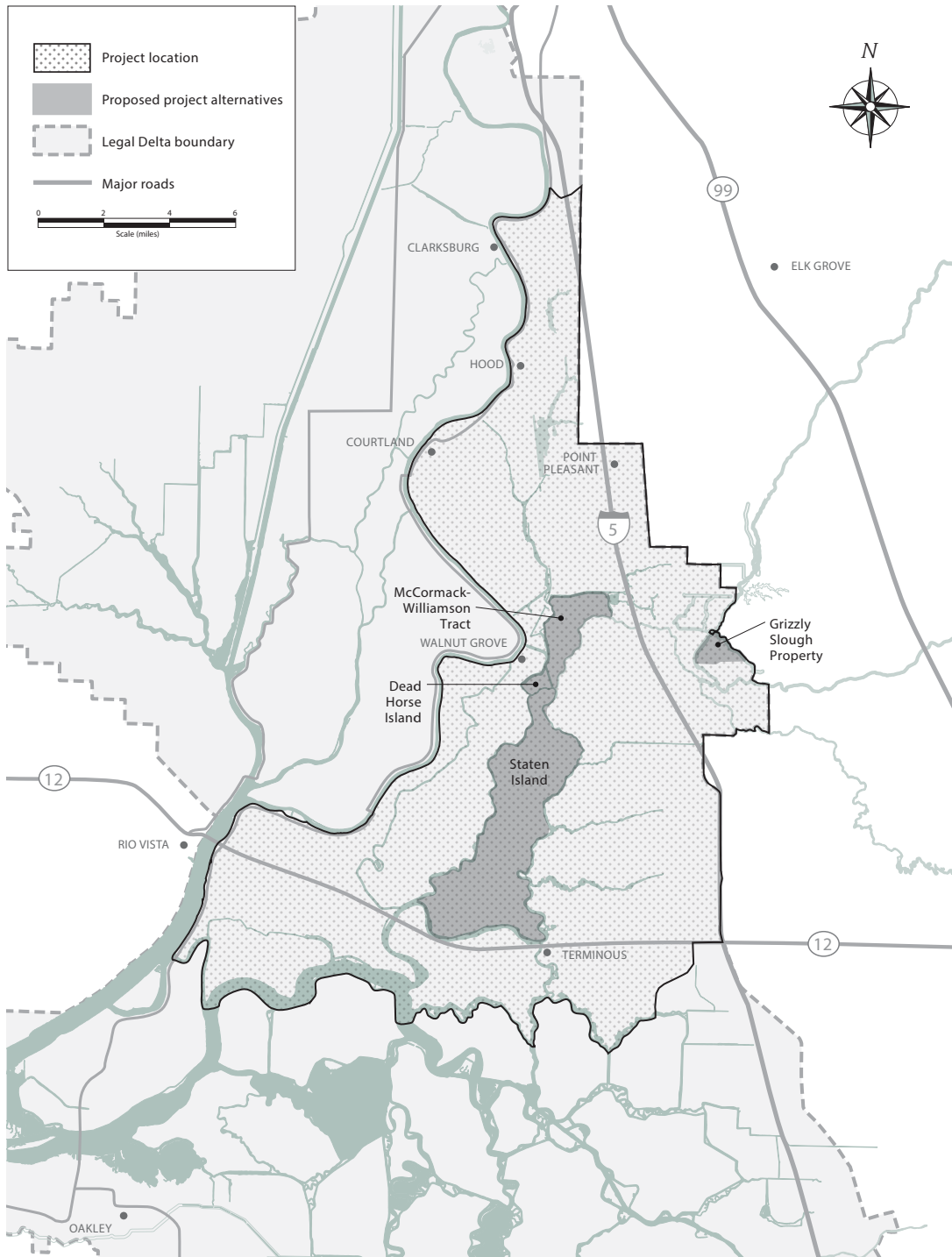
Two project elements are proposed for implementation: the MWT element combines North Delta flood surge reduction measures with the construction of habitat-friendly levees, floodplain restoration, and the creation of freshwater tidal habitat on MWT. The MWT property, purchased using a CALFED Bay-Delta Program grant, is currently owned and managed by The Nature Conservancy. (For background

on the CALFED Bay-Delta Program, see Bulletins 132-95 through 132-11.) When completed, the MWT element will result in nearly 1,500 acres of tidal marsh and floodplain restoration. The Grizzly Slough element consists of breaching the Grizzly Slough and Bear Slough levees upstream of MWT to help attenuate peak flood flows and maximize nearly 500 acres of floodplain habitat on the DWR-owned property. These projects are consistent with the objectives put forth in the *California Water Action Plan*, the *Delta Plan*, and the California EcoRestore initiative.

### Project Status

The MWT project planning, permitting, and implementation was divided into two phases, due to the size and complexity of the multibenefit project. Phase A entails constructing a protective tower levee and resloping the landside levee to strengthen levees and minimize the effect of wave-wash erosion when the land receives flood water as designed. Phase B is proposed to include weir construction, levee breaching, and floodplain and tidal marsh restoration.

In 2015, the MWT Project Team completed studies, regulatory requirements (e.g., permits under Clean Water Act Sections 401 and 404 and a biological assessment), and planning work for Phase A. Construction is planned for 2017. Considerable progress was made on Phase B (real estate activities, permitting strategies, and updated hydrologic models), which is proposed to be implemented in 2018 and 2019. As part of Phase B, DWR is working with the California Natural Resources Agency/California EcoRestore to evaluate long-term ownership, management/monitoring options, and potential funding sources. Concurrent with MWT project work, a separate team under Reclamation District 348 (New Hope Reclamation District) is beginning the project design work for Grizzly Slough, including the real estate analyses and wetland delineation.



**Figure 2-1 North Delta Flood Control and Ecosystem Restoration Project**

## South Delta Improvements Program

In 1999, the South Delta facilities became a key component of the CALFED Bay-Delta Program.

South Delta Improvements Program (SDIP) elements in the CALFED Bay-Delta Program record of decision included increasing diversions through Clifton Court Forebay (first to 8,500 cubic feet per second [cfs] and then to 10,300 cfs), dredging and installing operable tidal barriers in the South Delta, installing a fish barrier at the Head of Old River, and constructing the first phase of a new intake and fish screen in Clifton Court Forebay. SDIP is proposed to be implemented in two component stages.

DWR and the Bureau of Reclamation (Reclamation) identified the following SDIP project objectives and purposes:

- reducing movement of San Joaquin River watershed Central Valley fall-run and late fall-run juvenile Chinook Salmon into the South Delta via Old River (SDIP Stage 1);
- maintaining adequate water levels and water quality through improved circulation for agricultural diversions in the South Delta, downstream of the Head of Old River (SDIP Stage 1);
- increasing water deliveries and delivery reliability to SWP and CVP water contractors south of the Delta (SDIP Stage 2); and
- providing opportunities to convey water for fish and wildlife purposes by increasing the maximum permitted level of diversion through the existing intake gates at Clifton Court Forebay to 8,500 cfs (SDIP Stage 2).

The SDIP Stage 1 physical/structural component includes the following elements:

- constructing and operating a fish-control gate at the Head of Old River to reduce downstream movement of San Joaquin River watershed Central Valley fall-run and late fall-run juvenile Chinook Salmon into the South Delta via the Head of Old River;
- constructing and operating up to three flow-control structures (gates) at Middle River (near the confluence of Middle River with Victoria Canal); Grant Line Canal (near the confluence of Grant Line Canal and Old River); and Old River (just east of the Delta-Mendota Canal intake) to improve existing water levels and circulation patterns in South Delta water channels;
- dredging various channels in the South Delta, including Middle and Old rivers, to improve conveyance; and dredging areas surrounding agricultural diversions to improve their function; and
- extending up to 24 agricultural diversion intake facilities to improve their function.

The SDIP final environmental impact report/environmental impact statement (2006) determined the preferred alternative for SDIP Stage 1, which entails installation of permanent control gates to replace the temporary rock barriers currently installed and removed each year under the DWR South Delta Temporary Barriers Project. The preferred alternative also includes the elements of dredging and extending agricultural diversions.

### Preferred Plan

The preferred plan for SDIP is to construct the Stage 1 physical/structural component as soon as permits are obtained and defer the operational component until more is known about the project's potential effects on Delta Smelt and other protected fish species.



DWR deferred both the increase in diversions of up to 10,300 cfs and the associated new fish screens as components of the SDIP due to major funding issues and significant technical uncertainties associated with the design and construction of the new fish screens.

## Program Status

DWR and Reclamation continued to suspend most SDIP planning and permitting activities during 2015. Some activities were undertaken to address requirements of the 2009 NOAA Fisheries BiOp for the CVP and SWP Long-term Operations Criteria and Plan.

Discussions between DWR and NOAA Fisheries revealed NOAA Fisheries' concern for potential barrier hydraulic disturbances that could promote increased predation on juvenile salmon. DWR conducted a hydrodynamic study focusing on barrier design features to minimize these disturbances. A study report was submitted to NOAA Fisheries in April 2010, which identified several features that could be incorporated into the design.

NOAA Fisheries stated an interest in delaying further discussions on the SDIP until completion of an ongoing, multiyear South Delta Temporary Barriers Project predation study. The study is being conducted to satisfy requirements of the project's 2008 NOAA Fisheries BiOp and is examining the occurrence of predation associated with the project. The study's field data collection was completed in 2011, and data analysis is in progress. A final predation study report is expected in 2017. Data from the study will be useful in considering permanent barrier design options and operation strategies to minimize predation.

For additional information about SDIP, see Chapter 7, Water Supply Development and Reliability.

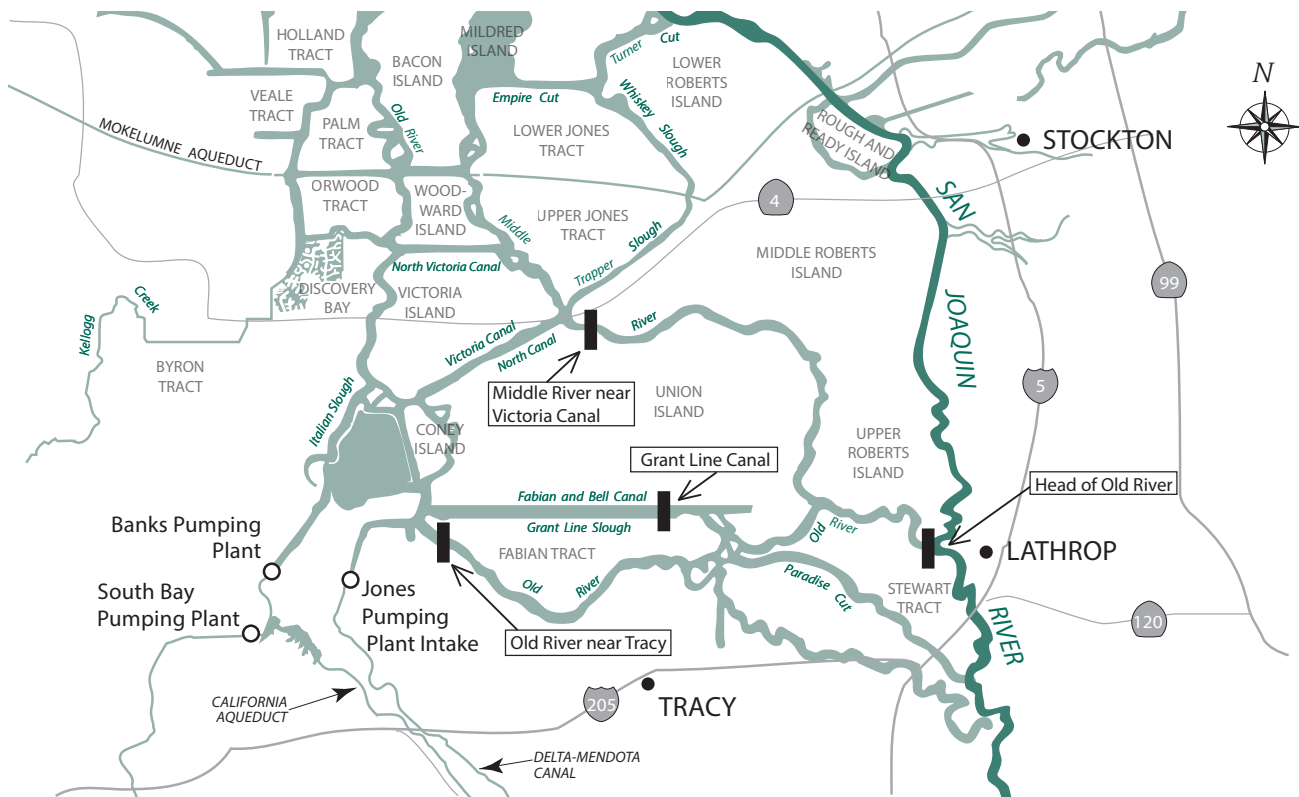
## Temporary Barriers Project Facilities

The South Delta Temporary Barriers Project is an ongoing project that installs up to four rock barriers in channels located in the southern portion of the Delta near the cities of Tracy and Lathrop in San Joaquin County. The barriers are usually installed during the irrigation season from April to November at four sites (see Figure 2-2), as follows:

- (1) Head of Old River, in Old River where it splits from the San Joaquin River;
- (2) Old River near Tracy, one-half mile east of the Jones Pumping Plant intake and about 8 miles northwest of Tracy;
- (3) Middle River near Victoria Canal, just southeast of the confluence of Middle River, Trapper Slough, and North Canal; and
- (4) Grant Line Canal, 420 feet east of the Tracy Boulevard Bridge.

The Old River near Tracy, Middle River near Victoria Canal, and Grant Line Canal rock barriers are designed to act as flow-control structures to improve water levels and circulation within the South Delta. The Head of Old River barrier is designed to improve migration conditions for Central Valley fall-run Chinook Salmon in the spring and fall. In the spring, the barrier blocks migratory movements of juvenile salmon into Old River from the San Joaquin River. In the fall, the barrier increases the volume of San Joaquin River flow passing downstream through the Port of Stockton and improves dissolved oxygen levels in the San Joaquin River. As a result, it improves the low dissolved oxygen sag that occurs near that area and aids upstream migration of adult salmon in the San Joaquin River basin.

In 2015, the three flow-control agricultural barriers at Middle River near Victoria Canal, Grant Line Canal, and Old River near Tracy were installed and operated as planned. Installation started in March, and the barriers were removed in November. Additionally,



**Figure 2-2 Temporary Barrier Locations in the South Delta**

the option of raising the Middle River barrier by 1 foot to increase the water level and improve circulation was exercised on June 8, 2015.

The spring Head of Old River rock barrier was installed in 2015 with construction beginning in early March and full closure achieved by April 3. Eight culverts with slide gates remained in the open position for the duration of the installation. The barrier was breached on June 1, 2015, and it was completely removed by June 8, 2015.

In 2015, the Head of Old River Predator Manipulation Study was implemented to study predatory fish distribution and abundance in the San Joaquin River in the vicinity of the Head of Old River. The coordinated acoustic telemetry studies were conducted by Reclamation, NOAA Fisheries, and the U.S. Fish and Wildlife

Service to track the movements of salmon smolts, steelhead, and predatory fish to determine the outmigrating salmon smolt survival in the Delta and to learn more about the predatory fish impact on the salmon population. In the Predator Manipulation Study, NOAA Fisheries used genetic analysis to determine predator diet and tested the hypothesis that salmon smolt survival can be improved in one reach of the San Joaquin River by removing and relocating predatory fish to another reach.

In 2015, the fall Head of Old River rock barrier was installed and operated from September 13 until November 12, when the barrier was breached. Removal was completed on November 18.

Data collected in 2015 are being analyzed, and the findings of the studies will be published in reports and peer-reviewed

journal articles by the respective agency for each individual study.

Information on the temporary barriers, including details about barrier operations, can be found on DWR's website.

## Delta Flood Control

Levees in the Delta protect valuable wildlife habitat, farms, homes, urban areas, recreational developments, highways, railroads, natural gas infrastructure, utility lines, a major aqueduct, and other public developments. Delta levees influence and protect critical water quality parameters in Delta waterways. Some levees also protect water quality for approximately 25 million Californians who receive a portion of their water from the Delta. The State Legislature recognized the importance of the Delta and enacted the Delta Flood Protection Act of 1988, declaring that "... the Delta is endowed with many invaluable and unique resources and that these resources are of major statewide significance" (California Water Code Sections 12300 et seq.).

Since 1988, the Delta Levees Program has provided more than \$310 million in State-appropriated funds. These monies are combined with local cost-share funding to provide flood protection and environmental benefits in the Delta.

In Senate Bill 34 (Boatwright; Chapter 28, Statutes of 1988), the Legislature declared its intent to appropriate \$6 million for local assistance under the Delta Levee Maintenance Subventions Program and \$6 million for Delta Levees Special Flood Control Projects, including subsidence studies and monitoring on Bethel, Bradford, Jersey, Sherman, and Twitchell islands; Holland, Hotchkiss, and Webb tracts; and the towns of Thornton and Walnut Grove.

In 1996, Assembly Bill 360 (Hannigan; Chapter 601, Statutes of 1996) expanded the

area covered by the Delta Levees Program to include the remainder of the legal Delta and northern Suisun Bay.

Additional funding sources for the Delta Levees Program include:

- Proposition 204 enacted in 1996 (\$25 million);
- Proposition 13 enacted in 2000 (\$30 million);
- Proposition 50 enacted in 2002 (\$70 million);
- Proposition 84 enacted in 2006 (\$275 million);
- Proposition 1E enacted in 2006; and
- Proposition 1 enacted in 2014.

## Delta Flood Emergency Preparedness, Response, and Recovery Program

The Delta Flood Emergency Preparedness, Response, and Recovery Program was initiated within the Division of Flood Management in response to the passing of the Disaster Preparedness and Flood Prevention Bond Act of 2006 (Proposition 1E). The program is designed to enhance emergency preparedness and enable DWR to better coordinate with its local partners to respond to and recover from a large-scale Delta flood emergency.

The *Delta Flood Emergency Management Plan* presents DWR's concept of operations for flood emergency response in the Delta. The plan describes the roles and responsibilities of DWR's emergency response organizations, including the Flood Operations Center, the Project Operations Center, and the Department Operations Center, and lists DWR's actions during flood emergency response. It also supports DWR's emergency preparedness efforts in the Delta and guides DWR management in making critical decisions during recovery.

A tabletop exercise was held in April 2015 in support of the Delta Flood Emergency Preparedness, Response, and Recovery Program. The exercise included staff from each of DWR's emergency response organizations.

For more information, visit DWR's website.

## Delta Levees Maintenance Subventions Program

The Delta Levees Maintenance Subventions Program (Subventions Program) is a cost-share program that provides technical and financial assistance to local levee-maintaining agencies in the Delta for the maintenance and rehabilitation of levees. The Subventions Program is authorized by California Water Code Sections 12980 through 12995 and is managed by DWR. The Central Valley Flood Protection Board reviews and approves DWR's recommendations and enters into agreements with local agencies to reimburse eligible costs for levee maintenance and rehabilitation.

The Subventions Program provides reimbursement funding to local levee-maintaining agencies for improving, maintaining, and enhancing nearly 700 miles of project and nonproject levees. Since its inception in 1973, the Subventions Program has provided more than \$180 million of State funding to more than 70 islands in the Delta. In fiscal year 2015–2016, the program expects to reimburse approximately \$8 million to local agencies for eligible levee maintenance and rehabilitation activities. (In fiscal year 2014–2015, the program reimbursed \$8 million.) These activities help minimize the risk of Delta levee failure, which in turn protects the Delta's ecosystem, communities, and agriculture; State and private infrastructure; and the State's water supply.

## Delta Levees Special Flood Control Projects Program

The Delta Levees Special Flood Control Projects Program assists eligible local agencies in the Delta with flood protection and levee stability repairs. In 1990, the California Water Commission approved actions and priorities that serve as guides for DWR to determine the best use of appropriations to protect Delta islands. Long-term actions and priorities include:

- rehabilitating threatened levees through the beneficial reuse of dredged material;
- improving water supply reliability, levee integrity, and habitat enhancement by soliciting multibenefit projects through the projects solicitation process;
- upgrading levees to the standards included in Bulletin 192-82 (*Delta Levees Investigation*); and
- considering projects that will help achieve net long-term habitat improvement for fish and wildlife.

While DWR seeks cost sharing for all projects, the actual reimbursement depends on each local agency's ability to pay. In some cases, DWR may provide up to 100 percent of the cost. Districts receiving these funds are required to participate in a habitat improvement program to ensure net long-term habitat enhancement.

Levee restoration projects, habitat projects, and other special projects were conducted on various Delta islands and tracts in 2015–2016.

## Bulk Credit Program

In 2012, the Delta Levees Subventions Program and the Special Flood Control Projects Program established a model Bulk Credit Program allowing reclamation districts to more effectively meet habitat mitigation obligations.



Under the Bulk Credit Program, reclamation districts are able to utilize mitigation credits purchased in advance from an existing mitigation bank. These credits provide more biologically effective mitigation than past practices of establishing less formal, smaller mitigation sites, and are a much more efficient way of meeting mitigation obligations. The bulk purchase of credits from the mitigation bank is made at a substantial discount.

In 2015, the Bulk Credit Program continued to be the principal tool for participating reclamation districts to meet their habitat mitigation obligations resulting from Delta levee maintenance and improvement work. The program also continued planning for an 80-acre habitat mitigation site on Twitchell Island to support future mitigation obligations of the program. The mitigation site will be bordered by an 80-acre habitat enhancement site that will provide riparian forest and scrub shrub habitats.

## Reuse of Dredged Material for Delta Levees

As local sources of fill material for levee repair are depleted, new economical sources must be located. DWR has worked to find opportunities to reuse clean, dredged material in the Delta.

As part of this effort, a charter for the multiagency Delta Long-Term Management Strategy (LTMS) for the beneficial reuse of dredged material became effective in February 2007. The Delta LTMS is designed to improve operational efficiency and coordination of collective and individual agency decision-making responsibilities, resulting in approved dredging and dredged material management actions in the Delta, including the beneficial reuse of such material. Regular Delta LTMS meetings have included representatives from DWR, the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, the

Regional Water Quality Control Board, the Ports of Stockton and West Sacramento, and other interested parties.

Delta LTMS long-term goals include:

- developing a streamlined permitting process for dredging and dredged material reuse;
- developing a consolidated guidance document addressing sampling, tests, protocols, and methods for assessing sediment and dredged material characterization;
- developing a sediment management plan of methodologies for assessing and characterizing sediments and determining appropriate disposal options;
- developing a programmatic biological assessment for sensitive Delta species;
- drafting a programmatic environmental impact report/environmental impact statement for the Delta LTMS; and
- identifying and permitting additional sediment placement and beneficial reuse sites in the Delta.

The Delta LTMS program conducted a technical review of the program in July 2015 and concluded there was a need for continued effort. Progress has been slowed due to funding issues.

## West Delta Program

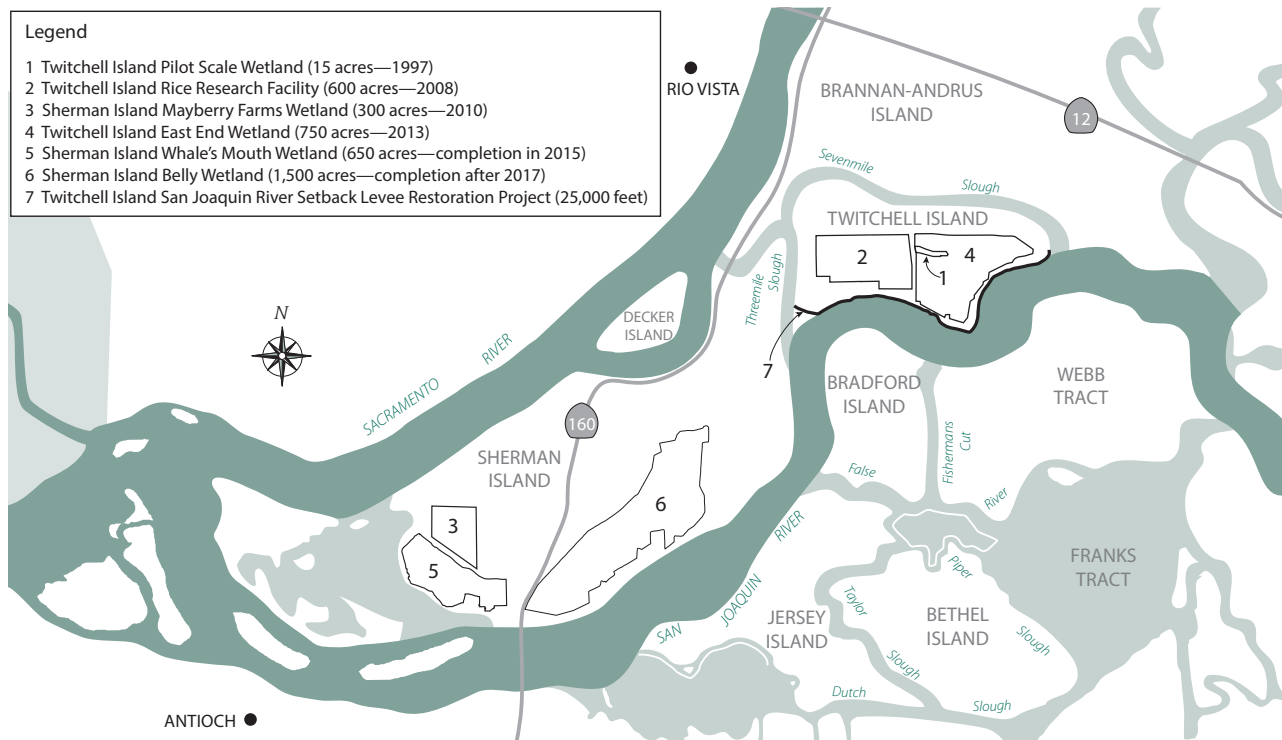
The West Delta Program is tasked with land management on Sherman and Twitchell islands to achieve DWR's goals and objectives, including understanding and managing methods that will mitigate subsidence. The West Delta Program objectives are supported by active research and application of land management activities used for subsidence reversal, carbon sequestration, and habitat development.

Since 2008, DWR has constructed approximately 1,700 acres of subsidence mitigation projects on Sherman and Twitchell islands and constructed approximately 6,000 lineal feet of “fish friendly” habitat setback levees. In 2015, the West Delta Program continued a partnership with the University of California, Berkeley, to collect greenhouse gas data on both newly constructed wetland sites, and typical Delta farmed crops such as corn and alfalfa, and irrigated pasture. Data collected since 2010 has shown that there is a net greenhouse gas benefit of approximately 10 metric tons of carbon dioxide equivalent by planting wetland crops on previously farmed Delta peatland soils.

Building upon subsidence mitigation work, DWR, in partnership with the Sherman Island Reclamation District, was awarded a \$10.5 million grant from the California Department of Fish and Wildlife’s fiscal

year 2014–2015 Wetlands Restoration for Greenhouse Gas Reduction Program. The grant provided funding for another 2,200 acres of wetlands on Sherman Island; construction of the Sherman Island Whale’s Mouth Wetland Restoration Project; and all planning, design, permitting, and construction for the Belly Wetland (see Figure 2-3). Matching funds from both DWR and the University of California, Berkeley, will provide for additional greenhouse gas monitoring throughout the Delta, resulting in a data set from a more robust variation of conditions.

In 2015, the West Delta Program completed construction of the Sherman Island Whale’s Mouth Wetland Restoration Project, a 650-acre wetland on the lower southwest side of Sherman Island. Project features include more than 9 miles of berms needed to terrace the land into cells for appropriate water depth, approximately 23 water control



**Figure 2-3 Selected West Delta Program Projects**

structures, and approximately 75 acres of new upland habitat, including 13 acres that had been a scour pond created during the 1969 Sherman Island flood.

Continued efforts for 2015 included carbon protocol development, a multiagency effort to develop a draft greenhouse gas protocol that will allow for quantification of a project's net increase in carbon sequestration, which could be considered for adoption by the California Air Resources Board in late 2016 or early 2017.

The West Delta Program continued working with Twitchell Island Reclamation District to develop construction plans and environmental permits for the Twitchell Island San Joaquin River Setback Levee Restoration Project. This project will construct approximately 25,000 lineal feet of setback levee along the San Joaquin River, allowing for habitat features to be developed on the water side.







## Chapter 3

# Environmental Programs

*The restored Cookhouse Meadow in the Sierra Nevada.*

## Significant Events in 2015

In February, DWR received the Climate Leadership Award for Excellence in Greenhouse Gas Management (Goal Setting) for its work on the DWR *Greenhouse Gas Emissions Reduction Plan*. The award, given by the U.S. Environmental Protection Agency, the Association of Climate Change Officers, The Climate Registry, and the Center for Climate and Energy Solutions, is the highest national award given for greenhouse gas (GHG) management. DWR is the first public agency to be honored with the award.

In April, the Department of Water Resources (DWR) announced a new alternative that would replace the proposed Bay Delta Conservation Plan (BDCP) as the State's proposed project. The conveyance facility and habitat restoration measures proposed in the BDCP would be separated into two distinct efforts—California WaterFix and California EcoRestore.

*Information in this chapter was contributed by the Division of Environmental Services, the Division of Operations and Maintenance, the Division of Integrated Regional Water Management, and the State Water Project Analysis Office.*



The Department of Water Resources (DWR) has developed and implemented several programs to avoid, minimize, and/or offset adverse environmental impacts resulting from construction and operation of State Water Project (SWP) facilities. DWR has also established other environmental programs and partnered with other agencies to restore and enhance the natural environment.

## Operations for Species of Concern

A primary consideration in the operation of the SWP is avoiding, minimizing, and/or offsetting adverse impacts to species of concern, species listed as threatened or endangered by a State or federal agency, or species proposed for listing. The SWP is operated pursuant to biological opinions (BiOps) issued under the federal Endangered Species Act (ESA), and consistency determinations or incidental take permits issued under the California Endangered Species Act (CESA). A key to avoiding and minimizing adverse impacts to these species is maintaining flexibility in SWP operations. Operational responses can include Delta Cross Channel gate closure, export curtailments, changes in delivery schedules, increased reservoir releases, preferential use of certain facilities, or a combination of these actions.

Additional information can be found in Chapter 7, Water Supply Development and Reliability.

## San Joaquin River Restoration Program

The San Joaquin River Restoration Program is a comprehensive long-term effort to restore flows to the San Joaquin River from Friant Dam to the confluence of the Merced River and to restore a self-sustaining Chinook Salmon (*Oncorhynchus tshawytscha*) fishery in the river, while reducing or avoiding adverse water supply impacts from restoration flows. The San

Joaquin River Restoration Program worked through several challenges in 2015 related to water availability, levee stability, project implementation, and fish reintroduction.

Restoration flows continued to be hindered due to another critical water year in the San Joaquin River basin. The amount of water the San Joaquin River Restoration Program receives each year is based on the water year classification, and with water year 2014–2015 being one of the driest years on record, no restoration flows were released for a second consecutive year.

The San Joaquin River Restoration Program updated its Framework for Implementation that describes how the program will be implemented over the next 15 years. The framework seeks to sequence projects in a logical order to achieve program goals, based on realistic funding and resources, and includes schedules, budgets, and priorities of the five implementing agencies, including DWR. An initial milestone in the framework is to reconnect the San Joaquin River to the ocean by releasing 1,300 cubic feet per second restoration flows and by implementing channel and structural projects.

DWR continued to perform levee evaluations along the river and flood bypasses in the restoration area to ensure that the restoration flows will not significantly increase flood risk. Levee evaluations in 2015 focused on the Eastside Bypass where data show flows over 580 cubic feet per second would exceed criteria set by the U.S. Army Corps of Engineers (Corps) for levee

seepage and stability. DWR is developing plans to investigate this critical reach and develop alternatives to improve these levees to achieve the framework's restoration flow release goal of 1,300 cubic feet per second.

The framework identifies the Mendota Pool Bypass and Reach 2B Improvements Project as one of the first major structural improvement projects to be implemented. A public draft environmental impact statement (EIS)/environmental impact report (EIR) was released in June 2015 and is expected to be finalized in 2016.

Planning for the Reach 4B, Eastside Bypass and the Mariposa Bypass Channel and Structural Improvements Project also continued. A consensus-based alternative development process was initiated in 2015 with landowner and agency stakeholders to identify a preferred alternative for routing fish and flows through Reach 4B and the flood bypass area. DWR is the California Environmental Quality Act (CEQA) lead agency for the project and plans to implement flow and fish passage components of the project by 2019 to correspond with the framework schedule.

In April 2015, the Department of Fish and Wildlife (DFW) and the U.S. Fish and Wildlife Service (USFWS) released approximately 54,000 hatchery-produced juvenile spring-run Chinook Salmon into the San Joaquin River near its confluence with the Merced River. This release follows a similar release made in 2014 and contributes to the San Joaquin River Restoration Program's plan for long-term reintroduction of spring-run salmon to the San Joaquin River.

More information is available on the San Joaquin River Restoration Program's website.

### Lower Yuba River Accord

The Lower Yuba River Accord's purpose is to resolve instream flow issues and protect

and enhance lower Yuba River fisheries and local water supply reliability. The Lower Yuba River Accord provides revenues for local flood control and water supply projects; water to enhance SWP and Central Valley Project (CVP) water supply reliability by offsetting Sacramento-San Joaquin Delta (Delta) export reductions for protection and restoration of Delta fisheries; and improvements in statewide water supply management, including dry year supplies for participating SWP and CVP contractors.

Water contracted by DWR under the Lower Yuba River Accord Water Purchase Agreement (Component 1 water) continues to be used to help offset Delta export reductions to benefit fish. In 2015, Yuba County Water Agency delivered 59,131 acre-feet of Component 1 water from surface releases, shared equally between DWR and the Bureau of Reclamation (Reclamation). This water was used to offset Delta pumping curtailments equally at Banks Pumping Plant and Jones Pumping Plant made pursuant to the BiOps on Delta Smelt and salmonids issued by the USFWS and the National Marine Fisheries Service (NOAA Fisheries) as modified by subsequent court orders. Under an agreement signed in 2012, DWR and Reclamation equally share Component 1 water made available from 2012 through 2015. Because 60,000 af of Component 1 water was due to be delivered in 2015, Yuba owes the remaining 869 af in a future year. In addition, Yuba County Water Agency provided 30,000 acre-feet of Component 4 groundwater substitution water through agreements with seven of its member units to enhance lower Yuba River flows. The water was then made available for transfer to many of the participating contractors through a letter agreement between DWR and Yuba County Water Agency.

For more information about the Lower Yuba River Accord, see Chapter 9, Water Contracts and Deliveries.

## Oroville Facilities

### Existing Federal Energy Regulatory Commission License Activities for 2015

#### *Invasive Plant Management*

During 2015, DWR removed all the red sesbania (*Sesbania punicea*) along the Thermalito Power Canal, Thermalito Forebay, and Thermalito Diversion Pool as part of the annual maintenance that started in 2007. The Thermalito Power Canal, Thermalito Forebay, and Thermalito Diversion Pool are the upstream extent of the red sesbania population on the Feather River and are considered a high priority management area.

DWR also continued to partner with the Butte County Agricultural Commissioner to remove several invasive plants within areas of joint management. The Butte County Agricultural Commissioner treated several stands of red sesbania that are adjacent to the upstream extents managed by DWR, but are not on DWR property, and several locations of skeleton weed (*Chondrilla juncea*) near McCabe Creek and Ponderosa Reservoir.

#### *Feather River Fish Hatchery*

**Fall-run Chinook Salmon.** A total of 7,075,242 juvenile fall-run Chinook Salmon were released into the Delta, Sacramento River, and San Francisco and San Pablo bays.

**Spring-run Chinook Salmon.** A total of 2,183,570 spring-run Chinook Salmon were released in the Feather River.

**Steelhead.** A total of 331,805 steelhead were planted in the Feather River at Boyd's Pump Boat Launch.

#### *Lake Oroville and Thermalito Afterbay*

In October, 139,388 Chinook Salmon were planted in Lake Oroville.

Due to a surplus egg supply at the Feather River Fish Hatchery (FRFH), 17,200 steelhead were stocked in the Thermalito Afterbay.

For additional information about fish stocking in the SWP, see Chapter 13, Recreation.

Habitat improvement continued in 2015 in the fluctuation zone of the lake. Approximately 1,600 Christmas trees were recycled with the help of the Boy Scouts and the California Conservation Corps. The recycled trees were used to construct structures for juvenile fish habitat at the Spillway Boat Launch area, Loafer Creek, and Thermalito Afterbay.

#### *Oroville Wildlife Area*

Monitoring and weed removal activities continued during 2015 at the wetland ponds that were constructed in 2011 in the Oroville Wildlife Area. These wetland ponds were created as a mitigation requirement in the 1995 Corps Clean Water Act Section 404 permit for a project that constructed two waterfowl brood ponds at Thermalito Afterbay. The wetland ponds project converted a 20-acre area of low-quality, disturbed, upland habitat into 10 acres of emergent wetland and 10 acres of riparian habitat. The waterfowl brood ponds were a requirement of the revised recreation plan that was part of the Federal Energy Regulatory Commission's September 22, 1994, order.

#### *Lake Oroville Elevation*

A number of aspects of the Oroville Facilities can be affected by lake surface elevation including:

- habitat;
- flora and fauna of the lakeshore area and upstream tributaries;
- recreation;
- water quality;



- water temperature;
- shoreline and lakebed stability and erosion;
- flood storage capacity;
- power generation; and
- streamflow requirements (downstream of the lake).

The 2015 low point for the Lake Oroville reservoir surface elevation was reached on December 9 at 649.5 feet, and the annual high point of 764.1 feet was reached on April 17. The full pool elevation of Lake Oroville is approximately 900 feet.

### Federal Energy Regulatory Commission Relicensing Activities

#### *USFWS Biological Opinion for the Oroville Facilities Relicensing*

Various conservation measures for the species identified in the USFWS 2007 BiOp for the Oroville Facilities relicensing project continued to be implemented on SWP lands. Monitoring associated with these measures includes an annual vernal pool survey (645 mapped vernal pools and/or features); protective measures for elderberry shrubs (*Sambucus* species, host plant for the valley elderberry longhorn beetle [*Desmocerus californicus dimorphus*]); and annual monitoring of nesting Bald Eagles (*Haliaeetus leucocephalus*) in the area (five currently active nests). In addition, habitat management activities within the Oroville Wildlife Area are coordinated through DFW. These activities include providing nest and forage habitat for waterfowl and upland bird species, monitoring and maintaining Thermalito Afterbay brood pond water surface elevations, and protecting and conserving Giant Garter Snake (*Thamnophis gigas*) habitat. An annual compliance report for 2015 was compiled by DWR and submitted to USFWS.

For more information about Oroville Facilities relicensing, see Chapter 10, Power Resources.

## Invasive Species

### Quagga and Zebra Mussel Monitoring and Assessment

The quagga mussel, *Dreissena rostriformis* (previously classified as *Dreissena rostriformis bugensis*), and the zebra mussel, *D. polymorpha*, are invasive freshwater mussels that pose a significant threat to the SWP. Both species attach to hard substrates, including other mussels, with strong byssal threads, forming dense colonies and causing significant biofouling impacts to raw water infrastructure by clogging small diameter piping and filters and encrusting trash racks and fish screens.

In early 2007, the quagga mussel was detected in the lower Colorado River and spread throughout connected water diversion systems (see Bulletin 132-08). The following year, the zebra mussel was detected in San Justo Reservoir in San Benito County, adding to the existing threat. In response, DWR formed the Aquatic Nuisance Species Program within the Division of Operations and Maintenance. The program includes applied studies, early detection monitoring, vector management, rapid response planning, long-term mussel management, and public outreach.

### Applied Studies

**Assessment of Habitat Suitability.** DWR's consultant (see Bulletin 132-11), examined the suitability of the SWP to support long-term populations of quagga and zebra mussels (dreissenids) if unintentionally introduced. Based on the results, SWP locations were classified into one of three groups: unable to support, potentially able to support, or able to support long-term populations of dreissenid mussels (see Bulletin 132-12). Understanding

where dreissenid mussels may survive in the SWP will be used to prioritize management efforts.

**Early Detection Monitoring.** DWR routinely monitors the California Aqueduct, SWP reservoirs, and the Delta for the presence of quagga and zebra mussels. DWR uses three different methods to monitor for mussels: zooplankton tows (with DNA analysis) for veligers (the free floating larval stage); settlement plates (see Bulletin 132-10); and bioboxes for adults (attached/settled stage).

In 2015, DWR and two collaborating water agencies, Santa Clara Valley Water District and The Metropolitan Water District of Southern California, collected veliger samples at 16 locations (see Bulletin 132-10). In addition, DWR staff are trained in quagga and zebra mussel identification and are instructed to look for mussels during regular field work and during routine facility maintenance activities. No mussels were detected in the SWP, the Delta, or other SWP source water during 2015.

### **Prevention and Response Planning**

To protect against and prepare for mussels in the SWP, the Aquatic Nuisance Species Program developed several planning documents to guide actions and identify vulnerabilities. The *Quagga and Zebra Mussel Vector Management Plan for the State Water Project* identifies potential mussel points-of-entry and vectors and outlines mechanisms to reduce the risk of introduction. The two primary vectors of mussels are downstream transport of planktonic veligers in natural and constructed waterways and overland transport of veligers and attached adults on watercraft. A critical component of the vector management plan is reducing the risk posed by watercraft. To accomplish this, DWR contracted with the California Department of Parks and Recreation and the Los Angeles County Department of Parks and Recreation to implement vessel inspection

and outreach programs at San Luis State Recreation Area (San Luis Reservoir, O'Neill Forebay, and Los Banos Creek Reservoir) and Pyramid and Castaic lakes (see Bulletin 132-12).

At San Luis State Recreation Area, 11,349 vessels were inspected during 2015. Of those vessels, 328 failed the inspection due to the presence of wet equipment or standing water and were not allowed to launch. At Castaic Lake, 22,123 vessels were inspected, and 678 failed the inspection. At Pyramid Lake, 19,169 vessels were inspected, with 931 failures. No mussels were found during the inspections.

In December 2013, quagga mussels were discovered in Lake Piru, operated by United Water Conservation District, in Ventura County (see Bulletin 132-14). Lake Piru is in close proximity to Pyramid and Castaic lakes.

Sampling for veligers had been routinely conducted at Pyramid and Castaic lakes since 2008, and all samples had been negative. Due to the possibility that mussels were introduced in Pyramid and Castaic lakes from Lake Piru, monitoring efforts were immediately increased, additional settlement plates were deployed in 2013, and additional sampling for veligers was conducted during 2013, 2014, and 2015. All additional samples were negative for quagga mussels.

If mussels are detected in the SWP, the *Quagga and Zebra Mussel Rapid Response Plan for the State Water Project* outlines a course of action to confirm the sighting; delineate the population; implement containment and eradication measures; and notify State and federal partner agencies, the SWP water contractors, and any potentially impacted entities.

With uncontrolled watercraft access to and from infested bodies of water, such as the Colorado River, the SWP and the Delta remain vulnerable to mussel infestation.

Therefore, DWR has prepared a long-term mussel management plan that identifies facility vulnerabilities and outlines both short-term and long-term options to prevent or mitigate mussel biofouling impacts for all at-risk SWP facilities. The short-term control strategies are those that can be implemented within a few weeks to a few months time and may be temporary in nature, such as shutdowns for power washing and shell removal. The long-term control strategies have longer implementation times (6 months to multiple years) and are permanent in nature (alterations to infrastructure).

DWR's consultant assisted DWR with plan preparation (see Bulletin 132-14). As a follow-up to the management plan reports, the consultant will develop cost estimates for facility retrofit implementation.

## The Bay Delta Conservation Plan

The Bay Delta Conservation Plan (BDCP) was initiated in 2006 with the goal of providing a plan to restore and protect water supply, water quality, and Delta ecosystem health within a stable regulatory framework. The BDCP was being developed through collaboration, scientific analysis, policy review, and public input. Participants included state, federal, and local water agencies, state and federal fish and wildlife agencies, environmental organizations, agricultural organizations, and other interested parties. The BDCP would have served as a natural community conservation plan under the State's Natural Community Conservation Planning Act and a habitat conservation plan under Section 10 of the ESA, providing long-term take authorization for SWP and CVP operations under the CESA and ESA while providing for the conservation and management of species in the Delta. The draft BDCP and its associated environmental review documents were available for public review and comment from December 13, 2013 through July 29, 2014. In response

to comments received during the public comment period, State and federal agencies decided to change the approach and would no longer pursue completion of the BDCP.

On April 30, 2015, DWR announced a new alternative that would replace the proposed BDCP as the State's proposed project. The conveyance facility and habitat restoration measures proposed in the BDCP would be separated into two distinct efforts—California WaterFix and California EcoRestore.

## California WaterFix and California EcoRestore

The California WaterFix will construct new Delta conveyance facilities in compliance with the ESA and CESA. The conveyance facilities would allow greater flexibility in water diversions and better balancing of the associated water quality and hydrodynamic benefits for fish, drinking water, agriculture, and other beneficial uses.

California EcoRestore was announced as an initiative to help coordinate and advance at least 30,000 acres of critical habitat restoration in the Delta over the next 4 years. California EcoRestore is unassociated with any habitat restoration that may be required as part of the construction and operation of the new Delta water conveyance (California Waterfix).

## Endangered Species Act Consultation Initiated

In early 2015, DWR and Reclamation initiated ESA Section 7 (informal) consultation with NOAA Fisheries and the USFWS and began to develop the biological assessment for construction and operation of California WaterFix. Species under the jurisdiction of the USFWS and NOAA Fisheries were confirmed by the agencies in May and July, respectively. DWR also engaged with DFW to begin the incidental take analysis for State-listed species, as required during the CESA



Section 2081(b) permitting process. The BiOp and 2081(b) permit are expected to be completed in 2016.

## Recirculated Draft Environmental Document Released

On July 10, 2015, DWR and Reclamation released the partially recirculated draft EIR/supplemental draft EIS for the BDCP/California WaterFix. The public comment period that began July 10, 2015, was originally scheduled to end August 31, 2015, but was extended to October 30, 2015. Public meetings were held in Sacramento on July 28 and in Walnut Grove on July 29.

The primary purposes of the partially recirculated draft EIR/supplemental draft EIS were to provide the public and interested agencies with updated environmental analysis to address certain revisions to the previously issued documents related to the BDCP and its draft EIR/EIS, to introduce new alternatives (Alternatives 4A, 2D, and 5A), and to address certain issues raised in comments received on the draft EIR/EIS. The partially recirculated draft EIR/supplemental draft EIS included evaluation of Alternative 4A, California WaterFix.

## Change Petition Submitted

On August 25, 2015, DWR and Reclamation submitted a petition for a change to the water rights necessary for the implementation of key components of California WaterFix. The petition requests the State Water Resources Control Board approval to add points of diversion and rediversion to the existing water right permits (and existing diversion authorization) held by the SWP and the CVP.

## Corps Permit Application Submitted

On August 26, 2015, DWR submitted a permit application to the Corps for California WaterFix. This application started a Corps environmental review process, which

runs parallel to the environmental review process required by CEQA and National Environmental Policy Act. The Corps' process will consider whether to issue a permit for California WaterFix project activities, such as construction, that will occur in or affect waters of the United States, triggering the Corps' regulatory authority under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899.

## Final EIR/EIS

In late 2015, DWR began preparing the final BDCP/California WaterFix EIR/EIS, including updating analyses and modeling, drafting the executive summary, drafting the mitigation monitoring and reporting program, and responding to public comments. The final EIR/EIS is expected to be released in 2017.

## Biological Opinions Issued on CVP/SWP Operations

The NOAA Fisheries and USFWS have both issued BiOps on CVP and SWP operations that include reasonable and prudent alternatives to avoid jeopardy of federally listed species. Both the 2008 USFWS and 2009 NOAA Fisheries BiOps were challenged in federal court but were eventually upheld and are the basis for ESA compliance for the SWP and CVP. As required by the court order, Reclamation completed an EIS in November 2015. For more information about the federal litigation, see Chapter 6, Legislation and Litigation.

The remand process allowed DWR, DFW, Reclamation, USFWS, and NOAA Fisheries to undertake a collaborative adaptive management approach to interim operations under the existing BiOps.

The Collaborative Science and Adaptive Management Program was formed in May 2013 to produce information developed through a collaborative science process that

is directly relevant to management actions in the Delta and can be used to manage operations in a way that protects fish while providing for greater water supply reliability.

The Collaborative Science and Adaptive Management Program is comprised of a Policy Group and a Collaborative Adaptive Management Team. The Policy Group includes State and federal agency directors, regional directors, general managers of water agencies, and executive directors of nongovernmental organizations. The Collaborative Adaptive Management Team includes managers and scientists working under the direction of the Policy Group

to facilitate collaborative science and adaptive management.

DWR, Reclamation, and the regulatory agencies have recently created multiple cooperative real-time management teams to provide a way to rapidly disseminate information, develop recommendations, and make decisions on fisheries-related issues to minimize adverse effects on listed species while meeting permit requirements and contractual obligations for water deliveries. These interagency teams meet regularly, up to weekly during critical periods, to review the latest available information on species status, environmental conditions, and

### Endangered Species and Biological Opinions

An endangered species is one in danger of extinction in all or a significant portion of its range; a threatened species is one likely to become endangered. The Endangered Species Act (ESA) and the California Endangered Species Act (CESA) are designed to protect threatened and endangered species by ensuring federal and State agencies adopt measures to protect the species during the design, construction, and operation of projects, or for other forms of agency action, and prohibit the unauthorized take of endangered species. Biological opinions and incidental take permits are issued to protect ESA- and CESA-listed species.

ESA Section 7 requires federal agencies to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species or modify their critical habitat, otherwise formal consultation is required. Federal agencies must consult with the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service (the wildlife agencies). As part of the consultation process, the wildlife agency issues a biological opinion which states the agency's determination of whether the action is likely to jeopardize a species or adversely modify critical habitat. If the wildlife agency determines an action will jeopardize or adversely modify, it will suggest reasonable and prudent alternatives that the "action agency" may take to avoid the likely jeopardy or adverse modification (Title 16, United States Code Sections 1531–1544 [1973]).

CESA is substantially similar to ESA in all aspects (California Fish and Game Code Sections 2050–2098 [1984]). Under CESA, an incidental take permit issued by the Department of Fish and Wildlife can allow for the take of State-listed species if specific criteria are met, including measures to minimize and mitigate the impacts of authorized take (California Code of Regulations, Title 14, Sections 783.0–783.8).

projected project operations and to develop recommendations for actions to protect listed species. A list of the interagency teams and their agency participants, descriptions of the teams, and the process for real-time decision making is in the EIS for the coordinated long-term operation of the CVP and SWP.

The Delta Science Program conducted the 2015 Long-term Operations Biological Opinions Annual Science Review in November. Background information, review materials, and the review report are available on the Delta Stewardship Council's website.

## Delta Operations for Delta Smelt and Longfin Smelt

The Smelt Working Group (an interagency team of experts on Delta Smelt and Longfin Smelt [*Spirinchus thaleichthys*] biology) meets regularly from December through June to assess the risk to Delta Smelt and Longfin Smelt from CVP and SWP export facilities. Based on near real-time technical information, such as fish distribution, salvage, and physical water conditions, the Smelt Working Group makes recommendations on export operations to the USFWS and DFW with the goal of reducing entrainment of the two species.

Recommendations are based on guidelines outlined in the 2008 USFWS BiOp and the 2009 DFW Longfin Smelt incidental take permit (see Bulletin 132-10).

During the 2014–2015 water year, the USFWS made no determinations that altered export operations. Several factors throughout the time period indicated that additional restrictions to pumping operations were not necessary to protect Delta Smelt or Longfin Smelt. These were: (1) low Delta Smelt salvage and no Longfin Smelt salvage at the export facilities, largely due to extremely low densities of both species in the system, and

(2) severely restricted export levels to meet flow and water quality objectives during the critically dry conditions.

## Fish Restoration Program

Pursuant to the USFWS and NOAA Fisheries BiOps and the DFW Longfin Smelt incidental take permit (see Bulletin 132-11), the Fish Restoration Program (FRP) continued to make progress towards fulfilling its restoration requirements.

In 2015, the FRP continued its outreach efforts, primarily by sending out eNews updates and updating the website with new documents. The FRP website provides an overview of the program and serves as a publicly accessible repository for documents that are relevant to the program's efforts, including links to project-specific documents for each separate restoration project under the FRP. The website also provides a means by which the public can contact the program.

Interim land management of Prospect Island continued in 2015. A small levee repair was done in January after several small diameter pipes extending from Miner Slough to the land side of the levee were found conveying water and causing erosion damage. Vegetation on the crown and slopes of the Miner Slough levee along Prospect Island was cleared, using a combination of boom mowers and goat herds, to facilitate inspection and monitoring of the priority levee repair sites. Due to delays in obtaining permits, larger-scale levee repairs were not done in 2015. DWR continues to pursue obtaining the necessary permits to complete this work. After acquiring the southern portion of Prospect Island from the Port of West Sacramento in September, DWR had the California Conservation Corps clear vegetation from the Miner Slough levee. A portion of the levee was cleared in 2015; the remainder will be completed in 2016.



DWR's North Central Region Office continues to monitor the 20 groundwater wells and one surface water gauge installed on Prospect Island, and nine groundwater wells and three surface water gauges on Ryer Island. Groundwater and surface water levels are monitored to characterize the subsurface hydrogeological conditions to further evaluate the potential for seepage to occur on Ryer Island as a result of tidal restoration on Prospect Island.

The preferred alternative project description and conceptual restoration plan for Prospect Island habitat restoration was developed in 2014. Work on the administrative draft EIR continued in 2015. A public draft is scheduled to be released in 2016.

FRP monitoring activities in 2015 focused on the refinement of a standardized framework for tidal wetland monitoring in the Delta. The intent in using a common framework is to increase data comparability across projects and provide more power to detect effects of restoration. The FRP monitoring team revised the preliminary monitoring plan for the Prospect Island project to reflect the hypotheses and metrics included in the framework. Additionally, the team developed databases, and metadata standards that will be applied to all future monitoring.

DWR acquired the Port of West Sacramento's 140-acre portion of Decker Island. Restoration planning for Decker Island progressed with the development of goals and objectives, initial topography, and cultural resources, and the completion of vegetation surveys. Several conceptual designs were selected and evaluated; a single project design will be chosen in early 2016.

DWR purchased the 245-acre Property 322 in February 2013 for tidal habitat restoration. At the end of 2015, DWR was in escrow to purchase Property 329. The two properties are located on Bradmoor Island within the

Suisun Marsh. Initial restoration planning includes alternatives to restore the whole island or only the portion already purchased.

The FRP continues efforts to acquire more restoration properties. In an effort to reach its BiOp restoration requirements, DWR is developing a process to solicit proposals for restoration projects in which private and nonprofit entities would acquire property and develop and implement tidal habitat restoration projects that meet DWR criteria. DWR began discussions with Reclamation to develop a joint, cost-shared process for soliciting proposals and awarding contracts. DWR expects to complete preparation of the full solicitation package to begin solicitation in 2016 and award contracts in late 2016.

## Decisions on Endangered Species

Table 3-1 lists fish species of concern found in the Delta. No status changes were made in 2015.

## Trends in Fish Abundance

Abundance indices for Longfin Smelt and Delta Smelt are based on DFW fall midwater trawl sampling conducted every year from September through December. Index calculations are based on average catch per trawl for 100 core index stations, which are partitioned into 14 geographic areas. The average monthly catch per tow in each area is multiplied by a weighting factor that is based on the estimated volume of water in each area. The resulting values are then summed over all areas and months to obtain the annual index. This fall abundance index serves as an indicator for adult Longfin and Delta Smelt populations over a relatively long period of time.

The abundance index for Longfin Smelt is shown on Figure 3-1. The index for 2015 declined from the previous year to the lowest value on record.

**Table 3-1 Special Status Delta Fish Species**

Common Name	Scientific Name	Listing or Action	
		ESA	CESA
Delta Smelt	<i>Hypomesus transpacificus</i>	threatened <sup>a</sup> (4/5/1993)	endangered (1/20/2010)
Longfin Smelt	<i>Spirinchus thaleichthys</i>	candidate <sup>b</sup> (4/2/2012)	threatened (4/9/2010)
Chinook Salmon (winter-run)	<i>Oncorhynchus tshawytscha</i>	endangered (2/3/1994)	endangered (9/22/1989)
Chinook Salmon (spring-run)	<i>Oncorhynchus tshawytscha</i>	threatened (11/15/1999)	threatened (2/5/1999)
Chinook Salmon (fall-/late fall-run)	<i>Oncorhynchus tshawytscha</i>	species of concern (4/15/2004)	none
Steelhead (Central Valley DPS)	<i>Oncorhynchus mykiss</i>	threatened (5/18/1998)	none
Green Sturgeon (Southern DPS)	<i>Acipenser medirostris</i>	threatened (6/6/2006)	none
Sacramento Splittail	<i>Pogonichthys macrolepidotus</i>	none	species of concern
Pacific Lamprey	<i>Entosphenus tridentata</i>	species of concern	none
River Lamprey	<i>Lampetra ayresii</i>	none	species of concern

ESA = federal Endangered Species Act; CESA = California Endangered Species Act; DPS = distinct population segment

<sup>a</sup> In April 2010, the USFWS found that reclassification of Delta Smelt from threatened to endangered was warranted but precluded by other higher priority listing actions.

<sup>b</sup> On April 2, 2012, the USFWS found that listing the San Francisco Bay-Delta DPS as threatened or endangered was warranted but precluded by other higher priority listing actions and has added the San Francisco Bay-Delta DPS of Longfin Smelt to its list of candidate species.

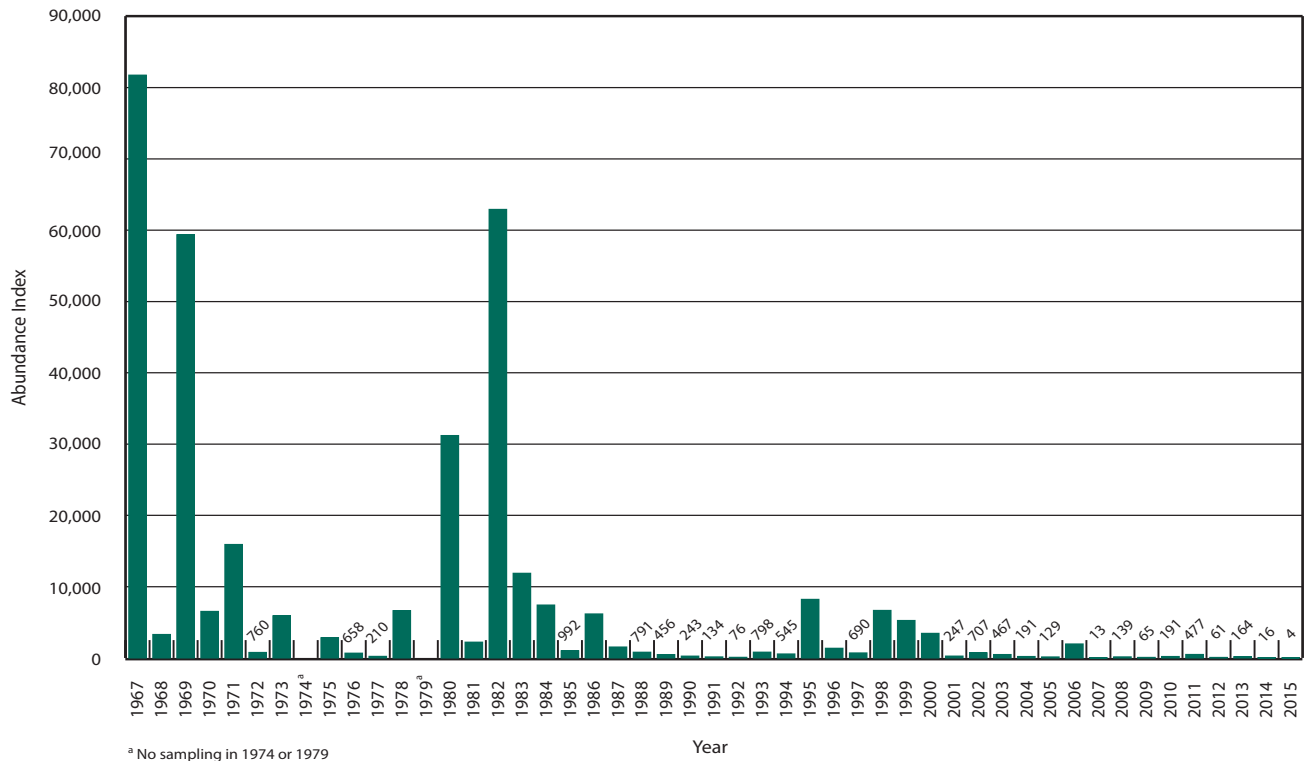
**Figure 3-1 Longfin Smelt Fall Midwater Trawl Abundance Index, 1967–2015**

Figure 3-2 shows the fall midwater trawl abundance index for Delta Smelt. In 2015, the index dropped to a value of 7, the lowest value observed since the inception of the survey.

Figure 3-3 shows estimates of returning adult winter-run Chinook Salmon from 1970 through 2015. These estimates, referred to as escapement estimates, are the number of adults that escape mortality and return to spawn. The Sacramento River winter-run Chinook Salmon escapement estimates are generated from the DFW carcass survey. DFW has been using the carcass survey data to generate escapement estimates since 2001, prior to which Red Bluff Diversion Dam counts were used. The estimated winter-run Chinook Salmon escapement for 2015 was 3,440, which was 14 percent higher than the 2014 escapement estimate.

Figure 3-4 shows estimates of returning adult spring-run Chinook Salmon from 1985 through 2015. Individual estimates are shown for the FRFH and the principal spring-run spawning streams: Battle Creek, Clear Creek, Mill Creek, Deer Creek, and Butte Creek. The escapement estimates are shown separately for each stream because the Feather River estimate is based on returns to the FRFH, where the genetic integrity of spring-run Chinook Salmon is uncertain. The estimated escapement for 2015 was 4,440 for the FRFH and 1,190 for the other streams combined. The 2015 escapement estimate was 1.2 times higher than the 2012 parent stock estimate for the FRFH, but 15.7 times lower than the 2012 parent stock estimate for naturally spawned fish in Battle, Clear, Mill, Deer, and Butte creeks.

Due to the lack of comprehensive monitoring programs, there are no reliable escapement estimates for wild Central Valley steelhead.

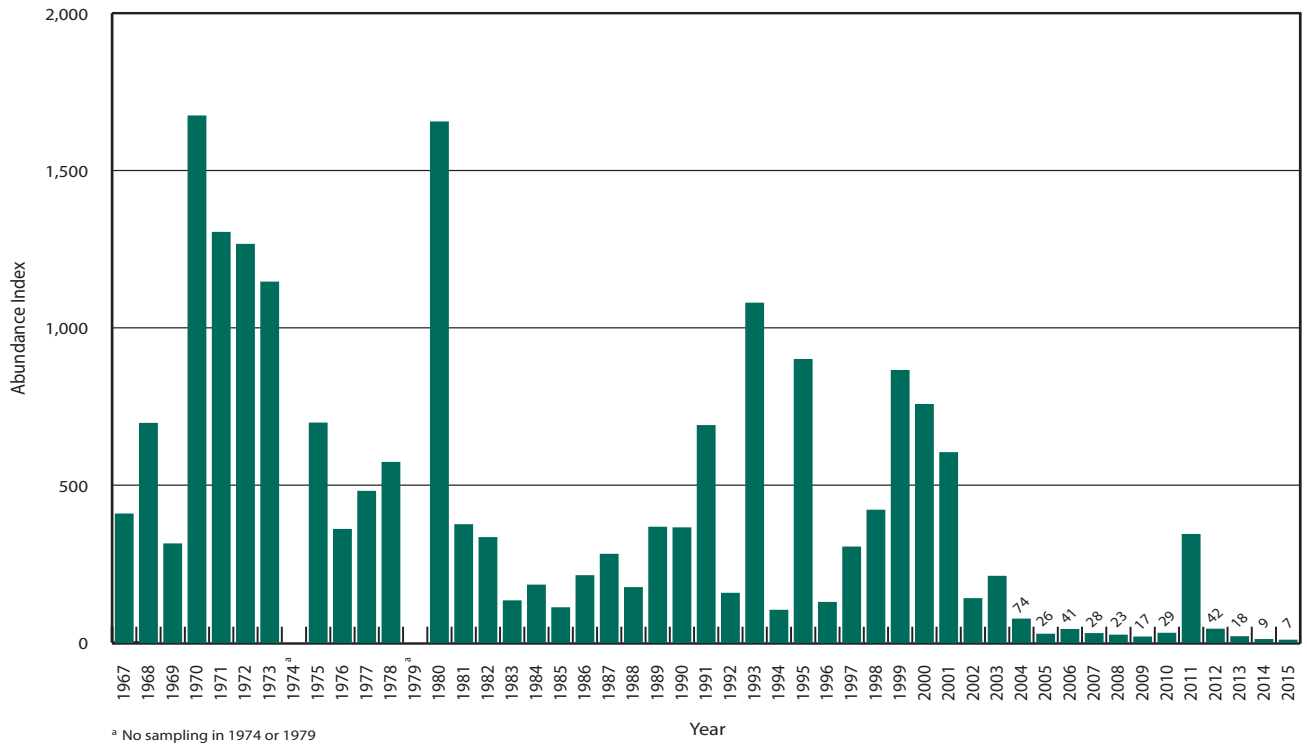
## Pelagic Organism Decline in the Upper San Francisco Estuary

By the early 2000s, long-term monitoring by the Interagency Ecological Program revealed marked declines in numerous pelagic (open water) fish species in the upper San Francisco Estuary (the Delta and Suisun Bay). This decline has collectively become known as pelagic organism decline.

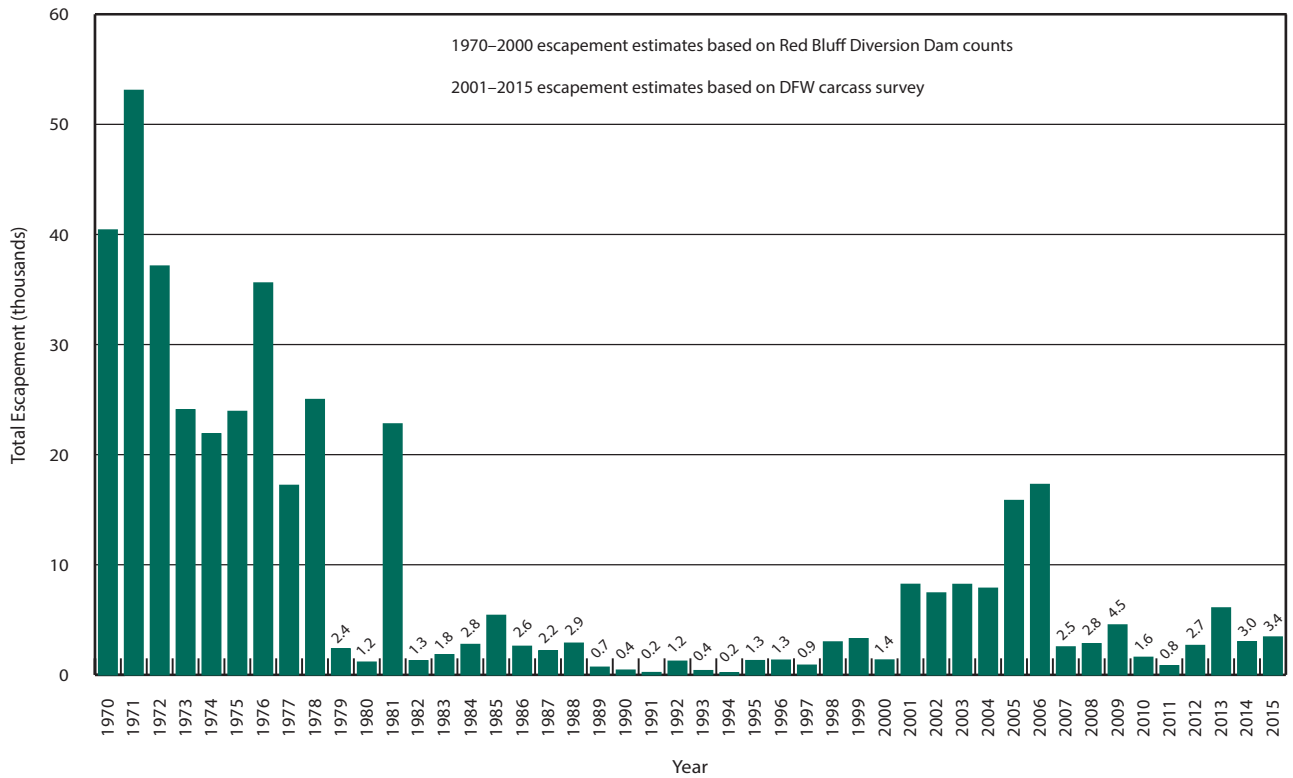
Pelagic fish species in decline include Delta Smelt, Longfin Smelt, Striped Bass (*Morone saxatilis*), and Threadfin Shad (*Dorosoma petenense*). These declines resulted in significant management consequences, including limits on SWP and CVP pumping operations for the protection of Delta Smelt (listed as threatened under ESA and endangered under CESA) and Longfin Smelt (listed as threatened under CESA).

Since 2005, Interagency Ecological Program scientists have been coordinating studies investigating potential causes of pelagic organism decline. In 2010, an “ecosystem regime shift” conceptual model was put forward, hypothesizing that pelagic organism decline was caused by changes to multiple and interacting environmental variables, such as outflow, turbidity, and salinity, which led to fundamental changes to the Delta ecosystem. This conceptual model has served as a working hypothesis for continuing pelagic organism decline investigations since 2011. In early 2012, the Interagency Ecological Program formed the Management, Analysis, and Synthesis Team to synthesize scientific datasets with the goal of addressing pressing management information needs.

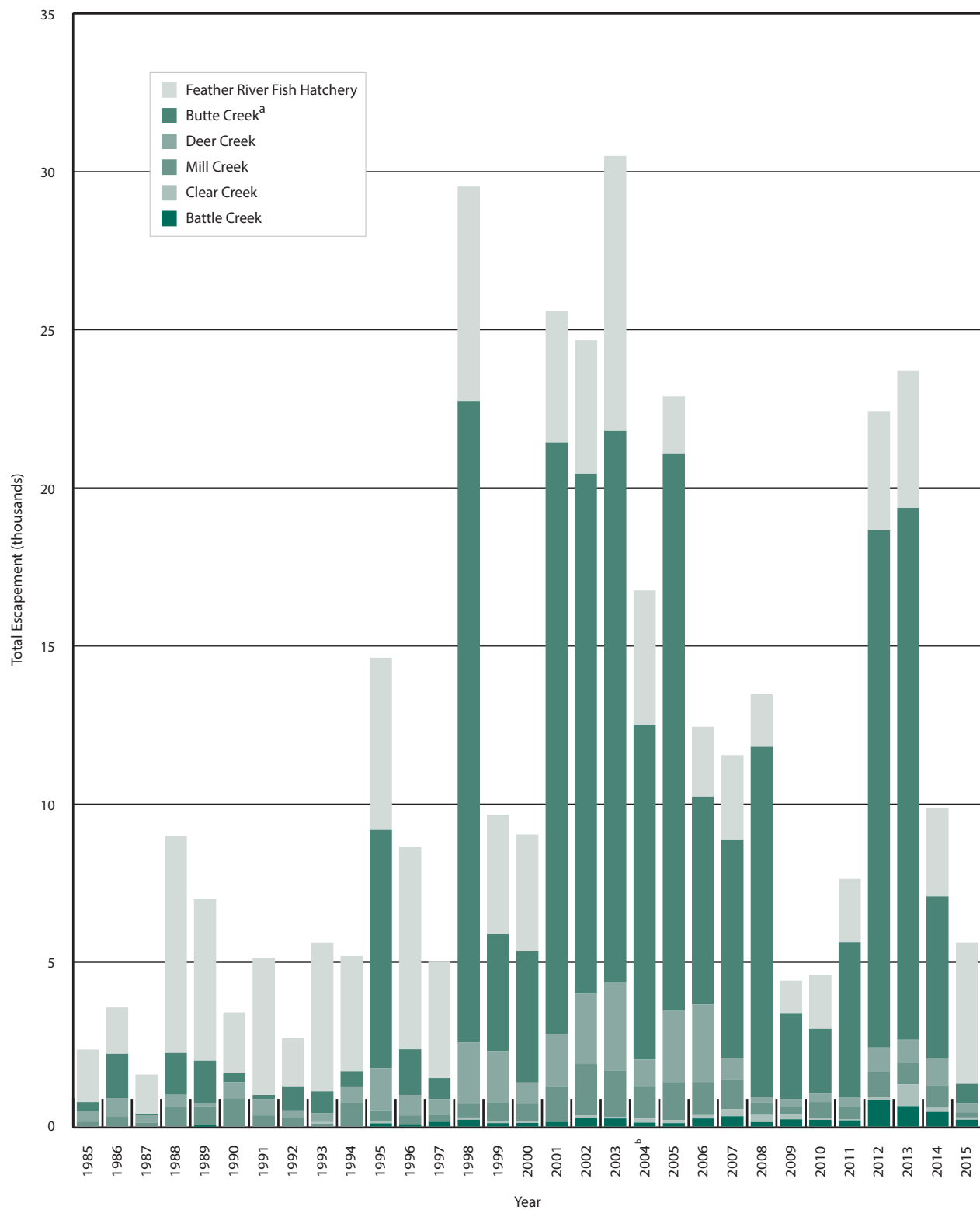
During 2015, the team conducted a synthesis on how recent drought conditions have influenced Delta fishes, including Delta Smelt and Longfin Smelt, and their habitats. The abundance of both species dropped



**Figure 3-2 Delta Smelt Fall Midwater Trawl Abundance Index, 1967–2015**



**Figure 3-3 Estimated Total Adult Winter-run Chinook Salmon Escapement, 1970–2015**



**Figure 3-4** Estimated Total Adult Spring-run Chinook Salmon Escapement, 1985–2015

to record low levels during the current multiyear drought that extended into 2015. A manuscript detailing the Management, Analysis, and Synthesis Team's synthesis will be submitted to a peer-reviewed journal in 2016.

## Feather River Fish Studies

In the early 1990s, the Feather River fish studies were initiated to document and monitor fish populations in the lower Feather River. Early efforts focused on studies to identify flow requirements for Chinook Salmon and steelhead. The program has progressively expanded since the mid-1990s, first, to prepare for the Federal Energy Regulatory Commission relicensing of the Oroville Facilities and then to satisfy the 2004 NOAA Fisheries BiOp for the CVP and SWP long-term Operations Criteria and Plan. Recently, efforts have been made to satisfy the NOAA Fisheries BiOp with the Oroville Facilities license issuance in mind. Baseline information will be developed that satisfies current requirements and will directly benefit planning and implementation of license requirements. Field program elements have included operation of rotary screw traps (RSTs), acoustic and radio telemetry, salmon and steelhead spawning surveys, salmon escapement surveys, spring-run Chinook Salmon tagging, otolith thermal marking studies, snorkel and beach seining surveys, Green Sturgeon studies, steelhead acoustic tagging, and hatchery juvenile Chinook Salmon movement and survival studies.

The study area is generally divided into the low-flow channel, from the Fish Barrier Dam downstream to the Thermalito Afterbay Outlet, and the high-flow channel, from the Thermalito Afterbay Outlet downstream to the confluence with the Sacramento River at Verona (see Figure 3-5).

## Rotary Screw Traps

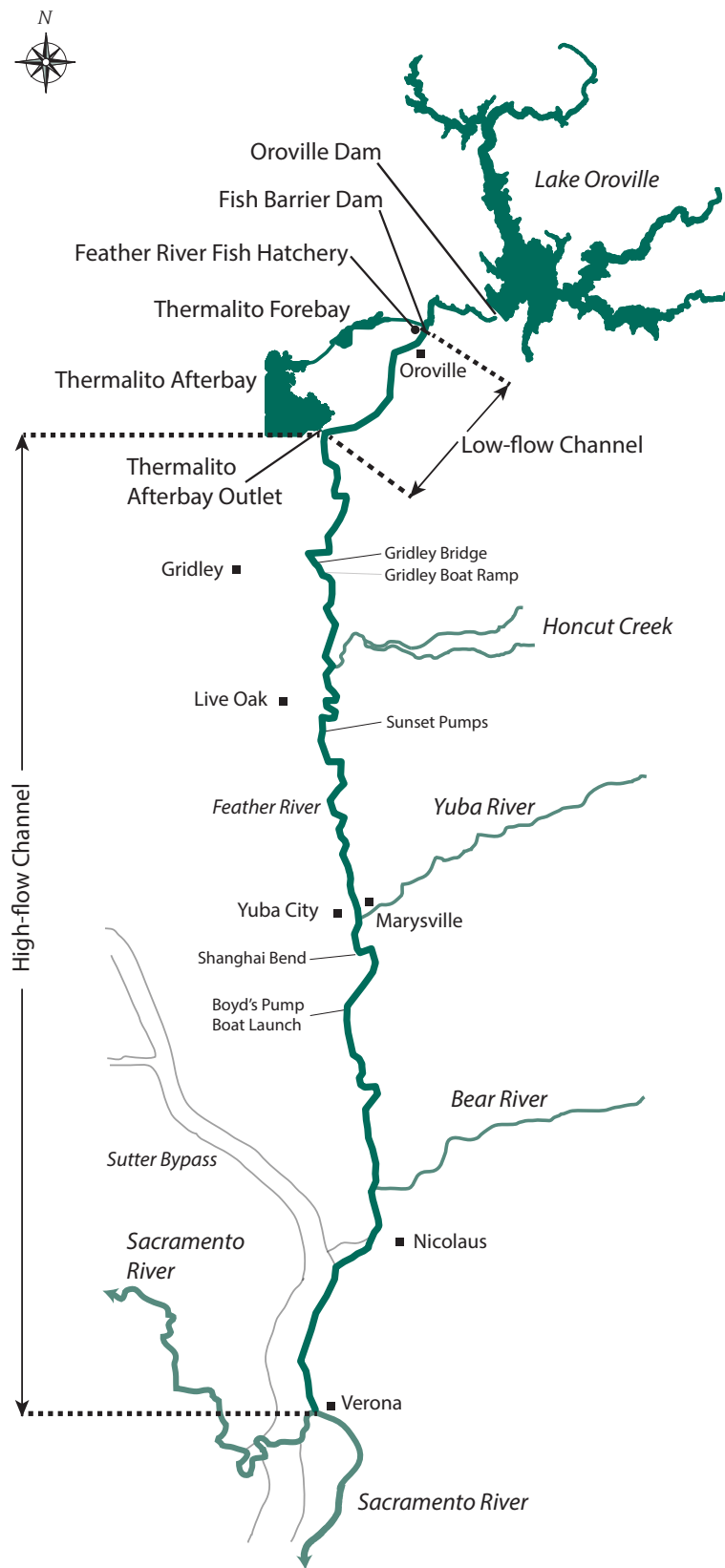
RSTs capture juvenile salmon and steelhead as they emigrate from the Feather River. Over the last 18 years, DWR has used RSTs as the primary method to assess the general abundance and timing of emigrating juvenile salmon and steelhead in the lower Feather River. In addition, large numbers of naturally produced (wild) salmon have been coded wire tagged to examine their return success. Although adult returns have been too small to evaluate, a 5-year tagging effort has led to estimates of fry survival through the upper reaches of the high-flow channel—the first time this has ever been achieved. This data will be presented in an upcoming report.

Emigration timing and travel times confirm that most wild juvenile Chinook Salmon move rapidly through the upper reaches of the lower Feather River as fry. However, little information exists regarding rearing behavior in the lower Feather River downstream of the town of Live Oak (see the Beach Seining section, later in the chapter). Additionally, trapping larger individuals that may be exhibiting alternative life-history strategies is difficult and not likely to be well documented without targeted trapping efforts (which are not currently employed).

In 2015, the RSTs fished throughout the majority of the emigration period, with salmon emigration observed from December through May, with the greatest abundance occurring in January and February. In 2015, trapping locations included both the low-flow and high-flow channels. Within the low-flow channel, approximately 19,500,000 juvenile salmon were estimated to have passed the RSTs. Within the high-flow channel, approximately 7,500,000 were estimated to have passed the Herringer Riffle trap at River Mile (RM) 46.

Although Chinook Salmon and steelhead were the primary targets of trapping efforts, records were kept on all fish species caught.





**Figure 3-5 The Lower Feather River**

Twenty-three species, including three races of Chinook Salmon (fall-run, spring-run, and late fall-run), were caught during the 2015 season. Chinook Salmon was the dominant species, comprising 95 percent of the catch. A total of 465,019 Chinook Salmon were caught in the RSTs with 319,221 (69 percent) of those captured in the low-flow channel and 145,798 (31 percent) caught in the high-flow channel.

## Acoustic Telemetry

Acoustic telemetry gathers baseline information on the migration and holding patterns of adult spring-run Chinook Salmon in the lower Feather River. In 2015, a telemetry study was conducted to collect additional data to better understand migration of prespawning adult Chinook Salmon.

Chinook Salmon with a spring-run life history enter freshwater in spring and hold in the river up to several months before spawning. In order to collect additional data to evaluate straying, migration patterns, and potential passage barriers for spring-run Chinook Salmon, adults were captured and tagged with acoustic tags.

Between April 28 and June 25, 2015, nine adult spring-run Chinook Salmon were captured at Shanghai Bend (downstream of the Yuba River confluence) using hook-and-line sampling and implanted with acoustic tags. These fish were monitored along the 67-mile stretch of river from the Fish Barrier Dam near the FRFH to the confluence with the Sacramento River at Verona. Twenty-six submersible hydrophone receivers positioned at various locations along this stretch picked up the signals from the implanted tags as fish passed the receivers. All salmon tagged at Shanghai Bend in 2015 swam to the upper reaches of the Feather River. Seven out of nine Chinook Salmon were observed to reach the uppermost extent near the FRFH (RM 67). Two fish demonstrated upstream

movement to River Bend Park (RM 65.7) with no evidence of movement upstream of this point.

## Spawning Surveys

To better understand Feather River salmon and steelhead spawning distribution and response to restoration actions, redd surveys (a redd is a shallow depression in a streambed, excavated by a salmonid and containing deposited fish eggs) are performed to identify the location, timing, magnitude, and physical characteristics of natural spawning sites in the lower Feather River. The surveys are generally performed weekly, and, depending on the survey type, much of the available spawning area between the Fish Barrier Dam and Gridley Bridge is searched.

## Salmon

In June and July 2014, DWR implemented a project to strategically place 8,300 cubic yards of salmon and steelhead spawning gravel in the lower Feather River near the FRFH. The spawning gravel used was in the ideal size range for salmon and steelhead, and the project was designed to optimize depth, flow, and velocity for immediate use. In selected areas with significant armoring and large cobble, the riverbed was also scarified to increase permeability and to break up the armoring that had occurred over the past 50 years. Redd mapping and hydraulic modeling occurred before the project to document existing use and to inform the design of each new feature. Post-project redd mapping and modeling were performed to document use of the newly restored sites and to validate predictions.

In 2015, Chinook salmon redd surveys were conducted within the gravel augmentation project boundary to monitor the response to the restored areas. Redd surveys were also performed in the high-flow channel to record redds that could be dewatered when flows decrease in the fall.

Ground surveys for the 2015 Chinook Salmon redd survey began on September 16 and continued until December 4. The redd survey consisted of a total of 37 days over 13 survey weeks. The surveys were concentrated in lower, middle, and upper Auditorium Riffle as well as the section between upper Cottonwood Riffle and upper Moe's Side Channel. Hatchery Riffle and upper Hatchery Riffle (RM 66.6) were also sampled. The high-flow channel was surveyed four times in 2015. The first survey was conducted on October 15 and the last survey took place on December 3.

During the 13 weekly surveys, 2,023 redds were found within the spawning area between upper Hatchery Riffle and lower Auditorium Riffle (RM 66.4). This area included all of the newly restored spawning sites as well as Cottonwood Riffle and Moe's Side Channel. Since 2014, the restored areas continue to see significant spawning activity, indicating that the project was successful. Another 147 redds were discovered in the high-flow channel from the Thermalito Afterbay Outlet to the Gridley Bridge.

The week 4 survey (October 5, 6, 8, and 9) covering the area between upper Hatchery Riffle and lower Auditorium Riffle revealed the highest number of redds with 377. The second highest total was 350 redds for the survey conducted the week of October 19 in the same areas. The locations with the largest number of redds were the lower Auditorium Riffle area with 651 (32 percent) and Hatchery Riffle with 257 (13 percent). The average depth for all salmon redds was 0.45 meters (m) (1.48 feet [ft]), and the average water velocity was 0.46 m (1.51 ft) per second. The average redd length and width was 2.1 m (6.89 ft) by 1.4 m (4.59 ft), respectively.

### Steelhead

In 2015, a total of 56 steelhead redds were identified during 8 weekly surveys. Forty of the 56 redds (71 percent) were observed

in Moe's Side Channel and Hatchery Side Channel, two side channels in the uppermost section (RM 66.5) of the lower Feather River. Steelhead redds were first observed on January 15, with newly constructed redds continuously observed through March 5. Fifty redds (89 percent) were observed between mid-January and mid-February.

The average depth for all recorded redds was 0.33 m (1.08 ft) with an average water velocity of 0.67 m (2.20 ft) per second. The average redd length and width was 1.17 m (3.84 ft) by 0.76 m (2.49 ft). Small gravel and pebbles were the dominant substrate types used by steelhead for redd construction, and overhead cover was present at 59 percent of observed redds. Instream cover was present at 55 percent of observed steelhead redds.

### Salmon Escapement Survey

The survey provides information crucial to monitoring, managing, and conserving Feather River salmon populations. The primary purpose of the salmon escapement survey is to evaluate the abundance of Chinook Salmon spawning in the lower Feather River. Other important objectives include: (1) understanding the distribution and success of spawning, (2) estimating the number of hatchery salmon spawning in the river, and (3) identifying trends in population and age structure.

The Chinook Salmon spawning escapement survey began September 8 and continued through December 23, 2015. The survey was conducted in the low-flow channel and the high-flow channel from the Table Mountain Bridge downstream to the Gridley Bridge. Due to the low numbers of returning fish in the high-flow channel, the data were pooled with the low-flow channel data to generate one estimate for the entire lower Feather River.

The carcass mark-recapture study resulted in a spawning population estimate of

18,069 adult Chinook Salmon for the lower Feather River. There were an estimated 2,497 grilse (2-year-old fish less than 65 centimeters in fork length). These estimates include both fall-run and spring-run Chinook Salmon since their spawning is currently not fully segregated on the Feather River.

Approximately 95.2 percent of the spawning population utilized the low-flow channel. Since 2000, the long-term average for the low-flow channel's spawning population is 82.8 percent. In the low-flow channel, survey section 8 (RM 66.5) had the highest carcass concentration followed by section 12 (RM 63.0). The highest concentrations of carcasses in the high-flow channel were found in sections 24 and 28 (RM 57 and 56, respectively).

### Feather River Fish Hatchery Spring-run Chinook Salmon Tagging

To better manage broodstock selection at the FRFH, a program was developed to mark spring-run Chinook Salmon entering the FRFH in the spring. The spring-run Chinook Salmon tagging program allows DFW to segregate the spawning of spring- and fall-run Chinook Salmon in the hatchery in the fall when the populations are mixed together in the fish ladder. The program also investigates potential differences in spawning distribution and timing of the early arriving spring-run Chinook Salmon in the river.

Early arriving spring-run Chinook Salmon entering the hatchery in May and June were marked with individually numbered Hallprint dart tags for identification. Once marked, the fish were released back into the river. During the hatchery spawning season, the tags enabled hatchery staff to distinguish the early arriving spring-run fish from the fall-run fish, allowing segregated spawning for each run. The tags also enabled the escapement survey crew to differentiate

spring- and fall-run salmon, so that any potential differences in spawning success, distribution, or behavior of the two runs can be analyzed.

In 2015, 5,355 Central Valley spring-run Chinook Salmon were tagged at the FRFH. Tagging began on May 21 and ended on July 2. When spawning commenced in the fall, a total of 4,940 tagged fish were recaptured: 4,440 at the FRFH and 500 in the river escapement survey.

### Snorkel Surveys

From 1999 to 2001, DWR conducted snorkel surveys focused on juvenile steelhead, but included observations of other species and life stages. In 2010, DWR reinstituted the lower Feather River snorkeling surveys with the following objectives:

- (1) determine the relative abundance and distribution of juvenile spring-run Chinook Salmon and steelhead prior to habitat improvements;
- (2) identify habitat conditions (depth, substrate, velocity, and cover) where juvenile Chinook Salmon and steelhead occur; and
- (3) identify potential sites for channel improvement and structural habitat restoration.

In 2015, the Feather River Program continued to collect data to determine the relative abundance and distribution of age-0 steelhead and salmon prior to habitat improvements. Nonsalmonid species were also identified and enumerated. The program also succeeded in quantifying habitat characteristics where juvenile steelhead and salmon occur as well as identifying other high-use areas of the low-flow channel that may benefit from habitat improvements.

Snorkel surveys were conducted during July, August, and September 2015 at 21 permanent sites, 12 in the low-flow



channel and 9 in the high-flow channel. Of the 116 Chinook Salmon identified during the snorkel surveys, 113 were adults. A total of 365 steelhead were identified and enumerated; 283 were considered to be juveniles ( $\leq 200$  mm fork length).

## Beach Seining

DWR conducted beach seining surveys in the lower Feather River between January 1997 and August 2001 to document fish distribution. Since then, beach seining has occurred intermittently since 2008 to further document the distribution and condition of steelhead and salmon in both the low-flow and high-flow channels during the primary emigration and rearing period (roughly December through July).

Although targeted at steelhead and salmon, beach seining is useful to augment screw trapping for the purpose of documenting the distribution and relative abundance of all fish species found in the Feather River. In 2015, the objectives for beach seining included two relatively new components: capturing spring-run smolts released from the FRFH to augment survival study and emigration rate data collected via acoustic tagging, and collecting random samples of juvenile Chinook Salmon for an ongoing *Ceratonova shasta* study. This study is looking at the rate of infection and disease from the parasite *C. shasta* experienced by juvenile Chinook Salmon rearing or emigrating in the lower Feather River.

Beach seining surveys were conducted from April through August 2015. A total of 83 seine hauls and 6,076 individual fishes were sampled during the 2015 surveys. Native fishes dominated the beach seine catch and represented 88 percent of the overall catch. The most abundant groups captured were juvenile minnows (1,880), Sacramento Sucker (1,693), and juvenile Chinook Salmon (794). A total of

23 steelhead were captured by beach seine in 2015.

## Green Sturgeon Studies

The primary objective of the sturgeon study is to provide DWR with data to make long-term management decisions concerning future monitoring programs, operational changes to the facilities, and/or habitat enhancement within the lower Feather River. Specific studies focus on the following components of Green Sturgeon life-history in the lower Feather River:

- potential adult migration barriers;
- migration patterns;
- distribution and habitat preferences;
- annual abundance of adults; and
- identification of spawning grounds.

In 2015, 73 sonar surveys were completed from January 12 to December 23. The number of surveys conducted at six locations was as follows:

- Lower Shanghai (RM 24.7), 25;
- Upper Shanghai (RM 25.5), 1;
- Sunset Pumps (RM 38.5), 23;
- Lower McFarland (RM 52.0), 2;
- Big Hole (RM 57.9), 1; and
- Thermalito Afterbay Outlet (RM 59), 21.

A total of 29 sturgeon detections were made during the survey season. Since individuals are detected multiple times, analysis of the 29 detections suggests that at least 3 to 5 individuals were within the study area. Sturgeon at Shanghai accounted for 89 percent of the detections and were 1.5 to 1.9 m (4.9 to 6.2 ft) in length at depths of 1.1 m (3.6 ft) to 4.7 m (15.4 ft). The only sturgeon detected at Sunset Pumps rock dam was 1.5 m (4.9 ft) long at 1.1 m (3.6 ft) depth. The two other detections occurred at Upper Shanghai (1.4 m (4.6 ft) long; 1.2 m (3.9 ft) deep) and Lower McFarland (1.3 m (4.3 ft) long; 2.5 m (8.2 ft) deep). It



is not clear whether these were Green or White Sturgeon.

One adult Green Sturgeon was captured via angling and tagged on October 22 below Shanghai where it remained until it began outmigrating on December 23. One adult Green Sturgeon was visually identified repeatedly below Sunset Pumps between June 29 and August 1 at 1 to 2 m (3.3 to 6.6 ft) depth. A Green Sturgeon was also visually confirmed by multiple biologists at Lower McFarland (above the Sunset Pumps rock dam) on multiple occasions.

No egg or larval sampling occurred in 2015 since adults were not detected until after the spawning season was over.

### **Ceratonova shasta Sampling**

*Ceratonova* (previously known as *Ceratomyxa*) *shasta* is a parasite that infects freshwater salmonid fishes throughout tributaries of the Pacific coast of North America, including the Feather River. *C. shasta* has a complex life cycle involving an invertebrate polychaete worm host (*Manayunkia speciosa*) in addition to the salmon host. Infected worms release actinospores into the water that infect fish by attaching to the gills.

A high prevalence of severe *C. shasta* infection (68–83 percent) was observed in natural Feather River juvenile Chinook Salmon sampled in the high-flow channel between 2012–2014. Juveniles collected in the low-flow channel were far less likely to be infected (<10 percent prevalence of infection). In 2015, DWR partnered with the USFWS Coleman National Fish Health Laboratory to better understand the problem observed in the lower Feather River. The objectives of this study were to:

- (1) compare prevalence and severity of infection by *C. shasta* and the myxozoan kidney parasite, *Parvicapsula minibicornis*, in natural

Chinook Salmon juveniles in the low- and high-flow channel reaches of the Feather River from late January until outmigration ends in late spring;

- (2) collect juvenile Chinook Salmon by beach seine in the lower Feather River below the confluence of the Yuba River during the prime infectivity period of March and April (the lower river sample may provide information on tributary input and prognosis of infections acquired up-river); and
- (3) collect environmental DNA samples from the Feather River at several different locations to better determine the locations where actinospores are of highest density.

Results of the 2015 *C. shasta* sampling show both a high prevalence (58 percent) and disease severity in natural Chinook Salmon juveniles collected in the high-flow channel of the Feather River. Infection was detected as early as February when the water temperature was 11–12°C (51.8–53.6°F). These fish had concurrent infections by *P. minibicornis*. Salmon sampled from the low-flow channel of the Feather River and Lake Oroville showed little to no *C. shasta* infection. Infection data for natural Chinook Salmon and sentinel fish along with the *C. shasta* environmental DNA concentration in river water demonstrates a zone of high infectivity for both pathogens in the high-flow channel, from approximately the Thermalito Afterbay Outlet (RM 59) to at least the Herringer RST site (RM 45.8). Actinospore concentrations declined downstream of the Herringer site.

### **Fish-related Mitigation Projects**

In 1986, DWR and DFW signed the Delta Pumping Plant Fish Protection Agreement (Delta Fish Agreement) to annually provide funds to offset direct losses of Chinook Salmon, steelhead, and Striped Bass at

Banks Pumping Plant. The Delta Fish Agreement is commonly referred to as the Four Pumps Agreement because it was adopted as part of the mitigation for four additional pumps at Banks Pumping Plant. Direct losses are defined as losses of fish that occur from the time fish are drawn into Clifton Court Forebay until the surviving fish are returned to the Delta. In principle, DFW and DWR intended this agreement to offset direct losses of all fish caused by the diversion of water by the pumping plant starting in 1986. However, at that time, information on impacts and measures to offset those impacts was sufficient only to deal with Chinook Salmon, steelhead, and Striped Bass. The agreement allowed for addressing impacts on other fish species once impacts could be identified and measures could be developed that would offset such impacts.

The agreement formalized the Delta Pumping Plant Fish Advisory Committee consisting of representatives from interest groups concerned with fish resources affected by the SWP, including, but not limited to, representatives of the SWP water contractors, sport and commercial fishing groups, and environmental groups. DWR and DFW work with the Delta Pumping Plant Fish Advisory Committee to review the success of the agreement in offsetting the direct effects of diversions at Banks Pumping Plant.

To mitigate fish loss, mitigation projects are selected and funded by the Delta Fish Agreement. The agreement outlines how project proposals are reviewed and selected for funding and gives priority to mitigation measures for habitat restoration and other nonhatchery measures. Under the agreement, DWR calculates fish loss as prescribed in the agreement, and approved mitigation projects earn fish mitigation credits to satisfy the fish loss mitigation provisions in the agreement. Mitigation is on a fish-for-fish basis.

The agreement provides for two funding components. One component is the Annual Mitigation Account for compensating the annual fish loss. It has no expiration date. The second is a \$15 million Lump Sum Account provided by DWR for additional projects to compensate for post-1986 fish loss.

Since 1986, DWR has spent \$71 million on mitigation projects developed under the Delta Fish Agreement. Mitigation fund expenditures through December 31, 2015, were \$57 million for the Annual Mitigation Account and \$14 million for the \$15 million Lump Sum Account. Funds approved but unexpended from each account were \$7 million and \$1 million, respectively. Funds for the Delta Fish Agreement's Lump Sum Account will be available for expenditure through December 31, 2016.

For more information, see DWR's website.

## Climate Change

Impacts on California under a changing climate include rising seas, longer, more frequent droughts, reduced snowpack, higher temperatures, and earlier snowmelt are already occurring and are projected to continue. These hydrologic changes will challenge current and future operation of the SWP.

California experienced a fourth consecutive year of drought in 2015. The extreme heat that accompanied this dry period was unprecedented. All four years ranked in the top 10 hottest years on record for the state, with 2014 being the hottest year ever recorded in California.

California's hydrology is a snowmelt-dominated system. Warmer temperatures are already shifting peak snowmelt runoff to earlier in the year. Projections show the trend of warming and earlier runoff will continue through the 21st century,

increasingly overlapping with winter storms and flood protection operations. Because flood control is a high priority for California's multipurpose reservoirs (like Lake Oroville) this shift in runoff timing will result in runoff being released to maintain flood protection storage space in reservoirs. Reduced late season runoff will result in less runoff captured for storage, increasing the potential for shortages when demand is high. Additionally, estimates of historical precipitation indicate that over time, there has been a trend toward more rain than snow in the total amount of precipitation in the Sierra Nevada. For more information, see *California Climate Science and Data*, published by DWR in June 2015 and available on DWR's website.

To address these challenges, DWR remains committed to contributing to statewide, national, and international efforts to mitigate the future impacts of climate change by reducing greenhouse gas (GHG) emissions from its activities and adapting to unavoidable climate change impacts. DWR's efforts throughout 2015 represent the continuation of its multipronged approach to addressing these issues by conducting research to better understand potential future impacts; monitoring and reporting GHG emissions; developing plans, strategies, and actions to improve the resiliency of DWR/SWP facilities and operations; reviewing and consulting with outside experts; and developing and managing climate data.

## Completed in 2015

### Review and Consultation

**DWR Climate Change Technical Advisory Group.** To improve the scientific basis for decisions and enhance the consistency of climate change approaches, DWR empaneled a Climate Change Technical Advisory Group. The group provides guidance on the scientific aspects of climate change, the impacts of climate change on water resources, the use

and creation of planning approaches and analytical tools, and the development of adaptation responses.

The advisory group's work concluded with the release of the report, *Perspectives and Guidance for Climate Change Analysis* in August 2015. The group processes and outcomes were also presented at the American Geophysical Union 2015 Fall Meeting in a poster titled, "Producing Scientific and Strategic Guidance for California's Department of Water Resources: The Climate Change Technical Advisory Group."

Additional information on the Climate Change Technical Advisory Group can be found in previous editions of Bulletin 132, and Climate Change Technical Advisory Group materials and meeting notes can be found on DWR's climate change website.

### Research

**Climate Change Impacts on California Water Rights.** The project goal was to evaluate future nonproject water rights reliability in the Sacramento, Feather, and American river watersheds. The final report, published in 2015, gives projections of future water rights curtailments showing that water rights are likely to be curtailed much more frequently and for significantly longer durations in the future. Further, many more water rights holders will be affected by curtailment actions in the future. As curtailments last longer and become more common, more water users will have to access other supplies, such as groundwater or water transfers, or will have to fallow land or conserve water in other ways to meet their demands. The report also provides information about the amount of stored SWP and CVP water that is released each year in excess of the releases that would be necessary to meet SWP and CVP deliveries and how this amount of water is likely to change in the future. The report



is available on the University of California eScholarship website.

### **Evaluation of Benefits of Meadow Restoration on Sierra Nevada Water Supply.**

DWR provided funding to the U.S. Forest Service for a 5-year investigation of the hydrologic effects of meadow restoration and how restored meadows can contribute to improved system operation and ecosystem functioning.

In a natural, undegraded condition, mountain meadow communities have deep soils, dense herbaceous vegetation, and a naturally developed drainage pattern. Water infiltrates the soil, and shallow meandering channels then carry water downstream. Meadows typically remain fully saturated for most of each year and can store substantial quantities of groundwater in their soils, acting as natural reservoirs of water at high elevations. Slow release of water stored in meadow sediments can provide base flow to downstream drainages long after surface runoff has stopped for the season. In addition, the water storage capacity of meadows can buffer the rate of water runoff during snowmelt and reduce peak flows that cause flooding downstream. Degraded meadows that have been exposed to poor land-use practices drain rapidly into stream channels rather than across meadow surfaces.

The project culminated with the release of the final report, *Effects of Meadow Erosion and Restoration on Groundwater Storage and Baseflow in National Forests in the Sierra Nevada, California*. The report is available on the Sierra Nevada Meadows Data Clearinghouse website.

**Data Development and Distribution Formation of Regional Energy Intensity of Water Supplies Website.** As a follow up to the SWP water-energy intensity work completed in the *California Water Plan Update 2013*, an interactive website has

been created. Regionally based energy intensity data is listed by source, including the SWP. SWP water-energy intensity is a measure of the amount of energy required to extract one unit of water from its origin on the Feather River or other tributary source water and convey it to a particular turnout point. Within California, the SWP water-energy intensity of water varies greatly depending on geography. Information about energy intensity and its associated GHG impacts is designed to help inform the public and SWP water contractors about the energy requirements of their SWP water supplies. Energy usage and GHG emissions information can support measures to reduce GHG emissions, as mandated by the State.

## **Ongoing during 2015**

### **Planning**

**Data Collection and Climate Services.** Since 2011, DWR has continued developing the Flood Emergency Response Information Exchange. Information in the exchange has been linked to the climate data in the California Climate Data Archive, and seasonal forecasting tools and a storms database have been developed. The exchange will also house a new server for providing depth-duration-frequency curves and annual extremes data sets that make up Bulletin 195 (*Rainfall Analysis for Drainage Design*) in a map-based format. Beta testing is currently underway in DWR's Hydrology and Flood Operations Office.

For observing data systems, DWR is continuing its partnership with the Earth System Research Laboratory of the National Oceanic and Atmospheric Administration and Scripps Institution of Oceanography to deploy new monitoring equipment for extreme precipitation events. For this network, water vapor measurements, wind profilers, soil moisture sensors, and freezing-level radar are being deployed across the State. The data from this network are currently served through

the National Oceanic and Atmospheric Administration's Hydrometeorology Testbed website and the Center for Western Weather and Water Extremes website. Other observing opportunities include elements of the Forecast-Coordinated Operations program, the Forecast Informed Reservoir Operations Project at Lake Mendocino in the Russian River watershed, and the University of California, Merced/University of California, Berkeley, observing system in the American River and Feather River watersheds. A remote sensing monitoring effort using airborne LIDAR (light detection and ranging) measurements of the snowpack is continuing under a joint project between DWR, the California Cooperative Snow Survey Program, and the National Aeronautics and Space Administration's Jet Propulsion Laboratory. In the San Francisco Bay Area, new observations for precipitation will be part of the Advanced Quantitative Precipitation Information System, a regional project funded through the Integrated Water Resources Management Program.

## Research

**Reoperation of Water Supply and Flood Protection Systems.** The system reoperation study is being conducted in cooperation with stakeholders to identify strategies for reoperation of flood protection and water supply systems to improve water supply reliability, ecosystem protection, and flood management. In 2015, DWR completed assessments of reoperation of Shasta Lake, Lake Oroville, and Lake McClure, and integrated operation of the SWP and CVP, completing Phase 3 of the study.

Development of the system reoperation study is a multiphased effort that includes:

- Phase 1, Plan of Study (completed in 2011);
- Phase 2, Strategy Formulation and Refinement (completed in 2014);

- Phase 3, Preliminary Assessments of Strategies (completed in 2015); and
- Phase 4, Reconnaissance Level Assessments of Strategies (planned to be completed in 2016).

More information about this project can be found on the System Reoperation Program webpage on DWR's website.

## Data Development and Curation

### DWR Climate Change Basic Data Group.

DWR's Climate Change Basic Data group consists of representatives from the Division of Statewide Integrated Water Management, the Division of Flood Management, and DWR's regional offices. The project goals are to assess current climate data acquisition efforts at DWR; promote cooperation and coordination across programs; and strategize on issues of data storage, management, and dissemination. A partnership with the Western Regional Climate Center continued for coordinating statewide climate data collection, storage, and dissemination.

During 2015, the group began researching potential partnerships for assistance with managing in-house historical climate data. Future goals include digitizing historical climate data and providing access for academic research.

## Policy

### Development of Internal DWR Policies on Climate Change Mitigation, Analysis, and Adaptation.

In 2010, the DWR CEQA Climate Change Committee began a three-phase process to develop a comprehensive DWR Climate Action Plan that will contain internal policies to address climate change mitigation, effects analysis, and adaptation.

**Climate Action Plan Phase I.** Completed in 2012, Climate Action Plan Phase I is the comprehensive DWR-wide *Greenhouse Gas Emissions Reduction Plan* that covers mitigation of GHG emissions. The plan lays



out steps to cut DWR's GHG emissions by 50 percent below 1990 levels by 2020 and 80 percent below 1990 levels by 2050.

In 2015, DWR's GHG emissions fell to their lowest levels since records have been kept (1988). The SWP produces more than 97 percent of DWR's GHG emissions. Since the implementation of the *Greenhouse Gas Emissions Reduction Plan* in 2012, DWR has realized a 30 percent reduction in overall GHG emissions.

**Climate Action Plan Phase II.** Started in 2012, Phase II is a framework and data toolbox to guide analysis of the effects of climate change on DWR projects and activities. Phase II will ensure that all DWR projects meet standards for consistency, quality, and adequacy in climate change analysis for planning activities. This guidance may also provide assistance to local water managers. Phase II is expected to be completed in 2018.

**Climate Action Plan Phase III.** Phase III of the Climate Action Plan evaluates the vulnerability of DWR facilities and operations to key climate change impacts and develops adaptation strategies to improve DWR's resiliency to climate change. The DWR Climate Change Vulnerability Assessment builds on studies of global, regional, and SWP-specific climate change impacts to evaluate, describe, and where possible, quantify DWR's vulnerabilities to expected changes in temperature, precipitation, and humidity. Specifically, this assessment looks at how changes in hydrology (precipitation, snowpack runoff, and flooding), extreme heat, wildfire, and sea-level rise will threaten DWR's infrastructure, maintenance activities, and operations. This comprehensive assessment is highly analytical using an array of geographic information system and modeling tools that goes beyond what any resource agency has previously employed for climate change vulnerability assessment. DWR-owned facilities and properties are considered, including those associated with

the SWP, flood facilities, regional offices, and managed lands. It is intended that the climate change vulnerability assessment will serve as a foundation for the development of a climate change adaptation plan for impacted operations, infrastructure, and staff work. Together the climate change vulnerability assessment and climate change adaptation plan will help prioritize DWR's adaptation and resiliency efforts such as additional water storage projects, infrastructure improvements, enhanced maintenance and operation procedures, and improved habitat management. The vulnerability assessment portion of Phase III is expected to be completed in 2016, with the adaptation plan following in 2017.

### Reporting

#### Emissions Reports to The Climate Registry.

DWR's emissions are primarily the result of electricity generation at DWR-owned power plants and power purchase transactions to provide power for operation of the SWP.

In May 2015, DWR reported its GHG emissions for the 2014 emission year to the California Air Resources Board pursuant to California mandatory GHG emissions reporting regulations (California Code of Regulations, Title 17, Sections 95100–95158). The report included energy generated and consumed by the SWP and sulfur hexafluoride emissions associated with the SWP's switchyard circuit breakers. The report did not include emissions from the Reid Gardner coal-fired power plant, which previously supplied DWR with up to 235 megawatts of power. (DWR's purchasing contract with Reid Gardner expired in 2013 and was not renewed in an effort to reduce GHG emissions from DWR activities.) In addition, to meet its compliance obligation for the Cap and Trade Program, DWR participated in GHG allowance auctions conducted by the California Air Resources Board.

## Environmental Document Review

Some environmental documents handled by the State Clearinghouse (a division in the Governor's Office of Planning and Research) concern proposed activities that could affect the SWP. Such documents are regularly reviewed to identify any public safety or liability issues arising from the proposed activities.

During 2015, the Division of Environmental Services, Environmental Document Review Section tracked documents related to development along the California Aqueduct, levee encroachment, dam safety issues, water transfers and other water supply issues, wastewater treatment, quarry development, solar and wind power facilities, and climate change issues. The number of environmental documents addressing significant climate change issues increased from 2, in 2010, to 26 in 2013 (after the CEQA guidelines were amended to address GHG emissions pursuant to Senate Bill 97 [Dutton; Chapter 185, Statutes of 2007]). However, in 2014, climate change issues began to be addressed in the general plan process, resulting in only 10 documents clearly dealing with climate change being processed that year. In 2015, 13 documents primarily related to climate change issues were processed.

DWR comments submitted through the CEQA and/or National Environmental Policy Act processes addressed a number of issues, including safety and water supply; encroachment on physical facilities; impacts to cross-drainage facilities; potential damage to SWP pipelines and aqueducts; wildlife issues, including migration, setbacks, and habitat conservation lands; DWR's status as a cooperating or responsible agency; development and operation of small-scale and utility-scale wind and solar projects; and jurisdictional dams.

In 2015, the Environmental Document Review Section screened 2,766 State Clearinghouse documents. After screening, 1,131 documents were referred for information, including notices of preparation and various final documents. Additionally, 129 formal referrals were made for negative declarations, notices of preparation, EIRs, and National Environmental Policy Act documents.

Seventy-six formal referrals plus one requested document were sent to the Division of Operations and Maintenance, and 17 referrals and two requested documents were sent to the State Water Project Analysis Office.

The total number of referrals and requests sent to the Division of Operations and Maintenance and the State Water Project Analysis Office remained the same as in 2014.

In 2015, formal referrals to all other DWR reviewers, including the Central Valley Flood Protection Board and the Division of Safety of Dams, decreased by about 25 percent from 2014. This decrease is relatively insignificant since the total number of referrals was small when compared to the total number of documents (41 were referred in 2014 and 31 in 2015). In addition, Central Valley Flood Protection Board referrals by the Environmental Document Review Section are made only if the State Clearinghouse does not directly assign an appropriate document to the board.





## Chapter 4

# Water Quality Programs

*An emergency drought barrier was built on West False River between Jersey and Bradford islands to block salt water from pushing into the central Delta from San Francisco Bay.*



## Significant Events in 2015

*D*ue to a fourth year of drought conditions, an emergency drought barrier on West False River between Jersey and Bradford islands was erected in May in an effort to maintain good water quality in the central Sacramento-San Joaquin Delta.

Pyramid Lake in Los Angeles experienced a potentially harmful algal bloom in the summer. On June 26, the Department of Water Resources (DWR) issued a public advisory to avoid body contact with algal scum or visible blooms and to take precautions during recreation at the lake. The bloom subsided and the advisory was lifted on July 24.

In mid-October, mudflows clogged the East Branch Aqueduct and caused a shutdown of the normal aqueduct flows to Antelope Valley-East Kern Water Agency. DWR's Southern Field Division and contractors cleaned up and replaced parts of the aqueduct liner by early November.

*Information in this chapter was contributed by the Division of Environmental Services, the Division of Operations and Maintenance, and the State Water Project Analysis Office.*



The Department of Water Resources (DWR), Division of Operations and Maintenance currently maintains 16 automated water quality monitoring stations at key locations along the SWP. This network of automated stations continuously monitors a variety of water quality parameters throughout the system and provides real-time data to SWP water contractors. In addition, field grab samples collected weekly, monthly, quarterly, or annually from more than 30 SWP locations are routinely analyzed for a broad range of constituents at the State's Bryte Chemical Laboratory.

## Delta Water Quality

Maintaining adequate water quality to support multiple beneficial uses of water from the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta) is of concern to DWR as well as other resource agencies. The State Water Resources Control Board (SWRCB) establishes water quality objectives to protect a variety of beneficial uses of water within the Bay-Delta. The objectives are contained within the water quality control plans (WQCPs) adopted by the SWRCB. Water quality objectives are also contained in Article 19 of the long-term SWP water supply contracts. In July 2014, the Drinking Water Program was transitioned from the California Department of Public Health (CDPH) to the SWRCB. The SWRCB is now the primary enforcement authority for federal and State safe drinking water acts and is responsible for the regulatory oversight of public water systems throughout the State.

The SWRCB adopted the current *Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary* (Bay-Delta Plan) on December 13, 2006 (Resolution No. 2006-0098).

The SWRCB adopted Water Right Decision 1641 (D-1641) in December 1999 (amended March 15, 2000). D-1641 implements the objectives of the Bay-Delta Plan. D-1641 amends the water rights of a number of water rights holders—primarily those for the SWP and Central Valley

Project (CVP)—to help achieve the Bay-Delta Plan objectives.

For additional background information about the SWRCB's activities and the Bay-Delta Plan, see the sidebar, State Water Resources Control Board, and Chapter 7, Water Supply Development and Reliability.

## 2015 Drought Conditions

In January 2014, the Governor declared a state of emergency due to severe drought conditions and directed State and local agencies to take all necessary actions to conserve water, enhance and protect water supplies, and reduce harmful effects of the drought. Subsequent proclamations and executive orders extended provisions and added new provisions. On November 13, 2015, the Governor issued Executive Order B-36-15, which requires the orders and provisions contained in the January 17, 2014 Proclamation; the April 25, 2014 Proclamation; and Executive Orders B-28-14 (December 22, 2014) and B-29-15 (April 1, 2015) to remain in full force and effect.

To address the effects of the historic drought in 2015, the Bureau of Reclamation (Reclamation), DWR, U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NOAA Fisheries), Department of Fish and Wildlife (DFW), and SWRCB continued coordinated and extensive water operations and regulatory adjustments. The adjustments to existing water quality and federal Endangered Species Act requirements of D-1641 and the USFWS and NOAA Fisheries

## State Water Resources Control Board

The State Water Resources Control Board (SWRCB), established by the California Legislature in 1967, oversees water rights and protects water quality by setting and implementing statewide policy, administering appropriative water rights, coordinating with and supporting Regional Water Quality Control Board (RWQCB) efforts, and reviewing petitions that contest RWQCB actions. The five SWRCB members are appointed by the Governor and confirmed by the Senate. The SWRCB is responsible for four major programs.

Water quality: to preserve, protect, enhance, and restore water quality.

Water rights: to issue permits for water rights specifying amounts, conditions, and construction timetables for diversion and storage.

Financial assistance: to assist local agencies and individuals with pollution prevention or clean-up.

Enforcement: to enforce water rights and water quality laws and regulations.

Under their water quality authority, the SWRCB and RWQCBs adopt water quality control plans (WQCPs) for each of the planning basins in the State. The WQCPs contain water quality objectives for flow, salinity, dissolved oxygen levels, and other parameters necessary for the protection of various beneficial uses, such as municipal and industrial, agricultural, and fish and wildlife. The SWRCB implements these objectives in a number of ways, depending on the circumstances, including imposing conditions on water rights permits and licenses.

Current water quality objectives for the Sacramento-San Joaquin Delta and Suisun Marsh are contained in the *Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary* (Bay-Delta Plan), adopted December 13, 2006. The SWRCB is required to conduct periodic updates of the Bay-Delta Plan. As part of the update process, the SWRCB conducts proceedings to gather information, receive recommendations, consider public comments, and facilitate detailed discussions to evaluate new information relevant to potential changes to the water quality objectives. Recent issues of concern related to the WQCP include the ongoing drought, pelagic organism decline, special status fish species, Delta inflow, San Joaquin River flows, and southern Delta salinity.

Water Right Decision 1641 (D-1641), adopted by the SWRCB in December 1999 and amended in March 2000, implemented the objectives in the 1995 Bay-Delta Plan and continues to implement the objectives in the 2006 Bay-Delta Plan. D-1641 places terms and conditions on a number of water rights, primarily those for the State Water Project (SWP) and Central Valley Project (CVP). The Department of Water Resources and the Bureau of Reclamation operate the SWP and CVP in coordination to meet the terms in D-1641 and other applicable regulatory requirements relevant to each project.

biological opinions (BiOps) allowed the CVP and SWP to support water deliveries and transfers and to maximize upstream water storage while minimizing adverse effects on listed fish species and protecting water quality.

### **Emergency Drought Barrier**

Since early 2014, emergency drought barriers had been part of drought planning for CVP/SWP operations. If there was insufficient water in upstream reservoirs for release to minimize saline intrusion into the Sacramento-San Joaquin Delta Estuary (Delta), salinity intrusion could occur to the extent that interior portions of the Delta would exceed water quality objectives. Increased salinity in the Delta could compromise municipal and irrigation water supplies and have an adverse effect on the sensitive aquatic resources in the Delta. A 750-foot-wide barrier was installed in May 2015 on West False River between Jersey and Bradford islands near the confluence of the West False and San Joaquin rivers. The purpose of the barrier was to limit the tidal push of saltwater from San Francisco Bay into the Central Delta to protect Delta water quality and to minimize the amount of fresh water released from upstream reservoirs to repel the saltwater. Approximately 150,000 tons of rock were used to build the barrier. The barrier was removed by mid-November. To monitor effectiveness of the barrier, DWR installed 10 new monitoring stations to augment the existing network of monitoring stations in the Delta. DWR used emergency drought barriers to reduce salinity intrusion during the 1976–1977 drought.

For more information, see Chapter 2, Delta Resources, and Chapter 7, Water Supply Development and Reliability.

### **SWRCB Drought Year Actions**

As the State experienced one of the driest periods on record, the SWRCB

took a number of drought-related actions pertaining to emergency rulemaking by issuing new or modifying existing orders; considering and/or approving temporary urgency change petitions (TUCPs) and water transfer requests; coordinating cooperative efforts with State and federal agencies; gathering information; and performing outreach, expanded monitoring, and field investigations.

On January 23, 2015, DWR and Reclamation filed a joint TUCP to temporarily change SWP and CVP water right permit and license conditions imposed pursuant to D-1641. On February 3, 2015, SWRCB issued an order approving parts of the TUCP, subject to conditions. Throughout the year, DWR and Reclamation submitted additional TUCPs and requests to modify the TUCP order, and SWRCB modified the order several times in response. Issues included Delta outflow requirements, export limits, Delta Cross Channel gate operations, Sacramento River and San Joaquin River flow requirements, western Delta agricultural salinity requirements, and adjusted operations to conserve water in upstream storage to ensure water supply.

DWR and Reclamation submitted the Drought Contingency Plan for the period January 15 through September 30, 2015, to SWRCB as required in SWRCB's TUCP order dated October 7, 2014, and water right order 2014-0029. The plan was developed in coordination with the fish and wildlife agencies and addressed projected water operations based on various hydrologic scenarios and potential adjustments to regulatory requirements. Proposed operations in the Drought Contingency Plan consider water quality, fish protection, and water supply. The Drought Contingency Plan serves as the framework to develop proposed modifications to D-1641 requirements during the drought. Reclamation and DWR will continue to work closely with the fish and wildlife agencies

to update the Drought Contingency Plan as necessary based on changing circumstances.

More information about the TUCP process is available on SWRCB's website.

## California WaterFix

In April 2015, DWR and Reclamation announced plans to split the proposed Bay Delta Conservation Plan into two separate efforts—one for water conveyance facilities and the other for habitat restoration. The water conveyance effort, identified as the California WaterFix, is Alternative 4a (the preferred alternative) of the Bay Delta Conservation Plan/California WaterFix partially recirculated draft environmental impact report/supplemental draft environmental impact statement released in July 2015. California WaterFix would construct new Delta conveyance facilities in compliance with the federal Endangered Species Act and California Endangered Species Act. The conveyance facilities would allow greater flexibility in water diversions and better balancing of the associated water quality and hydrodynamic benefits for fish, drinking water, agriculture, and other beneficial uses.

For additional information about California WaterFix, see Chapter 3, Environmental Programs and Chapter 7, Water Supply Development and Reliability.

## Water Quality Standards

Water quality objectives in the Bay-Delta Plan are categorized by the beneficial uses they are intended to protect, including municipal and industrial, agricultural, and fish and wildlife. DWR operators adjust upstream releases and Delta exports to meet D-1641 operational requirements for meeting water quality and flow standards.

## 2014–2015 Water Year Hydrologic Classifications

The Bay-Delta Plan contains water quality and flow standards that are conditioned by water year type and generally become less stringent in years with less precipitation. The water year classification system provides relative estimates of a basin's available water supply based on the amounts of rainfall and snowmelt runoff and rates of groundwater accretion. Water year types are classified as "wet," "above normal," "below normal," "dry," or "critical."

The Sacramento Valley Water Year Hydrologic Classification (Sacramento Valley 40-30-30 Index) forecast on May 1 of each year determines the water year type for the implementation of flow and water quality criteria contained in the Bay-Delta Plan.

The Sacramento Valley 40-30-30 Index and the San Joaquin Valley Water Year Hydrologic Classification (San Joaquin Valley 60-20-20 Index) were both critical, based on observed data for water year 2014–2015.

For a detailed discussion of water year 2014–2015, see Chapter 8, Water Supply.

## 2006 Bay-Delta Plan Review

California Water Code Section 13240 requires that the WQCP be periodically reviewed. Federal Clean Water Act Section 303(c) (33 U.S.C. Section 1313(c)) requires a triennial review of State water quality "standards," as defined in the act.

The WQCP review and amendment process consists of review of the Bay-Delta Plan to identify elements that may need amendment or new elements that may need to be added, staff preparation of any amendments or revision of the entire WQCP, and SWRCB adoption of some or all of the amendments or revisions. SWRCB information-gathering activities may affect the scope of the



WQCP review and may include a series of evidentiary hearings on critical issues concerning the Delta's ecology. The review includes both the review and update of water quality objectives (including flow objectives) and the program of implementation in the Bay-Delta Plan, as well as changes to water rights and water quality regulation consistent with the program of implementation.

The SWRCB is conducting the WQCP review in four phases:

- Phase 1 involves updating San Joaquin River flow and southern Delta water quality requirements.
- Phase 2 involves other comprehensive changes to the Bay-Delta Plan to protect beneficial uses not addressed in Phase 1 (e.g., objectives for Delta outflows, Sacramento River inflows, export constraints, Delta Cross Channel gate closure requirements, and Suisun Marsh protection).
- Phase 3 will involve changes to water rights and other measures to implement changes to the Bay-Delta Plan in Phases 1 and 2.
- Phase 4 involves developing and implementing flow criteria and flow objectives for priority Delta tributaries with a focus on the Sacramento River watershed.

The formal review and amendment process for the 2006 Bay-Delta Plan that began in October 2008 continued in 2015. Phase 1 began in 2009, Phase 2 began in 2012, and Phase 4 began in 2013.

## SWP Operations to Meet Water Quality Requirements

In 2015, DWR and Reclamation jointly operated the SWP and CVP in accordance with D-1641, which includes water quality, flow, and operational criteria for the SWP and CVP Delta operations. SWP and CVP

operations were coordinated to meet the various objectives of the Bay-Delta Plan, Central Valley Project Improvement Act, and BiOps for listed species, as well as other regulatory requirements. Fish species currently listed under the Endangered Species Act and the California Endangered Species Act include the winter and spring runs of Chinook Salmon, Delta Smelt, steelhead, and Green Sturgeon.

Real-time monitoring of fish movement and conditions in the estuary aids daily water management and provides timely protection of targeted fish species from entrainment at the Delta pumping facilities.

The Bay-Delta Plan includes the requirement to monitor a number of stations within the Delta for specific water quality constituents. DWR conducts extensive monitoring in the Delta and the Suisun Marsh. Figure 4-1 shows water quality compliance and monitoring stations throughout the Delta specified in the Bay-Delta Plan.

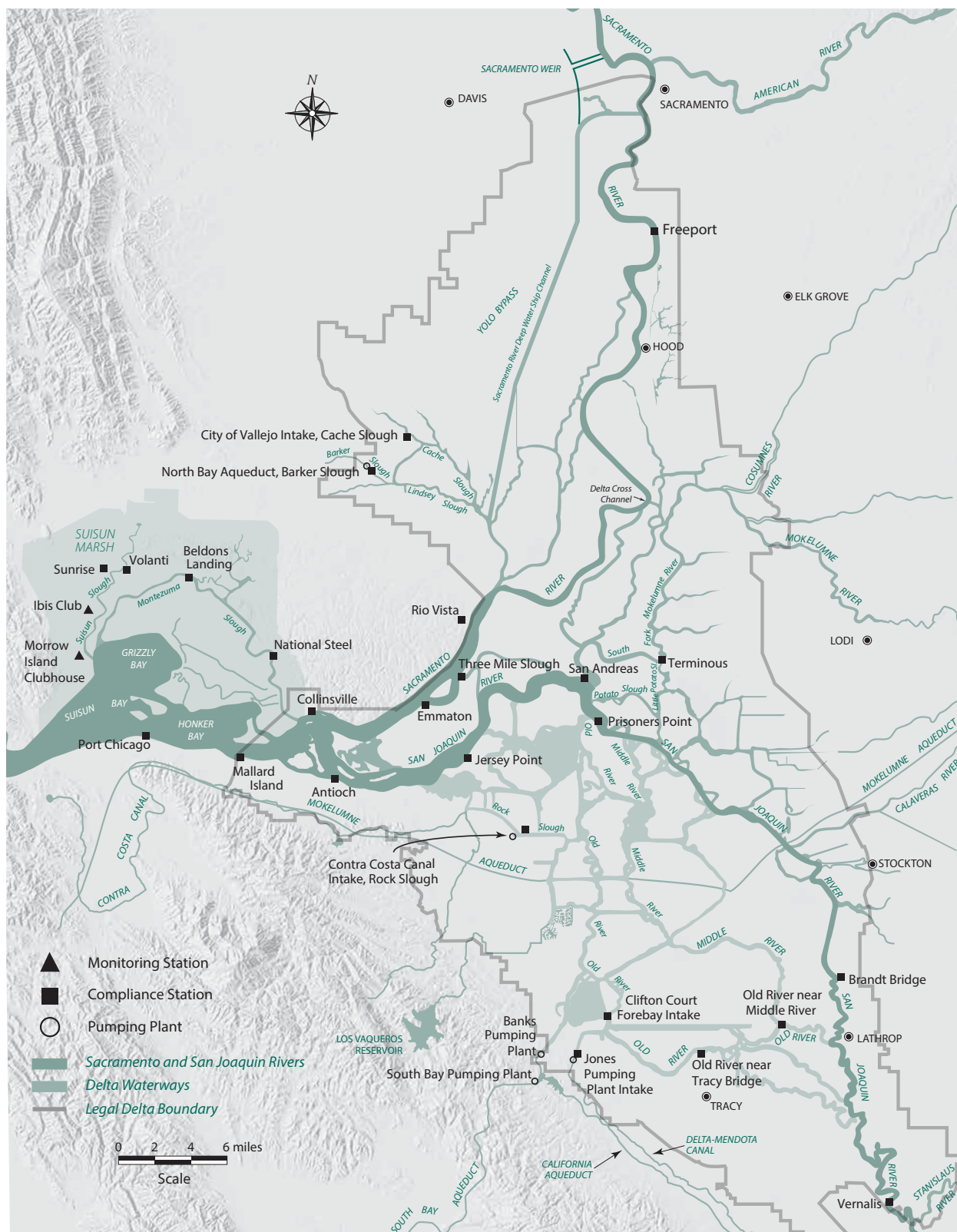
In January 2015, the SWP and CVP submitted a TUCP to the SWRCB requesting modification of D-1641 requirements due to drought conditions. The SWRCB approved the TUCP and issued an order allowing temporary changes to some of the water quality and flow objectives. For additional information, see the 2015 Drought Conditions and SWRCB Drought Year Actions sections earlier in this chapter.

For a discussion of other environmental issues, see Chapter 3, Environmental Programs.

## Delta Cross Channel Gates

The Delta Cross Channel gates are operated in accordance with the Bay-Delta Plan/D-1641 and other regulatory requirements. In 2015, the gates were open for 178 days to allow fresher Sacramento River water to flow into interior Delta channels toward the SWP and CVP export





**Figure 4-1 D-1641 Water Quality Compliance and Monitoring Stations in the Sacramento-San Joaquin Delta**

facilities. Reclamation's standard operating procedures call for gate closure when flow on the Sacramento River at Freeport reaches between 20,000 cubic feet per second (cfs) and 25,000 cfs to reduce flooding potential on the Mokelumne River and to prevent scouring on the downstream side of the gate structure. D-1641 contains measures that require gate closure under certain conditions from November 1 through May 20 for fisheries protection as requested by the USFWS, NOAA Fisheries, and DFW. SWRCB's order for the 2015 TUCP allowed for opening the Delta Cross Channel Gates to reduce infiltration of high salinity water during the winter and spring. Under this TUCP order, the gates were opened from May 14 to May 18.

## Municipal and Industrial Objectives

The Bay-Delta Plan includes a year-round 250 milligrams per liter (mg/L) (maximum mean daily) chloride objective that is in effect at Delta export locations (Contra Costa Canal Pumping Plant No. 1, Clifton Court Forebay, Jones Pumping Plant, and Barker Slough). Chloride levels remained below the objective for all days in 2015.

An additional municipal and industrial water quality objective for chloride at the Contra Costa Canal Intake, near Rock Slough, specifies that the chloride level must be below 150 mg/L (maximum daily mean) for a minimum number of days during the year, dependent upon the water year forecast. For calendar year 2015, the objective of 155 days was met.

## Agricultural Salinity Objectives

The Bay-Delta Plan contains agricultural salinity objectives, which vary by location. The salinity objectives, recorded as electrical conductivity (EC), are based on both water year type and a 14-day running average during the irrigation season, from April to mid-August, at Emmaton, Jersey Point, Terminous, and San Andreas in the West

and Central Delta. The agricultural salinity objectives at these Delta locations become less stringent under dryer conditions. The Terminous and San Andreas critical water year objectives were met for calendar year 2015. However, the Emmaton critical water year objective of 2.78 millisiemens per centimeter (mS/cm) was moved, under the SWRCB's TUCP order, to the Sacramento River at Three Mile Slough. The objective was not met at Jersey Point for 8 days and Three Mile Slough for 15 days for calendar year 2015.

In the South Delta, salinity may be influenced by San Joaquin River flows, in-Delta diversions, and SWP exports, and water circulation may be influenced by the annual placement of South Delta barriers. South Delta salinity objectives are based on a 30-day running average. The 1.0 mS/cm objective for the South Delta was met at Vernalis. The objective was not met at Old River near Tracy Road Bridge for 97 days, Old River near Middle River for 83 days, and San Joaquin River at Brandt Bridge for 39 days. The 0.7 mS/cm objective for the South Delta was met at Vernalis. The objective was not met at Old River near Tracy Road Bridge for 110 days, Old River near Middle River for 83 days, and San Joaquin River at Brandt Bridge for 82 days. The SWP and CVP share responsibility for meeting the agricultural EC objectives imposed at these South Delta compliance locations.

## Estuarine Habitat Protection Standard

The estuarine habitat protection standard incorporates modified X2 criteria (geographic isohaline) first established in the 1994 Delta Smelt BiOp. The upstream movement of 2 parts per thousand isohaline (2 parts per thousand of salt in the water), measured as 2.64 mS/cm at the surface, is maintained within a certain range of positions in the estuary by adequate Delta outflow. These positions (Collinsville, Chipps Island, Port

Chicago, or Martinez) are associated with an abundance of fish and biota.

The requirement for meeting X2 criteria at Collinsville applies to all days from February through June. The number of days per month when the daily average EC maximum (2.64 mS/cm) is in effect at Chipps Island or Port Chicago is conditioned by the previous month's Eight River Index. (The Eight River Index is the sum of the estimated unimpaired runoff from eight rivers—four in the Sacramento Valley [Sacramento River Region runoff] and four in the San Joaquin Valley [San Joaquin 4 Rivers runoff]. For more about runoff estimates, see Chapter 8, Water Supply.) This requirement may alternately be met with a maximum 14-day running average EC of 2.64 mS/cm or with specific Delta outflow, set as a 3-day average Net Delta Outflow Index (NDOI) of 7,100 cfs, 11,400 cfs, or 29,200 cfs, when the X2 position is at Collinsville, Chipps Island, or Port Chicago, respectively. As allowed by D-1641, the May and June X2 flow objective is reduced to a 14-day running average flow of 4,000 cfs when the best available estimate for the Sacramento River Index is less than 8.1 million acre-feet (af) at the 90 percent exceedance level. The Port Chicago standard becomes effective when the Port Chicago 14-day EC average, immediately prior to the first day of the month, is less than or equal to 2.64 mS/cm.

The Eight River Index for the months of January through May 2015, in million af, was 0.81, 2.23, 0.84, 0.77, and 0.83, respectively. The X2 habitat protection objective at Chipps Island was 1 day in February, 31 days in March, 1 day in April, and 0 days in May and June. The X2 habitat protection objective at Port Chicago was not in effect in 2015. Since the May estimate for the Sacramento River Index was 8.6 at the 90 percent exceedance level, the May and June NDOI objectives were reduced to 4,000 cfs on a 14-day running average. Starting February 3, 2015, the SWRCB TUCP order allowed for

a relaxation of the X2 objectives, where an NDOI of 4,000 cfs objective temporarily replaced the X2 objectives for February, March, April, May, and June.

These objectives were met in calendar year 2015.

## Net Delta Outflow Index Standard

Delta outflow cannot be measured directly due to the tidal influence in the Delta. Instead, an approximation of Delta outflow is calculated using measured inflows, exports, and estimated Delta water use. The NDOI was introduced in the 1995 Bay-Delta Plan/D-1641 and remains the same in the 2006 Bay-Delta Plan. NDOI calculates Delta outflow using inflows of the Sacramento River, the Yolo Bypass system, the eastside stream system (consisting of the Mokelumne, Cosumnes, and Calaveras rivers), the Sacramento Regional Treatment Plant, and a measurement of San Joaquin River flow at Vernalis.

Excess outflow conditions, as defined by the Coordinated Operations Agreement, allow for greater flexibility in project operations.

Specific minimum monthly NDOI standards for the protection of fish and wildlife are based on water year type. The SWRCB TUCP order reduced the July NDOI objective from 4,000 cfs to 3,000 cfs. In 2015, the monthly mean NDOI was highest in February, averaging 15,835 cfs. The lowest monthly mean NDOI occurred in August with 3,030 cfs, which was above the objective of 3,000 cfs. All other monthly NDOI objectives were met in 2015.

## River Flow Standards

Water quality objectives include minimum flow requirements measured in the Sacramento River at Rio Vista. These flow standards, incorporated from the winter-run salmon BiOp, set flow requirements based on the Sacramento Valley water year



classification. Water year 2014–2015 was critical, requiring mean monthly flows of 3,000 cfs for September and October and 3,500 cfs for November and December. During these periods, the 7-day running average could not be more than 1,000 cfs below the monthly standard. The SWRCB TUCP order reduced the Rio Vista flow objective to a mean monthly flow of 2,500 cfs and a 7-day running average of 2,000 cfs for September, October, and November. The actual mean monthly flows were 2,954 cfs in September; 2,747 cfs in October; 2,676 cfs in November; and 7,524 cfs in December. The 7-day average Rio Vista flow was less than 2,000 cfs from November 27 to November 30.

Water quality objectives also specify minimum flow requirements measured in the San Joaquin River at Vernalis. These flow standards are based on the San Joaquin Valley 60-20-20 Index, which was critical for water year 2014–2015. If the X2 objective is required to be at or west of the Chipps Island location, critical year base Vernalis flows are set at 710 cfs in February; 710 cfs or 1,140 cfs from March to April 15; and 710 cfs or 1,140 cfs from May 15 to June. The base-flow objective is relaxed to 710 cfs when X2 is required to be east of Chipps Island.

A San Joaquin River spring pulse flow (a short-term increase in stream flow) is required from April 15 to May 15 at Vernalis. This spring pulse flow requirement varies based on the location of X2 during April. However, the CALFED Operations Group may vary the actual timing and duration of the pulse attraction flow based on real-time monitoring data. (For background on the CALFED Bay-Delta Program, see Bulletins 132-95 through 132-11.) The 2015 SWRCB TUCP order allowed the total volume of the pulse flow to be no less than 710 cfs at Vernalis during the pulse flow period from March 25 through April 25. It also reduced the average minimum flow rate to 300 cfs to the end of May, and then to 200 cfs to the end of June.

Additional information about San Joaquin River water quality can be found in Chapter 5, Local Assistance.

## Export Standards

Water quality objectives and D-1641 include an export limitation for the SWP and CVP. It limits Delta exports to a ratio of Delta inflow to combined water project exports and is expressed as a maximum export rate in percentage of Delta inflow.

The SWRCB TUCP order added an additional export limitation for those times when the obligations under D-1641 were not being met. Under these conditions, the maximum combined exports were 1,500 cfs.

The actual export amount is calculated using the 3-day average that combines the inflow rate for Clifton Court Forebay (excluding Byron Bethany Irrigation District diversions from Clifton Court Forebay) added to the Jones Pumping Plant diversion. The export-to-inflow ratio limit is reported as either a 3-day or 14-day running average. A 14-day running average of inflows is used unless storage withdrawals from upstream reservoirs are being made for export, in which case a 3-day average of inflows is used. For all water year types, the maximum combined export rate from February through June is 35 percent of Delta inflow. This rate may be relaxed in February during years with less precipitation to between 35 and 45 percent. From July through January, the export-to-inflow ratio rises to 65 percent.

The 2008 USFWS and the 2009 NOAA Fisheries BiOps typically control the export rate for most of the winter and spring. Under these conditions, the Delta can be pushed into excess conditions more often. Additional information about the BiOps can be found in Chapter 3, Environmental Programs.

During 2015, the Delta was in excess conditions from January 1 to January 14, and

February 7 to March 15, for a total of 51 days. Within this period, combined SWP and CVP exports averaged about 27 percent of Delta inflow, meeting the 65 percent limitation in January and also meeting the 35 percent limitation for February to March.

The Delta was in balanced conditions from January 15 to February 6, and March 16 to December 3, for a total of 314 days. Within this period, combined SWP and CVP exports averaged about 29 percent of Delta inflow, meeting both the 35 percent and 65 percent limitations.

## South Delta Temporary Barriers Project

The South Delta Temporary Barriers Project, initiated as a test project in 1991, was extended for 5 years in 1996, and extended again for 7 years in 2001. The project was created partially in response to a 1982 lawsuit filed by the South Delta Water Agency and consists of rock barriers across four South Delta channels.

These temporary seasonal barriers are designed to improve local water levels and circulation patterns, protect fishery resources, and improve water quality. They are placed across Middle River, Old River near Tracy, Grant Line Canal, and at the Head of Old River.

For more information about the temporary barriers, see Chapter 2, Delta Resources, and Chapter 3, Environmental Programs.

## Delta Mercury Control Program and Mercury Monitoring and Evaluation

DWR's Mercury Monitoring and Evaluation (MME) Section was established in 2012 in the Division of Environmental Services to ensure DWR meets its Delta Mercury Control Program regulatory compliance

responsibilities for wetlands, open water, dredging, and educational outreach.

The Delta Mercury Control Program was adopted by the Central Valley RWQCB in 2010 to address mercury and methylmercury (MeHg) water quality impairments in the Delta. For more background information about the program, see Bulletin 132-14.

In 2015, continuing work included:

- completion of one tidal wetland control study and the initiation of a second study to characterize mercury dynamics in tidal wetlands;
- ongoing open water control studies to create mercury models for the Delta and Yolo Bypass;
- data collection from field and laboratory studies to provide information for the modeling work;
- development of brochures for the Mercury Exposure Reduction Program; and
- work on the Statewide Mercury Control Policy and Mercury Control Program for Reservoirs.

## Tidal Wetlands

The Yolo Bypass Wildlife Area tidal wetland study was completed in May 2015. Preliminary analysis of the data indicated that the tidal wetland was a sink for water as well as a sink for organic carbon and MeHg. The total mercury (THg) loads tended to show more seasonality with the tidal wetland being a small source of THg during the warmer months and a small sink during the cooler months.

The second wetland chosen for the tidal wetland studies was the Blacklock tidal wetland, located in the Suisun Marsh and owned by DWR. Sampling began in late spring 2015. To calculate loads and determine if the wetland was a net source or sink for THg or MeHg, two acoustic doppler



current profilers were installed in each of the two breaches to collect stage and velocity data for calculating flow. In October 2015, the acoustic doppler current profilers were removed due to biofouling and are expected to be redeployed in early 2016. The flow data were entered into the Hydstra database, where it was uploaded to DWR's Water Data Library. The study at Blacklock tidal wetland is expected to be completed in 2016.

In addition to flow data, the MME Section collected monthly samples using an autosampler. Composited water samples were analyzed for particulate and dissolved THg and MeHg, total suspended solids, total and dissolved organic carbon, and nutrients. Bryte Chemical Laboratory analyzed all samples except MeHg, which was analyzed by Moss Landing Marine Laboratories. The data collected during these events were entered by Bryte Chemical Laboratory into their Field and Laboratory Information Management System database, which was uploaded to DWR's Water Data Library.

A progress report was submitted to the Central Valley Regional Water Quality Control Board (RWQCB) in October 2015. The report included a preliminary analysis of the data collected at the Yolo Bypass Wildlife Area tidal wetland, plans for study of the Blacklock tidal wetland, and small changes in study design already approved by the RWQCB. The report is available on the Central Valley RWQCB's website.

## Open Water

In 2015, analytical data from the inlet/outlet sampling conducted during the miniflood event of December 2014 were reviewed. Preliminary results suggested that the Yolo Bypass was a net source for unfiltered THg as well as unfiltered and filtered MeHg and total suspended solids. Of the inlet sites, the Cache Creek Settling Basin was the highest contributor to THg loads, while the Knight's Landing Ridge Cut was the largest contributor to MeHg loads. Between the Toe

Drain at Interstate 80 and the Toe Drain at Lisbon Weir, total MeHg loads increased by 40 percent. The source of this increase was unknown, and several hypotheses have been considered.

By the end of calendar year 2015, no flooding had occurred in the Yolo Bypass, therefore, no samples were collected for the inlet/outlet study of mass balances and partitioning between the solid and dissolved phases of mercury and MeHg in the Yolo Bypass. However, the U.S. Geological Survey and Moss Landing Marine Laboratories studies to provide data for the modeling effort continued. These studies are not dependent on flood flows for the analyses.

In 2015, the U.S. Geological Survey conducted sediment mesocosm experiments to quantify erosion characteristics associated with different land uses in the Yolo Bypass. Assessment of erosion characteristics was completed for 4 of the 10 land uses in the Yolo Bypass modeling grid. Land uses analyzed were wild rice, white rice, and disked and undisked seasonal wetlands. Preliminary results suggested that erosion characteristics varied between wetlands and rice fields. It is anticipated that assessment of erosion characteristics will be conducted on the remaining land uses in 2016.

In 2015, Moss Landing Marine Laboratories collected sediment cores from 2 of the 10 land uses used in the Yolo Bypass modeling grid (wild rice and undisked seasonal wetland) to analyze for fluxes of mercury and MeHg between sediment and overlying water. Moss Landing Marine Laboratories began a vegetation senescence study to examine the potential MeHg contribution of vegetation submerged by flood flows. It is anticipated that both sediment flux and vegetation senescence studies will continue in 2016. Bale chamber experiments were discontinued because pilot studies indicated this approach did not provide reliable erosion values.

As part of the Delta Mercury Control Program Phase 1 reporting requirements, DWR submitted a progress report in October 2015 to the Central Valley RWQCB documenting modeling progress and preliminary results associated with field and pilot studies. The report is available on the Central Valley RWQCB's website.

Modeling work and field/laboratory studies to collect data for the models will continue in 2016.

### Dredging

DWR is required to submit study workplans to the RWQCB to evaluate management practices to minimize increases in MeHg and mercury discharges from dredging and dredge material reuse.

As discussed in Bulletin 132-14, no dredging activity was identified during the Phase I period of the regulation. Therefore, DWR was not required to submit control study workplans for dredging. In 2015, the MME Section continued to provide mercury guidance to DWR staff for proposed projects involving dredging or spoils usage.

### Delta Mercury Exposure Reduction Program

Elevated concentrations of mercury in fish pose a human health threat. The objective of the Delta Mercury Exposure Reduction Program is to provide educational outreach to reduce human exposure to mercury from consumption of contaminated Delta fish. All entities regulated under the Delta Mercury Control Program are required to participate in a mercury exposure reduction program. DWR is providing up to \$20,000 per year through 2019 of in-kind support for brochure and sign production, and associated costs.

Brochures are required for the Sacramento River/Northern Delta, the Central/Southern Delta, and the San Joaquin River regions.

DWR's Public Affairs Office worked with the Office of State Publishing to translate fish consumption warning brochures into eight languages: Cambodian, Chinese, Hmong, Lao, Russian, Spanish, Tagalog, and Vietnamese. Brochure production and distribution at local educational outreach meetings will begin in 2016. It is also anticipated that sign production will begin in 2016.

### Statewide Mercury Control Policy and Mercury Control Program for Reservoirs

The SWRCB is developing a statewide mercury policy to control mercury in California's waters. It is anticipated that the policy and its regulations will be presented to the SWRCB for adoption in 2016.

In 2015, the MME Section continued to track developments associated with the Statewide Mercury Control Program for Reservoirs and attended all reservoir owner/operator meetings convened by the SWRCB.

Stakeholder meetings have focused on gathering information about individual reservoirs, determining what reservoir water quality improvement projects are already underway, and soliciting reservoir owner/operator feedback on reservoirs that might be suitable for pilot studies. In addition to attending meetings, the MME Section has provided written feedback on the technical and economic feasibility of the SWRCB's suggested management approaches to reducing MeHg in DWR reservoirs.

The MME Section also continued to collaborate with Reclamation, providing technical advice on the development of a reservoir mercury model.

## Special Studies and Biological Surveys

DWR conducts several special studies and biological surveys each year. This includes a special study in the Stockton Deep Water Ship Channel during the late summer and early fall to monitor the occurrence of low dissolved oxygen (DO) levels. Low DO levels potentially cause physiological stress to fish and block the migration of salmon into the San Joaquin River. DWR also conducts biological surveys of benthic organism density and diversity and of phytoplankton biomass and community composition in the Delta, Suisun Bay, and San Pablo Bay.

### Fall Dissolved Oxygen Study in the Stockton Deep Water Ship Channel

Historically, during the late summer and early fall, DO levels in the eastern and central portions of the Stockton Deep Water Ship Channel have dropped below both the 5.0 mg/L and 6.0 mg/L water quality objectives set by SWRCB and the RWQCB, respectively. These low DO levels are a result of several factors, including low San Joaquin River inflows, high water temperatures, high biochemical oxygen demand, reduced tidal circulation, and intermittent reverse flow conditions in the San Joaquin River at Stockton.

To help reduce the severity of these low DO conditions, DWR normally installs a temporary rock barrier across the Head of Old River during periods of projected low fall flows in the San Joaquin River.

In 2015, installation of the spring barrier began on March 16. Removal of the spring barrier was completed by June 8. Installation of the fall barrier began on September 3, and removal of the fall barrier was completed on November 18.

### Methods

In 2015, DO concentration monitoring in the Stockton Deep Water Ship Channel was conducted by boat on 12 monitoring runs, from June 15 to November 24. During each run, 14 sites were sampled at low-water slack tide from Prisoners Point in the Central Delta to the Stockton Turning Basin at the terminus of the ship channel. Because monitoring results differ within the channel, sampling stations were grouped into western, central, and eastern regions. The western region of the channel begins at Prisoners Point and ends at Columbia Cut. The central region of the channel begins one-half mile east of Columbia Cut and ends at Fourteen Mile Slough. Finally, the eastern region of the channel begins at Buckley Cove and ends at Rough and Ready Island. The turning basin is unique within the channel because it is east of the entry point of the San Joaquin River into the channel and isolated from down-channel flows.

### Results

During the period of this study, DO levels varied by season and exhibited similar ranges between regions within the channel excluding the turning basin. The overall study period range was 6.10 to 11.80 mg/L at the surface and 5.47 to 10.67 mg/L at the bottom. In the western portion of the channel, DO concentrations ranged from 6.70 to 10.60 mg/L at the surface and 6.66 to 10.67 mg/L at the bottom. In the central portion of the channel, DO concentrations were variable, ranging from 6.35 to 10.30 mg/L at the surface and 5.86 to 10.43 mg/L at the bottom. In the eastern portion of the channel, DO levels were similar to the other regions, ranging from 6.10 to 11.80 mg/L at the surface and 5.47 to 9.22 mg/L at the bottom. In 2015, bottom DO concentrations never fell below the objectives.

Higher San Joaquin River inflows, as well as the absence of intermittent reverse flows

near Stockton, coincided with improved DO conditions. Monitoring operations for the fall 2015 special study were suspended after November 24.

## Benthic Survey

The operation of the SWP can impact flow characteristics of the upper San Francisco Estuary and subsequently influence the density and distribution of benthic biota. Benthic biota are relatively long-lived and can respond to changes in physical factors within the estuary, such as fresh water inflows, salinity, and substrate composition. The benthic monitoring program documents changes in the composition, abundance, density, and distribution of the benthic biota within the estuary. Biological surveys conducted under the benthic monitoring program provide an indication of physical changes occurring within the upper estuary. In addition, benthic monitoring data are also used to detect and document the presence of newly introduced species within the upper estuary.

Benthic monitoring was conducted at 10 sampling sites distributed throughout the major habitat types within the estuary:

- Clifton Court Forebay Intake;
- San Joaquin River at Buckley Cove and at Twitchell Island;
- Old River opposite Rancho del Rio;
- Sacramento River below the Rio Vista Bridge and above Point Sacramento;
- Suisun Bay at Bulls Head Point;
- Grizzly Bay at Dolphin near Suisun Slough; and
- San Pablo Bay near Pinole Point and near the mouth of the Petaluma River.

Four bottom grab samples for benthic analysis and one sample for sediment analysis were collected monthly at each site during 2015. Samples were analyzed to identify organisms to the lowest

possible identifiable taxon and to count all organisms collected.

DWR maintains a database of benthic organisms located within the upper estuary. The benthic database is dynamic and regularly undergoes peer review and update. When a new organism is identified at any of the sampling stations it is added to the database. In addition, the taxonomic names of organisms on the list are updated when sufficient evidence is produced to warrant such changes.

The benthic monitoring program collects a large number of organisms, but a relatively small number of species. A total of 198 species of benthic macrofauna were collected in 2015 at the 10 sampling sites. Of the 198 species, 10 represented 78.1 percent of all organisms collected:

- amphipods: *Ampelisca abdita*, *Corophium alienense*, and *Gammarus daiberi*;
- Asian clam: *Potamocorbula amurensis*;
- sabellid polychaetes: *Manayunkia speciosa* and *Laonome calida*;
- tubificid worms: *Limnodrilus hoffmeisteri*, *Varichaetadrilus angustipenis*, and *Aulodrilus pigueti*; and
- ostracod: *Cyprideis sp. A*.

Of the 10 dominant species, *Potamocorbula amurensis*, *Laonome calida*, and *Ampelisca abdita* represent macrofauna that inhabit a typically high saline environment and were found in San Pablo Bay, Suisun Bay, and Grizzly Bay. *Corophium alienense* tolerates a wider range of salinity. It was collected both in the higher saline western sites and the more brackish to fresh water eastern sites such as the San Joaquin River at Twitchell Island and the Sacramento River above Point Sacramento. The remaining six species, *Gammarus daiberi*, *Manayunkia speciosa*, *Limnodrilus hoffmeisteri*, *Varichaetadrilus angustipenis*, *Aulodrilus pigueti*, and *Cyprideis sp. A* are predominantly fresh water



species and were collected at sites east of Suisun Bay.

## Phytoplankton and Chlorophyll *a* Survey

Phytoplankton are small, free-floating or attached algae that can be tiny, single-celled organisms (less than 5 micrometers in diameter) or larger colonial organisms. Phytoplankton are an important source of food in the estuary for zooplankton, invertebrates, and some species of fish. Phytoplankton biomass is an indicator of the status of primary productivity in the estuary. Chlorophyll *a* is one of the main groups of pigments contained in the algal species that make up phytoplankton.

Monthly sampling of chlorophyll *a* concentrations and phytoplankton was conducted in 2015 by DWR's Bay-Delta Monitoring Branch at 13 stations throughout the upper San Francisco Estuary:

- Sacramento River at Greene's Landing/Hood and above Point Sacramento;
- San Joaquin River at Vernalis, Buckley Cove, and Potato Point;
- Old River opposite Rancho del Rio;
- Disappointment Slough near Bishop Cut;
- Frank's Tract near Russo's Landing;
- Suisun Bay at Bulls Head Point near Martinez and off Middle Point near Nichols;
- Grizzly Bay at Dolphin near Suisun Slough; and
- San Pablo Bay near Pinole Point and near the mouth of the Petaluma River.

Chlorophyll *a* concentration was measured at the 13 monitoring stations to estimate overall phytoplankton biomass in the estuary. Phytoplankton samples were collected and analyzed separately to determine which species were present in the estuary.

Monthly chlorophyll *a* concentrations throughout much of the estuary were relatively low. Of the 155 samples taken in 2015, 94.8 percent (147 samples) had chlorophyll *a* levels below 10 micrograms per liter ( $\mu\text{g/L}$ ). Chlorophyll *a* levels below 10  $\mu\text{g/L}$  are considered limiting for zooplankton growth. Of the 8 samples with chlorophyll *a* concentrations above 10  $\mu\text{g/L}$ , three were from the San Joaquin River at Vernalis in February, March, and June; two were from Franks Tract near Russo's Landing in April and December; two were from the San Joaquin River at Potato Point in April and December; and one was from Disappointment Slough near Bishop Cut in April. The mean chlorophyll *a* concentration for all samples in 2015 was 3.86  $\mu\text{g/L}$ ; the median value was 2.16  $\mu\text{g/L}$ . In 2014, the mean and median were similar (3.41  $\mu\text{g/L}$  and 2.03  $\mu\text{g/L}$ , respectively). The maximum chlorophyll *a* concentration in 2015 was 94.09  $\mu\text{g/L}$ , recorded in June on the San Joaquin River at Vernalis. It was much higher than the maximum in 2014 (34.18  $\mu\text{g/L}$ ). The minimum chlorophyll *a* concentration was 0.26  $\mu\text{g/L}$ , recorded in January in Suisun Bay off Middle Point near Nichols.

Phytoplankton biomass and resulting chlorophyll *a* concentrations in some areas of the estuary may be influenced by extensive filtration of the water column by the introduced Asian clam, *Potamocorbula amurensis*. Well-established benthic populations of *P. amurensis* in Suisun and San Pablo bays are thought to have contributed to the low chlorophyll *a* concentrations (and increased water clarity) measured in these westerly bays since the mid-1980s.

In addition to monitoring for chlorophyll *a*, water samples were analyzed for pheophytin *a*.

Pheophytin *a* is a primary degradation product of chlorophyll *a*, and its relative concentration is useful for estimating the



general physiological state of phytoplankton populations. When phytoplankton are actively growing, the concentrations of pheophytin *a* are normally expected to be low in relation to chlorophyll *a*. The mean pheophytin *a* concentration for all samples in 2015 was 1.38 µg/L, and the median value was 1.02 µg/L. The maximum pheophytin *a* concentration was 12.78 µg/L, recorded on the San Joaquin River at Vernalis in June. The minimum pheophytin *a* concentration was 0.43 µg/L, recorded in San Pablo Bay near the mouth of the Petaluma River in February.

Cyanobacteria, cryptomonad flagellates, and green algae constituted 98.5 percent of the organisms collected in 2015. Cyanobacteria alone constituted 97.0 percent due to the presence of small-celled but numerically dominant genera such as *Chroococcus* and *Synechococcus*.

All organisms collected fell into these 11 categories (in order of abundance):

- (1) cyanobacteria (class Cyanophyceae);
- (2) centric diatoms (class Coscinodiscophyceae);
- (3) pennate diatoms (classes Bacillariophyceae and Fragilariophyceae);
- (4) cryptomonad flagellates (class Cryptophyceae);
- (5) green algae (classes Chlorophyceae and Prasinophyceae);
- (6) chrysophyte flagellates (class Chrysophyceae);
- (7) euglenoid flagellates (class Euglenophyceae);
- (8) dinoflagellates (class Dinophyceae);
- (9) charophytes (class Klebsormidiophyceae);
- (10) synurophyte flagellates (class Synurophyceae); and
- (11) xanthophyte flagellates (class Xanthophyceae).

The 10 most common genera collected were:

- (1) *Chroococcus* (cyanobacterium);
- (2) *Synechococcus* (cyanobacterium);
- (3) *Chlorella* (green alga);
- (4) *Plagioselmis* (cryptomonad flagellate);
- (5) *Aulacoseira* (centric diatom);
- (6) *Cyclotella* (centric diatom);
- (7) *Rhodomonas* (cryptomonad flagellate);
- (8) *Thalassiosira* (centric diatom);
- (9) *Monoraphidium* (green alga); and
- (10) *Nitzschia* (pennate diatom).

The cyanobacterium genus *Chroococcus* dominated samples throughout the year, and cyanobacteria numbers overall were high compared to other phytoplankton. Overall numbers of all phytoplankton, however, were low compared with previous years. The low flows and long residence time associated with prolonged drought conditions likely contributed to the higher numbers of cyanobacteria seen in 2015, and cyanobacteria are likely to continue dominating the phytoplankton community during the drought.

## Activities Outside the Delta

Routine SWP water quality monitoring activities and special studies are conducted outside the Delta. The special studies are in response to increasingly stringent regulations facing water purveyors who rely on DWR to deliver high-quality raw water.

## Water Quality Monitoring in the SWP

DWR's Division of Operations and Maintenance monitors water quality throughout the SWP. This monitoring program has more than 30 sampling stations and analyzes more than 200 chemical, biological, and physical constituents. DWR operates monitoring stations at SWP storage and conveyance facilities located throughout the State, from the Feather

River watershed in the north to Lake Perris in the south. Conveyance facilities include the Oroville Facilities, California Aqueduct with the East and West Branches, North Bay Aqueduct, South Bay Aqueduct, Coastal Branch Aqueduct, and the San Luis Joint-Use Complex. DWR collects and analyzes samples monthly at most stations, although the frequency can vary from weekly to annually depending on location, time of year, or special events. DWR sends the water samples to its Bryte Chemical Laboratory in West Sacramento for analysis. Constituents analyzed include dissolved solids; nutrients; minerals such as chloride, sulfate, and sodium; trace metals; herbicides; pesticides; and organic substances.

DWR's water quality monitoring program also uses a network of 16 automated monitoring stations at key locations along the SWP. This network provides real-time data by continuously monitoring a variety of physicochemical parameters such as specific conductance (also referred to as specific conductivity or EC), turbidity (a measurement of suspended particles), pH (a measurement of how acidic or basic water is),  $UV_{254}$  (254 nanometer ultraviolet absorbance; a measurement of dissolved organic carbon), and fluorometry (a measurement of algal biomass). SWP water contractors rely on this essential data to assess the quality of water delivered by the SWP.

The water quality monitoring program is an important operational component of the SWP. DWR uses the program's data to evaluate water quality changes in the SWP, short- and long-term trends, and impacts from emergencies such as spills and pipe ruptures. DWR also utilizes the data to influence operations and to determine the quality of drinking water as defined by the SWRCB's Division of Drinking Water. DWR periodically conducts special studies to investigate the impacts of specific incidents affecting SWP water quality. The special studies include non-SWP water turn-ins,

floodwater inflows, hydrology, and Delta hydrodynamics. The Division of Operations and Maintenance posts a number of water quality reports on DWR's website.

During 2015, water quality was assessed monthly at eight SWP facilities and at the CVP's Delta-Mendota Canal. Table 4-1 provides mean concentrations for 27 water quality parameters.

EC is an important water quality measurement that estimates the amount of total dissolved salts in a water body. Examples of typical specific conductivity concentrations include a range of 30 to 1,500 microsiemens per centimeter ( $\mu S/cm$ ) for potable water and over 50,000  $\mu S/cm$  for sea water. Mean annual EC of SWP water was 104  $\mu S/cm$  at Thermalito Afterbay; 385  $\mu S/cm$  at the North Bay Aqueduct, Barker Slough Pumping Plant; and 776  $\mu S/cm$  at the Delta-Mendota Canal. EC ranged from 558 to 716  $\mu S/cm$  in the California Aqueduct.

Dissolved organic carbon measures the amount of organic matter in water. Monitoring of dissolved organic carbon is important to water treatment facility operators as dissolved organic carbon has the potential to facilitate the formation of trihalomethanes (potential toxins) during the chlorination process. Dissolved organic carbon was highest at the North Bay Aqueduct at 6.2 mg/L, while concentrations in the California Aqueduct ranged from 2.6 to 5.2 mg/L.

Turbidity monitoring is important because of the potential of increased turbidity to increase the cost of water treatment. The North Bay Aqueduct, Barker Slough Pumping Plant and Tehachapi Afterbay (Check 41) exhibited higher levels of turbidity (12 NTU [nephelometric turbidity units] and 15 NTU, respectively) compared with other locations, which had mean turbidity ranging from 1 to 4 NTU.

**Table 4-1 Mean Water Quality at Selected SWP Grab Sample<sup>a</sup> Locations in 2015**

California Aqueduct														
Constituent	Units <sup>b</sup>	Reporting Limit	Thermalito Afterbay at Outlet		North Bay Aqueduct, Barker Slough Pumping Plant		Delta-Mendota Canal Upstream of McCabe Road		Banks Pumping Plant	O'Neill Forebay Outlet (Check 13)	Kettleman City (Check 21)	Near Highway 119 (Check 29)	Tehachapi Afterbay (Check 41)	Devil Canyon Second Afterbay
			49	113	101	86	93	91						
Alkalinity	mg/L as CaCO <sub>3</sub>	1												
Antimony	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	mg/L	0.001	<0.001	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.007	0.006	0.005
Beryllium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Boron	mg/L	0.1	<0.1	0.2	0.3	0.2	0.2	0.3	0.2	0.2	0.3	0.2	0.2	0.2
Bromide	mg/L	0.01	<0.01	0.05	0.39	0.37	0.32	0.36	0.28	0.26	0.28	0.28	0.26	0.28
Calcium	mg/L	1	9	18	31	24	28	27	29	30	29	29	30	29
Chloride	mg/L	1	1	26	130	119	109	119	81	78	81	81	78	81
Chromium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.001	<0.001	0.001	0.001	<0.001
Copper	mg/L	0.001	<0.001	0.001	0.002	0.002	0.002	0.001	<0.001	0.001	0.001	<0.001	0.001	0.002
Hardness	mg/L as CaCO <sub>3</sub>	1	41	112	167	132	143	141	101	117	141	101	117	113
Iron	mg/L	0.005	0.008	0.029	0.007	0.015	0.009	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Lead	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Magnesium	mg/L	1	5	16	22	18	18	18	7	10	18	7	10	10
Manganese	mg/L	0.005	<0.005	0.027	<0.005	0.015	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Nitrite + Nitrate	mg/L as N	0.01	0.01	0.12	0.78	0.33	0.49	0.26	0.90	0.81	0.26	0.90	0.81	0.42
Organic Carbon, Dissolved	mg/L as C	0.5	NR	6.2	5.5	5.2	5.2	5.0	2.6	2.8	5.0	2.6	2.8	3.0
Organic Carbon, Total	mg/L as C	0.5	NR	6.4	5.0	5.4	5.3	5.2	2.5	3.1	5.2	2.5	3.1	3.2
Phosphate-Ortho	mg/L as P	0.01	<0.01	0.17	0.10	0.09	0.08	0.06	<0.01	0.01	0.06	<0.01	0.01	<0.01
Phosphorus, Total	mg/L	0.01	<0.01	0.28	0.15	0.13	0.13	0.11	0.05	0.14	0.11	0.05	0.14	0.03
Selenium	mg/L	0.001	<0.001	<0.001	0.001	<0.001	<0.001	0.001	0.001	<0.001	0.001	0.001	<0.001	<0.001
Sodium	mg/L	1	4	34	90	76	74	85	71	72	85	71	72	74
Specific Conductance	µS/cm	1	104	385	776	634	653	716	558	585	716	558	585	591
Sulfate	mg/L	1	2	22	68	42	52	67	58	72	67	58	72	72
Total Dissolved Solids	mg/L	1	63	223	429	359	364	399	322	355	399	322	355	335
Turbidity	NTU	1	2	12	4	4	4	4	4	15	4	4	15	1
Zinc	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

<sup>a</sup> A grab sample is a single sample chosen to represent the conditions in a given matrix (usually natural water) at a specific location, depth, and time. All reported constituents are the annual mean of laboratory analytical values sampled monthly from January through December. The annual mean for a constituent may be based upon analytical results of 1 to 12 months. When one or more analytical results for a constituent are a "non-detect," the mean is calculated using "0" for the non-detect results.

<sup>b</sup> mg/L = milligrams per liter; µS/cm = microsiemens per centimeter; NTU = nephelometric turbidity unit; NR = No data recorded at this location.

Mean arsenic concentrations ranged from less than 0.001 mg/L at Thermalito Afterbay to 0.007 mg/L at Check 29. These surface water values fall below the 0.010 mg/L maximum contaminant level (MCL) for arsenic in drinking water. (The MCL is the maximum level of a contaminant in drinking water at which no known or anticipated adverse effect on human health would occur.)

Bromide, another parameter that, when present in the water, has the potential to form trihalomethanes during water treatment. Bromide concentrations ranged from less than 0.01 mg/L at Thermalito Afterbay to 0.39 mg/L at the Delta-Mendota Canal.

In 2015, DWR sampled for pesticides, herbicides, and other organic compounds in March, June, and September at several SWP facilities and at the CVP's Delta-Mendota Canal (see Table 4-2). The concentrations of the detected herbicides ranged from 0.02 to 0.29 µg/L. No pesticides, herbicides, or other organic compounds were detected in March. In June, the herbicide metolachlor was detected at the Delta-Mendota Canal at a concentration of 0.29 µg/L and at Banks Pumping Plant at a concentration of 0.11 µg/L. The herbicides atrazine and simazine were also detected in June. In September, the detected herbicides were 2,4-D, atrazine, Dacthal (dimethyl tetrachloroterephthalate or DCPA), and simazine. The detected amounts of pesticides in 2015 were well below established MCLs.

DWR routinely monitors taste and odor compounds produced by algae. Chemical substances in water that are often associated with earthy, musty smelling or tasting water include geosmin and 2-methylisoborneol (MIB), which are produced in water bodies by cyanobacteria. Geosmin and MIB are natural by-products of algal chlorophyll production.

DWR's evaluation of a taste and odor event is based on microscopic examination of samples, and most importantly, the chemical analysis of MIB and geosmin. When sampling results indicate that concentrations of these compounds in SWP waters are increasing within the 10 nanograms per liter range, DWR responds by searching for the location of the source of the geosmin or MIB. To do this, water quality samples are collected and analyzed to ascertain the presence of possible algal sources. If an algal source is identified, DWR develops an aquatic herbicide application plan to control the specific algae that are associated with the elevated geosmin and/or MIB concentrations. In 2015, aquatic herbicide applications targeting taste- and odor-producing cyanobacteria occurred in the South Bay Aqueduct, Patterson Reservoir, Coastal Branch Aqueduct, and Castaic Lake.

Additional SWP water quality data are available on DWR's Water Data Library website.

## Non-SWP Turn-ins

Non-SWP water can be admitted to the California Aqueduct for conveyance and redistribution. Non-SWP water is considered to be any input to the SWP for conveyance that is not directly diverted from the Delta. According to California Water Code Section 1810, no agency may deny a transferor of water the use of a water conveyance facility which has unused capacity, for the period of time for which that capacity is available, if fair compensation is paid. Inputs to the California Aqueduct from these sources are called turn-ins.

Turn-in water may be used for local redistribution or transfer to other water contractors. Participants of an approved turn-in program can use available aqueduct capacity to move candidate waters from a point of availability to a point of need. Groundwater substitutions can also be

**Table 4-2 Pesticides, Herbicides, and Other Organic Substances Detected in the SWP in 2015**

Sampling Location <sup>a</sup>	Sampling Station ID Number	Sample Date	Chemical Detected <sup>b</sup>	Concentration (µg/L) <sup>c</sup>
North Bay Aqueduct, Barker Slough Pumping Plant	KG000000	3/17/15	None	—
		6/17/15	None	—
		9/14/15	None	—
Delta-Mendota Canal upstream of McCabe Road	DMC06716	6/16/15	Atrazine	0.03
		6/16/15	Metolachlor	0.29
		6/16/15	Simazine	0.02
		9/15/15	2,4-D <sup>d</sup>	0.2
California Aqueduct at Banks Pumping Plant	KA000331	3/17/15	None	—
		6/17/15	Atrazine	0.02
		6/17/15	Metolachlor	0.11
		6/17/15	Simazine	0.02
		9/16/15	2,4-D	0.2
California Aqueduct at O'Neill Forebay Outlet (Check 13)	KA007089	6/16/15	Simazine	0.02
		9/15/15	2,4-D	0.1
		9/15/15	Atrazine	0.02
California Aqueduct near Kettleman City (Check 21)	KA017226	6/16/15	Simazine	0.02
		9/15/15	None	—
California Aqueduct near Highway 119 (Check 29)	KA024454	3/17/15	None	—
		6/16/15	Simazine	0.02
		9/14/15	Dacthal (DCPA) <sup>e</sup>	0.15
California Aqueduct at Tehachapi Afterbay (Check 41)	KA030341	3/18/15	None	—
		6/17/15	None	—
		9/16/15	Dacthal (DCPA)	0.12
		9/16/15	Simazine	0.02
California Aqueduct at Devil Canyon Second Afterbay	KA041323	3/25/15	None	—
		6/17/15	Simazine	0.02

<sup>a</sup> Water at these locations is normally sampled during March, June, and September; however, no samples were collected in March 2015 at Delta-Mendota Canal, O'Neill Forebay Outlet (Check 13), or California Aqueduct near Kettleman City (Check 21). No samples were collected at Devil Canyon Second Afterbay in September 2015.

<sup>b</sup> Only chemicals found in detectable amounts at the sampling stations are included in this table. Refer to the document entitled *Analytical Methods for Organic Chemicals* for a complete listing of all organic chemicals included in the laboratory analysis. The document is available on DWR's website.

<sup>c</sup> µg/L = micrograms per liter

<sup>d</sup> 2,4-D = 2,4-dichlorophenoxyacetic acid

<sup>e</sup> Dacthal (DCPA) = dimethyl tetrachloroterephthalate

made whereby surface water diversions are reduced by replacing that water with a like amount of groundwater. In this manner, more surface water is made available for transfer to other users. These voluntary

water transfers aid in supplying water to areas experiencing shortages, usually during periods of drought or years with below-normal runoff.



Participants of turn-in programs include both SWP and non-SWP contractors that bank groundwater and routinely convey it into the California Aqueduct at various locations. Although most non-SWP turn-ins to the California Aqueduct originate as groundwater from Kern and Kings counties, other waters include excess surface flows or floodwaters typically from southern Sierra Nevada watersheds. Surface water turn-ins have included excess floodwaters from the Kings River redirected through the Mendota Pool and pumped into the California Aqueduct.

Certain conditions must be met before a turn-in proponent can be given approval to convey water into the California Aqueduct. In accordance with California Water Code Section 1810, water may be conveyed or transferred via any unused capacity of the California Aqueduct provided that the commingled water does not result in degradation of water quality. The transfer must also be made without unreasonably affecting fish, wildlife, or other instream beneficial uses.

DWR, therefore, established interim procedures and criteria to review turn-in proposals and determine their approval for acceptance into the California Aqueduct using a two-tiered approach. According to the policy, the proponent of any turn-in proposal shall demonstrate that the water is of consistent, predictable, and acceptable quality. Prospective turn-in entities are required to submit proposals describing their turn-ins, including information such as detailed water quality monitoring and analyses, source water description, identification of wells, inflow rates, and duration. Tier 1 programs have “no adverse impacts” based on historical water quality in the California Aqueduct. Tier 2 programs are those with constituent concentrations higher than historical California Aqueduct conditions and has the potential to cause adverse impacts. Tier 2

programs are referred to the State Water Contractor Facilitation Group for review. The facilitation group consists of DWR staff and representatives from each water contractor that chooses to participate. The group reviews Tier 2 proposals based on merits, impacts, mitigation, water quality monitoring, cost, benefits, and other issues. The group then provides recommendations to DWR regarding proposal approval. DWR considers all factors before making a decision on any turn-in proposal. Programs meeting Tier 1 criteria are approved by DWR without referral to the State Water Contractor Facilitation Group.

A total of 482,825 af of non-SWP turn-in water was admitted to the California Aqueduct during 2015. Most of it (94 percent) originated from groundwater pumping in the San Joaquin Field Division; the remainder came from pumping in the San Luis and Southern field divisions (see Table 4-3). Monitoring showed water quality in the California Aqueduct was affected, both positively and negatively, but the effects were sometimes inconsistent and depended on a variety of factors such as water quality parameter, upstream concentration, turn-in source, and relative flows.

Both the California Department of Public Health (CDPH) Title 22 parameters and a short list of constituents of concern, as determined via the DWR *Water Quality Policy and Implementation process for Acceptance of Non-Project Water into the State Water Project* (October 2012), are regularly monitored. Data are compared to MCLs. Since MCLs apply to drinking water and not surface water, they are used for turn-ins as a tangible goal for concentrations of constituents of concern in the aqueduct.

In the San Luis Field Division, 26,835 af of groundwater was pumped into the California Aqueduct from Westlands Water District. Sulfate and salinity consistently increased between upstream and downstream stations.

These parameters can cause taste and odor problems in drinking water but are not considered human health threats. No consistent increases or decreases were observed for arsenic, bromide, chromium, nitrate, or organic carbon. Manganese samples both upstream and downstream of turn-ins exceeded the secondary MCL of 0.05 mg/L; no other constituents of concern exceeded the MCL in California Aqueduct sampling.

In the San Joaquin Field Division, 454,385 af of groundwater was admitted to the aqueduct from Kern Water Bank Authority, Kern County Water Agency, Semitropic Water Storage District, Arvin-Edison Water Storage District, Wheeler Ridge-Maricopa Water Storage District, and West Kern Water District (see Table 4-3). These turn-ins comprised 44 percent of the total volume of water entering the aqueduct (turn-ins plus Check 21)—slightly less than the amount in 2014 (46 percent).

**Table 4-3 Turn-ins to the California Aqueduct in 2015**

Groundwater Source	Amount (acre-feet)
Antelope Valley-East Kern Water Agency	1,605
Arvin-Edison Water Storage District	70,200
Cross Valley Canal	89,886
Kern Water Bank Canal	155,394
Semitropic Water Storage District	109,580
West Kern Water District	2,103
Westlands Water District	26,835
Wheeler Ridge-Maricopa Water Storage District	27,222
<b>Total</b>	<b>482,825</b>

Arsenic, total chromium, and nitrate consistently increased in the aqueduct due to San Joaquin Field Division turn-ins. These are undesirable parameters in drinking water because of their potential threat to human health. Drinking water MCLs were exceeded once each for arsenic and chromium. Rising

concentrations of constituents like arsenic and other co-occurring contaminants are a concern because they can accumulate in biosolids as a byproduct of drinking water production, potentially increasing disposal costs. Sulfate concentrations varied throughout the San Joaquin Field Division, with slightly more occurrences of increasing concentrations overall. This result is undesirable because sulfate can cause taste and odor problems in drinking water, however, it is not considered a human health threat.

Bromide and organic carbon decreased in the aqueduct downstream of the San Joaquin Field Division turn-ins. This provided a net benefit to SWP contractors because these parameters can increase both the cost of producing drinking water and the potential for creating harmful trihalomethanes during the treatment process.

Chloride and salinity also decreased downstream of the turn-ins, providing a benefit to aqueduct water quality as these parameters have the potential to cause taste and odor problems in drinking water. There are other benefits of lower concentrations of salt and salt-related parameters not necessarily associated with drinking water. Salinity in treated or reclaimed wastewater must meet regulatory limits upon discharge and can become a limiting factor for groundwater recharge. Salinity can also affect some crops, and it remains an ongoing concern for agricultural users of aqueduct water.

In the Southern Field Division, 1,605 af of groundwater was pumped into the aqueduct from Antelope Valley-East Kern Water Agency. This turn-in had very little influence on aqueduct water quality due to small relative inflows and good water quality.

## San Joaquin Valley Agricultural Water Quality Programs

There are a number of programs that conduct or support monitoring, research, training, or demonstration projects related to San Joaquin Valley agricultural water quality. For information about these programs, see Chapter 5, Local Assistance.

## Municipal Water Quality Program Branch

### Municipal Water Quality Investigations Program

The Municipal Water Quality Program (MWQP) Branch includes the Municipal Water Quality Investigations (MWQI) Program, which conducts water quality monitoring (both real time and discrete) in the Delta for municipal and industrial uses. The MWQI Program is the most comprehensive drinking water quality monitoring program in the Delta. Since its inception in 1983, information derived from this program has been supplied to the SWP water contractors and other agencies supplying drinking water taken from the Delta. This information is used extensively by federal, State, and local agencies and the public in water supply planning studies. Data from this program are used to identify longer-term trends in water quality changes in the Delta and the SWP. Monitoring data also help MWQI and other agencies develop research and mitigation measures to reduce drinking water contaminants in Delta waters. In collaboration with the Division of Operations and Maintenance, and through modeling, monitoring data derived from this program are used as an “early warning” system of changing conditions in source water, which can be used to provide advance notice to Delta water users of possible drinking water quality problems. Additionally, the MWQI Program provides technical water quality expertise to other units within DWR, local municipal water

agencies, the SWRCB, and the RWQCBs. The program contributes water quality expertise while participating in regulatory, planning, and data sharing efforts.

### Real Time Data and Forecasting Comprehensive Program

The Real Time Data and Forecasting Comprehensive Program has become a central element of the MWQP. The goal of the program is to further develop the capability of real-time data collection and to forecast short- and long-term source drinking water quality conditions in the Delta and SWP. Within the MWQP, the Real Time Data and Forecasting Comprehensive Program entails the following elements:

- real-time water quality monitoring at key locations, providing stakeholders and interested parties with timely data;
- field operations that ensure proper operation of all automated sampling equipment;
- consistent modeling with continuous updates providing the best forecasts possible;
- quality assurance/quality control of the instruments and data; and
- centralized information management and dissemination.

The real-time monitoring network includes stations located at Banks Pumping Plant, Jones Pumping Plant, the Sacramento River at Hood, the San Joaquin River near Vernalis (McCune Station), and the Gianelli Pumping-Generating Plant at San Luis Reservoir.

### Quality Assurance/Quality Control Program

The Quality Assurance/Quality Control Program (Quality Assurance Program) was established in 1992 to ensure that data generated by DWR’s environmental monitoring programs meet high quality standards and are scientifically defensible.

Monitoring programs are encouraged to follow standardized procedures including quality control measurements in their sampling protocols.

The Quality Assurance Program integrates planned quality control activities at all levels of environmental monitoring programs through standardized project design and organization; the establishment of data quality objectives; defined sampling, analysis, and quality control procedures; practices for data reduction and validation; guidelines for report preparation; and means to assess progress, feedback, and process improvement.

In 2015, the Quality Assurance Program worked closely with various environmental monitoring programs and provided technical support in the development and review of quality assurance project plans, field manuals, and standard operating procedures. The program also provided assistance with statistical analysis and review of data to ensure compliance with quality assurance objectives and with review of field and laboratory activities to ensure comparable and consistent sample handling and quality control procedures.

### Water Quality Special Studies

Special studies focus on specific aspects of source waters, contaminant loading, measurement methods and instrumentation, and climate and hydrology. They are conducted to:

- investigate the origins, fate, transport, and, in some cases, loads of current and emerging contaminants of concern;
- investigate seasonal patterns and trends of constituents and examine circulation patterns of contaminants;
- refine modeling assumptions; and
- assess the impacts of increasing urbanization on levels of water quality constituents of concern.

The following studies were in progress during 2015:

- Urban Sources and Loads Investigation of Lathrop, California;
- investigation of O'Neill Forebay water circulation;
- spectrofluorometer study;
- feasibility study for a portable water quality monitoring station;
- nutrient budget of the SWP;
- in-situ fluorometer measurements of dissolved organic matter;
- San Joaquin River watershed sanitary survey;
- fluorescence of dissolved organic matter proof of concept study;
- tidal marsh restoration literature review;
- Eastside Watershed Analysis Risk Management Framework and Yolo Delta Simulation Model 2 (DSM2) model monitoring;
- DSM2 nutrient monitoring study;
- Cache Slough Complex preresoration baseline monitoring; and
- SWP limnology studies.

### Accomplishments for the 2014–2015 MWQI Work Plan

During 2015, the MWQI accomplished the following goals:

- continuous operation of five real-time water quality stations;
- continuous data dissemination of water quality reports;
- weekly distribution of short-term water quality forecasts;
- monthly distribution of volumetric, EC, and organic carbon source fingerprints;
- initialization of version 2 of the Field Station Real Time Monitoring Standard Operating Procedures; and
- production of several projects to develop data for historical conditions for the Delta and aqueduct models (DSM2 and DSM2 Aqueduct Extension Model of the SWP).



The special study reports and other MWQP publications can be found on DWR's website.

## Bryte Chemical Laboratory

Established in 1951, Bryte Chemical Laboratory is DWR's primary analytical laboratory. Its main function is to analyze drinking, surface, waste, and groundwater for the various water quality programs within DWR. Since 1990, the laboratory has been certified biennially by the SWRCB's Environmental Laboratory Accreditation Program to perform water quality analyses following U.S. Environmental Protection Agency or American Water Works Association procedures and analytical methods. This certification allows the laboratory to perform analyses that generate legally defensible data that can be used for regulatory or compliance purposes. The laboratory continues to perform the majority of chemical and other related analyses required to support DWR's water quality programs. Each year, thousands of water samples are routinely analyzed for inorganic and organic constituents such as standard minerals, cations, anions, nutrients, metals, chlorophyll, pesticides, herbicides, and volatile organic compounds.

In 2015, the laboratory upgraded its capability and capacity to detect and analyze anions (fluoride, chloride, bromide, nitrate, and sulfate) with the purchase of two ion chromatographs. The chromatographs are fully automated and computer-controlled electrochemical instruments that generate data that are highly stable, accurate, and reproducible. Each instrument's detection limit has been established at 1.0 part per million.

The laboratory has continued to manage a variety of analytical contracts with other State agencies and several outside laboratories in accordance with the master contract policy approved in fiscal year 1994–1995. These contracts are used to

perform analyses that are beyond the capability and capacity of the laboratory, such as analyses of solids and fish tissues. The laboratory works in conjunction with the MWQP Quality Assurance Program to replace these contracts as they expire each fiscal year. On July 1, 2015, Weck Laboratories, Inc. was awarded the contract for water and solids analyses worth \$1.5 million over 3 years.

Bryte Laboratory continues to be an active member of a group of laboratories called the California Association of Mutual Aid Laboratories Network headed by CDPH. The laboratory network's main objective is to voluntarily assist CDPH with analyzing chemical agents in water quality samples should a natural disaster or biochemical or chemical event occur in California. The assistance is only required should the analytical capacity of CDPH be exceeded or to confirm the presence or absence of chemical agents in water quality samples provided by CDPH. In 2007, Bryte Chemical Laboratory was classified as a Level II participating laboratory in the California Association of Mutual Aid Laboratories Network organization. Level II only allows the laboratory to receive samples that are prescreened and determined nonhazardous to laboratory personnel.

## Suisun Marsh Program Activities

Suisun Marsh consists of approximately 59,000 acres of tidal and managed brackish water wetlands and 30,000 acres of bays and sloughs. It is the largest contiguous brackish marsh remaining in the United States. Situated in southern Solano County, west of the Delta and north of Suisun Bay, the marsh encompasses more than 10 percent of California's remaining natural wetlands. The marsh is the resting and feeding ground for thousands of waterfowl and shorebirds migrating on the Pacific Flyway. It provides important habitat for more than 221 bird



species, 45 mammal species, 16 reptile and amphibian species, and more than 40 fish species.

DWR became involved in the Suisun Marsh in response to SWRCB Water Right Decision 1485, which required DWR and Reclamation to operate the SWP and CVP to meet salinity standards as specified in the SWRCB's 1978 *Water Quality Control Plan for the Delta and Suisun Marsh*, which established revised water quality objectives for flow and salinity in the Delta and Suisun Marsh. Water Right Decision 1485 also required DWR and Reclamation, in cooperation with other agencies, to develop a plan for Suisun Marsh that would ensure that the long-term standards for full protection of Suisun Marsh would be met. The 1984 *Plan of Protection for Suisun Marsh*, completed by DWR, included construction of a series of facilities to distribute lower-salinity water to managed wetlands and monitoring in relation to these facilities. Today, DWR operates and maintains these water management facilities, including the Roaring River Slough Distribution System, Morrow Island Distribution System (MIDS), Goodyear Slough Outfall, and the Suisun Marsh Salinity Control Gates (SMSCG). Figure 4-2 shows the water quality compliance and monitoring sampling locations and the water management facilities.

Through agreements and plans, DWR has been working in coordination with Reclamation, DFW, Suisun Resource Conservation District, USFWS, and other agencies, on habitat management, preservation, and restoration of the Suisun Marsh.

### Revised Suisun Marsh Preservation Agreement

In 1987, DWR, Reclamation, DFW, and the Suisun Resource Conservation District signed the *Suisun Marsh Preservation Agreement*

(SMPA), a contractual framework for implementation of the *Plan of Protection for Suisun Marsh*. It required Reclamation and DWR to meet salinity standards as specified in the SWRCB's 1978 WQCP, set a timeline for implementing the *Plan of Protection for the Suisun Marsh*, and delineated monitoring and mitigation requirements. A revised SMPA and *Revised Mitigation and Monitoring Agreement* were signed in 2005 to include actions to meet channel water salinity standards consistent with D-1641 and to implement landowner-based management activities in lieu of the western marsh facilities proposed in the plan of protection.

The revised SMPA included the following actions: operate facilities to meet channel water salinity standards consistent with D-1641; implement a Water Manager Program; provide portable pumps; update Individual Ownership Adaptive Management Habitat Plans; establish a Drought Response Fund; and replace turnouts on the Roaring River Slough Distribution System. The monitoring agreement included monitoring for the Salt Marsh Harvest Mouse (*Reithrodontomys raviventris*) and Ridgway's Rail (*Rallus obsoletus*; formerly known as the California Clapper Rail), fish, vegetation, and other biological monitoring.

### SMPA 2015

SMPA 2015 is the newest revision of the SMPA, which includes new provisions, including September SMSCG operation and the preservation agreement implementation funding. Preservation agreement implementation funds are provided by DWR and Reclamation to improve managed wetlands infrastructure for flooding and draining and joint-use facilities infrastructure.

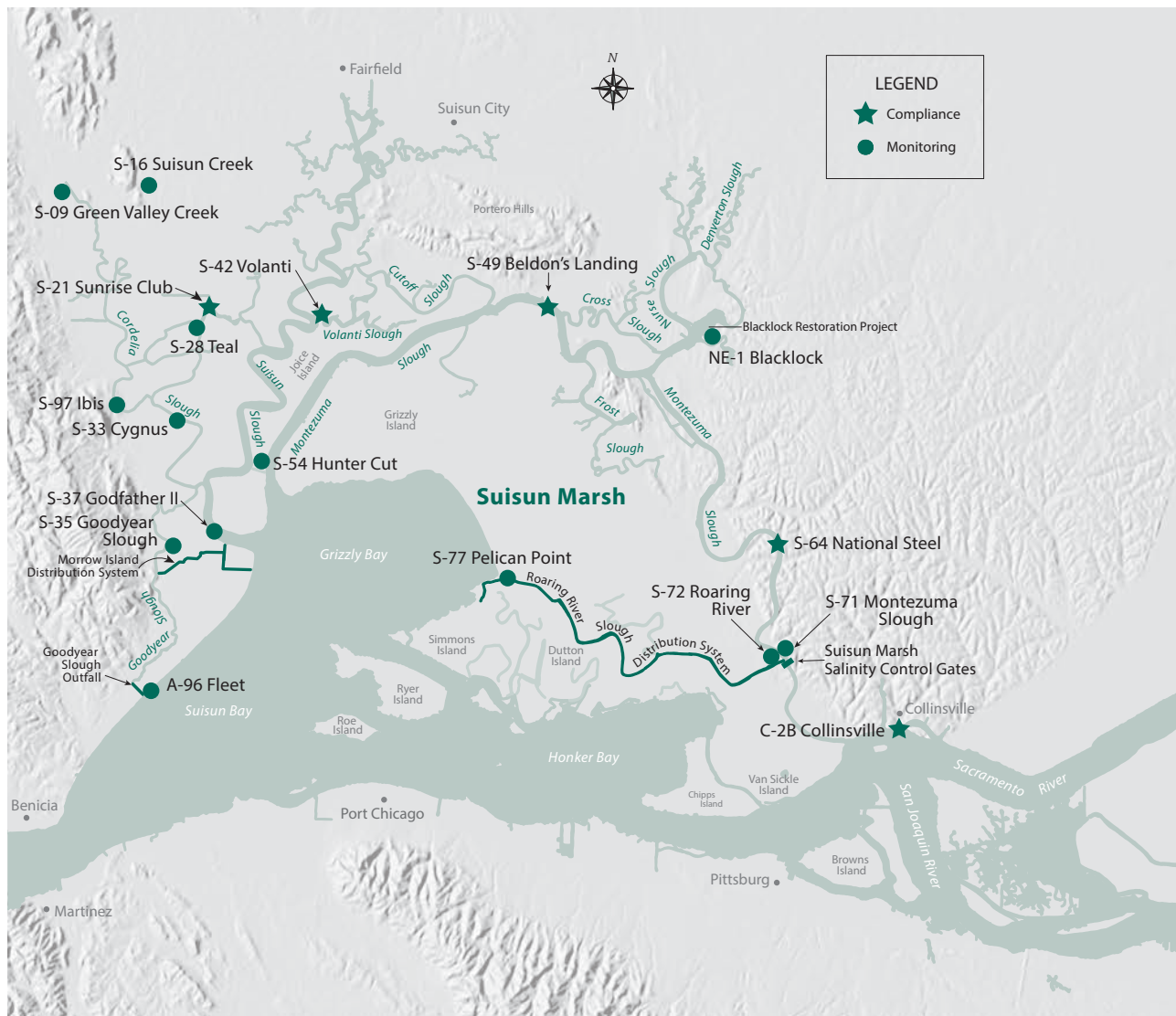
## Facility Operations, Maintenance, and Related Activities

### Morrow Island Distribution System

MIDS is an interior ditch bordered by levees that was created to distribute water to managed wetlands on the western edge of Suisun Marsh. Water with relatively lower salinity is taken from Goodyear Slough in the west through water control structures that transport the water into MIDS. Water is then distributed to managed wetlands through private landowner water control

structures along the ditch. Water not used by the landowners exits into Grizzly Bay through water control structures in the east (see Figure 4-2). Routine maintenance during 2015 included mowing, spraying, and levee road regrading and winterizing. Trees were trimmed and invasive trees were removed along 3 miles of the MIDS levee to reestablish access and to prepare for the ditch cleaning maintenance project in 2016.

**Fish Screen and Alternatives.** Based on previous study results, a fish screen



**Figure 4-2** Compliance and Monitoring Stations and Water Management Facilities in the Suisun Marsh

at MIDS would likely have negligible benefits to sensitive fish populations (see Bulletin 132-07, Chapter 4, Water Quality). DWR and Reclamation are proposing to fulfill the outstanding terms and conditions of the USFWS 1997 BiOp for the MIDS maintenance project by acquiring and protecting, in perpetuity, aquatic habitat in Suisun Marsh. (For additional information about the BiOp, see Bulletin 132-08.) This proposal is ongoing.

**Longfin Smelt Incidental Take Permit.** On February 23, 2009, DFW issued an incidental take permit for the ongoing and long-term operation of existing SWP facilities in the Delta for the protection of Longfin Smelt. MIDS is included as one of these facilities.

To minimize the take of Longfin Smelt at the MIDS diversion, DFW specifies the average intake velocities each year to adequately protect these fish.

Also, as a requirement of the incidental take permit, DWR is developing a study to confirm that the aforementioned operation prevents or substantially reduces the entrainment of Longfin Smelt at MIDS.

**Morrow Lane Bridge Repair.** In July 2012, the Division of Engineering inspected the Morrow Lane Bridge over Goodyear Slough and found the bridge was severely deteriorated. As a result, access and maintenance of MIDS was suspended.

DWR worked with a landowner and consultant to determine how to proceed with bridge repairs. The landowner decided to address the deficiency in two phases. The first was a repair to extend the life of the bridge one to two years, and the second is a full replacement of the bridge (anticipated in 2017).

### **Suisun Marsh Salinity Control Gates**

The SMSCG are operated as needed to meet salinity standards. When they are not in operation, they are placed in an open position to minimize fish concerns related to predation and impedance. Installation or removal of the flashboards and operation of the gates vary depending on salinity conditions, fisheries agencies' requests for sensitive species concerns, or repairs.

**Status of SMSCG in 2014–2015.** The control season started September 2014, a month earlier than usual, due to salinity concerns. The flashboards were installed and the boat locks became operational on September 3, 2014. The SMSCG were tidally operated between September 3, 2014, and June 2, 2015, due to salinity concerns in the marsh. The boat lock was partially closed during the control season due to safety concerns. The gates were tidally operated from September 3 until October 6 to meet the 7-day running average EC of 17 mS/cm for the revised SMPA. Gate operations stopped on October 7 to allow the interior Delta to meet water quality standards. The gates began operating again on October 22 to bring salinity down for November standards. On November 19 there was an electrical control system failure. Gates were set to an open position while repairs were done. Operations resumed on December 4. On December 15, operations stopped for technical work and resumed on January 1, 2015. Operations continued until June 2, 2015. The flashboards were then removed, and the boat locks were set to the open position.

### **Other Facility Operation and Maintenance**

The Roaring River Slough Distribution System and Goodyear Slough Outfall are operated and maintained as needed to provide lower-salinity water to managed wetland properties. Roaring River Slough Distribution System 2015 maintenance



activities included levee mowing and spraying. Goodyear Slough Outfall 2015 maintenance activities included ditch cleaning and levee raising.

### **Water Quality and Compliance**

A deficiency period began in January 2014, which was triggered by a dry water year in 2013, followed by a critical water year in 2014. The deficiency period allows higher salinity conditions at the western marsh compliance stations (S-21 Sunrise Club and S-42 Volanti) from December through May. The deficiency period continued during 2015. Salinity levels in November 2014 at Beldon's Landing (S-49) exceeded the D-1641 standard of a progressive daily mean salinity of 15.5 mS/cm. The salinity standard of 11.0 mS/cm was exceeded for Collinsville (C-2) during May 2015. All other salinity levels for the 2014–2015 control season were below monthly standards for the compliance stations.

Details about salinity levels in the marsh are available in the monthly report entitled *Suisun Marsh Monitoring Program Channel Water Salinity Report* available on DWR's website.

### **Blacklock Restoration Project**

DWR received CALFED Ecosystem Restoration Program grant funds in 2001 to acquire the 70-acre Blacklock property in December 2003. DWR, in cooperation with Reclamation, DFW, USFWS, and Suisun Resource Conservation District, implemented the Blacklock Restoration Project (location shown on Figure 4-2). This project restored diked, managed wetlands to tidal wetlands. Although a natural breach in the levee occurred in July 2006, it was determined that the planned breach should still be constructed to allow for full tidal flow and optimum sediment transportation. The planned breach construction occurred on October 3 and 4, 2006.

The project goals and objectives are to:

- restore the area to a fully functioning, self-sustaining marsh ecosystem created through restoration of natural hydrologic, sedimentation, and biological processes;
- increase the area and contiguity of emergent wetlands providing habitat for tidal marsh species; and
- assist the recovery of at-risk species.

The final restoration plan for the project was published in June 2007.

In 2015, DWR continued implementing the 10-year monitoring program at the Blacklock site. Monitoring is performed in cooperation with State and federal agencies. There are 15 parameters being monitored, including sediment accretion, channel network evolution, vegetation development, water quality, methylmercury concentrations, and avian use.

In 2013, Wetlands and Water Resources, Inc. worked on the monitoring report for years one through five. The report is being finalized by DWR.

For more information about the Blacklock Restoration Project, visit the Suisun Marsh Program webpage on DWR's website.

### **Suisun Marsh Habitat Management, Preservation, and Restoration Plan**

The *Suisun Marsh Habitat Management, Preservation, and Restoration Plan*, referred to as the Suisun Marsh Plan, was developed by the Principal Agencies (or Principals), a group of agencies with primary responsibility for Suisun Marsh management. The Suisun Marsh Plan is intended to balance the benefits of tidal wetland restoration with other habitat uses in the marsh by evaluating alternatives that provide a politically acceptable change in marshwide land uses, such as Salt Marsh Harvest Mouse habitat, managed wetlands public use, and upland

habitat. It relies on the incorporation of existing science and information developed through adaptive management.

The principals include USFWS, Reclamation, DFW, DWR, NOAA Fisheries, and Suisun Resource Conservation District. The Principals have consulted with other participating agencies, such as the U.S. Army Corps of Engineers, the San Francisco Bay Conservation and Development Commission, the RWQCBs, and SWRCB, to develop this plan.

On April 21, 2014, Reclamation and USFWS signed the record of decision for the Suisun Marsh Plan. The principals will implement or approve activities in the marsh consistent with the plan over a 30-year period of implementation. The Suisun Marsh Plan is available on Reclamation's website.

Annual figures are reported in Table 4-4 for DWR's up-front payments, Reclamation's reimbursements, General Fund reimbursements, and DWR's cumulative expenditure balance.

## Suisun Marsh Expenditure History

Suisun Marsh expenditures and reimbursements administered by DWR for calendar years 1968 through 2015 are summarized in Table 4-4. From 1968 through December 31, 2015, DWR disbursed more than \$162.1 million of SWP funds for planning, design, environmental documentation, construction, maintenance, monitoring, mitigation, and permit compliance in support of implementing the *Plan of Protection for the Suisun Marsh* through the SMPA and for meeting standards set by SWRCB. Reclamation has reimbursed DWR approximately \$61.2 million (38 percent), and the State's General Fund has reimbursed approximately \$9.5 million (5.9 percent). These figures do not include up-front payments made by Reclamation for staff and other direct costs, as well as approximately \$5.7 million in Reclamation interest payments during 1988 and 1989.



**Table 4-4 Suisun Marsh Expenditures and Reimbursements Administered by DWR, Calendar Years 1968–2015 (in dollars)**

Year [1]	Reach 305 Costs [2]	General Fund Payment [3]	Adjustment for General Fund Payment <sup>a</sup> [4]	Reclamation Invoice Payment <sup>d</sup> [5]	Interest Payment Credited Back to Contractors [6]	Net SWP Costs [2] through [6] [7]	Recreation Costs <sup>c</sup> [8]	SWP Water Contractors' Costs [7] minus [8] [9]
1968	10,571					10,571	359	10,212
1969	34,181					34,181	1,162	33,019
1970	23,343					23,343	794	22,549
1971	1,042					1,042	35	1,007
1972	47					47	2	45
1973	0					0	0	0
1974	0					0	0	0
1975	2,709					2,709	92	2,617
1976	32,960					32,960	1,121	31,839
1977	37,475					37,475	1,274	36,201
1978	350,831					350,831	11,928	338,903
1979	3,660,099					3,660,099	124,618	3,535,481
1980	5,005,759					5,005,759	170,772	4,834,987
1981	2,964,974					2,964,974	101,311	2,863,663
1982	2,955,705			(2,500,000)		455,705	101,111	354,594
1983	2,754,094					2,754,094	93,643	2,660,451
1984	2,418,344					2,418,344	82,388	2,335,956
1985	2,332,773					2,332,773	79,432	2,253,341
1986	6,495,322					6,495,322	220,843	6,274,479
1987	13,600,701					13,600,701	462,424	13,138,277
1988	7,456,364			(17,368,725) <sup>b</sup>	(2,039,752)	(11,952,113)	253,516	(12,205,629)
1989	2,341,960	(9,478,000)	6,634,600	(1,219,691) <sup>b</sup>	(283,857)	(2,004,988)	79,643	(2,084,631)
1990	3,030,010			(695,450)		2,334,560	101,460	2,233,100
1991	6,223,042			(2,925,429)		3,297,613	210,454	3,087,159
1992	2,737,259			(1,174,655)		1,562,604	91,951	1,470,653
1993	2,979,255			(238,130)		2,741,125	99,897	2,641,228
1994	3,192,213			(1,962,549)		1,229,664	107,281	1,122,383
1995	2,721,978			(647,138)		2,074,840	91,218	1,983,622
1996	3,391,678			(1,482,396)		1,909,282	113,244	1,796,038
1997	3,634,267			(1,520,219)		2,114,048	121,132	1,992,916
1998	5,342,834			(1,107,501)		4,235,333	177,132	4,058,201
1999	8,867,742			(2,696,200)		6,171,542	301,424	5,870,118
2000	2,857,534			(3,300,053)		(442,519)	98,146	(540,665)
2001	2,621,301			(444,009)		2,177,292	89,431	2,087,861
2002	3,752,486			(791,319)		2,961,167	124,387	2,836,780
2003	3,258,583			(2,389,979)		868,604	107,566	761,038
2004	2,874,629			(952,940)		1,921,689	94,885	1,826,804
2005	3,940,876			(1,409,296)		2,531,580	130,049	2,401,531
2006	5,770,068			(868,449)		4,901,619	192,622	4,708,997
2007	4,083,999			(939,879)		3,144,120	135,910	3,008,210
2008	3,802,297			(1,670,278)		2,132,019	126,064	2,005,973
2009	4,687,794			(1,123,705)		3,564,089	154,699	3,409,391
2010	2,840,455			(1,663,530)		1,176,925	93,735	1,083,190
2011	3,762,735			(1,748,136)		2,014,599	124,170	1,890,428
2012	6,374,544			(1,860,585)		4,513,959	210,360	4,303,600
2013	5,551,009					5,551,009	183,183	5,367,826
2014	4,974,994					4,974,994	164,175	4,810,819
2015	6,306,506			(6,538,766)		(232,260)	182,515	(414,776)
<b>Total</b>	<b>162,059,342</b>	<b>(9,478,000)</b>	<b>6,634,600</b>	<b>(61,239,007)</b>	<b>(2,323,609)</b>	<b>95,653,326</b>	<b>5,413,540</b>	<b>90,239,786</b>

<sup>a</sup> Under Assembly Bill 1442, the General Fund paid 20 percent of the Suisun Marsh costs through June 1988, which totaled \$9,478,000. This payment included \$2,843,400, which represents 5.9 percent of the costs through June 1988 paid by the General Fund. This amount has reduced the costs billed to the SWP water contractors. The remaining \$6,634,600 received from the General Fund represents DWR's recreation project purpose share of 14 percent.

<sup>b</sup> Excludes interest payments made by Reclamation.

<sup>c</sup> Allocation factors for capital recreation costs have changed from 14 percent to 3.4 percent, and operations and maintenance recreation costs from 14 percent to 3.3 percent.

<sup>d</sup> No payments were made by Reclamation in 2013 and 2014 due to disputed invoices. All disputed charges were resolved and paid in July 2015.





## Chapter 5

### Local Assistance

*California Irrigation Management Information System weather station buoy.*

## Significant Events in 2015

The program unit within the Department of Water Resources (DWR) that manages the California Irrigation Management Information System (CIMIS) conducted several outreach activities at farm shows and conferences to promote the use of CIMIS data to mitigate the impacts of drought. As a result, the CIMIS system received more data requests in 2015 than in any prior year.

DWR's Urban Water Use Efficiency Unit continued to review urban water management plans submitted for the 2010 cycle, and 242 reviews were finalized.

DWR's Water Use Efficiency Grant Program continued to manage approximately 170 grant agreements from previous proposal solicitations funded by Proposition 50.

DWR developed and released the application package for agricultural water management plan 2015 grants in October 2015. The grant program implements the Governor's Executive Order (EO) B-29-15, which directs DWR to prioritize grant funding for agricultural water management plans (AWMP) for midsized agricultural water suppliers.

*Information in this chapter was contributed by the Division of Statewide Integrated Water Management, the Division of Environmental Services, and the Division of Integrated Regional Water Management.*

The Department of Water Resources (DWR) manages the Davis-Grunsky Act program, water use efficiency, agricultural drainage, and Water Conservation Bond Law programs, and participates in several other programs that assist local agencies and benefit State Water Project (SWP) water contractors.

## Davis-Grunsky Act Program

The Davis-Grunsky Act, authorized in 1960 as part of the Burns-Porter Act, provides construction loans for local domestic water projects and agricultural water supply. It also provides grants for recreation and fish and wildlife enhancement. Additionally, loans and grants may be given to rehabilitate dams and reservoirs.

DWR's ongoing administration of Davis-Grunsky Act program loans and grants includes management and oversight of recreation projects and contracts. Administration costs are recovered from revenues generated by repayment of Davis-Grunsky Act loans. Recreation grant contracts are amended to reflect modification of DWR's fee oversight functions and actual construction of recreation facilities.

The Davis-Grunsky Act requires participating State agencies to operate and maintain the recreation projects, while DWR inspects the recreation facilities, monitors the recreation contracts, and maintains a list of the recreation projects.

## Water Use Efficiency

Activities of the Water Use and Efficiency Branch in the Division of Statewide Integrated Water Management include providing technical assistance to local agencies; managing water use efficiency financial assistance programs; managing the California Irrigation Management Information System (CIMIS); reviewing,

tracking, and reporting on urban and agricultural water management plans; and promoting water recycling/desalination projects.

## California Irrigation Management Information System

CIMIS is a network of automated weather stations that collects weather data and transmits it to a central repository in Sacramento. After performing quality control and calculations, data are made available to the public for such diverse purposes as irrigation scheduling, resource planning, research, and modeling.

In 2015, DWR's CIMIS network collected data from 146 stations, with approximately 50 percent of the stations on the network belonging to local cooperators. The demand for CIMIS data has been increasing steadily since its establishment in 1982. The number of registered data users has grown from 661 in 1989, to more than 55,000 in 2015.

Approximately 2.5 million reports were generated from the database using the CIMIS website in 2015. An additional 6 million reports were also retrieved from the CIMIS File Transfer Protocol site and CIMIS web services. The ongoing drought mitigation efforts may have led to the high demand for CIMIS data. Users can register online, access archived data, download data files, and peruse content about the CIMIS program and other helpful information. A separate but concurrently operating database and web application is maintained for redundancy to protect the data.



CIMIS continued providing the spatially distributed reference evapotranspiration ( $ET_0$ ) data, known as Spatial CIMIS, and expanded its user base through outreach activities. Spatial CIMIS is produced by coupling remotely sensed data from the National Oceanic and Atmospheric Administration's Geostationary Operational Environmental Satellite with point measurements from CIMIS stations to estimate  $ET_0$  data at 2-kilometer grids.

In addition to increasing the number of its stations, CIMIS made significant improvements to data quality and availability in support of California Water Code (CWC) requirements pertaining to conservation, development, and utilization of State water resources and the Model Water Efficient Landscape Ordinance (California Code of Regulations, Title 23, Sections 490–494), which requires all water suppliers to increase water use efficiency. It also requires, among other things, the development of agricultural water management plans and a 20 percent reduction in urban water consumption by the year 2020.

In 2015, DWR conducted several outreach activities at farm shows and conferences to promote the use of CIMIS data to mitigate the impacts of drought. As a result, the CIMIS system received more data requests in 2015 than in any prior year. In anticipation of increased future demand, the CIMIS program is in the process of exploring new technologies and methods to efficiently address CIMIS demand. In one such effort to quantify evaporation from water surfaces, in January 2015 a buoy was deployed to collect data for accurately estimating the amount of evaporated water and developing methodologies to use on other water bodies. This information will be significant for the public in general and for water managers in particular.

## Recycling and Water Desalination

The goal of the Division of Statewide Integrated Water Management's Recycling and Water Desalination Section is to improve water management by promoting the increased use of nonconventional water sources—namely recycled water and desalinated brackish and ocean waters—through planning, technical, and financial assistance. As part of a balanced water portfolio, nonconventional water sources will help meet existing and future water supply and environmental needs. The section's mission consists of increasing safe and beneficial reuse of treated municipal wastewater, advancing energy-efficient treatment and desalination technologies, and encouraging economically and environmentally acceptable use of desalinated brackish and ocean waters.

A primary activity of this section is to manage the Water Desalination Grant Program, funded by voter-approved bond issues: Proposition 50 in 2002 and Proposition 1 in 2014. There have been three rounds of Proposition 50 funding for 51 projects (completed and ongoing), which were awarded \$47.7 million for planning, construction, pilot studies, and research. All Proposition 50 funds have been obligated. Proposition 1 will provide \$93.1 million in local assistance, for which the first round of funding is planned for 2017.

## Water Use Efficiency Grants and Loans Program

Proposition 50 has provided approximately \$105 million for the Water Use Efficiency Grant Program since 2005. The grant program provided funds for implementation of all urban best management practices and agricultural efficient water management practices that would result in local, regional, and statewide benefits. The State benefits are water conservation, flow and timing, water quality, and energy efficiency, among others.

A competitive proposal solicitation package (PSP) was developed for all grant cycles, along with a comprehensive review and evaluation of the project proposals. The PSP defined project benefits, eligible projects, eligible applicants, funding caps, reporting, and other contract requirements.

In 2015, DWR's Water Use Efficiency Grant Program continued to manage close to 170 grant agreements from previous proposal solicitations funded by Proposition 50, pursuant to CWC Section 79550(g).

### ***Proposition 1 CalConserve Water Use Efficiency Revolving Fund 2015 Loan Program***

The CalConserve Water Use Efficiency Revolving Fund is intended to be a sustainable funding source for water use efficiency projects. One of the purposes of this fund is to provide measurable reductions in urban per capita potable water use.

In late 2015, DWR developed and released the *CalConserve Water Use Efficiency Revolving Fund Proposition 1 Draft 2015 Loan Guidelines and Proposal Solicitation Package*.

This loan program implements CWC Section 79746, added by Proposition 1, that authorizes DWR to provide funding to assist water suppliers and regions to implement conservation programs and measures that are not locally cost effective. The CalConserve Water Use Efficiency Revolving Fund, established by legislation in 2014 (CWC Section 81000–81046), provides funding available to DWR for the purpose of water use efficiency projects. Assembly Bill 92 (Chapter 2, Statutes of 2015; CWC Section 81023 ) further defines that \$10 million be established in the fund for water conservation and water use efficiency projects and programs to achieve urban water use targets. The loan program will provide local agencies with zero-interest loans of up to \$3 million.

Of the \$10 million in the CalConserve fund, \$5 million will be for a pilot project for local agencies to provide water efficiency upgrades to eligible residents, and \$5 million will be loaned to customers to finance the installation of onsite improvements to repair or replace, as necessary, cracked or leaking water pipes to conserve water. The final CalConserve guidelines and PSP are expected to be released in 2016.

### ***Proposition 1 Agricultural Water Use Efficiency 2015 Grants Program***

This grant program implements CWC Section 79746, added by Proposition 1 that authorizes DWR to provide funding for agricultural water management planning and agricultural water use efficiency projects and programs developed pursuant to CWC Section 10800–10802.

DWR prepared and released the *Draft Agricultural Water Use Efficiency 2015 Grants Proposition 1 Guidelines and Proposal Solicitation Package* in August 2015.

The grant program funds agricultural water use efficiency projects that produce State benefits. Benefits to the State include: water savings, improved in-stream flow, improved water quality, increased energy conservation, reduction of greenhouse gas emissions, and increased local water supply reliability. Thirty million dollars of the \$33 million of Proposition 1 funding allocated for agricultural water use efficiency grants in the Governor's budget are available through this PSP. The remaining \$3 million are allocated to fund a joint request for proposal with the California Department of Food and Agriculture for a pilot project that will encourage partnerships between an agricultural water supplier and its growers to save water and reduce greenhouse gas emissions through on-farm and districts' conveyance water use efficiency improvements. A separate PSP and guidelines are being developed jointly

with the California Department of Food and Agriculture, and a draft is expected to be released in 2016.

The \$30 million agricultural water use efficiency PSP gives priority to projects that are not locally cost-effective, employ a regional scope of activities, provide direct benefits to disadvantaged communities or economically distressed areas, produce multiple benefits, conserve energy and help the greenhouse gas emission reduction or carbon sequestration goals, and employ new or innovative technology or practices. Per the Governor's April 1, 2015, Executive Order (EO) B-29-15, priority in this solicitation will also be given to projects that implement agricultural water management plan (AWMP) actions for agricultural water suppliers serving 10,000 to 25,000 acres of irrigated land.

In accordance with legislative requirements, the draft PSP was posted on DWR's website in October 2015 to accept public comments. Three public workshops were conducted on November 3, 4, and 5, 2015, in Glendale, Sacramento, and Oroville, respectively.

The final Agricultural Water Use Efficiency PSP and guidelines are expected to be released in January 2016.

### ***Agricultural Water Management Planning Grants***

DWR developed and released the application package for agricultural water management plan 2015 grants in October 2015. The grant program implements the Governor's EO B-29-15, which directs DWR to prioritize grant funding for AWMPs for midsized agricultural water suppliers (agricultural water suppliers that provide water to 10,000 to 25,000 irrigated acres of land). The grant program is a noncompetitive program to fund AWMPs that meet the requirements of the Governor's EO B-29-15, and to provide sufficient funds to prepare plans

in order to meet the original intent of the CWC. One million dollars in grant funding was made available with a \$50,000 cap for suppliers preparing new plans, a \$10,000 cap for suppliers updating plans, and a \$5,000 cap for suppliers who must already submit plans to the Bureau of Reclamation. Grant applications are accepted and reviewed for approval on a continuous basis until all available funding has been awarded, or by May 31, 2016, whichever occurs first.

### ***Turf Replacement and High-Efficiency Toilet Rebate Programs***

In August 2015, DWR announced two rebate programs to help Californians further conserve water during the State's historic drought. The rebate programs are financed by the Proposition 1 water bond, approved by voters in 2014. The programs help carry out the Governor's April 1, 2015, EO B-29-15 on drought to further reduce water use in homes by replacing more than 10 million square feet of lawns and upgrading more than 60,000 water-wasting toilets. DWR oversees the rebate programs.

With \$24 million in Proposition 1 funding, the turf replacement program will rebate \$2 per square foot of turf replaced, up to \$2,000 per household, through State or local turf replacement programs. Consumers are eligible to replace turf that is living or dead at the time of the rebate application. The turf rebate program is estimated to benefit more than 10,000 homes, with a focus on disadvantaged communities hardest hit by the drought. Twelve million dollars of the lawn removal funds is targeted for residents in disadvantaged communities with areas of depleted groundwater basins. The turf rebate program is monitored by DWR and administered by the Electric & Gas Industries Association. Approximately \$1 million is targeted for lawn removal in institutional properties, such as schools, through an interagency agreement with the California Conservation Corps.



The \$6 million toilet rebate program, also funded by Proposition 1, will help Californians replace approximately 60,000 inefficient toilets by offering a \$100 customer rebate, per household, to replace them with high-efficiency toilets. Approximately \$6 million is being used to fund the direct installation of high-efficiency toilets in disadvantaged communities through an interagency agreement with the Department of Community Services and Development.

## Agricultural Water Management Plans

The CWC requires all water suppliers to increase water use efficiency. Agricultural water suppliers are responsible for preparing, implementing, and updating AWMPs, measuring the volume of water delivered to customers, adopting a pricing structure, and implementing efficient water management practices. Agricultural water suppliers that fail to meet the specified water management planning requirements are not eligible for water grants or loans awarded or administered by the State.

The Agricultural Water Management Planning Act (CWC Section 10800, et seq.) requires an agricultural water supplier to prepare and adopt an AWMP on or before December 31, 2012, and to update its AWMP on December 31, 2015, and every 5 years thereafter. Updated AWMPs have to be submitted to DWR within 30 days of adoption.

“Agricultural water supplier” is defined as a publicly or privately owned water supplier that provides water to 10,000 or more irrigated acres, excluding acreage that receives recycled water. An agricultural water supplier is a supplier of or contractor for water that distributes or sells water for resale. Every water supplier that becomes an agricultural water supplier after December 31, 2012, and provides water to 25,000 or more irrigated acres, excluding

recycled water, is responsible for preparing and adopting an AWMP within one year of becoming an agricultural water supplier. Agricultural water suppliers that provide water to less than 25,000 irrigated acres, excluding recycled water, are not required to adopt and implement AWMPs unless sufficient funding has specifically been provided for that purpose.

Agricultural water management and water use efficiency received major attention in the *California Water Action Plan Update 2013* as well as the Governor’s EO B-29-15. Under the Emergency Services Act, and in response to the declared Drought Emergency, the Governor issued EO B-29-15, which required all mid-sized agricultural water suppliers to develop AWMPs. Under EO B-29-15, these agricultural water suppliers must develop AWMPs and shall include a detailed drought management plan and quantification of water supplies and demands for 2013, 2014, and 2015, to the extent data is available. These AWMPs must be submitted to DWR by July 1, 2016.

In 2015, DWR conducted workshops, targeted phone conferences, and Agricultural Stakeholder Committee public meetings as part of updating the AWMP guidebook and developing guidance related to the new agricultural water management requirements in EO B-29-15.

After updating and releasing *A Guidebook to Assist Agricultural Water Suppliers to Prepare a 2015 Agricultural Water Management Plan*, DWR conducted workshops statewide to provide technical assistance and help agricultural water suppliers effectively use the provided guidebook while preparing and implementing their AWMPs. DWR also employed a new web-based tool to make it easier for suppliers to submit AWMP data and tables in a format that will allow DWR to better track and analyze information. DWR continued to provide technical assistance and answer inquiries on the development and implementation of AWMPs.

DWR received AWMPs from 64 agricultural water suppliers for the 2012 submittal cycle. Those plans represent approximately 3.6 million acres, or roughly 44 percent, of the 8.13 million acres of irrigated lands estimated in the *California Water Plan Update 2013*. Some of the 2012 AWMPs were submitted as late as the summer of 2015 because the suppliers needed more time to develop and adopt their first AWMPs. Out of 54 agricultural water suppliers identified as having more than 25,000 acres of irrigated land that were required to submit plans, 44 agricultural water suppliers submitted plans, representing 81 percent compliance.

DWR expects to start receiving the 2015 AWMPs from the agricultural water suppliers after January 2016.

## Urban Water Management Plans

In accordance with the Urban Water Management Planning Act (CWC Section 10610 et seq.), California urban water suppliers are required to adopt and submit urban water management plans to DWR every 5 years on or before December 31 in years ending in five and zero.

CWC Section 10617 defines “urban water supplier” as a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. Assembly Bill 2067 (Chapter 463, Statutes of 2014) amended CWC Sections 10608.42, 10621, 10631, and 10632 to require each urban water supplier to submit its 2015 plan to DWR by July 1, 2016. In addition, the bill extended the date by which DWR is required to review the plans and report to the Legislature to July 1, 2017. Senate Bill 1036 (Chapter 285, Statutes of 2014) and Senate Bill 1420 (Chapter 490, Statutes of 2014) amended CWC Sections 10631 and 10644 regarding voluntary reporting of energy intensity, electronic submittal, standardized

forms, water loss, and estimating future water savings.

In 2015, DWR continued to review urban water management plans submitted for the 2010 cycle, and 242 reviews were finalized.

DWR also collected the information reported in urban water management plans into a database and provided reports on urban water use data to the Governor, legislators, the media, and interested members of the public. These reports were posted online.

## 20 Percent Urban Water Use Reduction by 2020

The CWC directs DWR to be the lead agency in implementing a number of separate actions that would guide the State to a targeted reduction of 20 percent of urban water use by 2020. To implement these actions through a public process, DWR convened and continues to work with an Urban Stakeholder Committee to provide guidance and input.

Many of these actions required the development of methodologies, for use by urban water agencies, to calculate agency-level targets and progress toward meeting their water use reduction targets by 2020.

DWR is required to report to the Legislature by the end of 2016 and make recommendations on needed changes if the State is not on track to meet per capita targets. Data analysis is ongoing in preparation for this report.

## Integrated Regional Water Management Grant Program

The Integrated Regional Water Management (IRWM) Grant Program provides funding for planning, disadvantaged community involvement, implementation, and companion grant programs that support sustainable groundwater planning and



water-energy programs and projects. The program is funded in part by Proposition 84.

### **Proposition 84**

In 2015, draft recommendations were made for the final round of Proposition 84 implementation grants. IRWM will award \$231.6 million to 27 grant recipients for projects totaling more than \$1 billion in improvements to water supply reliability projects.

## **Agricultural Drainage Program**

The Agricultural Drainage Program's mission is to seek in-valley solutions to surface and subsurface agricultural drainage water problems, particularly in the San Joaquin Valley, and to improve water quality in the San Joaquin River.

This program consists of several activities, including drainage monitoring and evaluation, drainage treatment, integrated on-farm drainage management, drainage reduction and reuse, environmental services, and the San Joaquin River Water Quality Improvement Program.

In 2015 the following activities were conducted:

- monitoring shallow groundwater levels and flows and collecting water quality data for drainage water from west side San Joaquin Valley tile drain sumps;
- measuring groundwater levels quarterly for approximately 200 wells in Kern County;
- preparing shallow groundwater and irrigation methods maps of drainage-impaired areas using drainage monitoring data in conjunction with land use and irrigation methods data;
- providing assistance for collecting groundwater, soil, and operational data

for the integrated on-farm drainage management project at Red Rock Ranch in western Fresno County;

- collecting flow, electrical conductivity, and temperature data from several satellite-linked and web-accessible stations on the mainstem of the San Joaquin River for the Real-time Water Quality Monitoring Program;
- producing weekly forecasts of salinity and flow conditions on the San Joaquin River near Vernalis and other upstream stations using the San Joaquin River Input-Output Day model, and publishing them on DWR's website;
- testing the Watershed Analysis Risk Management Framework model (developed by the University of California, Merced, and the Bureau of Reclamation) and working with the Bureau of Reclamation to refine it for use to replace the current San Joaquin River Input-Output Day model;
- collaborating with the Central Valley Regional Water Quality Control Board and State Water Resources Control Board's initiative, the Central Valley Salinity Alternatives for Long-term Sustainability, by providing data, attending committee meetings, and reviewing program documents; and
- maintaining a DWR website that includes information on drainage programs and activities, salinity and shallow groundwater maps, grants, and links related to other agricultural drainage programs.

## **San Joaquin River Water Quality Grant Program**

The program provides funding to support projects that will result in direct, measurable water quality improvements to the San Joaquin River by reducing or eliminating discharges of subsurface agricultural drainage, a significant water quality concern for the San Joaquin River. The guidelines and PSP for the program were

released in November 2015. The amount of funding available was \$36.6 million from Proposition 84. The due date for applications is March 4, 2016.

## **Water Conservation Bond Laws**

To help local agencies obtain financing for their water management programs, California voters have approved a number of bond laws authorizing DWR to provide grants and low-interest loans to fund project feasibility studies or construction activities. Recent bond laws are summarized below, with focus on funds administered by DWR.

- The Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006 (Proposition 84; Public Resources Code Sections 75001–75130) authorized \$1 billion to continue the IRWM Grant Program. Under this program, grants and construction loans are available with repayment periods of up to 20 years at reduced interest rates for most programs.
- The Water Quality, Supply, and Infrastructure Improvement Act of 2014 (Proposition 1; CWC Sections 79700–79798) authorized the appropriation of \$510 million in IRWM funding for implementation and planning efforts. Funds for water use efficiency and desalination projects are also authorized.

Please see previous bulletins for historical authorizations.



## Chapter 6

# Legislation and Litigation

*Canada Geese at Lake Oroville.*

## Significant Events in 2015

**L**egislation related to drought response and planning; water management and infrastructure projects; urban water management plans; groundwater management; atmospheric rivers; and water supply, reliability, and flood control passed in 2015.

*Information for this chapter was provided by the Legislative Affairs Office and the Office of the Chief Counsel.*



The Department of Water Resources (DWR) monitors State and federal legislation that affects management of the State Water Project (SWP). Legislative bill tracking involves reviewing legislation at its introduction, evaluating amendments in State Assembly and Senate committee hearings, and monitoring its enactment into law. The DWR Assistant Director for Legislation monitors proposed legislation. The Office of the Chief Counsel tracks State and federal litigation that impacts management of the SWP. The DWR Chief Counsel also manages legal cases that involve SWP operations.

## Legislation

### State Legislation

#### ***AB 91 (Committee on Budget; Chapter 1, Budget Act of 2014)***

Assembly Bill (AB) 91, an amendment to the Budget Act of 2014, expedited General Fund, Proposition 1E bond fund, and Greenhouse Gas Reduction Fund monies for activities related to drought response and planning, as well as other water management and infrastructure projects.

#### ***AB 92 (Committee on Budget; Chapter 2, Budget Act of 2014)—Water: Drought***

This bill made changes to various provisions of law to address immediate actions associated with the State's drought conditions. Specifically, it granted new authorities to the State Water Resources Control Board (SWRCB), expedited drought response through exemption of certain actions from the California Environmental Quality Act (CEQA), and authorized funding for the removal of a salinity barrier installed in the Sacramento-San Joaquin Delta.

#### ***AB 149 (Chavez; Chapter 49, Statutes of 2015)—Urban water management plans***

AB 149 extends the date for urban water suppliers to submit their 2020 Urban Water Management Plans by 6 months, which allows DWR extra time to submit

its consolidated report to the Legislature. This bill also allows for the most current census population data to be used in planning efforts.

#### ***AB 617 (Perea; Chapter 666, Statutes of 2015)—Groundwater***

This bill made various changes to the Sustainable Groundwater Management Act of 2014. Specifically, it created a pathway for compelling State agencies to comply with a groundwater plan, and it allowed for an extension to implement a groundwater sustainability plan if litigation had prevented implementation.

#### ***AB 1390 (Alejo; Chapter 672, Statutes of 2015)—Groundwater: comprehensive adjudication***

This bill establishes a special procedure for a comprehensive adjudication, defined as an action filed in superior court to determine the rights to extract groundwater in a basin. It authorizes the court to determine all rights to groundwater in a basin whether based on appropriation, overlying right, or other rights.

#### ***SB 13 (Pavley; Chapter 255, Statutes of 2015)—Groundwater***

Senate Bill (SB) 13 made technical changes to the Sustainable Groundwater Management Act of 2014 to improve groundwater management in California.



***SB 208 (Lara; Chapter 675, Statutes of 2015)—Integrated regional water management plans: grants: advanced payment***

This bill established a requirement for DWR, within 60 days of receiving project information for projects that satisfy specified criteria, to provide advanced payment of 50 percent of the grant awards. It also requires that the advanced funds be handled as prescribed in the bill.

***SB 226 (Pavley; Chapter 676, Statutes of 2015)—Sustainable Groundwater Management Act: adjudication***

SB 226 provides for expedited groundwater basin adjudication with the intent of encouraging early settlement and avoiding lengthy adjudication processes. The bill makes provisions to integrate and streamline the adjudication process for groundwater basins subject to the Sustainable Groundwater Management Act so that future adjudication furthers the objectives of the act.

***SB 664 (Hertzberg; Chapter 681, Statutes of 2015)—Water: urban water management planning***

This bill establishes a requirement that an urban water supplier include within its plan, beginning January 1, 2020, a seismic risk assessment and mitigation plan to assess the vulnerability of each of the various facilities of a water system and mitigate those vulnerabilities. The bill authorizes an urban water supplier to comply with this requirement by submitting a copy of the most recently adopted local hazard mitigation plan or multihazard mitigation plan under specified federal law that addresses seismic risk.

***SB 758 (Block; Chapter 682, Statutes of 2015)—Atmospheric Rivers: Research, Mitigation, and Climate Forecasting Program***

SB 758 established the Atmospheric Rivers: Research, Mitigation, and Climate Forecasting Program in DWR to, upon appropriation of special fund monies, research the causes and effects of atmospheric rivers; take actions to capture water generated by atmospheric rivers to increase the water supply and reliability of water resources in the State; and operate reservoirs in a manner that improves flood protection in the State.

## Federal Legislation

There was no significant federal legislation in 2015 affecting management of the SWP.

## Litigation

As of December 31, 2015, DWR was involved in, or closely monitored, a number of court cases and other actions related to the management of the SWP.

### Sacramento-San Joaquin Delta Delta Smelt

***Delta Smelt Consolidated Cases. San Luis & Delta-Mendota Water Authority v. Jewell (9th Cir. 2014 747 F.3d 581).*** Litigation stemming from a coalition of environmental groups' challenge to the 2005 biological opinion (BiOp) on Delta Smelt issued by the U.S. Fish and Wildlife Service (USFWS) continued. After judicial review, the 2005 BiOp was found to be unlawful, and USFWS was ordered to prepare a new one. On December 15, 2008, USFWS issued a new BiOp, which required sufficient quantities of fresh water be allowed to flow through the Delta to promote the survival and recovery of Delta Smelt. State and federal water contractors, along with DWR, challenged the BiOp in court alleging that the BiOp violated the National Environmental Policy Act (NEPA), the federal Endangered Species

Act (ESA), and the Administrative Procedure Act (APA.) (For details about this litigation prior to 2015, see Bulletin 132-15 and earlier bulletins.)

On May 12, 2014, DWR, along with State and federal water contractors, filed a petition for rehearing, arguing that the Ninth Circuit Court of Appeals decision did not apply the standard of review that has been established by the U.S. Supreme Court and Ninth Circuit precedent. DWR's petition for rehearing was denied on July 23, 2014. In September and October, State and federal water contractors filed petitions for writ of certiorari seeking review of the Ninth Circuit's decision by the U.S. Supreme Court. The Supreme Court did not rule on the petitions in 2014.

On January 12, 2015, without hearing oral arguments and without ruling on the merits of the case, the Supreme Court denied the petitions of the farmers and water districts seeking review of the March 2014 decision by the Ninth Circuit, thus upholding the 2008 BiOp.

## Salmon

**The Consolidated Salmon Cases (U.S. Dist. Ct., Eastern Dist. Cal., No. 1:09-cv-1053).** *San Luis & Delta-Mendota Water Authority, et al. v. Gary F. Lock, as Secretary of the United States Department of Commerce, et al.* (U.S. Dist. Ct., Eastern Dist. Cal., No. 1:09-cv-1053); *Stockton East Water District, et al. v. National Oceanic and Atmospheric Administration, et al.* (U.S. Dist. Ct., Eastern Dist. Cal., No. 1:09-cv-1090); *State Water Contractors v. Gary F. Locke, Secretary, etc., et al.* (U.S. Dist. Ct., Eastern Dist. Cal., No. 1:09-cv-1053); *Kern County Water Agency, et al. v. United States Department of Commerce, et al.* (U.S. Dist. Ct., Eastern Dist. Cal., No. 1:09-cv-1520); *Oakdale Irrigation District, et al. v. United States Department of Commerce, et al.* (U.S. Dist. Ct., Eastern Dist. Cal., No. 1:09-cv-1580); *The Metropolitan Water District of Southern California v. National Marine Fisheries Service, et al.* (U.S. Dist. Ct., Eastern Dist. Cal., No. 1:09-cv-1625).

Litigation stemming from a challenge to the 2004 BiOp issued by the National Marine Fisheries Service (NOAA Fisheries) continued. In August 2005, a coalition of environmental groups challenged the 2004 BiOp in federal district court. On April 16, 2008, the court held that the 2004 BiOp violated the ESA and APA and ordered NOAA Fisheries to prepare a new BiOp. NOAA Fisheries issued a new BiOp in June 2009. In September 2009, federal and State water contractors challenged the issuance and adoption of the BiOp on the grounds that the federal defendants failed to comply with NEPA, the ESA, and the APA. DWR joined the litigation in January 2010. (For earlier information about this litigation, see Bulletin 132-15 and prior bulletins.)

On December 22, 2014, a panel for the Ninth Circuit Court of Appeals issued its opinion, overturning in part and upholding in part the district court's ruling.

The panel held that the district court did not give NOAA Fisheries the substantial deference it was due under the APA. The panel found that the components of the BiOp invalidated by the district court were reasonable and supported by the record and therefore the panel upheld the BiOp in its entirety. Given that the U.S. Supreme Court denied review of the Delta Smelt case, parties did not file for Supreme Court review of the consolidated salmon cases.

**State Water Resources Control Board California Sportfishing Protection Alliance, et al. v. California State Water Resources Control Board, et al., California Department of Water Resources and United States Bureau of Reclamation, Real Parties in Interest (Case No. RG15-780498).** The California Sportfishing Protection Alliance filed a petition for writ of mandate challenging the SWRCB's orders granting Temporary Urgency Change Petitions to DWR and the Bureau of Reclamation (Reclamation) in 2014 and 2015. DWR and Reclamation are named as

real parties in interest. On September 16, 2015, the California Sportfishing Protection Alliance filed a first amended complaint claiming that the SWRCB's orders violate the federal Clean Water Act, the Central Valley Basin Plan, and the Public Trust Doctrine. On October 21, the SWRCB filed a demurrer to dismiss the action. A hearing on the matter was set for December 14, 2015.

***California Water Impact Network, California Sportfishing Protection Alliance, and AquAlliance v. California State Water Resources Control Board and California Department of Water Resources (Super. Ct. Sacramento County, No. 34-2010-80000653).***

These conservation groups allege that permit approvals and enforcement failure by the SWRCB has allowed DWR to cause extensive damage to the San Francisco Bay/Sacramento-San Joaquin Delta Estuary and the fish and wildlife that live there. The administrative record was prepared.

There was no new activity in this case in 2015.

***Bay Delta Conservation Plan***

***Property Reserve, Inc. v. The Superior Court of San Joaquin County; Department of Water Resources, real party in interest: The Carolyn Nichols Revocable Living Trust v. The Superior Court of San Joaquin County; Department of Water Resources, real party in interest (C067765) Coordinated Proceedings Special Title (Rule 3.550) (C067758, writ denied).*** Twenty-four Delta property owners declined DWR's request to gain temporary entry onto their properties to perform environmental and geological surveys. DWR sought orders for temporary entry onto the respondents' properties under Code of Civil Procedure Section 1245.010 et seq. (More information about this litigation is available in Bulletin 132-14 and earlier bulletins.)

On March 13, 2014, the Third District Court of Appeal determined that the precondemnation entry order process was not sufficient to give DWR access to private

properties to conduct the surveys. The court ruled that both the geotechnical studies and less disruptive environmental surveys would constitute takings, and therefore, DWR would need to bring condemnation actions to get the access it sought. By the end of 2014, an appeal had been filed with the Supreme Court of California, where briefing was completed in early 2015.

***Jones Tract***

***Armando P. Vanni, et al. v. Rindge Land Reclamation District #2039 (Super. Ct. San Joaquin County, No. C072383, app. pending).***

Three consolidated lawsuits alleging damages arising out of the levee breach on Upper Jones Tract in 2004 went to trial from August 22 to December 29, 2011.

In April 2012, the court entered judgment in favor of DWR. The court found that the plaintiffs failed to show a causal connection between the levee failure and SWP operations. The plaintiffs appealed.

On December 30, 2014, the Third District Court of Appeal rejected the plaintiffs' contention that the judgment was based on a factual premise not supported by evidence and affirmed the judgment. On January 21, 2015, the Supreme Court of California denied the Petition for Review.

***State Water Resources Control Board Hearing***

SWRCB Water Right Decision 1641 contains a water quality objective requiring DWR to annually maintain 0.7 millimhos per centimeter electrical conductivity at three compliance points within the South Delta, from April 1 through August 31, beginning in 2005. In response to allegations that the water quality objective was not being met and would not be met, the SWRCB issued a cease and desist order, which was final on May 16, 2006, requiring DWR and Reclamation to take corrective actions to eliminate the threat of noncompliance.



After a period of negotiations, the SWRCB issued a final order in 2010, modifying its 2006 order, which extended the schedule to implement measures to meet the water quality objectives pending completion of the SWRCB's review and potential modification of the salinity objectives. The order also required DWR, along with Reclamation, to undertake studies to assess the feasibility of implementing various measures to meet the salinity objectives.

Through continued coordination with the Delta Watermaster, additional studies began in 2012 to determine the sources of this local salinity and to explore options for reducing those sources. Preliminary results of these studies indicated significant local sources of salinity. Coordination with the Delta Watermaster continued in 2015.

## Hydropower

### ***Oroville Relicensing—Federal Energy Regulatory Commission Project No. 2100***

***Butte County et al. v. Department of Water Resources (C071785, app. pending).*** DWR is seeking renewal of the Federal Energy Regulatory Commission (FERC) license for its hydroelectric generation facilities at Oroville (Project No. 2100). DWR filed its relicensing application in 2005. The original 50-year FERC license expired on January 31, 2007. In February 2008, FERC authorized continued operation by issuing an annual license—under the same terms and conditions—that renews each year until FERC issues a new license. (Details of the license renewal negotiations and earlier litigation are described in previous bulletins.)

In January 2012, the court denied the petitioner's requests to set aside the EIR prepared by DWR and upheld the award to DWR of \$675,087 in charges for the administrative record required to proceed with the suit. The court found that the EIR was legally adequate and noted that the record preparation complied with the

California Environmental Quality Act (CEQA) and was reasonable and necessary. The petitioners, Butte and Plumas counties, appealed the judgment, and the appellate briefs were filed in 2013.

Oral argument on the appeal was pending through 2015.

## Other Cases

### ***The Monterey Amendment***

***Central Delta Water Agency et al. v. California Department of Water Resources (Super. Ct. Sacramento County, No. 34-2010-80000561) (Central Delta I); Central Delta Water Agency et al. v. Kern County Water Agency et al., DWR et al., real parties in interest (Super. Ct. Kern County, No. S-1500-CV-270965) (Central Delta II); Rosedale-Rio Bravo Water Storage District and Buena Vista Water Storage District v. DWR (Super. Ct. Kern County, No. S-1500-CV-270635-KCT) (Rosedale-Rio Bravo) (C098249, app. pending).*** Legal challenges were brought against the 1995 Monterey Amendment and the EIR adopted by DWR in 2010. (The Monterey Amendment, litigation challenging the amendment and the first EIR, the settlement of that litigation, development of the second EIR (Monterey Plus EIR), and litigation prior to consolidation of the cases in Sacramento County Superior Court are described in earlier bulletins.)

After holding a hearing on the CEQA challenges in the remaining two cases, the trial court ruled that most of the EIR was adequate under CEQA, but that the EIR's discussion of the impacts on continued use and operation of the Kern Water Bank was insufficient. The court issued a decision in favor of the plaintiffs in the two cases finding that the EIR failed to analyze impacts associated with the use and operation of the Kern Water Bank, particularly as to potential groundwater and water quality impacts. On October 2, 2014, the court ordered DWR, as the remedy for the deficiency, to provide additional environmental analysis on the

future impacts of the continued use and operation of the Kern Water Bank and, upon completion of the EIR process, to determine whether to continue use and operation of the Kern Water Bank. On November 24, 2014, the court ordered DWR to set aside the certification of the Monterey Plus EIR and set a deadline of December 31, 2015, for DWR to correct deficiencies in and recertify the Monterey Plus EIR. In December 2014, one set of plaintiffs filed a notice of appeal with the court of appeal. The plaintiffs are appealing the lower court's final CEQA and validation decisions.

On August 10, 2015, the court granted DWR's request for an extension and set a new deadline of June 30, 2016, for completion of a revised Monterey Plus EIR.

### **Construction Arbitration**

***D.A. McCosker Construction Co., dba Independent Construction Company v. Department of Water Resources (OAH/PWCA No. A-0021-2013)***. This dispute arose out of the construction of Dyer Reservoir under a contract for \$11 million. The work concluded in 2012, nearly 2 years behind schedule. In September 2013, the contractor brought a binding arbitration action seeking additional compensation in the amount of \$12 million due to alleged defective specifications, differing site conditions, and owner-caused delay. DWR withheld over \$1 million in liquidated damages for late completion. Limited discovery was conducted in 2014, and a mediation that took place in December 2014 was unsuccessful. The arbitration hearing is scheduled to commence in January 2016.

### **Colorado River**

***Quantification Settlement Agreement Cases ((2015) 237 Cal.App.4th 72; (2014) 767 F.3d 781)***. These nine claims (which have been coordinated into a single proceeding before the Sacramento County Superior Court) and federal litigation challenge the

Quantification Settlement Agreement (QSA) and associated actions taken to implement the QSA—a collection of 38 agreements that resolve disputes among water users in Southern California regarding their rights to California's shrinking share of Colorado River water. (The QSA and earlier litigation activities are described in Bulletins 132-04 and 132-06 through 132-13.)

In State litigation, after the Sacramento County Superior Court issued a final judgment in July 2013 upholding the QSA's validity, another appeal was filed. In April 2015, the parties agreed to a settlement, and on May 26, 2015, the 3rd District Court of Appeal dismissed all remaining appeals.

On May 19, 2014, the Ninth Circuit Court of Appeals affirmed the judgment of the district court ruling that the Secretary of the Interior did not violate the NEPA or the Clean Air Act in approving the Colorado River Water Delivery Agreement. All remaining appeals were dismissed.

### **Clean Water Act**

***Catskill Mountains Chapter of Trout Unlimited, Inc., et al. v. United States Environmental Protection Agency, et al. (N.Y. Dist. Ct., No. 7:08-CV-05606-KMK, app. pending)***. A number of environmental groups, private entities, and governmental agencies controlling or utilizing water filed an action challenging the application of the Environmental Protection Agency's (EPA) Water Transfer Rule under the Clean Water Act (CWA). The CWA provides that the discharge of any pollutant by any person without a National Pollution Discharge Elimination System Permit is unlawful. (33 U.S.C. Section 1311(a)). The federal statute defines a discharge of a pollutant to mean any addition of any pollutant to navigable water from any point source. The EPA has applied the CWA provisions to transfers of water between navigable bodies of water and not to "water transfers."



According to the CWA, “water transfers” are “an activity that conveys or connects waters of the United States without subjecting the transferred water to intervening industrial, municipal, or commercial use.”

On March 28, 2014, the court found the EPA Water Transfer Rule to be inconsistent with the CWA. The case has been appealed. As the outcome of the case will have a direct and material effect on the operations of the SWP, in June 2014, DWR filed a friend of the court brief (an amicus curiae brief) to advise the court of relevant information and arguments the court might wish to consider. Oral argument was scheduled for December 1, 2015.

***Oregon Natural Resources Council, Inc., et al. v. Bureau of Reclamation, et al. (798 F.3d 933 (2015))***. The CWA prohibits discharge of any pollutant into navigable waters from any source. However, the CWA allows for the EPA to issue a permit authorizing the discharge of a pollutant in certain instances. If an activity conveys or connects waters of the United States without subjecting the transferred water to intervening industrial, municipal, or commercial use it is excluded from the permit requirement.

Oregon Natural Resources Council, Inc. filed suit against Reclamation alleging that Reclamation violated the CWA by discharging pollutants into the Klamath River from the Klamath Straights Drain without the necessary permit. After initiation of the suit, the EPA adopted a rule that provides an additional exemption from permitting under the CWA for an activity that moves water between two navigable waters without an intervening use. The court held that the rule was a valid regulation because it was a reasonable interpretation of the CWA. This ruling means that the water transfer activities by DWR in California (e.g., routing water through tunnels, channels, or natural streams and directing it to use for irrigation,

municipal, or power purposes) are not subject to the permitting process under the national pollutant discharge elimination system program.

In June 2014, DWR filed a friend of the court brief (an amicus curiae brief) to advise the court of relevant information and arguments the court might wish to consider. Oral arguments for the appeal were heard on November 21, 2014.

On August 21, 2015, the Ninth Circuit Court of Appeals issued its determination that a permit is not required under the CWA for waters flowing from the Klamath Straits Drain into the Klamath River.

## Environmental Review Acts

The National Environmental Policy Act (NEPA) (Title 42 United States Code Sections 4321 et seq.) and the California Environmental Quality Act (CEQA) (California Public Resources Code Sections 21000 et seq.) require government agencies to document and consider environmental consequences of their actions in their decision-making processes. NEPA states that it is the goal of the federal government to use all practicable means consistent with other considerations of national policy to protect and enhance the quality of the environment. All federal agencies must prepare an environmental impact statement (EIS), including a discussion of mitigation measures and alternatives, for federal actions that could significantly affect environmental quality.

CEQA is patterned after NEPA. Under CEQA, State and local agencies are required to (1) disclose, through an environmental impact report (EIR), the significant impacts a proposed project would have on the environment, and (2) identify ways to reduce or avoid environmental damage.

CEQA applies to projects directly undertaken, funded, or approved by State or local agencies. NEPA applies to projects directly undertaken, funded, or approved by federal agencies. The Department of Water Resources (DWR) conducts many projects in cooperation with federal agencies. In these cases, both CEQA and NEPA must be followed.

NEPA requires that mitigation measures and alternatives be disclosed to the public in the EIS, but it does not generally require federal agencies to adopt such mitigation measures or alternatives. CEQA does impose substantive duties on all California government agencies approving projects with significant environmental impacts to adopt alternatives or mitigation measures that they find to be feasible to substantially lessen these impacts, unless there are overriding reasons they cannot. When a project is subject to both CEQA and NEPA, both laws encourage agencies to cooperate in planning the project and preparing joint environmental documents.

The environmental review process allows citizens to learn about a proposed project and its potential significant effects and to participate in the decision-making process by providing feedback on agency information. The review process requires agencies to:

- describe the proposed project and the purpose or need for it;
- identify the lead and cooperating agencies involved in the project;
- invite interested parties to participate in the process;
- determine the scope of study with input from responsible agencies and the public;
- prepare and distribute a draft EIS or EIR;
- respond to comments received on the draft;
- prepare the final EIS or EIR;
- make findings and adopt feasible alternatives or mitigation measures to avoid significant effects, if applicable;

## Environmental Review Acts

- adopt a monitoring plan to ensure compliance with mitigation measures; and
- prepare a list of permits required to implement the project if it is approved.

The scoping phase, which occurs early in the review process, is particularly important because it enables government agencies to identify issues and topics to be considered or addressed in the EIS or EIR.

Information gathered in the scoping phase helps agencies identify and evaluate reasonable alternatives, identify potential environmental impacts of the project, determine data and information needed, develop a work schedule, and allocate resources for preparing and distributing the draft environmental document for public review and comment.

NEPA requires a lead agency to involve the public during scoping, while CEQA does not. CEQA, however, does encourage public involvement, and agencies often opt to conduct activities that provide for wide public involvement. Members of the public may raise issues and identify additional alternatives, environmental effects, methods of assessment, and mitigation measures during the scoping phase and continue to participate in the review process for the draft environmental document. Thus, the CEQA process may lead to changes in a project through the development, consideration, and adoption of alternatives or enforceable mitigation measures to avoid or reduce any potential significant adverse effects on the environment.

If the project is approved, the lead agency publishes a document discussing all the factors considered in reaching its decision to proceed with the proposed action. It also discusses whether all practical means to avoid or minimize environmental harm have been adopted, and if not, the reasons they were not.







## **Chapter 7**

# **Water Supply Development and Reliability**

*Emergency drought barrier construction nears completion on the West False River in the Sacramento-San Joaquin Delta.*

## Significant Events in 2015

*A*s the State continued to experience one of the driest periods on record, the State Water Resources Control Board (SWRCB) convened several workshops and approved a number of temporary urgency change petitions (TUCPs) from the Department of Water Resources (DWR) and the Bureau of Reclamation (Reclamation) to modify their water right permits for the State Water Project (SWP) and Central Valley Project (CVP).

In May, due to severe drought conditions, a temporary emergency drought barrier was installed on West False River between Jersey and Bradford islands to deter saltwater intrusion from the San Francisco Bay and to conserve water in upstream reservoirs needed to protect Delta water quality. The barrier was removed in November.

In July, *The State Water Project Final Delivery Reliability Report 2015* was released.

*Information in this chapter was contributed by the State Water Project Analysis Office, the Division of Integrated Regional Water Management, the Division of Statewide Integrated Water Management, and the Bay-Delta Office.*

The Department of Water Resources (DWR) works to improve the reliability of State Water Project (SWP) water supplies and the long-term water contract annual Table A water allocations delivered to SWP water contractors. DWR is engaged in planning activities to develop additional water supplies and storage capacity.

Developing new water supplies and storage projects that are economically, environmentally, and technically sound, while satisfying institutional requirements and political concerns, presents significant challenges. Many concerns center on possible adverse effects that additional storage and delivery facilities may have locally and on the Sacramento-San Joaquin Delta (Delta). In the SWP conveyance system, the Delta is the critical link between water supplies in the Sacramento Valley and deliveries to the rest of the Central Valley and Southern California.

DWR works with the State and federal governments, local agencies, and public interest stakeholder groups to ensure water supply reliability now and in the future. To meet SWP water contractors' needs for sufficient water supplies, DWR is engaged in planning, developing, and providing local assistance with the objective of augmenting future SWP water supplies.

## Supply Development and Reliability

Activities DWR is engaged in to augment future SWP supplies include:

- facilitating transfers between SWP long-term water contractors and other agencies, including Central Valley Project (CVP) contractors;
- funding studies on the Giant Garter Snake, a protected species known to inhabit rice growing regions of the Sacramento Valley, and on rice

evapotranspiration, to better understand issues related to the transfer of water made available by crop idling;

- supporting the planning and implementation of local and regional conjunctive-use projects in the Sacramento Valley;
- constructing, operating, and maintaining groundwater and land subsidence monitoring networks to detect potential impacts caused by groundwater substitution transfers and other groundwater management activities in the Sacramento Valley;
- assisting with the development and implementation of restoration projects in the Feather River watershed to reduce sedimentation in Lake Oroville and preserve watershed storage capacity; and
- investigating and evaluating storage projects.

## Water Conveyance Through the SWP

DWR encourages and facilitates temporary transfers of water using SWP conveyance facilities for SWP water contractors and other agencies to help meet local, State, and environmental water supply needs. As a practical matter, SWP facilities are often needed to convey transfer water from the existing place of use to the place of use of the transferee. State law requires DWR to make unused SWP capacity available for transfers upon payment of fair compensation, provided that (1) no legal user of water will be injured; (2) there will be no unreasonable effect on fish, wildlife, or

other instream beneficial uses; and (3) there will be no unreasonable effect on the overall economy or the environment of the county from which the water is being transferred (California Water Code [CWC] Section 1810). Water transfers can involve transfers and exchanges among SWP water contractors, between SWP water contractors and non-SWP entities, or between two or more non-SWP entities.

### ***Transfer and Exchange Evaluations***

An important element of any water transfer is to determine what quantity of water, if any, is transferable.

The transferability of water depends on many factors including the source of the water being transferred, what is being done to make water available, when the water can be made available, and the type of water right the existing user holds. Several CWC provisions authorize temporary transfers of water rights issued by the State Water Resources Control Board (SWRCB) (appropriative water rights issued after 1914) and placed conditions on the transfers to protect those not involved in them.

Short-term transfers, of less than one year, are authorized under CWC Sections 1725–1732. Long-term transfers, for periods greater than one year, are authorized by CWC Sections 1735–1737. Other CWC sections specify conditions under which water can be transferred and legal protections for those transferring water.

Transfers based on water rights obtained before 1914 are not under SWRCB jurisdiction but must comply with the requirements of the California Environmental Quality Act (CEQA) and possibly the National Environmental Policy Act (NEPA).

The CWC sections noted above contain provisions intended to protect other legal users of water and fish and wildlife from

the possible adverse effects of a water transfer. These provisions reflect the concept that changes can be made to the authorized place and purpose of use or point of diversion of a water supply as long as there is no injury to others as a result of the change (the “no injury rule”). The no injury rule in State water law is intended to protect other legal users from the potential expansion of water use beyond what would have been consumed by the original users in the absence of the transfer. Hence, under the no injury rule, only “new water” is transferable (i.e., water added to the downstream water supply only as a result of the transfer). To protect other users, a transfer would not be authorized to the extent that it would reduce the amount or timing of water that would otherwise be available to downstream users, regardless of the water right priority of those users.

CWC Section 1810(d) requires DWR to consider potential impacts of a transfer on legal users, instream uses, and the economy of the area from which the water would be transferred. DWR must determine whether to allow the use of any unused available water conveyance capacity for a transfer under this section. DWR reviews each request to transfer water through SWP facilities to assure that only new water will be transferred. This requirement applies to transfers based on both pre-1914 and post-1914 water rights.

Transfer water is most commonly developed through one of four methods: surplus water release from storage facilities, substituting groundwater for transferred surface water, idling agricultural land, and undertaking conservation activities that develop new water. Because transfers may result in direct impacts and third-party impacts (impacts to parties not involved in the transfer), certain CWC provisions were enacted to limit potential impacts. For example, since additional groundwater pumping from a groundwater substitution project may



potentially affect other groundwater users in the area, CWC Section 1745.10 requires that the groundwater substitution project: (1) be consistent with a groundwater management plan adopted pursuant to State law for the affected area or (2) if a management plan has not been adopted, the transfer project proponent determines the transfer would not create or contribute to conditions of long-term overdraft in the affected groundwater basin.

Injury can also occur due to streamflow depletion induced by increased pumping from wells for groundwater substitution transfers. Consequently, to mitigate possible impacts from groundwater substitution transfers, DWR assesses a streamflow depletion factor, which represents an estimate of the potential effects of the additional groundwater pumping on the surface water system. Each type of transfer has its own set of potential impacts that must be evaluated to protect parties not involved in the transfer.

With the exception of short-term transfers under CWC Section 1725 et seq. (which provides for an expedited process for water rights issued by the SWRCB), water transfers are subject to compliance with CEQA and, possibly, NEPA. The CEQA/NEPA and SWRCB processes provide opportunities for public review and comment on water transfer proposals. The Governor's January 17, 2014, Drought Emergency Proclamation directed DWR and the SWRCB to expedite the review and approval of water transfer proposals and suspended the provisions of CEQA for actions taken by DWR related to transfers. The proclamation did not suspend CEQA for local agencies.

Staff in DWR's State Water Project Analysis Office, Division of Operations and Maintenance, Division of Integrated Regional Water Management, and the Office of the Chief Counsel evaluate proposed water transfers to determine whether the transfers will impact the SWP, other water users, the

environment, or the area from which the water will be transferred.

## SWP Delivery Capability Report

*The State Water Project Final Delivery Capability Report 2015* was released in July 2015. The next update of this report is expected in March 2017.

Delivery capability depends on three factors:

- (1) the availability of water at the source;
- (2) the ability to convey water from the source to the desired point of delivery; and
- (3) the level of demand.

To assist local agencies with assessing their overall water supply needs, and the amount of deliveries that they can expect from the SWP, the 2015 report and its appendices provide information on the annual SWP deliveries in the 10-year historical sequence preceding the publication date (2005–2014); the status of DWR activities in the Office of Water Use Efficiency; the results of a simulation model on the current (2015) level of development; and a range of future conditions (2035 level of development and climate change with varying regulations and facilities).

In order to provide a conservative estimate of water delivery capability for current conditions, no planned facility improvements to the SWP infrastructure were assumed, and the analysis of the ability to convey water from the source to the points of delivery assumes only current SWP facilities, regulations, and water rights permits existing in 2015. Lastly, the level of demand for SWP water assumed the maximum Table A delivery amount was requested and reflected current trends in demand from SWP water contractors.

Detailed information on the assumptions, data, and simulation results of existing and



future conditions for annual Table A water deliveries can be found in the final 2015 capability report available on DWR's website.

## SWP Future Water Supply Program

The Future Water Supply Program's goal is to improve and protect the water supply reliability of the SWP while protecting the environment and other legal users of water. The program consists of two main components; Sacramento Valley Groundwater (SVG) and Upper Feather River Watershed Management (UFRWM). The SVG component provides technical support for the Lower Yuba River Accord (Yuba Accord) and to monitor other groundwater and conjunctive-use projects and assess conditions of the Sacramento Valley Groundwater Basin that may affect SWP yield. The four primary objectives of the SVG are to: (1) collect, analyze, and report data to determine the effects of groundwater substitution transfers on the SWP; (2) analyze and report on groundwater substitution transfers that use SWP facilities; (3) monitor groundwater management planning and implementation activities that may affect SWP yield; and (4) develop and utilize analytical tools to support and enhance sustainable groundwater management in the Sacramento Valley.

The UFRWM component of the program evaluates the Feather River watershed above Lake Oroville with respect to watershed management and restoration actions being planned or implemented. These actions are intended to improve the ecological and hydrologic functions of watersheds, thus affecting base flow, improving flood attenuation, and reducing erosion and sedimentation. DWR continued collaborative efforts with local stakeholders in 2015 to implement and enhance monitoring activities for assessing the immediate and long-term hydrologic effects of these actions.

## SWP Water Rights Activities

### Water Right Permits

SWP operations are governed by the terms and conditions contained in DWR's water right permits and licenses along with other State and federal regulatory restrictions, including biological opinions (BiOps) for the protection of endangered species. DWR holds water right permits authorizing SWP operations at each of the SWP facilities, including the Oroville and Delta facilities (which include the North Bay Aqueduct), for water supply purposes. Each permit specifies the authorized quantities of direct diversion and diversion to storage, place of use, purpose of use, and time within which the permitted quantities must be put to beneficial use. A change in any of the terms and conditions contained in the water right permits and licenses, including a change in the place or purpose of use or point of diversion, requires SWRCB approval.

Diversion and use of SWP water throughout the SWP service area has increased since initial operations in the 1960s. However, due to a number of factors, including operational and regulatory constraints, water deliveries have not yet reached the maximum quantities anticipated for full development of the SWP.

### 2015 Temporary Urgency Change Petition

Water conditions continued to be critically dry in 2015. These conditions created severe challenges for the SWP and CVP to meet the regulatory objectives both within the Delta and in upstream areas. The SWRCB convened several workshops and approved a number of temporary urgency change petitions (TUCPs) received from DWR and the Bureau of Reclamation (Reclamation) to modify their water right permits for the SWP and CVP.

DWR estimated water balances, performed extensive water supply and salinity

modeling, coordinated with fish and wildlife agencies, and prepared drought contingency plans and operational forecasts, as required by the SWRCB.

On January 23, 2015, DWR and Reclamation filed a joint TUCP to temporarily change SWP and CVP water right permits and license conditions in SWRCB Water Right Decision 1641.

On February 3, 2015, SWRCB issued an order approving parts of the TUCP, subject to conditions. Throughout 2015, DWR and Reclamation submitted additional TUCPs and requests to modify the TUCP order, and SWRCB modified the order several times in response. Issues included Delta outflow requirements, export limits, Delta Cross Channel gate operations, Sacramento River and San Joaquin River flow requirements, western Delta agricultural salinity requirements, and adjusted operations to conserve water in upstream reservoirs.

### ***Drought Contingency Plan***

SWRCB's Water Right Order 2014-0029, issued on September 24, 2014, and final TUCP order, dated October 7, 2014, required DWR and Reclamation to develop a drought contingency plan (DCP) for operations in the Delta and the associated project reservoirs in the event that water supplies remain inadequate to satisfy the projects' water right permits and license requirements and other uses. A DCP covering the beginning of water year 2014–2015 through January 15, 2015, was submitted to the SWRCB October 15, 2014. DWR and Reclamation submitted a DCP for the remainder of the 2014–2015 water year (January 15 through September 30, 2015) by January 15, 2015, as required by the 2014 water right and TUCP orders. The DCP included an interagency 2015 drought strategy describing the anticipated coordination, process, planning, and potential drought response actions for 2015.

The DCP was prepared by Reclamation and DWR, working with the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NOAA Fisheries), and the Department of Fish and Wildlife. The DCP addressed projected water operations based on various hydrologic scenarios and potential adjustments to regulatory requirements. Reclamation and DWR continued to work closely with the fish and wildlife agencies to develop operational and contingency plans, as well as real-time coordinated operations and monitoring, in order to responsibly manage the State's limited water supplies. The DCP will be continually updated as necessary based on changing circumstances.

### ***Emergency Drought Barrier***

In response to drought conditions in the State and potentially insufficient water supplies to repel salinity in the central and southern Sacramento-San Joaquin Delta, State and federal water and wildlife agencies, working together since 2014 as the Real-time Drought Operations Management Team, determined that installing an emergency drought barrier would help reduce tidally-driven saltwater intrusion into the Central and South Delta. DWR implemented the 2015 emergency drought barrier project constructing a temporary physical (rock) barrier across West False River to help protect Delta water quality and minimize the amount of water released from upstream reservoirs to repel salinity, allowing more water to be conserved in upstream areas. Ongoing coordination with regulatory agencies since 2014 and the Governor's April 1, 2015, Executive Order provided for an expedited permitting process.

Barrier installation started on May 5, 2015. The barrier was hydraulically closed May 28, and completed June 12, installation construction, including the installation of 10 new real-time water quality and flow monitoring stations, was completed July 2, 2015. Barrier removal

started on September 1, 2015, the barrier was breached on October 1, and barrier removal was completed on November 15, and demobilization was completed on November 16, 2015. Removal, including removal of the steel abutment structure, was slow-going and completed on the last day of permitted in-water work. Geologic explorations were also completed during removal thus allowing a future barrier to not require steel abutments. Levee improvements including buttress rock of steel sheet-pile cutoff walls remain in place.

Installation and operation of the 2015 emergency drought barrier successfully allowed the SWP and CVP to operate with reduced Sacramento River/Delta outflow while maintaining salinity control in the Central and South Delta. A comprehensive report is being drafted by DWR and is planned to be completed by March 2017.

### ***Water Right Change Petition for California WaterFix***

In April 2015, DWR and Reclamation announced plans to split the proposed Bay Delta Conservation Plan (BDCP) into two separate efforts—one for water conveyance facilities and the other for habitat restoration. The water conveyance effort, identified as the California WaterFix, is Alternative 4a (the preferred alternative) of the BDCP/California WaterFix partially recirculated draft environmental impact report/supplemental draft environmental impact statement released in July 2015. California WaterFix would construct new Delta conveyance facilities consisting of three new water diversion intakes along the Sacramento River and two 30-mile long, 40-foot diameter tunnels to convey water to the existing SWP and CVP pumping facilities in the South Delta. The proposed conveyance facilities would allow greater flexibility in water diversions and better balancing of the associated water quality

and hydrodynamic benefits for fish, drinking water, agriculture, and other beneficial uses.

On August 26, 2015, DWR and Reclamation submitted a joint petition to the SWRCB requesting changes in SWP and CVP water right permit conditions. The petition proposes adding points of diversion of water for the SWP and CVP associated with California WaterFix. In October, the SWRCB issued a public notice for the petition and the hearing for the petition. The hearing is scheduled to begin in April 2016 and is expected to be conducted in two parts.

For additional information about California WaterFix, see Chapter 3, Environmental Programs.

## **Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary**

The Delta and Suisun Marsh are located where California's two major river systems, the Sacramento and the San Joaquin, converge and flow westward to meet incoming seawater tides flowing through the San Francisco Bay. The watershed of the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta Estuary) is a critical source of water supply for much of California. The watershed is a source of drinking water for two-thirds of the State's population; it supplies some of the State's most productive agricultural areas; and it provides water for fish, wildlife, and other public trust uses of water within and upstream of the estuary.

Water originating in the Bay-Delta watershed is delivered to areas within the watershed and to areas south and west of the estuary. The largest water distribution systems that release stored water into the Delta and directly divert water from the Delta are the SWP, operated by DWR, and the



federal CVP, operated by Reclamation. Numerous other water storage and diversion projects also influence Bay-Delta Estuary inflows, outflows, water quality, and other hydrologic characteristics.

The SWRCB regulates both the quality of water in the Bay-Delta Estuary and the diversions and uses of water released into and diverted from the estuary for water supply. The SWRCB coordinates its regulatory authorities under State laws governing water quality and water rights, ensuring that water quality is protected for all beneficial uses when water is diverted from the estuary.

In 1999, the SWRCB adopted Water Right Decision 1641 (later modified by Order WR 2000-02) modifying the terms and conditions of a number of water right permits and licenses, primarily those for the SWP and CVP, to implement the objectives of the 1995 water quality control plan.

Under its authority to protect beneficial uses of water, the SWRCB adopted the *Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary* (Bay-Delta Plan) on December 13, 2006 (Resolution No. 2006-0098). The Bay-Delta Plan contains objectives for flow, salinity, dissolved oxygen levels, and other parameters necessary for protection of various beneficial uses such as municipal and industrial, agricultural, and fish and wildlife. The SWRCB implements these objectives in part or in whole, depending on the circumstances, through conditions on water right permits and licenses.

## 2006 Bay-Delta Plan Review

CWC Section 13240 requires that the water quality control plan be periodically reviewed. Federal Clean Water Act Section 303(c) (33 U.S.C. Section 1313(c)) requires a triennial review of State water quality “standards,” as defined in the act. Formal

review of the 2006 Bay-Delta Plan began in October 2008.

The review and amendment process for the 2006 Bay-Delta Plan consists of:

- identifying elements that may need amendment or new elements that may need to be added;
- preparing any amendments to or revisions of the entire water quality control plan; and
- SWRCB’s adoption of some or all of the amendments or revisions.

SWRCB information-gathering activities may affect the scope of the 2006 Bay-Delta Plan review and may include evidentiary hearings on critical issues concerning the Delta’s ecology.

In 2015, SWRCB continued its review and update of the 2006 Bay-Delta Plan. The work consists of a four-phased process to develop and implement updates to the Bay-Delta Plan and flow objectives for priority tributaries to the Delta to protect beneficial uses in the Bay-Delta watershed. Phase 1 includes review and potential modification of the San Joaquin River flow objectives for the protection of fish and wildlife beneficial uses, the southern Delta water quality objectives for the protection of agricultural beneficial uses, and the program of implementation for those objectives. Phase 2, initiated in 2012, focuses on issues such as: (1) Delta flow objectives, (2) export/inflow objectives, (3) Delta Cross Channel gate closure objectives, (4) Suisun Marsh objectives, (5) potential new reverse flow objectives for Old and Middle rivers, (6) potential new flood plain habitat flow objectives, (7) potential changes to the monitoring and special studies program, and (8) other potential changes to the program of implementation. Phase 3 involves changes to water rights and other measures to implement changes to the Bay-Delta Plan from Phases 1 and 2. Phase 4 involves developing and implementing flow

objectives for priority Delta tributaries outside of the Bay-Delta Plan updates.

For more information about water quality objectives and compliance monitoring in the South Delta, see Chapter 4, Water Quality Programs.

## 2015 SWRCB Bay-Delta Proceedings

In 2015, SWRCB proceedings examined a number of issues in the Bay-Delta Estuary relating to water quality, conservation, availability, and rights, which have the potential to affect Delta water supply and reliability. The drought was the main issue of concern in 2015. The SWRCB proposed or adopted a number of emergency regulations related to the drought.

## Storage Program

DWR is the State lead agency for the Storage Program, which consists of surface storage studies and groundwater programs and projects. The Storage Program began under the CALFED Bay-Delta Program. (For background on the CALFED Bay-Delta Program, see Bulletins 132-95 through 132-11.)

The Storage Program is a comprehensive program with potential benefit for the SWP consisting of actions related to surface and groundwater storage. DWR's Division of Statewide Integrated Water Management and Division of Integrated Regional Water Management have been working with State and federal agencies to enhance storage and conjunctive-use programs that support local project development via loans and grants. The Storage Program is part of an ongoing evaluation of how storage, both groundwater conjunctive use and surface storage, can help meet California's urban, agricultural, and environmental water supply reliability, ecosystem restoration, and water quality needs.

## Surface Storage Investigations

Surface storage investigations are developing environmental documentation and feasibility studies for four of the five surface storage projects identified for further study in the CALFED record of decision. The four projects are discussed below.

### *Los Vaqueros Reservoir Expansion Project*

Contra Costa Water District owns and operates the 160,000 acre-foot (af) Los Vaqueros Reservoir just southwest of the Sacramento-San Joaquin Delta. The Los Vaqueros Reservoir Expansion Project involves analysis of increasing reservoir storage up to 275,000 af.

The project objectives are: (1) to develop water supplies for environmental water management; (2) to increase water supply reliability within the San Francisco Bay Area; and (3) to the extent possible, improve the quality of water deliveries to municipal and industrial customers without impairing the project's ability to meet the first two objectives.

The Contra Costa Water District Board certified a final environmental impact report and approved an expansion from 100,000 af to 160,000 af in March 2010. The expansion was completed and dedicated in July 2012.

Contra Costa Water District and local, State, and federal partners continue to study the feasibility of a 275,000 af expansion alternative in the context of other Delta initiatives to improve Delta conveyance and Delta fisheries protection, including long-term programs being explored in California WaterFix and California EcoRestore.

### *Shasta Lake Water Resources Investigation*

Reclamation, in coordination with other agencies, is studying the feasibility of expanding Shasta Dam and Lake,



primarily to promote increased survival of anadromous fish populations in the upper Sacramento River and to increase water supply reliability. An enlargement of Shasta Dam would inundate additional lands around the existing reservoir and affect a portion of the McCloud River. California Public Resources Code Section 5093.542(c), the Wild and Scenic Rivers Act, states that, “except for participation by the Department of Water Resources in studies involving the technical and economic feasibility of enlargement of Shasta Dam, no department or agency of the state shall assist or cooperate with, whether by loan, grant, license, or otherwise, any agency of the federal, state, or local government in the planning or construction of any dam, reservoir, diversion, or other water impoundment facility that could have an adverse effect on the free-flowing condition of the McCloud River, or on its wild trout fishery.”

The State budget does not include funding for DWR to continue participating in this study. However, Reclamation’s planning is ongoing.

In 2015, Reclamation completed the final feasibility study report and EIS for the Shasta Lake Water Resources Investigation.

### ***North-of-the-Delta Offstream Storage Investigation***

DWR and Reclamation are working in partnership with local, State, and federal agencies to further study north-of-the-Delta offstream storage opportunities. The North-of-the-Delta Offstream Storage Investigation focuses on potential projects on the west side of the Sacramento Valley, including Sites Reservoir.

Storing water in offstream reservoirs during excess flow periods could provide opportunities to increase water storage in an environmentally sensitive manner. The

stored water can then be made available to enhance water management flexibility in the Sacramento Valley and the Bay-Delta Estuary, reducing water diversions on the Sacramento River during critical fish migration periods, increasing the reliability of supplies for the Sacramento Valley and statewide, and providing storage and operational flexibility to support environmental enhancement actions and adapt to climate change.

DWR, Reclamation, and the Sites Project Joint Powers Authority continued to work on completing the draft feasibility study report and environmental documentation in 2015.

### ***Upper San Joaquin River Basin Storage Investigation***

Reclamation, in coordination with other State and federal agencies, is evaluating opportunities for increased storage in the upper San Joaquin River watershed. The objectives of the Upper San Joaquin River Basin Storage Investigation are to: (1) increase water supply reliability and operational flexibility in the CVP’s Friant Division, other San Joaquin Valley areas, and other regions, and (2) enhance water temperature and flow conditions in the San Joaquin River in support of San Joaquin River restoration efforts. Other opportunities include additional hydropower generation, reduction of flood damages, water quality improvements, and recreation site development.

In 2015, Reclamation continued working to complete the final feasibility study report and environmental impact statement. The feasibility report examines potential construction of a new dam and reservoir on the San Joaquin River. The environmental impact statement documents the potential environmental effects of alternatives to increased storage of water from the upper San Joaquin River watershed.

## Delta Conveyance Program

The Delta Conveyance Program previously consisted of projects proposed in the North and South Delta. As a result of the efforts associated with the BDCP and the Delta Stewardship Council's *Delta Plan*, many of these efforts were suspended as staff was redirected to work on the SWP Delta Compliance Program. The remaining projects are discussed briefly below; more detailed information about the Delta can be found in Chapter 2, Delta Resources.

## SWP Delta Compliance Program

The SWP obtained take authorization for federal and California Endangered Species Act listed species through the December 2008 USFWS BiOp for Delta Smelt; the February 2009 Department of Fish and Wildlife incidental take permit for Longfin Smelt; and the June 2009 NOAA Fisheries BiOp for salmon, steelhead, and Green Sturgeon. Many of the regulatory requirements require studies and projects, which are currently underway.

## North Delta

With the North Delta Flood Control and Ecosystem Restoration Project, solutions to improve flood management and the ecosystem are being considered, including setback levees, detention basins, dredging, and levee degradation for floodplain expansion. For more information about this project, see Chapter 2, Delta Resources.

## South Delta

Actions in the South Delta include monitoring and assessment of the South Delta Improvements Program (SDIP), implementing flood control and ecosystem improvements in the lower San Joaquin River, and continuation of DWR's Temporary Barriers Project.

SDIP is a two-stage project. Stage 1 proposes to reduce the movement of San Joaquin River watershed Central Valley fall-run and late fall-run juvenile Chinook Salmon into the South Delta via Old River and to maintain adequate water levels and water quality for agricultural diversions in the South Delta. Stage 2 would increase water deliveries and delivery reliability to SWP and CVP contractors south of the Delta and increase the maximum permitted level of diversion through the existing intake gates at Clifton Court Forebay.

DWR deferred both the increase in diversions and the associated new fish screens as components of the SDIP due to funding issues and technical uncertainties associated with the design and construction of the new fish screens.

The SDIP final environmental impact report/environmental impact statement (2006) evaluated alternatives and proposed continuing with SDIP Stage 1. This component involves constructing permanent operable gates and channel dredging in the South Delta. DWR is proposing installation of these permanent gates to replace temporary rock barriers currently installed and removed each year under DWR's Temporary Barriers Project.

Reclamation and DWR's 2008 biological assessment for the SWP and CVP Long-term Operations Criteria and Plan included operation of the SDIP permanent operable gates.

The USFWS BiOp, issued in December 2008, concluded that coordinated operations of the CVP and SWP would jeopardize Delta Smelt. The USFWS provided a reasonable and prudent alternative under which SDIP could move forward.

The NOAA Fisheries BiOp, issued in June 2009, concluded that CVP and SWP operations would jeopardize a number of

anadromous species, in particular Chinook Salmon. NOAA Fisheries provided no reasonable and prudent alternative for SDIP. DWR initiated discussion with NOAA Fisheries in late 2009 to establish what actions could lead to a reasonable and prudent alternative under which SDIP could move forward; however, NOAA Fisheries stated an interest in holding off on further discussion until completion of an on-going multiyear South Delta Temporary Barriers Project salmonid survival and predation study. The study field data collection has been completed, data analysis is in progress, and the final predation study report is expected in 2017. Data from the study will be useful in considering permanent barrier design options and operation strategies to minimize predation. Other than the on-going temporary barriers project Predation and Survival study, no work on Stage 1 of SDIP took place in 2015.

Any action regarding SDIP Stage 2 will require further study and public input. Stage 2 planning continued to be suspended in 2015.

For additional information about the South Delta Temporary Barriers Project, see Chapter 2, Delta Resources.

## Lower Yuba River Accord

The Lower Yuba River Accord's (Yuba Accord) purpose is to resolve instream flow issues and protect and enhance lower Yuba River fisheries and local water supply reliability. The Yuba Accord provides revenues for local flood control and water supply projects; water to enhance SWP and CVP water supply reliability by offsetting Delta export reductions for protection and restoration of Delta fisheries; and improvements in statewide water supply management, including dry year supplies for participating SWP and CVP contractors.

The Yuba Accord is based on three agreements, as follows:

- a water purchase agreement between DWR and Yuba County Water Agency (Yuba);
- conjunctive use agreements with Yuba member units; and
- a fisheries agreement.

Three amendments to the water purchase agreement were executed in 2009 and 2010 to address a technical refill accounting issue and groundwater substitution pricing issues.

DWR and Yuba executed Amendment 4 to the Water Purchase Agreement in 2012 to streamline the process for addressing groundwater substitution pricing issues. Conforming amendments were also executed to the participation agreements between DWR and 22 participating contractors in the Yuba Accord.

On December 5, 2014, DWR executed Amendment 5 between DWR and Yuba. The key new terms included: increased pricing for the four components of transfer water to be delivered by Yuba from 2016 through 2020; a \$20 million deposit to be paid to Yuba to lock in the new pricing for 5 years, and that will be credited to surface water purchases; allowing for third-party sales by Yuba to nonparticipants in the program under certain circumstances; and continued annual negotiations of groundwater substitution pricing when available. All 22 participating contractors continued their participation from 2016 through 2020 by executing the conforming Amendment 5 to their participation agreements.

On January 8, 2015, DWR executed a Participation Agreement, Amendment 1, and Amendment 5 with two additional contractors, Mojave Water Agency and Santa Barbara County Flood Control and Water

Conservation District, increasing the number of participating contractors from 22 to 24.

Yuba released 59,131 af of Component 1 surface water in 2015 that was shared equally between the SWP and the CVP for project purposes to offset Delta export pumping reductions to benefit fish. Because 60,000 af of Component 1 water was due to be delivered in 2015, Yuba owes the remaining 869 af in a future year. In addition, Yuba provided 30,000 af of Component 4 groundwater substitution water to enhance lower Yuba River flows through agreements with seven of its Member Units. This Component 4 water was made available to many of the Participating Contractors through a letter agreement between DWR and Yuba executed on March 26, 2015, at an effective price of \$665 per af.

The water purchase agreement transfers water to help offset Delta export reductions annually and provides dry-year transfer water for SWP and CVP contractors from surface and groundwater substitution sources.

For additional details about the Yuba Accord, see Chapter 9, Water Contracts and Deliveries.





## Chapter 8

# Water Supply

*There was no snow to measure when the April 1, 2015, manual snow survey was conducted at the Phillips snow course.*

## Significant Events in 2015

Water year 2014–2015 proved to be another dry year, the fourth consecutive year with less than average precipitation and mountain snowpack. The State received precipitation at 74 percent of average in water year 2014–2015 compared to 56 and 79 percent of average in water years 2013–2014 and 2012–2013, respectively. Though a below-average water year, the Northern Sierra 8-Station Precipitation Index had 37.2 inches of precipitation. Of this total, 22.8 inches fell during December and February. This accounted for 61 percent of the water year total. The statewide mountain snowpack on April 1 was only 5 percent of average.

Statewide river runoff totaled 46 percent of average in the 2014–2015 water year, which is well below average but 11 percent higher than the previous water year. The Feather River runoff totaled 45 percent of average. Water year runoff totals for the Sacramento River Region (SRR), San Joaquin 4 Rivers (SJR), and Tulare Lake Region (TLR) were well below average at 51, 24, and 19 percent of average, respectively.

The Sacramento Valley Water Year Hydrologic Classification (Sacramento Valley 40-30-30 Index) and the San Joaquin Valley Water Year Hydrologic Classification (San Joaquin Valley 60-20-20 Index) were both “critical,” based on observed data for water year 2014–2015.

*Information in this chapter was contributed by the Division of Flood Management and the Division of Operations and Maintenance.*



The Department of Water Resources (DWR) monitors precipitation, estimates mountain snowpack, calculates river runoff, and operates storage facilities during each water year. The official California water year runs from October 1 through September 30.

## California's Hydrology

DWR divides California into 10 hydrologic regions. Each hydrologic region corresponds to the State's major water drainage basins. Annual precipitation, mountain snowpack, and runoff data are collected and analyzed for the hydrologic regions and used to determine water year type classifications and forecasts for the State's water supply outlook.

The State's precipitation is measured using three primary indices, the Northern Sierra 8-Station Precipitation Index, the San Joaquin 5-Station Precipitation Index, and the Tulare Basin 6-Station Precipitation Index. For more information, see the sidebar, Precipitation Estimates.

Runoff estimates are determined for the Sacramento River Region (SRR), the San Joaquin 4 Rivers (SJR), and the Tulare Lake Region (TLR). For more information, see the sidebar, Runoff Estimates.

The Eight River Index is used to determine the duration of fish and wildlife salinity and flow standards at Chipps Island or Port Chicago from February through June (see Chapter 4, Water Quality Programs). This index is the sum of the unimpaired runoff from the eight rivers in the SRR and SJR.

Two water supply indices, the Sacramento Valley Water Year Hydrologic Classification (Sacramento Valley 40-30-30 Index) and the San Joaquin Valley Water Year Hydrologic Classification (San Joaquin Valley 60-20-20 Index), are used to derive the water year classification for the Sacramento Valley and the San Joaquin Valley, respectively.

Water year classification is used by various water agencies to formulate water supply decisions. For more information, see the sidebar, Water Supply Indices.

DWR continually updates hydrologic data and information. If your research requires more current data than was available at the time of publication of this bulletin, please consult the most recent edition of Bulletin 120, and/or contact DWR staff in the Hydrology and Flood Operations Office.

## Water Year 2014–2015

### Precipitation

California experienced below average rainfall (74 percent of average) for the water year, and regionally, precipitation varied widely. Figure 8-1 presents water year precipitation for the various regions of the State.

Table 8-1 presents monthly precipitation totals for water year 2014–2015 at various gauges located throughout the State, listed north to south. Statewide, the wettest month, as measured by inches of precipitation, was December when most stations in the list received well above average precipitation. San Francisco measured nearly 290 percent of average.

December started with a strong precipitation event that resulted when a cut-off low drifted south offshore and entrained a pulse of tropical moisture. While not a traditional atmospheric river event, the high precipitation totals across the State reflected the high moisture content pushed into the State by the low. The warm temperatures that accompanied the storm also limited



**Figure 8-1** Statewide Precipitation by Hydrologic Region, 2014–2015 Water Year, as Percent of Average



**Table 8-1 Monthly Precipitation Totals at Various Locations in California, Water Year<sup>a</sup> 2014–2015**

Station <sup>b</sup>	Monthly Precipitation (inches)													Water Year 2015–2016					
	Water Year 2014–2015																		
	2014			2015															
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	WY Total	Oct	Nov	Dec			
Mount Shasta City	4.83	1.86	12.83	0.48	10.16	1.27	1.48	1.76	0.23	1.50	0.00	0.23	36.63	0.59	1.44	7.46			
percent of average	206	41	218	7	181	29	53	104	22	600	0	29	101	25	31	127			
Eureka Woodley Island	4.74	3.89	9.81	1.36	5.04	3.11	2.56	0.01	0.08	0.15	0.39	0.27	31.41	1.18	4.88	14.66			
percent of average	159	70	153	21	97	60	89	1	13	136	163	36	82	39	88	229			
Blue Canyon (DWR-2)	3.62	7.23	17.01	0.11	9.63	1.26	4.78	1.49	1.13	0.04	0.00	0.11	46.41	1.80	5.67	16.57			
percent of average	97	92	163	1	99	15	95	55	128	19	0	15	74	48	72	158			
Sacramento WB City	0.53	1.25	8.60	0.00	2.28	0.22	1.85	0.07	0.07	0.00	0.00	0.04	14.91	0.44	1.35	1.83			
percent of average	58	62	270	0	70	9	125	15	54	0	0	19	83	48	67	57			
San Francisco WB AP	0.31	1.99	10.66	0.00	2.01	0.06	1.28	0.02	0.26	0.00	0.00	0.02	16.61	0.00	1.42	3.37			
percent of average	29	84	287	0	61	2	90	5	173	0	0	11	83	0	60	91			
Yosemite Headquarters	0.00	2.98	4.81	0.07	3.15	0.43	2.90	1.35	0.65	2.11	0.02	0.08	18.55	3.37	3.74	9.05			
percent of average	0	71	73	1	50	9	90	96	114	754	10	13	50	196	89	138			
Fresno WB AP	0.50	0.40	2.29	0.21	1.13	0.06	1.25	0.57	0.01	0.43	0.00	0.12	6.97	0.49	1.74	2.97			
percent of average	104	36	130	10	54	3	116	204	14	0	0	80	64	102	157	169			
Grant Grove	0.00	3.34	6.25	0.24	4.85	0.80	1.71	2.19	0.50	1.19	0.00	<sup>c</sup>	21.07	2.82	5.18	6.09			
percent of average	0	65	80	3	67	11	40	187	179	1,983	0	<sup>c</sup>	48	144	100	78			
Los Angeles WSO AP	0.24	0.42	4.04	1.25	0.27	0.49	0.11	0.43	0.01	0.35	0.00	1.81	9.42	0.10	0.06	1.08			
percent of average	63	30	192	46	9	26	12	307	20	3,500	0	1,006	74	26	4	51			
San Diego NWS Lindbergh Field	0.0	0.37	4.50	0.42	0.28	0.93	0.02	2.39	0.04	1.71	0.01	1.24	11.91	0.43	1.54	0.88			
percent of average	0	33	236	20	15	58	3	1,138	57	8,550	11	689	115	102	136	46			

<sup>a</sup> Water Year = October 1–September 30<sup>b</sup> AP = Airport; NWS = National Weather Service; WB = Weather Bureau; WSO = Weather Service Office<sup>c</sup> During September 2015, a fire prevented the measurement of precipitation at Grant Grove.

the amount of snowpack that accumulated during this event. The second week included a strong Pacific storm that brought more rain and more snow to the high country. This event was focused more on the northern half of the State and included high winds—more than 100 miles per hour in the Sierra Nevada. In contrast, January was extremely dry with only one of the ten selected stations receiving more than 25 percent of average precipitation.

Eureka Woodley Island on the north coast of California received 31.4 inches of precipitation for a water year total that was 82 percent of average. For the 2014–2015 water year, precipitation for the station was above normal for October, December, July, and August. Totals for

October, December, and August were greater than 150 percent of average.

Blue Canyon experienced above normal precipitation for 2 months of water year 2014–2015. The station totals for the water year were 46.4 inches and 74 percent of average. The largest amount of precipitation and highest percent of normal for the water year occurred in December with 17.0 inches and 163 percent of average, respectively.

Areas of the Central Valley also received their largest amounts of precipitation in December. Precipitation totals were 8.6 inches (270 percent of average) for Sacramento and 2.3 inches (130 percent of average) for Fresno. For the water year, Sacramento received 83 percent of its annual

## Precipitation Estimates

### Northern Sierra 8-Station Precipitation Index (8SI)

In the northern Sierra Nevada, precipitation is indexed by averaging rain gauge totals at eight representative stations, creating what is known as the Northern Sierra 8-Station Precipitation Index. The index provides a representative sample of the major watersheds (upper Sacramento, Feather, Yuba, and American rivers) and serves as a wetness index for the Sacramento River hydrologic region.

The rain gauge stations are:

- |                       |                                |                   |
|-----------------------|--------------------------------|-------------------|
| (1) Mount Shasta City | (4) Quincy                     | (7) Blue Canyon   |
| (2) Shasta Dam        | (5) Brush Creek                | (8) Pacific House |
| (3) Mineral           | (6) Sierraville Ranger Station |                   |

### San Joaquin 5-Station Precipitation Index (5SI)

In the central Sierra Nevada, precipitation is indexed by averaging rain gauge totals at five representative stations, creating what is known as the San Joaquin 5-Station Precipitation Index. The index provides a representative sample of the major watersheds (Stanislaus, Tuolumne, Merced, and San Joaquin rivers) and serves as a wetness index for the San Joaquin River hydrologic region.

The rain gauge stations are:

- |                            |                               |                     |
|----------------------------|-------------------------------|---------------------|
| (1) Calaveras Big Trees    | (3) Yosemite Headquarters     | (5) Huntington Lake |
| (2) Hetch Hetchy Reservoir | (4) North Fork Ranger Station |                     |

### Tulare Basin 6-Station Precipitation Index (6SI)

In the southern Sierra Nevada, precipitation is indexed by averaging rain gauge totals at six representative stations, creating what is known as the Tulare Basin 6-Station Precipitation Index. The index provides a representative sample of the Kings, Kaweah, Tule, and Kern river watersheds.

The rain gauge stations are:

- |                       |                  |                  |
|-----------------------|------------------|------------------|
| (1) Balch Power House | (3) Giant Forest | (5) Ash Mountain |
| (2) Springville       | (4) Pascoes      | (6) Isabella     |

precipitation average, while Fresno received 64 percent of its annual average.

In the San Joaquin and Tulare Lake watersheds, water year total precipitation was also well below average. The largest amounts of precipitation fell in these watersheds during the month of December, which is similar to what transpired in Northern California. Approximately one-fourth of the water year precipitation fell during December for Yosemite Headquarters and Grant Grove. Water year precipitation totals at those two sites were 50 and 48 percent of their respective annual averages.

Further south, Los Angeles was below average, totaling 74 percent of its annual average, whereas San Diego was above average totaling 115 percent of its annual average. San Diego received 4.5 inches of precipitation in December, which is 236 percent of the monthly average. San Diego received 2.4 inches of precipitation in May, which is 1,138 percent of the monthly average. Los Angeles received 4.0 inches of precipitation in December, which is 192 percent of the monthly average.

The monthly totals for the water year for the Northern Sierra 8-Station, the San Joaquin 5-Station, and the Tulare Basin 6-Station precipitation indices are presented in Table 8-2. Precipitation for the three indices totaled 37.2 inches (74 percent of average), 19.0 inches (47 percent of average), and 13.6 inches (47 percent of average), respectively.

For the Northern Sierra 8-Station Precipitation Index, December was wet, registering 15.2 inches, 181 percent of the monthly average. During the 3-month period of December through February, typically the wettest period in the Sierra Nevada, 23.1 inches of precipitation accumulated, which is 91 percent of the average (25.4 inches) for the index for those 3 months. January precipitation was only 3 percent of the monthly average.

For the San Joaquin 5-Station Precipitation Index, the total accumulated precipitation during December through February was 10.1 inches, which represents 53 percent of the water year total for the index and 49 percent of the average for those months for the index.

**Table 8-2 Regional Monthly Precipitation for Water Year 2014–2015**

	Month	Northern Sierra 8-Station Precipitation Index		San Joaquin 5-Station Precipitation Index		Tulare Basin 6-Station Precipitation Index	
		Precipitation (inches)	Percent of Monthly Average	Precipitation (inches)	Percent of Monthly Average	Precipitation (inches)	Percent of Monthly Average
2014	October	3.70	123	0.10	5	0.80	67
	November	3.90	62	3.10	66	0.90	29
	December	15.20	181	5.90	95	4.70	107
2015	January	0.30	3	0.20	3	0.50	9
	February	7.60	95	4.00	58	3.20	62
	March	1.00	14	0.40	7	0.20	4
	April	2.30	59	2.30	64	1.00	38
	May	1.20	57	1.40	78	0.90	82
	June	0.80	80	0.30	50	0.50	125
	July	0.70	350	1.10	367	0.80	400
	August	0.10	33	0.00	0	0.00	0
	September	0.40	44	0.20	29	0.10	17
<b>Total</b>		<b>37.20</b>	<b>74</b>	<b>19.00</b>	<b>47</b>	<b>13.60</b>	<b>47</b>

For the Tulare Basin 6-Station Precipitation Index, a total of 8.4 inches accumulated during December through February, which represents 62 percent of the water year total for the index and 56 percent of the average for those months for the index.

## Mountain Snowpack

Precipitation that fell during water year 2014–2015 consisted mostly of rain; snow accumulation was quite small, setting record lows throughout the State's mountainous regions. Monthly statewide snowpack for the water year is shown in Table 8-3. Snow water equivalents shown in the table were obtained from daily snow sensor reports corresponding to the first day of each month. The statewide average snow water equivalent reported for April 1 was 1.4 inches or 5 percent of average, lower than the previous record low snowpack of 25 percent in 1977 and 2014. April 1 is typically the average annual date of peak snow accumulation. In 2015, the mountain snowpack peaked during the second week of February at approximately 5.6 inches of snow water content or 19 percent of its April 1 average.

**Table 8-3 Statewide Mountain Snowpack for Water Year 2014–2015**

	Date	Snow Water Equivalent (inches)	Percent of Average	Percent of April 1 Average <sup>a</sup>
2014	October 1	0.0	0	0
	November 1	0.0	0	0
	December 1	1.0	24	4
2015	January 1	4.8	47	17
	February 1	4.2	23	14
	March 1	5.0	19	17
	April 1	1.4	5	5
	May 1	0.4	3	2
	June 1	0.0	0	0
	July 1	0.0	0	0
	August 1	0.0	0	0
	September 1	0.0	0	0

<sup>a</sup> April 1 is the average date of peak statewide mountain snowpack.

This table is based on snow pillow (a device for measuring mountain snowpack at automated reporting stations) data.

## River Runoff

Statewide river runoff totaled 46 percent of average in the 2014–2015 water year. The monthly runoff totals for the SRR, the SJR, the TLR, and the Feather River are shown in Table 8-4. As shown, the water year runoff totals for all of these areas were well below average, with the TLR the lowest at 19 percent of average.

**Table 8-4 Unimpaired Runoff for Water Year 2014–2015 (million acre-feet)**

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	WY
SRR runoff	0.35	0.43	2.75	0.74	1.95	0.69	0.57	0.5	0.38	0.31	0.27	0.28	9.23
percent of average	68	49	161	29	78	24	24	22	31	53	66	69	51
SJR runoff	0.01	0.03	0.14	0.06	0.28	0.15	0.19	0.32	0.17	0.06	0.02	0.01	1.44
percent of average	21	21	57	13	61	24	23	23	15	13	17	20	24
TLR runoff	0.01	0.02	0.04	0.03	0.08	0.07	0.07	0.11	0.08	0.05	0.02	0.01	0.59
percent of average	25	30	36	17	41	26	18	15	13	16	16	16	19
Feather River runoff	0.05	0.09	0.59	0.18	0.44	0.16	0.12	0.1	0.08	0.07	0.07	0.06	2.02
percent of average	47	43	152	31	78	22	19	15	26	49	66	64	45
Statewide runoff	65	44	139	24	87	23	23	21	21	30	46	56	46

SRR: Sacramento River Region

Sacramento River above Bend Bridge, Feather River at Oroville, Yuba River near Smartville, American River below Folsom Lake

SJR: San Joaquin 4 Rivers

Stanislaus River below Goodwin Dam, Tuolumne River below La Grange, Merced River below Merced Falls, San Joaquin River below Millerton Lake

TLR: Tulare Lake Region

Kings River below Pine Flat Reservoir, Kaweah River below Terminus Reservoir, Tule River below Lake Success, Kern River below Lake Isabella

WY: Water Year (October 1–September 30)



## Runoff Estimates

Unimpaired runoff represents the natural water production in a river basin, unaltered by upstream diversions, storage, or export of water to or import of water from other basins.

### Sacramento River Region (SRR)

The runoff estimate for the SRR is the sum of unimpaired flow in million acre-feet (maf) at the following gauging stations:

- |   |                                      |
|---|--------------------------------------|
| (1) Sacramento River above Bend Bridge                  | (3) Yuba River near Smartville       |
| (2) Feather River at Oroville (inflow to Lake Oroville) | (4) American River below Folsom Lake |

### San Joaquin 4 Rivers (SJR)

The runoff estimate for the SJR is the sum of unimpaired flow in maf at the following gauging stations:

- |   |   |
|---|---|
| (1) Stanislaus River below Goodwin Dam<br>(inflow to New Melones Reservoir) | (3) Merced River below Merced Falls<br>(inflow to Lake McClure)             |
| (2) Tuolumne River below La Grange<br>(inflow to New Don Pedro Reservoir)   | (4) San Joaquin River below<br>Millerton Lake<br>(inflow to Millerton Lake) |

### Tulare Lake Region (TLR)

The runoff estimate for the TLR is the sum of unimpaired flow in maf at the following gauging stations:

- |   |                                    |
|---|------------------------------------|
| (1) Kings River below Pine Flat Reservoir | (3) Tule River below Lake Success  |
| (2) Kaweah River below Terminus Reservoir | (4) Kern River below Lake Isabella |

### Eight River Index

The Eight River Index is the sum of the unimpaired runoff from the eight rivers in the SRR and the SJR.

From a water supply perspective, the most closely monitored period is April through July. By the end of July, the April–July runoff was 27, 19, and 15 percent of average, for the three respective regions.

## Water Supply Indices

The Sacramento Valley 40-30-30 Index and the San Joaquin Valley 60-20-20 Index were both “critical,” based on observed data for water year 2014–2015.

For more information, see the sidebar, Water Supply Indices.

## Water Supply Indices

### Sacramento Valley 40-30-30 Index

State Water Resources Control Board, Water Right Decision 1641 (D-1641) defines the Sacramento Valley Water Year Hydrologic Classification (Sacramento Valley 40-30-30 Index), a water supply forecasting tool used to derive the water year type for the Sacramento Valley. The State Water Resources Control Board first introduced the Sacramento Valley 40-30-30 Index in the 1991 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta Plan), and continued using it with the 1995 and 2006 Bay-Delta Plans. D-1641 implements portions of the 2006 Bay-Delta Plan with respect to the operation of the State Water Project and the Central Valley Project.

The Sacramento Valley 40-30-30 Index is used to determine the Sacramento Valley water year type for the purpose of implementing water quality objectives defined in D-1641. It also provides an estimate of the potential water supply originating in the basin from rainfall and snowmelt runoff, groundwater accretion, and reservoir carryover storage. The index incorporates seasonal differences in water contribution for the year and includes the prior year's conditions in order to establish a more reliable index of water availability. The 40-30-30 factors represent the percentage weight given to the following:

- (1) 40%—the current year's April through July Sacramento Valley unimpaired runoff;
- (2) 30%—the current year's October through March Sacramento Valley unimpaired runoff; and
- (3) 30%—the previous year's index with a cap of 10 million acre-feet (to account for required flood control reservoir releases during wet years).

The water year type is determined by the index value on a scale specific to the Sacramento Valley (as defined in D-1641).

Classification	Index (million acre-feet)
Wet	Equal to or greater than 9.2
Above Normal	Greater than 7.8 and less than 9.2
Below Normal	Equal to or less than 7.8 and greater than 6.5
Dry	Equal to or less than 6.5 and greater than 5.4
Critical	Equal to or less than 5.4

Water year type forecasts are made beginning in December. The Sacramento Valley 40-30-30 Index May 1 forecast (at the 50 percent exceedance level) determines the "official" water year type for implementing water quality and flow requirements contained in D-1641. The D-1641 objectives are conditioned by water year type and generally become less stringent during dryer years.

## Water Supply Indices

### San Joaquin Valley 60-20-20 Index

D-1641 uses a similar method in the San Joaquin Valley Water Year Hydrologic Classification (San Joaquin Valley 60-20-20 Index) to determine the water year type for the San Joaquin Valley. The 60-20-20 factors represent the percentage weight given to the following:

- (1) 60%—the current year's April through July San Joaquin Valley unimpaired runoff;
- (2) 20%—the current year's October through March San Joaquin Valley unimpaired runoff; and
- (3) 20%—the previous year's index with a cap of 4 million acre-feet (to account for required flood control reservoir releases during wet years).

The water year type is determined by the index value on a scale specific to the San Joaquin Valley (as defined in D-1641).

Classification	Index (million acre-feet)
Wet	Equal to or greater than 3.8
Above Normal	Greater than 3.1 and less than 3.8
Below Normal	Equal to or less than 3.1 and greater than 2.5
Dry	Equal to or less than 2.5 and greater than 2.1
Critical	Equal to or less than 2.1

The San Joaquin Valley 60-20-20 Index May 1 forecast (at the 75 percent exceedance level) determines the "official" water year type for implementing D-1641 San Joaquin River Vernalis flow standards.

## Water Year 2015–2016 October through December Water Conditions

The last 3 months of calendar year 2015 mark the beginning of a new water year, 2015–2016. October was a warm, dry month.

Statewide, the average precipitation for October was 66 percent of average according to the Western Regional Climate Center. November was cool and dry with below normal precipitation. Statewide, November precipitation was 66 percent

of average. December was cool and wet with 111 percent of average statewide precipitation. Preliminary records, reported in the National Weather Service Record Event Report, show that statewide there were 36 temperature records tied or broken and 7 precipitation records set for December. Of the 36 temperature records set, 16 were for new high maximum temperatures and 11 were for new low minimum temperatures.

At the end of December, water year runoff totals were 55 percent of average for the SRR, 73 percent of average for the SJR, and 49 percent of average for the TLR.

## Storage

### Statewide Storage

Monthly storage totals for the major Sierra Nevada reservoirs are shown in Table 8-5. Water year 2014–2015 began at 56 percent of average reservoir storage following a dry 2013–2014 water year. The percent of average storage dipped slightly in the fall and then rose through the winter, peaking at 71 percent of average at the end of February. During the next 5 months, storage dropped gradually to 54 percent of average in July where it remained through September.

### State Water Project Storage

The State Water Project (SWP) operates a complex system of dams, canals, and reservoirs to collect and store water for future deliveries. Lake Oroville is the first of two primary SWP conservation facilities. Lake Oroville inflow comes from tributaries of the Feather River.

San Luis Reservoir is the second primary SWP conservation facility. This Central California joint-use facility derives its inflow from pumping at the Gianelli Pumping-Generating Plant. San Luis is an off-stream storage reservoir. Most of the water is pumped into the reservoir from late fall to early spring. This water is temporarily

**Table 8-5 Monthly Reservoir Storage for Water Year 2014–2015 (thousand acre-feet)**

Reservoir	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Shasta	1,109	1,048	1,867	2,001	2,613	2,689	2,662	2,404	2,198	1,990	1,789	1,603
percent of average	41	39	66	65	79	73	68	62	60	62	62	59
Oroville	954	910	1,347	1,444	1,736	1,794	1,782	1,565	1,395	1,162	1,072	1,057
percent of average	45	43	62	62	70	67	62	52	48	45	46	48
Folsom	305	278	430	448	564	572	576	535	438	286	195	174
percent of average	61	59	90	88	104	91	79	65	54	41	32	31
San Luis	394	489	820	1,103	1,293	1,354	1,273	1,090	813	523	410	398
percent of average	36	40	59	69	74	73	70	67	63	52	48	42
Pardee	161	171	168	166	178	176	179	179	175	171	163	140
percent of average	93	98	95	93	99	97	98	94	90	90	89	77
New Melones	513	513	547	563	606	553	491	453	401	344	295	268
percent of average	38	38	40	40	41	37	33	30	26	23	21	20
Don Pedro	756	756	794	827	872	893	843	826	756	694	651	644
percent of average	58	57	59	59	60	60	57	53	47	45	45	47
Millerton	175	175	180	186	195	205	192	177	179	179	158	193
percent of average	90	80	66	56	57	56	53	44	43	55	67	92
Pine Flat	113	119	130	132	160	185	211	265	266	156	126	119
percent of average	33	32	32	28	30	33	34	37	39	31	33	35
Kaweah	14	16	22	26	42	54	61	72	48	30	24	18
percent of average	129	122	143	126	173	133	80	60	45	58	124	144
Success	3	3	5	5	7	8	9	9	8	6	5	4
percent of average	36	36	37	31	30	25	20	16	15	18	24	25
Isabella	45	45	45	45	48	46	45	44	36	33	31	30
percent of average	28	29	28	26	26	23	19	15	12	12	14	16
Statewide	56	55	67	65	71	68	64	59	55	54	54	54
percent of average												



stored, then released into the California Aqueduct to meet SWP water contractor peaking demands in the summer months. The remaining SWP dams and reservoirs regulate the stored water supply with delivery patterns that are designed to fit local water demands.

### **2015 Storage Totals in Major SWP Reservoirs**

End-of-year storage on December 31, 2015, in major SWP reservoirs and the State's share of joint-use reservoirs was 1.6 million acre-feet (maf) or 30 percent of maximum storage, compared to 2.3 maf or 43 percent of maximum storage at the end of 2014. The average end-of-month total storage in major SWP reservoirs for 2015 was 2.2 maf.

### **Lake Oroville**

Lake Oroville has a maximum water storage capacity of 3,537,580 acre-feet (af). Runoff from the upper Feather River drainage is collected and stored in this reservoir and released to the Sacramento-San Joaquin Delta through Oroville Dam, Thermalito Diversion Dam, and Thermalito Afterbay.

**2015 Inflow.** Total Lake Oroville inflow for 2015 was 1,295,451 af, which was 35 percent of the average (3.69 maf) over the last 30 years. Maximum daily inflow occurred on February 9 at 55,407 af. Minimum daily inflow occurred on November 16 at 26 af. Peak monthly total inflow occurred in February at 329,201 af, 25 percent of the 2015 total. The highest total inflow in the last 30 years (1986–2015) was in 1995 at 8,996,242 af. The lowest total inflow for the same period was in 2015 at 1,295,451 af.

Figure 8-2 shows monthly Lake Oroville inflow for 2013, 2014, and 2015.

Figure 8-3 shows historical maximum and minimum cumulative Lake Oroville inflow and the current cumulative inflow for 2015.

**2015 Storage.** Minimum storage occurred on December 9 at 909,041 af, 26 percent of lake capacity. Maximum storage occurred on April 17 at 1,812,641 af, 51 percent of lake capacity. End-of-year Lake Oroville storage was 1,016,767 af. Figure 8-4 shows storage in Lake Oroville for 2014 and 2015.

### **2015 San Luis Reservoir Operations**

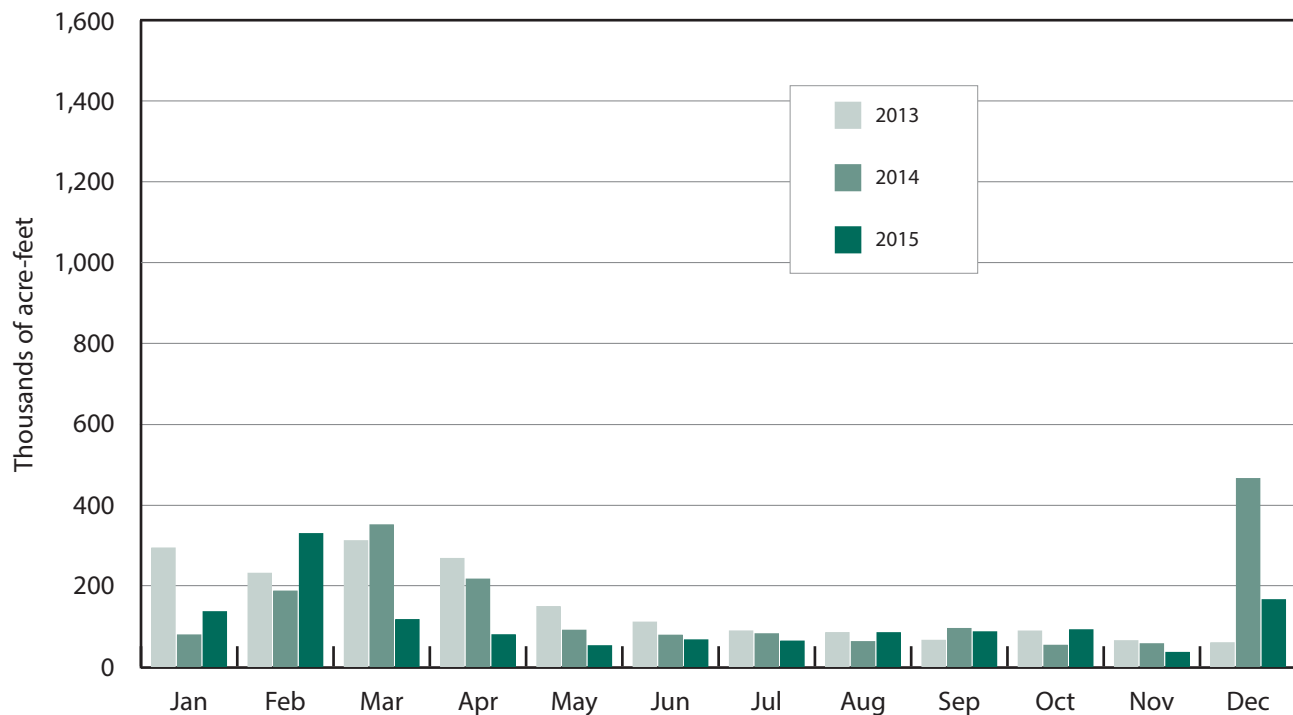
San Luis Reservoir is operated jointly by DWR and the Bureau of Reclamation pursuant to operating procedures adopted in June 1981. San Luis Reservoir has a normal operating capacity of 2,027,840 af. The SWP share of this capacity is 1,062,183 af.

San Luis Reservoir reached its maximum storage on March 16 at 1,382,623 af, 68 percent of its normal maximum operating capacity. At the beginning of 2015, San Luis Reservoir contained 820,209 af, 40 percent of its capacity. The SWP storage share was 535,326 af. The highest end-of-month SWP share of water storage occurred in March at 958,679 af. Figure 8-5 shows the SWP share of storage and total storage in San Luis Reservoir for 2014 and 2015.

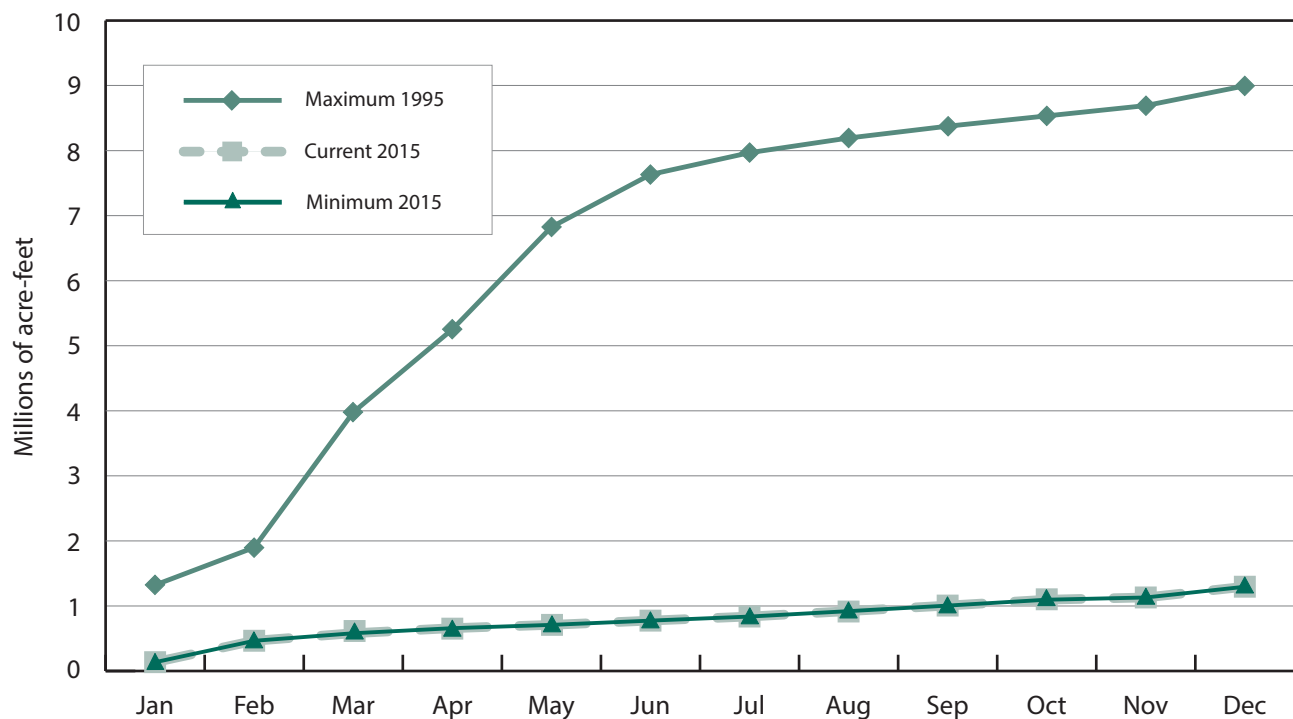
### **2015 Lake del Valle Operations**

Lake del Valle, located off the South Bay Aqueduct, functions primarily as a storage facility for water delivery to Santa Clara and Alameda counties. At the beginning of 2015, Lake del Valle held 34,663 af, which was about 45 percent of its maximum capacity of 77,111 af. Its highest storage occurred on April 28 at 40,733 af. Its lowest storage occurred on December 21 at 26,161 af.

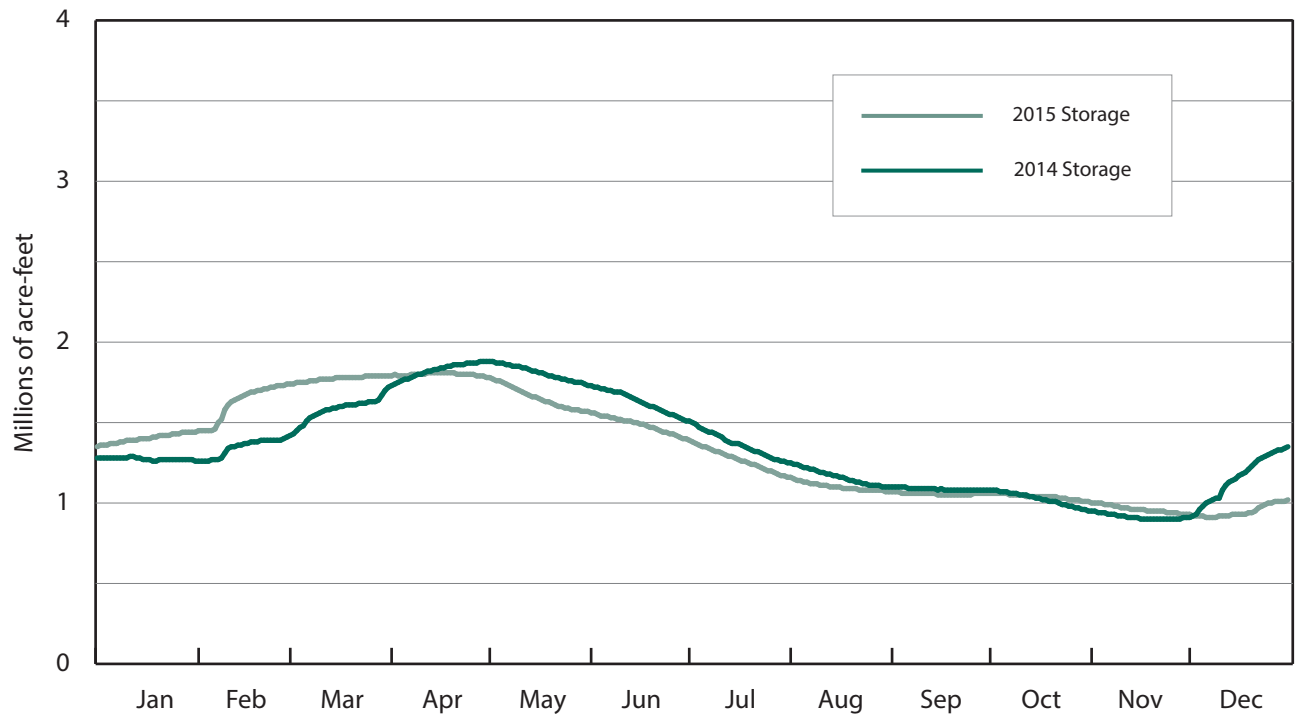
On December 31, storage in Lake del Valle was 26,181 af, 34 percent of its maximum capacity. There was 3,509 af of natural inflow into Lake del Valle, and 4,377 af of inflow from the South Bay Aqueduct. There were no releases to Arroyo Valle, and releases for 2015 to the South Bay Aqueduct from Lake del Valle totaled 13,353 af.



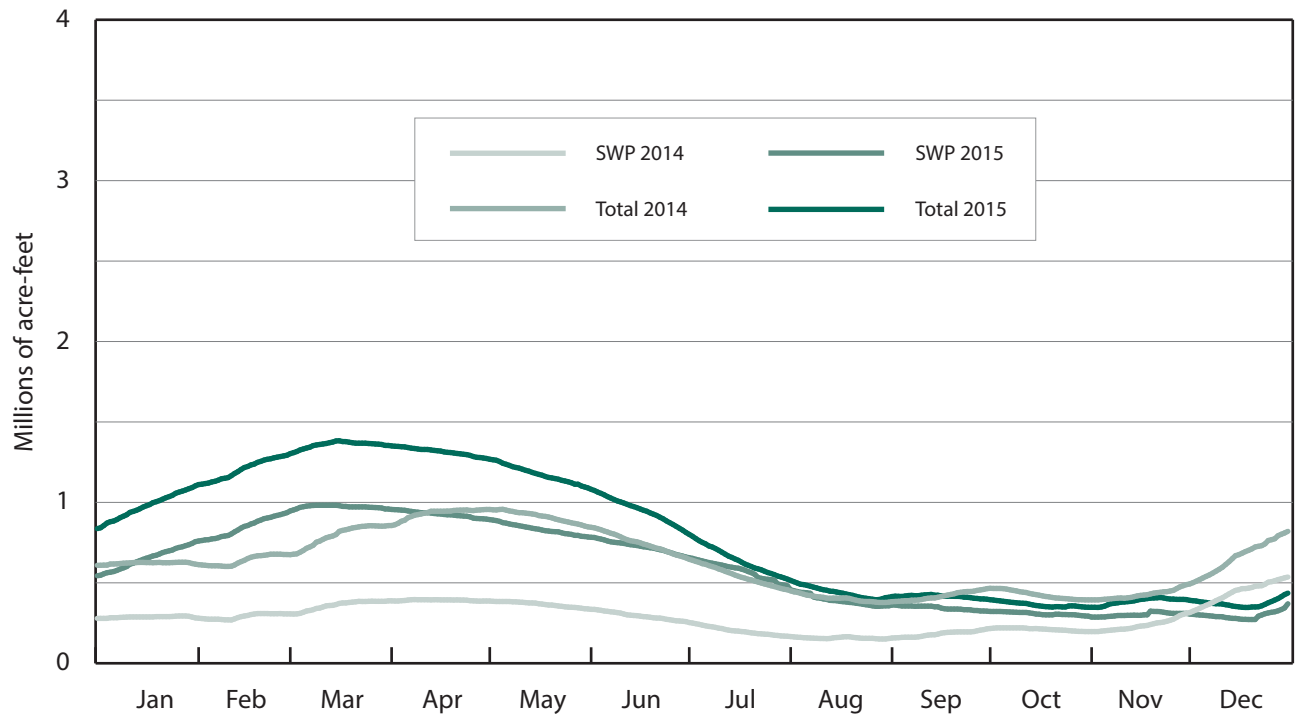
**Figure 8-2 Monthly Inflow into Lake Oroville from the Feather River, 2013–2015**



**Figure 8-3 Lake Oroville Cumulative Inflow over the Last 30 Years—Current and Historical Maximum and Minimum**



**Figure 8-4** Storage in Lake Oroville, 2014 and 2015



**Figure 8-5** SWP Share of Storage and Total Storage in San Luis Reservoir, 2014 and 2015

### 2015 Southern Reservoir Operations

During normal operating conditions, DWR maintains its four southern reservoirs—Pyramid, Castaic, Silverwood, and Perris—at or near full operating capacity to ensure uninterrupted delivery of water to Southern California SWP water contractors.

At the beginning of 2015, these reservoirs held 406,879 af, which is 59 percent of their combined normal maximum operating capacity of 689,021 af. At the end of 2015, the reservoirs held 409,546 af, 59 percent of combined normal maximum operating capacity.

### Diversions from the Delta

The SWP diverts water from the Sacramento-San Joaquin Delta, through the Barker Slough and Banks pumping plants, for delivery to SWP water contractors' storage facilities. The SWP diverts water from Barker Slough Pumping Plant to the North Bay Aqueduct. Water is delivered from Banks Pumping Plant to the South Bay Area through the South Bay Aqueduct, and to the San Joaquin Valley, Central Coastal, and Southern California areas through the California Aqueduct. The Central Valley Project (CVP) diverts water to similar areas from the Delta through Jones Pumping Plant and Contra Costa Pumping Plant.

In 2015, the North Bay Aqueduct received 35,179 af of water from the Barker Slough Pumping Plant.

Figure 8-6 shows the amounts of water pumped each month for 2015 at Banks Pumping Plant, totaling 845,801 af. Of this amount, the SWP diverted 837,421 af. There was no pumping for the Cross Valley Canal, and 8,380 af was wheeled for the CVP. All CVP pumping at Banks Pumping Plant occurred in May and August.

The CVP diverted 688,723 af at Jones Pumping Plant and 71,621 af at Contra Costa Pumping Plant in 2015.

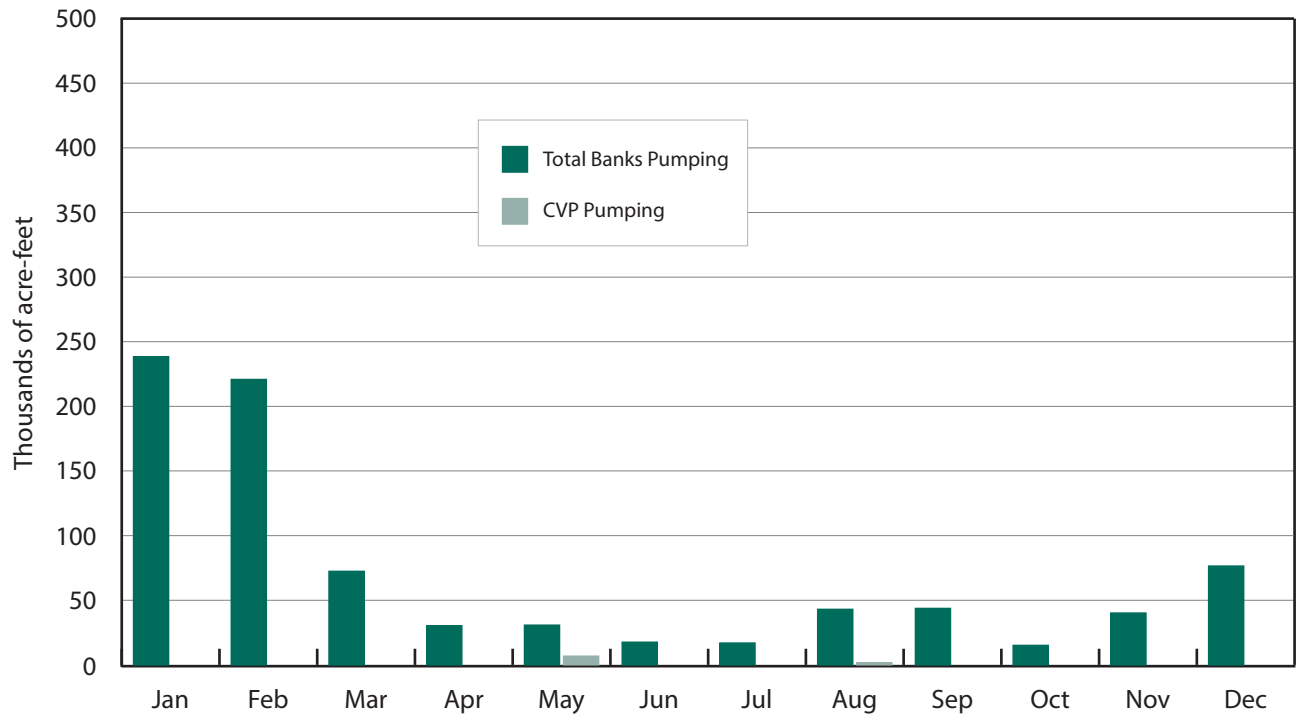
The combined Delta exports include all of these plants. Figure 8-7 shows the monthly amounts of water diverted from the Delta in 2015 by the SWP and CVP. Maximum daily Delta exports occurred on February 12 at 13,797 af. Combined SWP and CVP monthly Delta exports in 2015 varied from a low of 42,300 af in July, to a high of 318,941 af in January. Delta exports totaled approximately 1.6 maf in 2015.

Figure 8-8 shows monthly total amounts pumped at Dos Amigos Pumping Plant for 2015. Dos Amigos Pumping Plant diverts water from O'Neill Forebay to the California Aqueduct. Dos Amigos pumped the largest amount in July at 190,325 af.

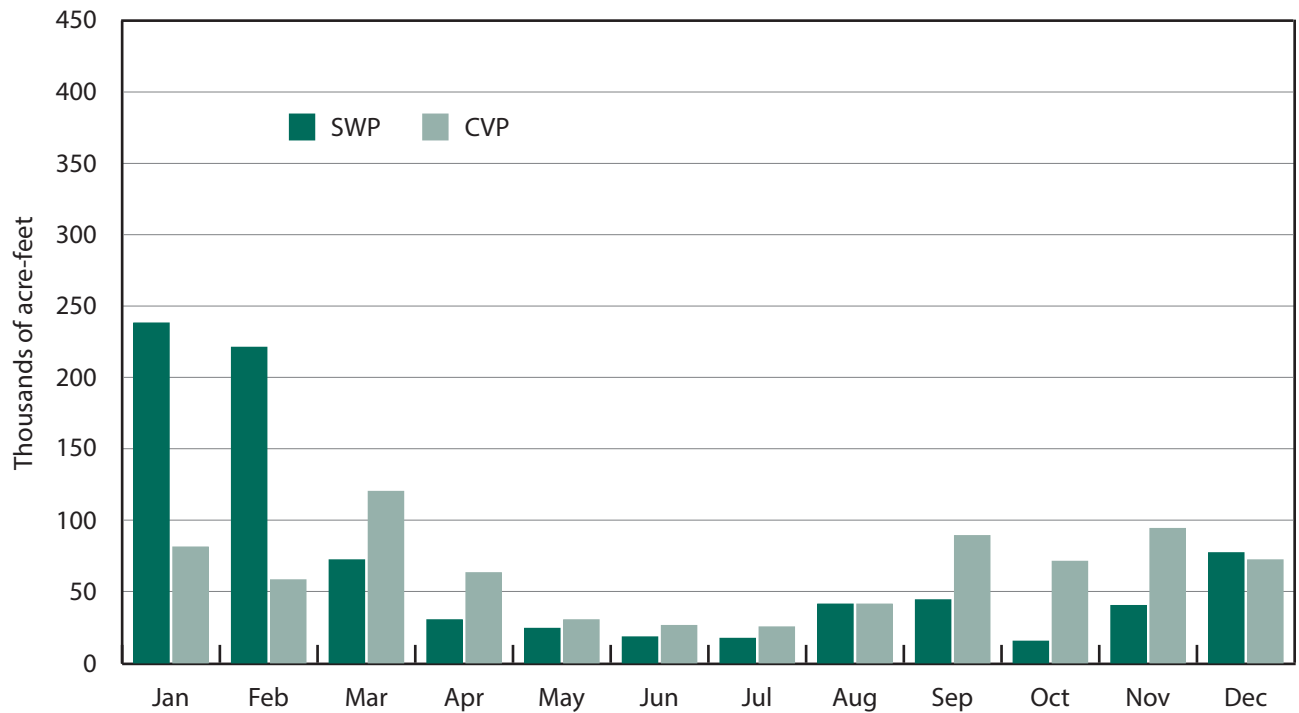
Figure 8-9 shows the amount of water pumped each month in 2015 at Edmonston Pumping Plant. Water pumped through the Edmonston Pumping Plant for delivery to Southern California totaled 735,381 af.

Additional water supply information can be found on DWR's website.

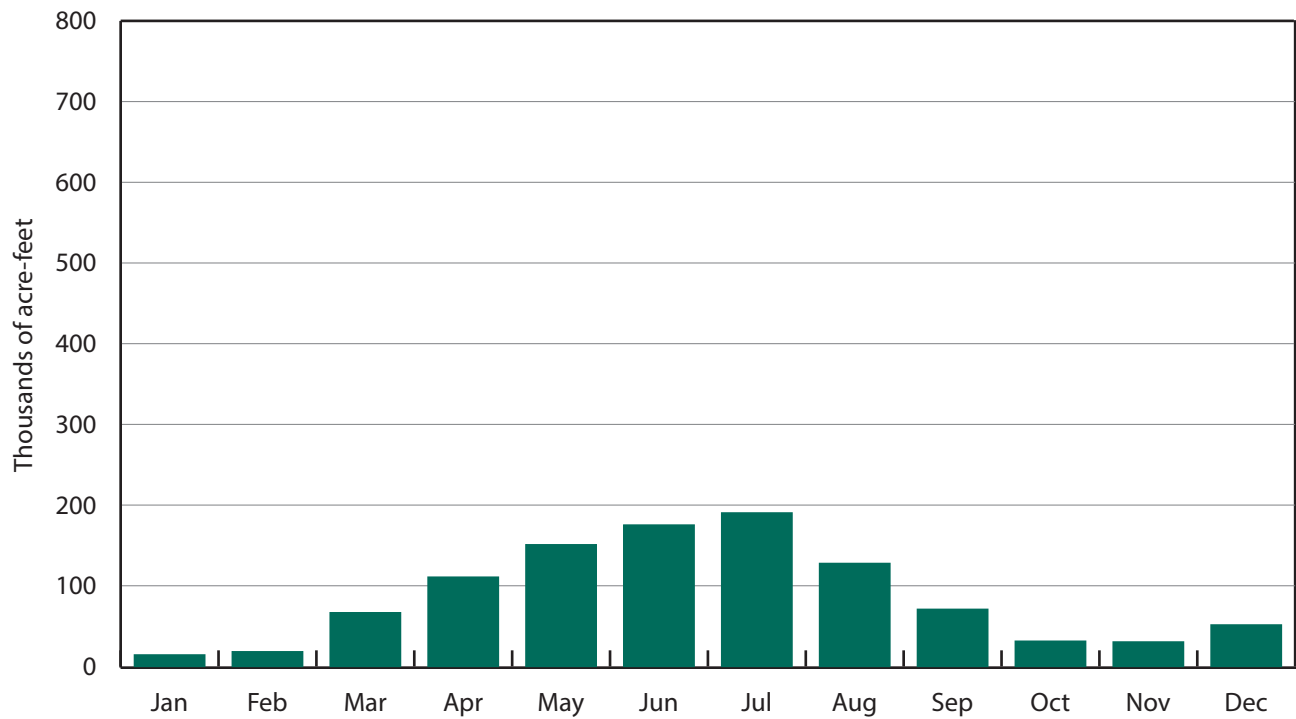




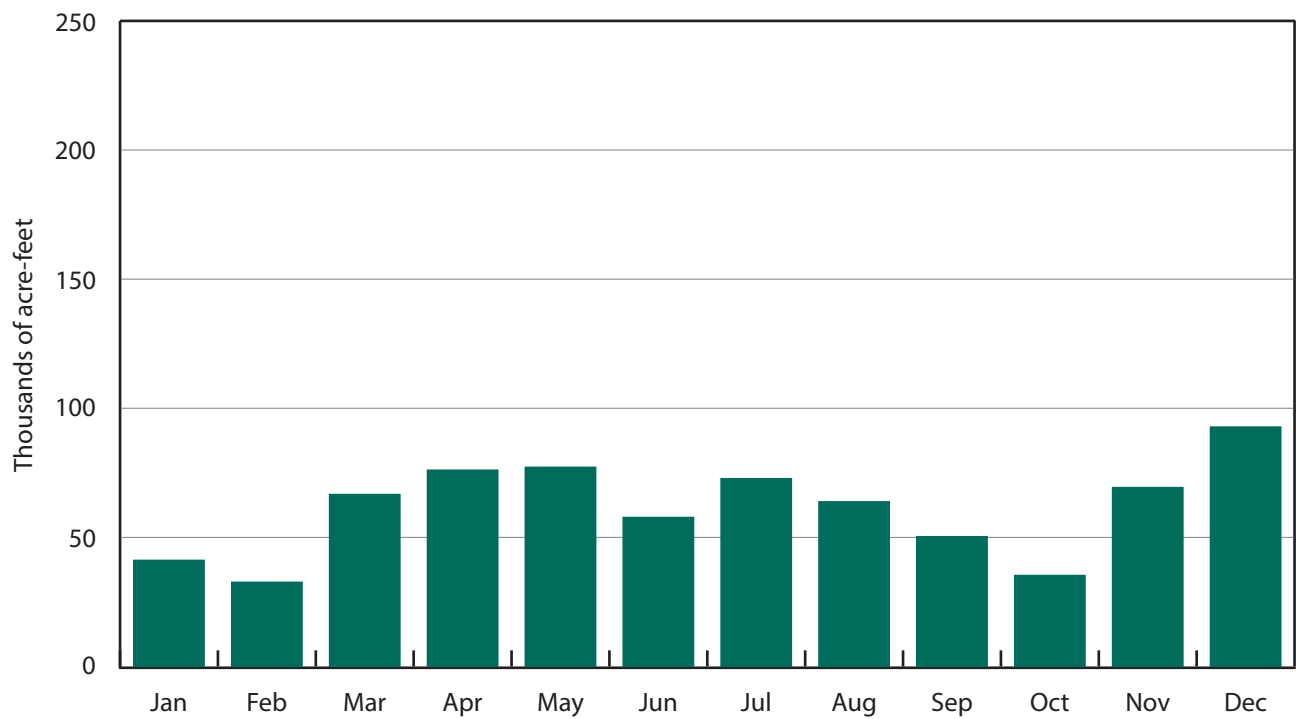
**Figure 8-6** Water Pumped at Banks Pumping Plant, 2015



**Figure 8-7** Sacramento-San Joaquin Delta Exports by State Water Project and Central Valley Project, 2015



**Figure 8-8** Water Pumped at Dos Amigos Pumping Plant, 2015



**Figure 8-9** Water Pumped at Edmonston Pumping Plant, 2015



## Chapter 9

# Water Contracts and Deliveries

*Dyer Reservoir.*

## Significant Events in 2015

A total of 2,104,264 acre-feet (af) of State Water Project (SWP) and non-SWP water was delivered to 29 long-term SWP water contractors and 19 other agencies. The portion delivered to SWP water contractors was 1,336,889 af; the portion delivered to non-SWP agencies was 767,375 af.

The hydrologic conditions in the Sacramento and San Joaquin river watersheds were both classified as “critically dry.” As a result, the Department of Water Resources (DWR) approved only 20 percent of the SWP water contractors’ Table A allocation requests.

Eight SWP water contractors recovered approximately 347,852 af of water from water banks.

*Information for this chapter was provided by the State Water Project Analysis Office.*



Long-term water supply contracts between the Department of Water Resources (DWR) and 29 public agencies and local water districts provide for water service from the State Water Project (SWP) and are the basis for the SWP's construction and on-going operations. The State provides SWP financing, capital construction, improvements, and all operations and maintenance of SWP facilities, and the agencies and local districts have contractually agreed to repay all associated costs.

## Long-term Water Supply Contracts

The long-term water supply contracts also set forth the maximum amount of water a contractor may request each year from the SWP, and these water amounts are written within the contracts in a list format known as Table A. "Table A" or "Table A water" represents a portion or all of the annual Table A amount requested by SWP water contractors and approved for delivery by DWR based on hydrologic conditions, current reservoir storage, and combined requests from the SWP water contractors. Under certain water year conditions, DWR is not able to deliver the quantity of water requested by SWP water contractors. In those years, a proportional amount is allocated and delivered according to the long-term water supply contracts by prorating the amount in proportion to each SWP water contractor's annual Table A amount. Table A amounts may also be used as a factor to allocate other available water supplies to each contractor. Approved Table A amounts may also be referred to in this chapter as "approved amounts," "approved water," or "allocated water."

SWP water provided under the long-term water supply contracts include current year Table A amounts, transfer and exchange of Table A water, carryover water, Turn-Back Pools A and B water, Multiyear Water Pool Program water, and Article 21 water.

DWR enters into agreements with SWP water contractors and non-SWP agencies, which may be amended periodically, to convey SWP and non-SWP water through the California Aqueduct. Using SWP facilities, DWR conveys non-SWP water for various agencies according to the terms of water rights and water transfer and exchange agreements. DWR also enters into agreements to approve construction, operation, and maintenance of SWP facilities, including turnouts and turn-ins.

The State Water Project Analysis Office (SWPAO) uses a numbering system for contracts, amendments, and agreements executed by DWR. These numbers, referred to as SWPAO numbers, are designated in Chapter 9 text as "SWPAO #XXXXX" and are located in parentheses in descending order, after each contract, amendment, or agreement description. These numbers can be used as identifiers to contact DWR staff for more detailed information on a particular document.

## Contract Extension Negotiations

In May 2013, DWR and the SWP water contractors began negotiations in a public forum to develop contract amendments to extend the term and change certain financial provisions of the long-term water supply contracts. In June 2014, the negotiators for DWR and the SWP water contractors reached a general agreement on principles for such an amendment (the "Agreement in Principle").

## State Water Project Long-term Water Supply Contracts

The first long-term water supply contract was signed with The Metropolitan Water District of Southern California (Metropolitan) on November 4, 1960. The contract was negotiated by the Department of Water Resources (DWR) and Metropolitan according to terms of the contracting principles for water service contracts announced by the Governor on January 20, 1960.

The Metropolitan contract became the prototype for all long-term water supply contracts; by the end of 1967, 31 agencies had contracted for water. In addition, a long-term water supply contract was executed with the City of West Covina in December 1963, but it was terminated in August 1965, and the city's Table A amount was transferred to Metropolitan through an amendment to its long-term contract with DWR. Long-term contracts with Hacienda Water District and Devil's Den Water District were also terminated when those districts transferred their Table A amounts, through contract amendments, to Tulare Lake Basin Water Storage District (1981) and Castaic Lake Water Agency (1992), respectively. Today the State Water Project (SWP) has long-term water supply contracts with 29 SWP water contracting agencies. Those contracts have been amended periodically, and as needed, to incorporate mutually agreed upon modifications.

All water contracts signed in the 1960s included an estimated date for initial water deliveries and a schedule of the water delivery amount the SWP water contractor could expect annually (annual Table A amounts). That amount was designed to increase gradually until the maximum amount of annual Table A was reached. The total combined maximum annual Table A amount for all SWP water contracting agencies was initially 4,230,000 acre-feet (af), assuming full development of the SWP.

The contracts were executed for 75 years or until all bonds sold as part of the California Water Resources Development Bond Act were repaid, whichever period was longer. As a result of amendments to contracts in the 1990s, the current combined maximum annual Table A amount totals 4,172,786 af, and the contracts are in effect for the longest of the following periods: (1) the project repayment period, which extends to December 31, 2035; (2) 75 years from the date of the contract; or (3) the period ending with the latest maturity date of any bond used to finance the construction costs of project facilities.

Currently, the long-term water supply contracts remain in effect for whichever period is longest, the project repayment period, which extends to December 31, 2035, 75 years from the effective date of the contract, or until all bonds issued to finance construction costs of SWP facilities are repaid. Each SWP water contractor may elect to receive continued service under its

long-term water supply contract contingent upon certain specified terms and conditions and other reasonable and equitable terms mutually agreed upon by DWR and the SWP water contractors.

The 75-year long-term water supply contract term results in the contracts having varying termination dates that range between

December 31, 2035, and December 31, 2042. Under the Agreement in Principle, each SWP water contractor that signs an amendment would extend its contract term to December 31, 2085.

Also under the Agreement in Principle, payment provisions for capital costs and certain other costs will be amended from an amortized basis to an annual “pay as you go” basis. The “pay as you go” provisions will provide revenues needed by DWR to operate the SWP in a fiscally sound manner. The long-term water supply contracts’ current provisions authorizing DWR to charge the SWP water contractors annually for the full amount of required annual debt service and coverage on the bonds will continue in any extended long-term water supply contract.

The Agreement in Principle also provides for, among other things, the following:

- an increase in DWR’s operating reserves—a mechanism for financing capital projects with interest from the SWP water contractors;
- the establishment of accounts to fund for certain State Water Resources Development System expenses not chargeable to the SWP water contractors; and
- the establishment of a finance committee consisting of DWR and contractor representatives to serve as a forum for discussions and to provide a channel for recommendations concerning SWP financial policies.

Before any long-term water supply contract amendment is adopted, DWR must accomplish the following as part of the contract amendment process: (1) complete an environmental review pursuant to the California Environmental Quality Act and (2) deliver a presentation in an informational hearing to the California Legislature. In 2015, DWR continued preparing a draft

environmental impact report (EIR) for the proposed contract extension amendment.

## Amendments to Long-term SWP Water Supply Contracts

All of the original long-term water supply contracts signed by DWR and the 29 long-term SWP water contractors have been amended to incorporate mutually desired changes. Most amendments fall under the following general categories:

- (1) permanent transfers of Table A amounts from one SWP water contractor to another;
- (2) allocation of costs and benefits for the addition or enlargement of SWP facilities;
- (3) purchase of excess capacity in the California Aqueduct; and
- (4) provisions to implement Monterey Agreement principles.

## 2015 Amendments to Long-term SWP Water Supply Contracts

There were no amendments to the long-term water supply contracts in 2015.

## Monterey Amendments

The Monterey Amendments increased the reliability of existing water supplies and water management flexibility, providing more tools for the 29 long-term SWP water contractors to maximize use of existing facilities.

The Monterey Amendments included changes in allocation of Table A water, the transfer of Table A amounts and land, financial restructuring, and increased operational flexibility. The Monterey Amendments are discussed in detail in Bulletin 132-95, Chapter 1, Summary of Significant Events, available on the DWR website.

In 2015, DWR continued to operate the SWP according to the long-term water supply contracts, the Monterey Amendments, and the May 5, 2003, settlement agreement for the Planning and Conservation League v. DWR (1995) lawsuit. The May 2003 settlement agreement is discussed in detail in Bulletin 132-04, Chapter 9, Water Contracts and Deliveries, available on DWR's website. As required by the settlement agreement, the Monterey Plus EIR was prepared and eventually certified by DWR in 2010. The adequacy of the Monterey Plus EIR was challenged, and the court found that the Monterey Plus EIR complied with the California Environmental Quality Act in all respects except with regard to its discussion/analysis of the development, use, and operation of the Kern Water Bank. In November 2014, the court ordered DWR to correct the deficiencies in a revised Monterey Plus EIR and to recertify the revised Monterey Plus EIR by December 31, 2015. In July 2015, the court granted DWR's request for a 6-month extension, changing the deadline to June 30, 2016.

See Chapter 6, Legislation and Litigation, for the current status of the Monterey Amendment litigation.

## Miscellaneous Agreements with Long-term SWP Water Contractors

### 2015 Water Conveyance and Exchange Agreements

Water conveyance and exchange agreements that were executed or pending execution with SWP water contractors during 2015 are described below.

#### *AVEK/Littlerock*

A letter agreement among DWR, AVEK, and Littlerock, dated December 29, 2015, and executed on December 31, 2015, approved the delivery of up to 460 acre-feet (af) of

Littlerock's 2015 SWP Table A water to AVEK by December 31, 2015. In exchange, AVEK will return an equal amount, up to 460 af, of its future approved SWP Table A water to Littlerock by December 31, 2025. There will be no monetary payments between AVEK and Littlerock for this 1:1 exchange. During 2015, a total of 460 af was delivered to AVEK under this agreement. (SWPAO #15026)

#### *Alameda County/Alameda-Zone 7/Contra Costa*

A letter agreement among DWR, Alameda County, Alameda-Zone 7, and Contra Costa Water District (Contra Costa), dated December 18, 2015, was executed December 21, 2015. The agreement approved the exchange of up to 5,000 acre-feet (af) of SWP water supplies for an equal amount of Contra Costa's Central Valley Project (CVP) water supplies.

This CVP-SWP water exchange is to facilitate the return of up to 5,000 af of Alameda County's and Alameda-Zone 7's previously stored water in Kern County. Contra Costa can divert up to 5,000 af of SWP water supplies at its intakes for use in its service area before January 20, 2016. In exchange, the Bureau of Reclamation (Reclamation) will make available an equal amount, up to 5,000 af, of Contra Costa's CVP water supplies at Banks Pumping Plant for subsequent delivery by DWR to Alameda County and Alameda-Zone 7 turnouts located on the South Bay Aqueduct under Article 55 of Alameda County's and Alameda Zone 7's respective long-term water supply contracts with DWR. DWR filed a petition with the State Water Resources Control Board (SWRCB) and received a 1-year approval, effective January 20, 2015, for a temporary change in point of diversion to allow the diversion of SWP water at Contra Costa's intakes. Reclamation filed a separate petition and received a 1-year approval, effective September 28, 2015, for a change in point of diversion to allow the diversion



of CVP water at Banks Pumping Plant to complete the water exchange. In 2015, no water was moved under this agreement. (SWPAO #15025)

### ***Santa Clara***

An agreement between DWR and Santa Clara, executed September 21, 2015, provides additional temporary points of delivery for the return of a portion of Santa Clara's previously stored SWP water supplies in the Semitropic Water Banking and Exchange Program. DWR and Santa Clara have previously entered into separate change in point of delivery agreements that allow for the storage and future return of Santa Clara's approved SWP water supplies under the Semitropic Water Banking and Exchange Program. Under the executed point of delivery agreements, Santa Clara's stored water can be returned to Santa Clara through the South Bay Aqueduct. This agreement allows for temporary additional points of delivery of a portion of Santa Clara's stored water in the Semitropic Water Banking and Exchange Program at O'Neill Forebay and/or San Luis Reservoir through December 31, 2017. Santa Clara's water delivered to San Luis Reservoir and/or O'Neill Forebay under this agreement will be used within the SWP place of use. (SWPAO #15017)

An agreement between DWR and Santa Clara Valley Water District (Santa Clara), executed September 21, 2015, allows for additional temporary points of delivery of a portion of Santa Clara's SWP water supplies at San Luis Reservoir and/or O'Neill Forebay through December 31, 2017. Santa Clara's water delivered to San Luis Reservoir and/or O'Neill Forebay under this agreement will be used within the SWP place of use. (SWPAO #15016)

### ***Dudley Ridge/Westlands***

A change in point of delivery agreement among DWR, Dudley Ridge, and Westlands Water District (Westlands), executed

August 4, 2015, approved the delivery of up to 850 af of Dudley Ridge's approved 2015 SWP Table A water to Westlands through August 31, 2015. This is to facilitate an exchange between Sandridge Partners and a landowner in Westlands' service area. The landowner acquired 850 af of water from Shafter-Wasco Irrigation District, a CVP Friant Division contractor. This water was made available to Sandridge Partners for use in Kern County. In exchange, an equivalent amount, up to 850 af, of Dudley Ridge's approved 2015 SWP Table A water was delivered to Westlands in Reach 7 of the California Aqueduct for use on lands in the Kings County portion of Westlands' service area, which is within the SWP place of use. In 2015, 850 af of Dudley Ridge's Table A water was delivered to Westlands under this agreement. (SWPAO #15015)

### ***San Bernardino/Santa Clara***

A letter agreement among DWR, San Bernardino, and Santa Clara, dated July 16, 2015, and executed August 4, 2015, approved the delivery of up to 2,500 af of San Bernardino's approved 2015 SWP Table A water to Santa Clara by December 31, 2015. In exchange, Santa Clara will return up to 5,000 af, based on an exchange ratio of 1:2, of its future approved SWP water supplies. Santa Clara will return to San Bernardino up to 2,500 af by December 31, 2018, and up to 2,500 af by December 31, 2023. During 2015, a total of 2,500 af of San Bernardino's Table A water was delivered to Santa Clara under this agreement. (SWPAO #15014)

### ***Tulare/San Luis Water District/Westlands***

A change in point of delivery agreement among DWR, Tulare, San Luis Water District (San Luis), and Westlands, executed August 4, 2015, approved the delivery of up to a total of 14,000 af of Tulare's approved SWP water supplies to Westlands and San Luis by April 30, 2016. This agreement facilitates delivery of Kings River pre-1914 water rights water from J.G. Boswell



Company, a landowner in Tulare, to Westlands' and San Luis' service areas. In exchange, up to 14,000 af of J.G. Boswell Company's Kings River pre-1914 water rights water will be delivered to Tulare for use in its service area. DWR filed a petition with the SWRCB and received a 1-year approval effective May 1, 2015, for consolidation of SWP and CVP places of use. During 2015, a total of 14,000 af of Tulare's Table A water was delivered to Westlands and San Luis, of which 10,500 af was delivered to Westlands and 3,500 af was delivered to San Luis under this agreement. (SWPAO #15013)

### **Kern/Westlands**

A change in point of delivery agreement among DWR, Kern, and Westlands, executed August 12, 2015, provided for a same landowner transfer by Paramount Farming Company that owns land in both Kern's and Westlands' service areas. This agreement approved the delivery of up to 3,000 af of Kern's approved 2015 and/or 2016 SWP Table A water to Westlands. In exchange, Kern will retain a like amount of Paramount Farming Company's CVP water previously stored in Kern's service area. DWR filed a petition with the SWRCB and received a 1-year approval order, effective May 1, 2015, for the consolidation of SWP and CVP places of use. During 2015, no water was delivered to Westlands under this agreement. (SWPAO #15012)

### **Kern**

A change in point of delivery agreement between DWR and Kern, executed July 9, 2015, approved the delivery of up to 16,705 af of Kern's approved 2015 and/or 2016 SWP Table A water at O'Neill Forebay to Reclamation for subsequent delivery by Reclamation to the San Joaquin River Exchange Contractors (Exchange Contractors) through April 30, 2016. This is to facilitate the return of Kern-Tulare Water District's (Kern-Tulare) and Delano-Earlimart Irrigation District's (Delano-

Earlimart) previously stored CVP water supplies in Kern's service area. The return and delivery of Kern-Tulare's and Delano-Earlimart's previously stored water was accomplished through a series of exchanges. First, DWR made available up to 16,705 af of Kern's approved Table A water at O'Neill Forebay to Reclamation for subsequent delivery by Reclamation to the Exchange Contractors for use on lands outside the SWP place of use. In exchange, Kern will retain a like amount of Kern-Tulare's and Delano-Earlimart's previously stored water in Kern's service area. Kern-Tulare and Delano-Earlimart will in turn receive a like amount of San Joaquin River water, normally delivered to the Exchange Contractors, which will instead be released by Reclamation from Millerton Lake for delivery to Kern-Tulare and Delano-Earlimart. DWR filed a petition with the SWRCB on May 11, 2015, and received approval on May 22, 2015, for an additional exchange of water under SWRCB's April 27, 2015, order for approval of consolidation of SWP and CVP places of use. During 2015, a total of 16,705 af of Kern's Table A water was made available to Reclamation at O'Neill Forebay under this agreement. (SWPAO #15011)

### **AVEK/Kern**

A letter agreement among DWR, AVEK, and Kern, dated May 28, 2015, and executed October 20, 2015, approved the transfer of up to 861 af of approved AVEK's SWP water supplies to Kern on behalf of Tejon Ranch Company that farms in both AVEK's and Kern's service areas. During 2015, no water was delivered to Kern under this agreement. (SWPAO #15008)

### **Kern/Westlands**

A change in point of delivery agreement among DWR, Kern, and Westlands, executed August 12, 2015, provided for a same landowner transfer by Poso Creek Water Company that has farming operations in both Kern's and Westlands' service areas.

This agreement approved the delivery of up to 12,819 af of Kern's approved 2015 and/or 2016 SWP Table A water to Westlands. In exchange, Kern will retain a like amount of Poso Creek Water Company's CVP water previously stored in Kern's service area. DWR filed a petition with the SWRCB and received a 1-year approval order, effective May 1, 2015, for the consolidation of SWP and CVP places of use. During 2015, no water was delivered to Westlands under this agreement. (SWPAO #15007)

### ***AVEK/Santa Barbara***

A letter agreement (SWPAO #15005) among DWR, AVEK, and Santa Barbara, dated March 26, 2015, and executed April 10, 2015, approved the delivery of up to 7,500 af of AVEK's approved SWP water supplies to Santa Barbara by December 31, 2015. In exchange, Santa Barbara will return up to 7,500 af, based on an even exchange ratio of 1:1, of its future approved SWP water supplies to AVEK by December 31, 2025. A subsequent amendment (SWPAO #15005-A), dated July 27, 2015, and executed August 31, 2015, allows storage of a portion of AVEK's SWP water supplies in San Luis Reservoir. The water supplies are identified as carryover water for later delivery to Santa Barbara by December 31, 2017. During 2015, 4,847 af of AVEK's Table A water was delivered to Santa Barbara under this agreement. (SWPAO #15005 and #15005-A)

### ***AVEK/Santa Clara***

A letter agreement among DWR, AVEK, and Santa Clara, dated March 18, 2015, and executed April 23, 2015, approved the delivery of up to 15,000 af of AVEK's approved SWP water supplies to Santa Barbara by December 31, 2015. In exchange, Santa Clara will return up to 15,000 af, based on an even exchange ratio of 1:1, of its future approved SWP water supplies to AVEK by December 31, 2025. During 2015, a total of 7,500 af of AVEK's Table A water

was delivered to Santa Clara under this agreement. (SWPAO #15004)

### ***Tulare/Westlands***

A letter agreement among DWR, Tulare, and Westlands, dated March 5, 2015, and executed March 16, 2015, approved the transfer of up to 4,000 af of Tulare's 2015 SWP Table A water to Westlands on behalf of Westlake Farms Incorporated, which has farms in both Tulare's and Westlands' service areas. During 2015, no water was delivered to Westlands under this agreement. (SWPAO #15003)

### ***Kern/Tulare***

A letter agreement among DWR, Kern, and Tulare, dated March 5, 2015, and executed April 24, 2015, approved the transfer of up to 10,000 af of Tulare's 2015 SWP Table A water to Kern on behalf of J.G. Boswell Company, which has farms in both Tulare's and Kern's service areas. During 2015, no water was delivered to Kern under this agreement. (SWPAO #15002)

### ***AVEK/Littlerock***

A letter agreement among DWR, AVEK, and Littlerock, dated December 23, 2014, and executed September 3, 2015, approved the delivery of up to 115 af of Littlerock's 2014 SWP Table A water to AVEK. In exchange, AVEK will return an equal amount, up to 115 af, of its future approved SWP Table A water to Littlerock by December 31, 2024. There will be no monetary payments between AVEK and Littlerock for this 1:1 exchange. During 2015, no water was moved under this agreement. (SWPAO #14021)

### ***Kern/Westlands***

A change in point of delivery agreement among DWR, Kern, and Westlands was executed February 24, 2015, to facilitate a water exchange between Harris Farms, LLC and Semitropic Water Storage District, a member unit of Kern. This agreement

approved the delivery of up to 4,627 af of Kern's approved 2014 and/or 2015 SWP Table A water to Westlands through April 30, 2015. In exchange, Kern will retain a like amount of Harris Farm, LLC's CVP water previously stored in Kern's service area. DWR filed a petition with the SWRCB on October 20, 2014, and received approval on October 24, 2014, for additional exchange of water under SWRCB's March 28, 2014, order for the approval of the consolidation of SWP and CVP places of use. An amendment (SWPAO #14020-A) dated July 9, 2015, and executed July 14, 2015, extends the term of the agreement to allow the delivery of up to 3,055 af of Kern's approved 2015 and/or 2016 Table A water to Westlands through April 30, 2016. DWR filed a petition with the SWRCB and received a 1-year approval order, effective May 1, 2015, for the consolidation of SWP and CVP places of use. During 2015, a total of 4,627 af of Kern's Table A water was delivered to Westlands under this agreement. (SWPAO #14020 and SWPAO #14020-A)

### **Kern**

An amendment between DWR and Kern, dated July 6, 2015, and executed July 15, 2015, approved the delivery of up to 5,182 af of Kern's Table A water to Westlands' service area outside of Kings County for 2015 and 2016. The original agreement (SWPAO #06013), executed April 26, 2007, allowed the return water to be delivered only in the Kings County portion of Westlands' service area, which is within the SWP place of use. DWR filed a petition with the SWRCB and received a 1-year approval order, effective May 1, 2015, for the consolidation of SWP and CVP places of use. During 2015, a total of 1,341 af of Kern's Table A water was delivered to Westlands under this agreement. (SWPAO #06013 and SWPAO #06013-D)

### **Kern/Metropolitan**

An amendment among DWR, Kern, and Metropolitan, executed August 31, 2015, approved the delivery of up to 20,000 af of Metropolitan's approved SWP water supplies to O'Neill Forebay by March 1, 2015, facilitating an exchange among the Exchange Contractors. Under this amendment, up to 20,000 af of Metropolitan's approved SWP water supplies would be made available at O'Neill Forebay and subsequently delivered by Reclamation to the Exchange Contractors. In exchange, Reclamation will deliver an equal amount of CVP water to Arvin-Edison Water Storage District (Arvin-Edison) on behalf of Metropolitan. DWR filed a petition with the SWRCB and received a 1-year approval order, effective May 1, 2014, for the consolidation of SWP and CVP places of use. The original long-term point of delivery agreement (SWPAO #01013), executed March 18, 2004, approved the delivery of a portion of Metropolitan's approved SWP water supplies for storage and later recovery from groundwater basins within Arvin-Edison through December 31, 2035. No water was moved under this amendment in 2015. (SWPAO #01013 and SWPAO #01013-A)

### **AVEK/Mojave**

An amendment (SWPAO #97003-B) among DWR, Mojave, and AVEK, executed April 30, 2015, approved an additional point of delivery of Mojave's approved SWP Table A water to AVEK's turnout in Reach 20A of the California Aqueduct. The 1997 agreement (SWPAO #97003) executed on November 13, 1997, and the amendment (SWPAO #97003-A) executed on January 12, 2012, approved the delivery of up to 1,800 af per year of Mojave's approved Table A water for use by a solar power generating plant operated by Luz Solar Partners, Ltd. III-VII. The amendment approved the delivery of up to 3,000 af of Mojave's approved Table A water in AVEK's groundwater basin as a



backup water supply to the solar plant in the event of an SWP outage through December 31, 2035. During 2015, a total of 1,023 af of Mojave's Table A water was delivered to AVEK under this agreement. (SWPAO #97003, SWPAO #97003-A, and SWPAO #97003-B)

## **Water Conveyance and Exchange Agreements Prior to 2015**

### ***Palmdale/San Bernardino***

A letter agreement among DWR, Palmdale, and San Bernardino, dated August 1, 2014, and executed August 14, 2014, approved the delivery of up to 2,500 af of San Bernardino's approved SWP water supplies to Palmdale by December 31, 2014. In exchange, Palmdale will return up to 5,625 af, based on an unbalanced exchange ratio of 1:2.25, of its future SWP water supplies to San Bernardino by December 31, 2018. During 2015, a total of 500 af of Palmdale's Table A water was delivered to San Bernardino under this agreement. (SWPAO #14013)

### ***Butte***

A letter agreement between DWR and Butte, dated July 7, 2014, and executed July 29, 2014, approved the conveyance of up to 3,000 af per year of non-SWP water to California Water Service Company, a member agency of Butte, through December 31, 2017. This non-SWP water is made available by Pacific Gas & Electric Company for DWR to convey to California Water Service Company's turnouts at the Thermalito Power Canal, under Article 55 of Butte's long-term water supply contract. During 2015, a total of 2,558 af of non-SWP water was conveyed under this agreement. (SWPAO #14011)

### ***Dudley Ridge/Santa Clara***

A letter agreement among DWR, Dudley Ridge, and Santa Clara, dated June 28, 2013, and executed July 12, 2013, approved the conveyance of up to 3,100 af per year, minus

Sacramento-San Joaquin Delta carriage water losses, on a 50/50 equal basis of non-SWP water to Dudley Ridge and Santa Clara through December 31, 2024. This non-SWP water is made available by Browns Valley Irrigation District. During 2015, 1,240 af was delivered to Dudley Ridge and 1,240 af was delivered to Santa Clara under this agreement. (SWPAO #13020)

### ***Butte***

Three multiyear agreements (SWPAO #13013, SWPAO #13014, and SWPAO #13015) were executed in 2014 among DWR, Butte, and several participating SWP contractors. Butte's long-term water supply contract with DWR provides for Butte to have a maximum Table A amount of 27,500 af per year. Butte determined that 24,000 af per year of its Table A amount is not needed to meet its in-county demands for 2014 through 2021 and requested a transfer of up to 24,000 af per year of its Table A water to Palmdale, Dudley Ridge, and Kern. Up to 10,000 af of Butte's allocated Table A water is made available to transfer to Palmdale. Up to 14,000 af of Butte's allocated Table A water is shared on a percentage basis of 85.66 and 14.34 percent for transfer to Kern and Dudley Ridge, respectively. Butte also determined that the difference of 3,500 af per year (27,500 af minus 24,000 af) may not be fully utilized by Butte for its in-county needs and requested a transfer of a portion of the 3,500 af per year on a percentage basis to Palmdale, Dudley Ridge, and Kern when it becomes available (Butte's Additional Water). In 2015, Butte's allocated Table A water was transferred as follows.

**Butte/Kern.** A multiyear agreement among DWR, Butte, and Kern, executed August 5, 2014, approved the annual delivery of a portion of Butte's allocated Table A water plus a portion of Butte's Additional Water when it becomes available to four of Kern's member units (Belridge Water Storage District, Berrenda Mesa Water Storage District, Lost Hills Water District, and



Wheeler Ridge-Maricopa Water Storage District) in years 2014 through 2021. During 2015, a total of 1,554 af of Butte's Table A water was delivered to Kern under this agreement. (SWPAO #13015)

**Butte/Dudley Ridge.** A multiyear agreement among DWR, Butte, and Dudley Ridge, executed August 5, 2014, approved the annual delivery of a portion of Butte's allocated Table A water plus a portion of Butte's Additional Water when it becomes available to Dudley Ridge in years 2014 through 2021. During 2015, a total of 260 af of Butte's Table A water was delivered to Dudley Ridge under this agreement. (SWPAO #13014)

**Butte/Palmdale.** A multiyear agreement among DWR, Butte, and Palmdale, executed August 5, 2014, approved the annual delivery of a portion of Butte's allocated Table A water plus a portion of Butte's Additional Water when it becomes available to Palmdale in years 2014 through 2021. During 2015, a total of 1,296 af of Butte's Table A water was delivered to Palmdale under this agreement. (SWPAO #13013)

### **Dudley Ridge/Kern/Metropolitan**

A multiyear exchange and change in point of delivery agreement among DWR, Dudley Ridge, Kern, and Metropolitan, executed December 16, 2013, approved the delivery of up to 8,700 af of Dudley Ridge's approved SWP water supplies to Metropolitan by December 31, 2017. In exchange, Metropolitan will return up to 4,350 af, based on an unbalanced exchange ratio of 2:1, of its future approved SWP water supplies to Dudley Ridge by December 31, 2022. This agreement allows for the delivery of a portion of Dudley Ridge's approved SWP water supplies to either Metropolitan's service area and/or Kern's turnouts for storage in Rosedale-Rio Bravo Water District (Rosedale-Rio Bravo), a member unit of Kern, for later use by Metropolitan within its own service area. During 2015, a total

of 452 af of Dudley Ridge's Table A water was delivered to Metropolitan under this agreement. (SWPAO #13012)

### **Coachella/Kern**

A multiyear change in point of delivery and conveyance agreement among DWR, Coachella, and Kern, executed July 30, 2013, approved the annual delivery of up to 16,500 af of water acquired by Coachella back to Coachella through December 31, 2035. Glorious Land Company (GLC) and Rosedale-Rio Bravo executed an agreement in 2005 to provide a water supply from Rosedale-Rio Bravo to GLC's development project in Riverside County. GLC was not yet ready to receive the water to which it was entitled under the 2005 Rosedale-Rio Bravo/GLC agreement. In 2012, GLC and Coachella executed an assignment agreement that allowed Coachella to annually acquire up to 16,500 af of Rosedale-Rio Bravo's water under the 2005 Rosedale-Rio Bravo/GLC Agreement (Assigned Water). This agreement allows for the delivery of the Assigned Water to Coachella by (1) a change in point of delivery of a portion of Rosedale-Rio Bravo's allocation of Kern's Table A water as an exchange for a like amount of Assigned Water and (2) conveyance of the Assigned Water to Coachella under Article 55 of Coachella's long-term water supply contract by direct pump-in of the water into the California Aqueduct. In 2015, a total of 9,500 af was delivered to Coachella under this agreement. (SWPAO #12023)

### **Dudley Ridge/Tulare**

A same landowner agreement among DWR, Dudley Ridge, and Tulare, executed September 7, 2012, approved multiyear transfers between Dudley Ridge and Tulare through December 31, 2035. This agreement allows for the delivery of up to 15,000 af per year of a portion of Dudley Ridge's and/or a portion of Tulare's approved Table A water for same landowner transfers to the other party without any expected return. During

2015, a total of 617 af of Tulare's Table A water was delivered to Dudley Ridge's turnouts. (SWPAO #12011)

### ***Kern/Metropolitan/Santa Barbara***

A letter agreement among DWR, Kern, Metropolitan, and Santa Barbara, dated April 18, 2012, and executed June 28, 2012, approved the exchange of up to 1,500 af of Santa Barbara's approved SWP water supplies with Metropolitan's future SWP water supplies equal to one-half, less losses, of the total amount delivered to Metropolitan. Metropolitan will provide the return water to Santa Barbara by December 31, 2017. A separate change in point of delivery agreement (SWPAO #11022) among DWR, Kern, and Metropolitan, executed August 3, 2012, allowed for Santa Barbara's approved SWP water supplies to be delivered to Kern's turnouts for storage in Kern County, as described in Bulletin 132-13. During 2015, a total of 410 af of Metropolitan's Table A water was delivered to Santa Barbara. (SWPAO #11021)

### ***AVEK/Palmdale***

A letter agreement among DWR, AVEK, and Palmdale, dated May 1, 2012, and executed November 13, 2012, approved the delivery of up to 10,000 af of Palmdale's 2011 SWP water supplies to AVEK. In exchange, AVEK will return 50 percent, up to 5,000 af, of its future SWP water supplies to Palmdale by December 31, 2021. During 2015, a total of 2,465 af of AVEK's water was delivered to Palmdale, of which 653 af was Article 56(c) carryover water and 1,812 af was Table A water. (SWPAO #11020)

### ***Dudley Ridge/Kern***

A multiyear same landowner transfer agreement among DWR, Dudley Ridge, and Kern, executed June 13, 2011, provided for the delivery of a portion of Dudley Ridge's approved Table A water for same landowner transfers to Kern through December 31, 2020, without any expected

return. During 2015, a total of 16,950 af of Dudley Ridge's water was delivered to Kern under this agreement. (SWPAO #10030)

### ***Empire/Westlands***

A long-term change in place of use agreement among DWR, Empire, and Westlands, executed March 3, 2011, approved the annual delivery of up to 2,000 af of Empire's approved Table A water to Westlands through April 1, 2027. This transfer was made on behalf of two landowners, Brooks Farms and Newton Brothers Farms, that farm in both Empire's and Westlands' service areas. DWR filed a petition with the SWRCB and received approval for a temporary change in place of use. The SWRCB subsequently issued an order authorizing the long-term change in place of use on November 21, 2011. During 2015, a total of 262 af of Empire's Table A water was delivered to Westlands under this agreement. (SWPAO #10008)

### ***Tulare/Westlands***

A long-term change in place of use agreement among DWR, Tulare, and Westlands, executed January 7, 2011, approved the annual delivery of up to 8,000 af of Tulare's approved Table A water to Westlands' turnouts through April 1, 2027. The transfer was made on behalf of two landowners, Hansen Ranches and Newton Brothers Farms, that farm in both Tulare's and Westlands' service areas. DWR filed a petition with the SWRCB and received approval for a temporary change in place of use. The SWRCB issued an order authorizing the long-term change in place of use on November 21, 2011. In 2015, a total of 1,742 af of Tulare's Table A water was delivered to Westlands. (SWPAO #10006)

### ***Napa/Solano***

A long-term change in point of delivery agreement among DWR, Napa, and Solano, executed October 11, 2010, approved the conveyance of up to 500 af per year of

the City of Vallejo's non-SWP water from Solano's service area to Napa's turnouts located on the North Bay Aqueduct under Article 55 of Napa's long-term water supply contract. The City of Vallejo, a member agency of Solano, has water rights to this non-SWP water originating from Cache Slough and Lindsay Slough (tributaries of the Sacramento River). This agreement provides for the delivery of the City of Vallejo's non-SWP water through Reach 3B of the North Bay Aqueduct. This agreement is effective through December 31, 2035. During 2015, a total of 500 af of non-SWP water was conveyed under this agreement. (SWPAO #10005)

### ***Crestline/San Bernardino***

A letter agreement (SWPAO #08063) among DWR, Crestline, and San Bernardino, dated December 17, 2008, and executed December 22, 2008, approved the delivery of up to 1,000 af of Crestline's approved SWP Table A water to San Bernardino by December 31, 2008. In exchange, San Bernardino returned an equal amount of its future approved Table A water to Crestline by December 31, 2011. There was no monetary payment between Crestline and San Bernardino for this 1:1 exchange. An amendment (SWPAO #08063-A) dated December 14, 2009, and executed February 16, 2010, among DWR, Crestline, and San Bernardino, extended the term for the delivery of San Bernardino's approved Table A water to Crestline to December 31, 2018. During 2015, a total of 850 af of San Bernardino's Table A water was delivered to Crestline under this agreement. (SWPAO #08063 and SWPAO #08063-A)

### ***Castaic Lake/Kern***

A long-term agreement among DWR, Castaic Lake, and Kern, executed February 5, 2008, approves the annual conveyance of up to 11,000 af of non-SWP Kern River water from Buena Vista Water Storage District, a member unit of Kern, to Castaic Lake. The

Kern River water was delivered to Castaic Lake either by a change in point of delivery of a portion of Kern's Table A water to Castaic Lake in exchange for a like amount of Buena Vista Water Storage District's water, or by direct pump-in to the California Aqueduct and conveyed to Castaic Lake under Article 55 of Castaic Lake's long-term water supply contract. During 2015, a total of 10,995 af was delivered to Castaic Lake under this agreement. (SWPAO #07008)

### ***Mojave/Solano***

A letter agreement among DWR, Mojave, and Solano, dated December 7, 2007, and executed March 10, 2008, approved the delivery of up to 2,000 af of Solano's 2005 approved SWP water supplies to Mojave by December 31, 2005. In exchange, Mojave will return up to 1,000 af, based on an exchange ratio of 2:1, of its SWP water supplies to Solano by December 31, 2015. During 2015, a total of 1,000 af of Mojave's Table A water was delivered to Solano, thereby completing this agreement. (SWPAO #05019)

### ***Kings/Westlands***

A long-term change in point of delivery agreement among DWR, Kings, and Westlands, executed March 24, 2004, provides for the delivery of up to 5,000 af of Kings' annual Table A water through Westlands' turnouts for use at Lemoore Naval Air Station. This agreement is effective through December 31, 2035. During 2015, a total of 190 af of Kings' Article 56(c) carryover water was delivered to Westlands' turnouts under this agreement. (SWPAO #04005)

### ***Solano/Cities of Fairfield, Vacaville, and Benicia***

A settlement agreement among DWR, Solano, and the cities of Fairfield, Vacaville, and Benicia, which includes conveyance service by Solano, was executed on May 19, 2003. The agreement provides for delivery through December 31, 2035, of up to



31,620 af per year of settlement water to Solano for delivery through the North Bay Aqueduct to the three cities to help meet their current and future municipal and industrial water needs. During 2015, a total of 728 af of settlement water was delivered to Solano for conveyance to the three cities. (SWPAO #03017)

### **Kings/Tulare**

A long-term change in point of delivery agreement among DWR, Kings, and Tulare, executed March 10, 2006, provides for the delivery of up to 200 af of Kings' annual Table A water to Westlands' turnouts. The water is conveyed to GWF Energy LLC for use within Kings' service area. This agreement is effective through December 31, 2035. During 2015, a total of 22 af of Kings' Table A water was delivered to Westlands' turnouts. (SWPAO #02031)

### **Kern**

A long-term change in point of delivery agreement between DWR and Kern, executed June 8, 2000, approved the delivery of a portion of Kern's annual Table A water to Western Hills Water District (Western Hills). In exchange, Kern will receive a like amount of local water acquired by Western Hills in the Pioneer Groundwater Bank. The SWRCB approved Western Hills' service area to be included within the authorized SWP place of use on April 21, 2000. During 2015, a total 718 af of Kern's water was delivered to Western Hills, of which 133 af was Table A water and 585 af was Article 56(c) carryover water. (SWPAO #01001)

### **Napa/Solano**

A change in point of delivery agreement among DWR, Napa, and Solano, executed December 26, 2001, approved the delivery of up to 628 af of Napa's annual Table A water to the City of Vallejo's Water Treatment Plant in Solano's service area. This water is further conveyed to the city of American Canyon, a member agency of Napa. The agreement is

effective through December 31, 2035. During 2015, a total of 66 af of Napa's Table A water was delivered to Solano's turnouts. (SWPAO #00029)

## **Introduction of Local Water Agreement**

### **AVEK**

An agreement between DWR and AVEK, executed April 7, 2015, approved the introduction and conveyance of up to 27,000 af of AVEK's local groundwater into the California Aqueduct within AVEK's service area. During 2015, AVEK introduced a total of 1,516 af of its local water into the California Aqueduct; DWR conveyed and delivered 1,516 af to AVEK's turnouts under this agreement. (SWPAO #14016)

## **Turnout Agreements**

### **Alameda-Zone 7**

On September 30, 2015, DWR executed an agreement with Alameda-Zone 7 for construction, operation and maintenance of the Olivina Turnout. The turnout, located at Station 37+50 of the South Bay Aqueduct's Del Valle Branch Pipeline, has a maximum design capacity of 0.7 cubic feet per second (cfs).

### **AVEK**

On June 24, 2015, DWR executed an agreement with AVEK for a temporary water diversion at Milepost 366.53 of the California Aqueduct's East Branch. Deliveries from this turnout, up to 100 af and not exceeding 4 cfs, were for agricultural purposes. The agreement expired on December 24, 2015.

On November 25, 2015, DWR executed an agreement with AVEK for operation and maintenance of the existing Quartz Hill Turnout. The turnout, located at Milepost 366.73 of the California Aqueduct's East Branch, has a maximum design capacity of 144 cfs.



### ***Byron Bethany Irrigation District***

On August 25, 2015, DWR executed an agreement with Byron Bethany Irrigation District (Byron Bethany) and Musco Family Olive Company (Musco) for modification, operation and maintenance of the Musco Olive Turnout. Modifications included the installation of a magnetic flow meter and chart recorder on Musco property. The turnout, located at Milepost 12.47 of the California Aqueduct, has a maximum design capacity of 1 cfs.

### ***Kings***

On November 20, 2015, DWR executed an agreement with Kings and Kettleman City Community Services District (Kettleman City) for construction, operation and maintenance of the Kettleman City Turnout. The turnout, located at Milepost 173.12 of the California Aqueduct, has a maximum design capacity of 2.67 cfs.

### ***Dudley Ridge/Kern***

On August 6, 2015, DWR executed an amendment to the December 9, 2014, agreement with Dudley Ridge, Kern, Lost Hills Water District, Berrenda Mesa Water District, Semitropic Water Storage District, and Belridge Water Storage District for the 2014–2015 California Aqueduct Pump-Back Program. The amendment renamed the program from 2014–2015 California Aqueduct Pump-Back Program to 2014–2016 California Aqueduct Pump-Back Program and extended the termination date of the original agreement from April 30, 2015, to May 31, 2016.

### ***Kern***

On July 20, 2015, DWR executed an amendment to the May 23, 1994, agreement with Kern and Buena Vista Water Storage District (Buena Vista) for construction, operation and maintenance of Buena Vista Turnout No. 7. The amendment specified

the requirements for decommissioning the Buena Vista Turnout.

On July 20, 2015, DWR executed an agreement with Kern and Henry Miller Water District (Henry Miller) for operation and maintenance of Henry Miller Turnouts No. 1 and 2. Henry Miller Turnout No. 1, previously known as Buena Vista Turnout No. 3, is located at Milepost 243.09 of the California Aqueduct and has a design flow of 125 cfs. Henry Miller Turnout No. 2, previously known as Buena Vista Turnout No. 4, is located at Milepost 249.85 and has a design flow of 120 cfs.

## **Activities Related to the Monterey Amendments**

### ***Storage of Water Outside SWP Contractor Service Areas***

Pursuant to Article 56(c) of the Monterey Amendments, seven SWP water contractors have separate agreements with DWR to convey approved water supplies outside their service areas for storage in existing and operational groundwater storage programs and for future recovery of water to use within their service areas. These change in point of delivery agreements are listed in Table 9-1. These agreements include provisions for conveyance to and from storage, and recovery methods by exchange and/or pump-in to the California Aqueduct. During 2015, a total of 239,100 af was recovered from storage.

### ***Turn-Back Water Pool Program***

Pursuant to Article 56(d) of the Monterey Amendments, SWP water contractors who signed the Monterey Amendments are permitted to participate annually in the Turn-Back Water Pool Program. In 2015, SWP water contractors did not buy or sell water under Pool A or Pool B of the Turn-Back Water Pool Program due to their participation in the Multiyear Water Pool Program.

**Table 9-1 Storage of Water Outside SWP Contractor Service Areas in 2015 (acre-feet)<sup>a</sup>**

Contractor	Contract Status	Storage Provider	To Storage (includes losses, if any)	From Storage	Return By
<b>Alameda-Zone 7</b>					
SWPAO #99018	Continuing	Semitropic	0	3,250	2035
SWPAO #00037 <sup>b</sup>	Continuing	Semitropic	0	9,535	2035
SWPAO #01035 <sup>b</sup>	Continuing	Semitropic	0	0	2035
SWPAO #02010 <sup>b</sup>	Continuing	Semitropic	0	0	2035
SWPAO #03008 <sup>b</sup>	Continuing	Semitropic	0	0	2035
SWPAO #04017	Continuing	Semitropic	0	0	2035
SWPAO #06010	Continuing	Cawelo	0	5,029	2035
<b>Alameda County</b>					
SWPAO #99017	Continuing	Semitropic	0	0	2035
SWPAO #00030	Continuing	Semitropic	0	7,691	2035
SWPAO #07005	Continuing	Semitropic	0	8,521	2035
SWPAO #10009	Continuing	Semitropic	0	0	2035
<b>Castaic Lake</b>					
SWPAO #02015 <sup>b</sup>	Continuing	Semitropic	0	0	2022
SWPAO #03060 <sup>b</sup>	Continuing	Semitropic	0	0	2024
SWPAO #05016	Continuing	Rosedale-Rio Bravo	0	2,998	2035
<b>Dudley Ridge</b>					
<i>SWP Water</i>					
SWPAO #08050	Continuing	Kern Water Bank	0	0	2035
SWPAO #09002	Continuing	Semitropic	0	0	2035
<i>Non-SWP Water</i>					
SWPAO #09040 <sup>b</sup>	Continuing	Kern Water Bank	0	14,460	2020
SWPAO #03053	Continuing	Cawelo	0	2,000	2035
<b>Metropolitan</b>					
SWPAO #95010	Continuing	Semitropic	0	57,084	2035
SWPAO #01013 <sup>b</sup>	Continuing	Arvin-Edison	0	42,080	2035
SWPAO #03019	Continuing	Kern Delta	0	31,977	2035
SWPAO #03057	Continuing	Mojave	0	0	2015
SWPAO #11011	Continuing	Mojave	0	8,580	2035
SWPAO #11022	Continuing	Rosedale-Rio Bravo	0	410	2017
<b>San Bernardino</b>					
SWPAO #11015	Continuing	Kern Delta	0	0	2035
<b>Santa Clara</b>					
<i>SWP Water</i>					
SWPAO #99016	Continuing	Semitropic	0	0	2035
SWPAO #00031	Continuing	Semitropic	0	0	2035
SWPAO #06011	Continuing	Semitropic	0	37,312	2035
SWPAO #10012	Continuing	Semitropic	0	0	2035
<i>Non-SWP Water</i>					
SWPAO #06012 <sup>b</sup>	Continuing	Semitropic	0	8,173	2035
SWPAO #10029	Continuing	Semitropic	0	0	2035
SWPAO #11012	Continuing	Semitropic	0	0	2035
<b>Total<sup>c</sup></b>			<b>0</b>	<b>239,100</b>	

<sup>a</sup> Storage amounts in this table may differ from the amounts in Table 9-8 due to water-type reclassification.<sup>b</sup> Indicates amendments to agreement.<sup>c</sup> Total acre-feet indicates all water recovered from various water banks. Some of the recovered water may be temporarily stored in SWP facilities. Amounts include losses, if any.

### Multiyear Water Pool Program

The 2015–2016 Multiyear Water Pool was initiated through a program letter sent to all SWP water contractors dated February 2, 2015. All SWP water contractors were permitted to participate in the program as either buyers or sellers in 2015 and/or 2016. The program allowed SWP water contractors to offer portions of their approved 2015 Table A water for sale in a water pool for use by interested SWP water contractors.

Based on Table A supply and demand, the pool water was allocated among the purchasing SWP water contractors into one of the two buyer pools. The “69 Percent Pool” consisted of water purchased by Metropolitan and Kern, which together take up 69.37 percent of the total SWP Table A amount. The remaining 30.63 percent of the SWP Table A amount was available for the other SWP water contractors to purchase in the “31 Percent Pool.”

The Multiyear Water Pool Program participation occurred in June 2015, with 3,000 af purchased under this program. Multiyear Water Pool Program water was sold for \$322.00 per af, for a Table A allocation of 20 percent on June 1, 2015. The 2015 Multiyear Water Pool Program closed on June 15, 2015.

Table 9-2 lists SWP water contractors that participated in the 2015 Multiyear Water Pool Program.

### Article 21 Water Program

Pursuant to the Monterey Amendments, Article 21 water replaces surplus, wet weather, and Article 12(d) water. The Article 21 Water Program allows an SWP water contractor to take delivery of water over the approved and scheduled Table A amounts for the current year. Article 21 water is only available for delivery on a short-term basis as determined by DWR when water is still available after operational requirements for SWP water deliveries, water

**Table 9-2 2015 Multiyear Water Pool Program (acre-feet)**

Contractor	Sold	Purchased
Alameda County		51
Alameda-Zone 7		97
AVEK		174
Desert		67
Dudley Ridge		55
Kern-Agriculture		707
Kings		11
Metropolitan		1,374
Napa		35
Palmdale		26
San Bernardino		123
Santa Barbara		55
Santa Clara		120
Tulare		105
Ventura	3,000	
<b>Total</b>	<b>3,000</b>	<b>3,000</b>

quality, and Sacramento-San Joaquin Delta (Delta) requirements are met. During 2015, 690 af of Article 21 water was delivered.

### Flexible Storage Program

Pursuant to Article 54 of the Monterey Amendments, the Flexible Storage Program provides the option to SWP water contractors participating in the repayment of the capital costs of Castaic Lake and Lake Perris to withdraw water in excess of approved deliveries. The program objective is to provide additional flexibility to benefit local water management activities. Participating SWP water contractors are given 5 years to replace withdrawn stored water with approved SWP or non-SWP water.

Flexible storage allows for withdrawal of up to 160,000 af at Castaic Lake and 65,000 af at Lake Perris. SWP water contractors participating in the Castaic Lake Flexible Storage Program include Metropolitan,

Ventura, and Castaic. These contractors are allowed to withdraw up to a maximum of 153,940 af, 1,377 af, and 4,683 af, respectively. Metropolitan is the only SWP water contractor allowed to withdraw water from Lake Perris, up to a maximum of 65,000 af.

In 2015, Metropolitan started with a balance of -218,940 af in flexible storage. Metropolitan did not withdraw flexible storage water, leaving them with an end-of-year balance of -218,940 af. Castaic started the year with a balance of -4,424 af in flexible storage. Castaic did not withdraw flexible storage water, but replaced 4,339 af of withdrawn storage water using their water bank recovery water, leaving them with an end-of-year balance of -85 af.

### **Extended Carryover Program**

Pursuant to Article 56 of the Monterey Amendments, SWP water contractors can elect to store SWP water outside of their service areas and carry it over to the following year for use within their service areas. Qualified SWP water contractors can request the carryover of Table A water for delivery in the following year to the extent that such deliveries do not adversely affect current or future project operations. Factors that influence how much extended carryover water can be delivered include operational constraints of project facilities, filling of SWP conservation storage facilities, flood control releases, and water quality restrictions.

If storage requests exceed the available storage capacity, the amount available is allocated among the SWP water contractors requesting storage in proportion to their annual Table A amount for that year.

Twenty SWP water contractors took delivery of Article 56(c) water in the amount of 131,990 af of previously approved Table A water carried over into 2015. A total of 265 af of SWP water contractors' carryover water

was delivered to non-SWP contractors for a total of 132,255 af of water delivered.

## **2015 Water Transfers**

Due to the critically dry hydrologic conditions in 2015, a number of SWP water contractors experienced significant water supply shortages. Nine SWP water contractors executed water transfer conveyance agreements with DWR and six non-SWP agencies on the Feather, Yuba, Sacramento, and American rivers, and within the Delta.

A total of 21,586 af of water was made available to the SWP buyers from a combination of reservoir releases and groundwater substitution. See Table 9-3 for a list of sellers that provided water for transfer in 2015. A total of 17,286 af of transfer water was delivered to the SWP buyers after conveyance losses, including Delta carriage water losses of 20 percent, except to Napa, which was assessed a zero percent carriage water loss. See Table 9-4 for a list of the SWP buyers and the quantities delivered.

## **Lower Yuba River Accord**

The Lower Yuba River Accord (Yuba Accord) was announced in 2005 to settle long-standing litigation over instream flows in the Yuba River in relation to fisheries. The purpose of the Yuba Accord is to resolve instream flow issues associated with the operation of the Yuba River Development Project in a way that protects and enhances lower Yuba River fisheries and local water supply reliability. The Yuba River Development Project provides revenues for local flood control and water supply projects, water to enhance SWP and CVP water supply reliability by offsetting Delta export reductions for the protection and restoration of Delta fisheries, and improvements in statewide water supply management, including dry year water



**Table 9-3 2015 Water Transfers Seller Activities (acre-feet)**

Sellers	Buyers	SWPAO #	Transfer Action	Transfer Water Available
Garden Highway Mutual Water Company	Dudley Ridge	15702	Groundwater Substitution	140
	Kern			241
	Oak Flat			17
	Metropolitan			468
Sutter Extension Water District	Kern	15704	Groundwater Substitution	510
	Metropolitan			990
Plumas Mutual Water Company	Kern	15724	Groundwater Substitution	591
	Metropolitan			1,149
Sutter South Water District	Kern	15725	Reservoir Releases	1,679
	Kings			29
	Metropolitan			3,269
	Napa			89
	Palmdale			66
	Santa Barbara			140
	Santa Clara			308
Foresthill Public Utility District	Santa Clara	15740	Reservoir Releases	1,900
South Feather Water and Power Agency	Dudley Ridge	15750	Reservoir Releases	154
	Kings			32
	Kern			3,333
	Metropolitan			6,481
Total				21,586

**Table 9-4 2015 Water Transfers Buyer Activities (acre-feet)**

Buyers	Water Available to Buyer	Carriage Water Losses <sup>a</sup>	Net Water Delivered
Dudley Ridge	294	59	235
Kern	6,354	1,271	5,083
Kings	61	12	49
Metropolitan	12,357	2,472	9,885
Napa	89	0	89
Oak Flat	17	3	14
Palmdale	66	13	53
Santa Barbara	140	28	112
Santa Clara	2,208	442	1,766
<b>Total<sup>b</sup></b>	<b>21,586</b>	<b>4,300</b>	<b>17,286</b>

<sup>a</sup> Carriage water losses of 20 percent were applied to all transfers except to Napa. Napa (located north of the Delta) was assigned with zero carriage water loss.

<sup>b</sup> Totals may not sum as expected due to rounding.

supplies for participating SWP and CVP water contractors.

## Agreements

The Yuba Accord is based on three sets of agreements: a water purchase agreement with DWR, that includes water to help offset Delta export reductions and dry year water for participating SWP and CVP water contractors; conjunctive use agreements with Yuba County Water Agency (Yuba) member units; and a fisheries agreement resolving minimum flows. The Yuba Accord provides for higher releases into the Yuba River to benefit Chinook Salmon and steelhead, transfer water to help offset Delta export reductions annually, and provide dry year transfer water for SWP and CVP water contractors from both surface and groundwater substitution sources.

The required agreements were executed in late 2007 and early 2008, and the SWRCB approved the Yuba Accord on March 25, 2008, setting the flow schedules for the river and authorizing accord-based water transfers through 2025. During that same period, DWR completed executing 22 agreements for dry year supplies for participating SWP and CVP water contractors under the accord.

## Amendments

In April 2009, two amendments to the Yuba Accord's water purchase agreement were executed. Amendment Number 1 resolved a technical issue related to refill accounting, and Amendment Number 2 addressed pricing issues for groundwater substitution water.

Amendment Number 3 was executed April 22, 2010, and addressed market pricing issues for groundwater substitution water.

On January 6, 2012, Amendment Number 4 was executed between DWR and Yuba, and between DWR and 22 participating contractors. Amendment Number 4 provides

for annual negotiations of groundwater substitution water pricing, prioritizing SWP water contractors' Delta export transfer supplies, and optionally suspending certain accounting rules to permit all groundwater substitution water to be classified as Component 4 water.

Under Amendment Number 4, all accrued groundwater substitution water is payable even if it cannot be exported. The single exception is that DWR and Yuba Accord water contractors will not be required to pay for the portion (if any) of groundwater substitution component water that is released in accordance with the provisions of the Yuba Accord Fisheries Agreement, Section 5.1.8, Supplemental Flows for Groundwater Substitution Programs, unless it can be exported

On December 5, 2014, DWR executed Amendment Number 5 to the Yuba Accord Water Purchase Agreement with Yuba. The key new terms included: increased pricing for the four components of transfer water to be delivered by Yuba from 2016 through 2020; a \$20 million deposit to be paid to Yuba to lock in the new pricing for 5 years and will be credited to surface water purchases; an allowance for third-party sales by Yuba to nonparticipants in the program under certain circumstances; and continued annual negotiations of groundwater substitution pricing when available. All 22 participating contractors agreed to continue their participation in the Yuba Accord from 2016 through 2020 by executing the conforming Amendment Number 5 to their participation agreements. On January 8, 2015, DWR executed a Participation Agreement, Amendment 1, and Amendment 5 with Mojave and Santa Barbara, increasing the number of participating contractors to from 22 to 24.

## Component 1 and Component 4 Water Deliveries

In 2015, Yuba delivered 59,131 af of Component 1 water from surface releases, shared equally between DWR and Reclamation. Because 60,000 af of Component 1 water was due to be delivered in 2015, Yuba owes the remaining 869 af in a future year. There were no water deliveries for Component 2 or Component 3 water.

A letter agreement was executed between DWR and Yuba on March 26, 2015. The agreement provided for 30,000 af of Component 4 groundwater substitution water at an effective price of \$665 per af.

The 59,131 af of Component 1 water was used to offset Delta pumping curtailments equally at the Banks Pumping Plant and Jones Pumping Plant. The curtailments were made pursuant to the biological opinions on Delta Smelt and salmonids issued by the U.S. Fish and Wildlife Service and the National Marine Fisheries Service as modified by subsequent court orders. Yuba delivered 30,000 af of Component 4 groundwater substitutions water.

Component 4 water was shared 50 percent among 13 participating SWP water contractors, and 50 percent among CVP contractor members of the San Luis & Delta-Mendota Water Authority, a federal CVP water contractor. The 2015 transfers by Yuba pursuant to the 2007 DWR/Yuba Water Purchase Agreement totaled 89,131 af. The 30,000 af of Component 4 water was used by the 14 State and federal participating contractors to help offset low water allocations.

### Carriage Water Losses

The 13 SWP water contractors shared the Yuba River water based on their relative requests for the various components in proportion to their Table A contract amounts. The SWP water contractors that purchased

the water are responsible for applicable carriage water costs and conveyance charges based on Article 55 of their long-term water supply contracts. Carriage costs reduced actual deliveries of Yuba River water through Banks Pumping Plant and Jones Pumping for all participating contractors in 2015. The Yuba water for DWR and the SWP water contractors was exported through the Banks Pumping Plant, and the Yuba water for Reclamation and the San Luis & Delta-Mendota Water Authority was exported through the Jones Pumping Plant in 2015 with applicable carriage water costs.

Table 9-5 shows Lower Yuba River Accord Component 4 water deliveries.

## Agreements with Non-SWP Agencies

In addition to negotiating agreements with SWP water contractors to provide for specified water deliveries, DWR also enters into agreements with non-SWP agencies to provide water conveyance service.

### San Luis & Delta-Mendota Water Authority

An agreement among DWR, San Luis & Delta-Mendota Water Authority, Oakdale Irrigation District, and South San Joaquin Irrigation District was executed on September 29, 2015. DWR and San Luis & Delta-Mendota Water Authority purchased 23,000 af of pulse flow releases from Oakdale Irrigation District and South San Joaquin Irrigation District to benefit migratory fish on the Stanislaus River below Goodwin Dam during October and November 2015. The pulse flow releases provided water supply benefits in the Delta that were shared equally between the SWP and the CVP. DWR paid \$500 per af for the pulse flow water. (SWPAO #15022)

**Table 9-5 Lower Yuba River Accord Component 4 Water Deliveries, 2015 (acre-feet)**

Participating Contractor	Component 4	Carriage Water Losses (20%)	Water Delivered
	[1]	[2]	[1] - [2]
<b>SWP Contractor</b>			
Alameda-Zone 7	345	69	276
Coachella	533	107	426
Crestline	2	1	1
Dudley Ridge	194	39	155
Kern	4,211	843	3,368
Kings	40	8	32
Metropolitan	8,192	1,639	6,553
Napa <sup>a</sup>	124	0	124
Oak Flat	24	5	19
Palmdale	91	19	72
San Bernardino	440	88	352
Santa Clara	429	86	343
Tulare	375	75	300
<i>SWP Contractor Total</i>	<i>15,000</i>	<i>2,979</i>	<i>12,021</i>
<b>Non-SWP Contractor</b>			
San Luis & Delta-Mendota Water Authority	15,000	5,250 <sup>b</sup>	9,750
<b>Grand Total</b>	<b>30,000</b>	<b>8,229</b>	<b>21,771</b>

<sup>a</sup> Carriage loss does not apply to Napa because these contractors are north of the Delta.

<sup>b</sup> San Luis & Delta-Mendota Water Authority's water was pumped through Jones Pumping Plant by Reclamation with deliveries reduced by 35 percent carriage water losses.

## Westlands Water District

An agreement between DWR and Westlands, executed June 29, 2015, allowed for the introduction of up to 30,000 af of Westlands' local groundwater within Westlands' service area in Reaches 4 through 7 of the California Aqueduct through October 30, 2015. During 2015, a total of 26,835 af of Westlands' water was pumped into the California Aqueduct under this agreement. (SWPAO #15019)

An amendment was executed February 10, 2015, to extend the term of an agreement between DWR and Westlands. The original agreement (SWPAO #14010) executed July 15, 2014, approved the introduction of up to 30,000 af of Westlands' local

groundwater into the California Aqueduct, and provided for the conveyance and delivery by DWR to Westland's turnouts in Reaches 4 through 7 of the California Aqueduct through October 31, 2014. This amendment (SWPAO #14010-B) extends the term of the agreement to February 28, 2015. In 2015, Westlands introduced 4,297 af of local water into the California Aqueduct; DWR conveyed and delivered to Westlands a total of 3,641 af within the San Luis Canal portion (Reaches 4–7) of the California Aqueduct. Westlands made available, as mitigation to the SWP, 568 af for allocation to the SWP water contractors. (SWPAO #14010 and SWPAO #14010-B)



## Del Puerto Water District

An exchange agreement among DWR, Reclamation, Del Puerto Water District, and Oak Flat, executed May 14, 2014, approved the exchange of up to 2,000 af of Del Puerto Water District's CVP water supplies for an equivalent amount of Oak Flat's approved SWP water supplies through April 30, 2015. DWR will deliver up to 2,000 af of approved SWP water supplies to Del Puerto Water District using Oak Flat's turnouts in the California Aqueduct. In exchange, Reclamation will make an equivalent amount of Del Puerto Water District's CVP water supplies available to DWR at O'Neill Forebay. DWR filed a petition with the SWRCB, and received a 1-year approval order, effective May 1, 2014, for the consolidation of SWP and CVP places of use. During 2015, a total of 19 af was delivered to Oak Flat's turnouts under this agreement. (SWPAO #13022)

## Reclamation and Kern National Wildlife Refuge—U.S. Fish and Wildlife Service

A letter agreement sent by DWR on September 17, 2012, and accepted by Reclamation on September 21, 2012, provided for DWR to deliver up to 30,500 af of CVP water to the Kern National Wildlife Refuge from June 1, 2012, through September 30, 2028. Under this agreement, DWR conveys CVP water from the end of Reach 7 of the California Aqueduct to Buena Vista Water Storage District's turnouts in Reaches 10A and 12E. DWR conveyed a total of 10,455 af during 2015. (SWPAO #12309)

## Reclamation—Joint Point of Diversion

In 2012, DWR renewed the joint point of diversion agreement with Reclamation. Under this agreement, DWR makes excess SWP conveyance capacity available to Reclamation for the conveyance of water from the Delta at Banks Pumping Plant.

This includes: (1) making up for curtailed water exports from Jones Pumping Plant associated with improving conditions for fish in the Delta; (2) replacing water exports foregone during maintenance and repair of CVP facilities between the Delta and O'Neill Forebay; and (3) conveying Reclamation's share of Component 1 water provided under the Yuba Accord. As part of the joint point of diversion agreement, the first 21,000 af conveyed through Banks Pumping Plant for July, August, and September of each year include a charge for the temporary barriers in the Delta. In 2015, DWR conveyed 8,380 af of water. (SWPAO #12300)

## Reclamation and San Joaquin Valley National Cemetery—U.S. Department of Veterans Affairs

A pending letter agreement among DWR, Reclamation, and the U.S. Department of Veterans Affairs provides for the conveyance of up to 850 af of CVP water to Reach 2B of the California Aqueduct for the U.S. Department of Veterans Affairs' San Joaquin Valley National Cemetery. DWR delivered a total of 210 af to the national cemetery through Reach 2B of the California Aqueduct in 2015 under this pending agreement. (SWPAO #10310)

## Reclamation and Byron Bethany Irrigation District—Musco Family Olive Company

A pending agreement among DWR, Byron Bethany, and Reclamation provides for the conveyance of up to 800 af of Byron Bethany's CVP water to repayment Reach 2A of the California Aqueduct for use by Musco Family Olive Company. DWR delivered a total of 453 af in 2015 under this pending agreement. (SWPAO #04300)

## Reclamation and Cross Valley Canal Contractors

Through eight, 3-party contracts, and the corresponding changes in points of delivery associated with Cross Valley Canal (CVC) contracts with Reclamation and CVC water contractors, DWR conveys CVP water for CVC water contractors. The following eight CVP water contractors are defined as CVC water contractors: the County of Fresno, County of Tulare, Hills Valley Irrigation District, Kern-Tulare Water District, Lower Tule River Irrigation District, Pixley Irrigation District, Rag Gulch Water District, and the Tri-Valley Water District.

During 2015, DWR did not convey any water for the CVC water contractors.

## Delta Settlement Agreements

DWR negotiated contracts with various Delta agencies to settle adverse impact claims by the agencies against DWR due to operation of the SWP. Water deliveries to these agencies in 2015 are reported in the sections covering deliveries to non-SWP agencies later in this chapter.

### *Byron Bethany Irrigation District*

Byron Bethany executed an agreement with DWR on May 28, 2003, that describes the nature and extent of Byron Bethany's right for the diversion of water from the Delta for agricultural, municipal, and industrial uses within the district. This agreement terminated a 1993 exchange agreement.

### *City of Antioch*

DWR and the City of Antioch executed an agreement on April 11, 1968, that requires DWR to reimburse the City of Antioch for decreases in usable San Joaquin River water availability caused by operation of the SWP. The agreement was amended October 29, 2013 to update boundaries and clarify measurement definitions. DWR reimburses the City of Antioch for the purchase of

substitute water when the number of usable days, as defined by the contract, is below 208. Credits for the number of usable days above 208 in this same period accrue to offset the water-day deficiencies in future years.

In 2015, DWR determined that 45 usable days were available to the City of Antioch, and there were no credits to offset the deficiency of 163 days. DWR reimbursed the City of Antioch \$1,386,287 for the purchase of substitute untreated water.

### *Contra Costa Water District*

DWR and Contra Costa Water District (Contra Costa) executed an agreement on April 21, 1967, that requires DWR to reimburse Contra Costa for decreases in availability of usable river water in Mallard Slough caused by operation of the SWP. DWR reimburses Contra Costa for the purchase of substitute water when the number of usable days, as defined by the contract, is below 142. Credits for the number of usable days above 142 in this same period accrue to offset the water-day deficiencies in future years.

In 2015, DWR determined that 10 usable days were available to Contra Costa, and there were no credits to offset the deficiency of 132 days. DWR reimbursed Contra Costa \$337,499 for the purchase of substitute untreated water. The reimbursement included energy costs for pumping water into Los Vaqueros Reservoir for later release as substitute water.

### *East Contra Costa Irrigation District*

East Contra Costa Irrigation District (East Contra Costa) executed an agreement with DWR on January 7, 1981, that requires East Contra Costa to make payments to DWR for the assurance of adequate water supply and specific water quality from Delta channels. An agreement executed April 11, 1991, with DWR, East Contra Costa, and Contra Costa

allows for intake at Rock Slough on Contra Costa Canal by Contra Costa to treat water for municipal and industrial users within East Contra Costa's service area. It was amended February 7, 2000, to allow diversions under both contracts at the Rock Slough intake of the Contra Costa Canal and the Los Vaqueros Reservoir intake at Old River.

East Contra Costa paid DWR \$38,145 for the assurance of adequate water supply and specific water quality in 2015.

### **North Delta Water Agency**

North Delta Water Agency's (North Delta) agreement with DWR, executed January 28, 1981, requires North Delta to make payments to DWR for the assurance of adequate water supply and specific water quality from Delta channels. An amendment signed on January 21, 1997, changed the monitoring station at Emmaton to Three Mile Slough and reduced North Delta's payments in lieu of assessments on land DWR owns within North Delta's jurisdiction. A memorandum of understanding was executed on May 26, 1998, to establish the joint position with respect to implementation of water quality objectives contained in the 1995 Bay-Delta water quality control plan.

An agreement executed on May 21, 2008, resolved a lawsuit regarding the Department of Fish and Wildlife's land within North Delta boundaries. The 2008 agreement expired May 4, 2011. DWR is negotiating with the Department of Fish and Wildlife and North Delta on a new agreement to replicate the functionality of the 2008 agreement.

North Delta paid DWR \$368,711.96 for the assurance of adequate water supply and specific water quality in 2015.

In 2015, North Delta experienced a drought emergency as defined by the 1981 contract. DWR developed an expedited claims

procedure and provided it to North Delta for its review.

### **South Delta Water Agency**

In September 1990, DWR completed negotiations for a long-term agreement with South Delta Water Agency and Reclamation. The parties agreed to proceed with the design, construction, and operation of certain barrier facilities in South Delta channels. These facilities resolved portions of the lawsuit that South Delta Water Agency filed in 1982 regarding the alleged effects of export pumping by the SWP and CVP on water levels, quality, and circulation in the South Delta.

DWR has installed and operated temporary barrier facilities in the South Delta to improve area conditions and collect data needed to design and operate permanent barrier facilities. Ongoing efforts are being made to improve water levels, circulation, and quality in South Delta channels. These efforts have included modifying and dredging around local diverters' intakes, conducting a series of computer modeling studies, and modifying barrier flap gate operations.

## **Water Deliveries**

### **Table A Deliveries**

Each year, by October 1, the SWP water contractors submit initial requests for Table A deliveries allocated to them for use in the subsequent calendar year. Initial Table A allocation amounts for the coming year are made by DWR in December. The Table A allocations are based on operations studies that assume 90 percent exceedance of historical water supply (where exceedance refers to the possibility that water supply in the coming year will be less than the historical average annual water supply), current reservoir storage, and total requests by the SWP water contractors. Forecasts for the year are updated as hydrologic conditions change. Table A amounts are

increased or decreased depending on both actual and projected hydrologic conditions, though decreases are rare as the 90 percent exceedance criterion is fairly conservative.

On October 1, 2014, SWP water contractors submitted initial requests for 2015 totaling 4.17 million acre-feet (maf).

DWR approved delivery of 0.42 maf on December 1, 2014, resulting in initial Table A amounts of 10 percent of SWP water contractor requests. DWR increased the 2015 Table A amounts to 0.83 maf, for a final allocation of 20 percent, on March 2, 2015.

Table 9-6 lists the changes in Table A amounts that were approved by DWR based on updated hydrologic conditions.

## 2015 Water Deliveries

In 2015, a total of 2,104,264 af of SWP and non-SWP water was delivered to 29 long-term SWP water contractors and 19 non-SWP agencies. The SWP portion totaled 1,336,889 af, and the non-SWP portion totaled 767,375 af.

The 1,336,889 af delivered to SWP water contractors was categorized as follows:

- 640,444 af of Table A water;
- 37,011 af of transfers and exchanges of Table A water;
- 3,000 af of Turn-Back or Multiyear Water Pool Program water;
- 131,990 af of carryover water;
- 690 af of Article 21 water;
- 347,852 af of water bank recovery;
- 128,871 af of delivery of backup water;
- 728 af of settlement water;
- 2 af of SWP water for parks and recreation;
- 12,025 af of 2015 Yuba Accord Dry Year Purchase Program water;
- 7,716 af of local water;

**Table 9-6 2015 Allocated Table A Amounts**

Notice to SWP Contractors No.	Allocation Amount (maf)	Percentage of Requested Water
14-10	0.42	10
15-01	0.63	15
15-03	0.83	20

- 4,870 af of permit water; and
- 21,690 af of other non-SWP programs.

The 767,375 af portion delivered to 19 non-SWP agencies was categorized accordingly:

- 39,058 af of SWP contracted supply;
- 26,181 af of water bank recovery;
- 689,930 af of regulated delivery of local supply;
- 211 af for parks and recreation;
- 877 af for fish and wildlife;
- 10,455 af for Kern National Wildlife Refuge; and
- 663 af for annual contracts.

Figure 9-1 shows amounts of water delivered to various locations during 2015.

Specific information about water deliveries made to SWP water contractors and other agencies during 2015, and historical deliveries from 1962 through 2015, is presented in the following four sections, each with a corresponding table located at the end of the chapter:

- Water Delivered to Long-term SWP Water Contractors in 2015, by Service Area (Table 9-7);
- Total Amounts of Water Delivered in 2015, by Month (Table 9-8);
- Total Amounts of Annual Table A Water and Water Conveyed, by Type, 1962–2015 (Table 9-9); and
- SWP Water Delivered by Category, 1962–2015 (Table 9-10).





**Figure 9-1** Water Delivered in 2015 and Delivery Locations of Long-term SWP Water Supply Contractors and Feather River Area Districts with Water Rights Agreements with DWR

Please note that the water delivery figures listed are accurate at the time of this Bulletin 132 publication, but small volumes of water may be reclassified over time pursuant to long-term water supply contract provisions. If your research requires more current data than was available at the time of publication, please consult the most recent edition of Bulletin 132 and/or contact DWR staff in the State Water Project Analysis Office.

## 2015 Water Deliveries to Long-term SWP Water Contractors

Table 9-7 shows amounts delivered in 2015 by service area. The following information is arranged by column number.

### *Table A Water Delivered*

Columns 1 through 5 show a detailed breakdown of Table A water delivered for SWP water contractors in 2015.

### *Multiyear Water Pool Program*

Column 3 shows 3,000 af of Multiyear Water Pool Program water delivered to SWP water contractors in 2015.

### *Carryover Table A Water Delivered in 2015*

Column 4 shows a total of 132,255 af was carried over from previous years for delivery in 2015, which includes deliveries to non-SWP agencies.

The carryover program was designed to encourage the most effective and beneficial use of water and to avoid obligating the SWP water contractors to use or lose water by December 31 of each year. The SWP water contractors' long-term water supply contracts and amendments state the criteria for carrying over Table A water from one year to the next under Articles 12(e), 14(b), and 56(c).

### *Total Table A Water Delivered*

Column 5 shows all Table A water delivered in 2015—a total of 851,503 af.

### *Article 21*

Column 6 shows Article 21 water delivered to SWP water contractors. In 2015, 690 af of Article 21 water was delivered.

### *Other SWP Water*

Column 7 shows 728 af of other SWP water. Other SWP water consists of settlement water delivered to Solano.

### *Total SWP Water Delivered*

Column 8 shows a total of 852,921 af of SWP water was delivered in 2015. This includes total Table A water, Table A carryover water, Multiyear Water Pool Program water, and other SWP water consisting of settlement water.

### *Non-SWP Water Deliveries*

Columns 9, 10, and 11 include deliveries of non-SWP water to long-term water contractors. Column 9 shows delivery of 128,871 af of backup water, Column 10 shows 347,852 af of water bank recovery, and Column 11 shows 46,303 af of other non-SWP water. Other non-SWP water is local and permit water that an SWP water contractor has a water right to, or has purchased from, exchanged with, or transferred from non-SWP agencies.

### *Total Deliveries*

Column 12 shows total amounts of water delivered to SWP water contractors. In 2015, the SWP delivered 1,375,947 af of water to the 29 SWP water contractors.

### *Water Delivered in 2015 by Month*

During 2015, the SWP provided water service to 48 agencies, including 29 SWP water contractors. The amounts of water delivered by month to all agencies are listed in

Table 9-8 and are summarized below as SWP water and non-SWP water.

### **SWP Water**

SWP water, as defined in the long-term water supply contracts, includes current year Table A amounts, transfer and exchange of Table A water, carryover of Table A water, Turn-Back Pools A and B water, Multiyear Water Pool Program water, and Article 21 water. Detailed information concerning those conveyances for 2015 is found under the “Miscellaneous Agreements with Long-term SWP Water Contractors” section in this chapter’s preceding pages or is listed below.

### **Non-SWP Water**

In 2015, DWR used SWP facilities to convey non-SWP water for various non-SWP agencies according to the terms of water rights and water transfer and exchange agreements. Detailed information concerning those deliveries is in this chapter’s preceding pages or is listed below.

**Last Chance Creek Water District.** Under the water supply agreement between DWR and Last Chance Creek Water District, dated April 29, 2013, a total of 4,542 af was supplied from Frenchman Lake to Last Chance Creek Water District.

**Water Rights Water.** Water in this category is transported through SWP facilities to agencies with settlement agreements with DWR. Some water passes through SWP transportation facilities; some is stored in SWP reservoirs for release later. In 2015, the following water was delivered to the Feather River, North Bay, South Bay, Delta, and Southern California areas, as summarized below.

**Feather River Area.** Seven non-SWP agencies received 664,207 af, under their water right settlement agreements, as follows:

- Garden Highway Mutual Water Company, 10,481 af;
- Joint Water Districts Board, 402,934 af;
- Oswald Water District, 1,501 af;
- Plumas Mutual Water Company, 7,882 af;
- Tudor Mutual Water Company, 2,622 af;
- Western Canal Water District, 238,781 af; and
- Valberde and Ramelli, 6 af.

DWR conveyed local water totaling 6,331 af through SWP facilities on behalf of two non-SWP agencies:

- South Feather Water and Power Agency (formerly Oroville-Wyandotte Irrigation District), 4,740 af; and
- Thermalito Water and Sewer District (formerly Thermalito Irrigation District), 1,591 af.

**North Bay Area.** Deliveries in the North Bay area included 500 af of Vallejo permit water delivered to Napa, and 728 af of settlement water delivered pursuant to the May 19, 2003, *Settlement Agreement among DWR, Solano County Water Agency, and the Cities of Fairfield, Vacaville, and Benicia*.

**South Bay Area.** In the South Bay area, a total of 7,690 af of local water was delivered to Alameda-Zone 7 and Alameda County. These two South Bay Aqueduct SWP water contractors hold water rights to runoff from the Lake del Valle watershed.

**Delta.** In the Delta, 19,392 af of water was delivered to Byron Bethany pursuant to the May 28, 2003, *Agreement Between the Department of Water Resources of the State of California and the Byron-Bethany Irrigation District Regarding the Diversion of Water from the Delta*.

East Contra Costa Irrigation District diverted 18,982 af of water pursuant to the January 7, 1981, *Contract Between the State of California Department of Water*



*Resources and the East Contra Costa Irrigation District for the Assurance of a Dependable Water Supply of Suitable Quality.*

**Southern California Area.** In the Southern California area, 26 af of local runoff from the Houston Creek watershed was stored and delivered to Crestline under water rights held by DWR on Houston Creek. The authorized place of use is limited to the Crestline area.

## Annual Table A Water and Water Delivered Since 1962

Information about 2015 annual Table A water and water conveyed, by type, for the previous 50 years is contained in Table 9-9. The following discussion of conveyed Table A water is arranged according to column numbers.

### Annual Table A Water

Columns 1 through 7 of Table 9-9 show the amount of SWP water contractors' annual maximum Table A water by area for years 1962 through 2015 as specified in the Table A schedules of the long-term water supply contracts.

In some instances, Table A schedules—projections of each contractor's need for water to 2035—have been amended to meet the needs of individual contractors. The amounts of annual Table A water each SWP water contractor may request for years 1962 through 2035 can be found in Table B-4 of Appendix B in the back of this bulletin.

### Water Delivered

Columns 8 through 16 show water delivered or conveyed, including initial fill water and operational losses and storage changes.

**Table A Water.** Column 8 shows amounts of Table A water delivered each year from 1962 through 2015. In 2015, a total of 851,503 af of Table A water was delivered.

### Article 21 and Unscheduled Water.

Column 9 shows amounts of Article 21 water, as defined under SWP deliveries, and unscheduled water delivered from 1962 through 2015. Article 21 and unscheduled water are water in excess of that required to meet all demands for the year's Table A water and water to be stored in SWP reservoirs. In 2015, 690 af of Article 21 or unscheduled water was delivered.

**Other Water.** Column 10 includes amounts of water classified as other water delivered in 2015, including non-SWP water conveyed through SWP facilities and regulated delivery of local supply. In 2015, a total of 580,841 af of other water was delivered.

**Feather River Diversions.** Column 11 includes amounts of water from the Feather River delivered according to agreements with non-SWP agencies on the Feather River, including Last Chance Creek Water District. In 2015, a total of 670,538 af in this category was delivered to agencies in the Feather River area.

### Recreation and Fish and Wildlife Water.

Column 12 shows water conveyed for recreational use or to improve water quality for fish and wildlife. In 2015, a total of 692 af of SWP water was conveyed for this purpose.

**Initial Fill Water.** The quantities listed in Column 14 represent the amounts used to initially fill the aqueducts and reservoirs south of the Delta to maximum operating capacities. Initial filling began in 1962, with the filling of the South Bay Aqueduct, and was completed in 1979, when Lake Perris reached its maximum operating capacity of 127,000 af. In 1996 and 1997, the Coastal Aqueduct was initially filled.

**Operational Losses.** Column 15 includes the total amounts of water lost through evaporation and seepage, net storage changes in reservoirs south of the Delta, and amounts of inflow from local drainage areas,



including inflows into San Luis Canal and from the Kern River Intertie. Negative values are indicated for years when withdrawals and evaporation from reservoirs south of the Delta exceed the amounts of water added to the reservoirs.

**Historical Water Delivered**

Table 9-10 shows SWP water delivered by category from 1962 to 2015.

**Table 9-7 Water Delivered to Long-term SWP Water Contractors in 2015, by Service Area (acre-feet)<sup>a, b</sup>**

Service Area and SWP Contractor	Table A Water Deliveries					SWP Water			Non-SWP Water			
	2015 Table A Not Transferred, or Exchanged, or Stored [1]	2015 Table A Transferred or Exchanged [2]	2015 Multiyear Pool Program [3]	Carryover Water [4]	Total Table A [5]	2015 Article 21 [6]	Other SWP Water [7]	Total SWP Water [8]	Delivery of Backup Water [9]	Water Bank Recovery [10]	Other Non-SWP Water [11]	Total Water Delivered [12]
<b>Feather River</b>												
Butte	205	3,110	-	-	3,315	-	-	3,315	-	-	2,560	5,875
Plumas	730	-	-	-	730	-	-	730	-	-	-	730
Yuba City	2,400	-	-	604	3,004	-	-	3,004	-	-	-	3,004
<b>North Bay</b>												
Napa	5,799	66	35	3,893	9,793	690	-	10,483	-	-	216	10,699
Solano	2,020	-	-	15,718	17,738	-	728	18,466	-	-	4,870	23,336
<b>South Bay</b>												
Alameda-Zone 7	4,686	-	97	3,307	8,090	-	-	8,090	6,264	15,454	6,197	36,005
Alameda County	-	-	51	2,233	2,284	-	-	2,284	8,763	10,180	1,769	22,996
Santa Clara	-	-	120	3,150	3,270	-	-	3,270	21,076	38,780	3,057	66,183
<b>San Joaquin Valley</b>												
Oak Flat	698	-	-	348	1,046	-	-	1,046	-	-	31	1,077
Kings	676	22	11	335	1,044	-	-	1,044	-	-	185	1,229
Dudley	3,209	4,308	55	1,570	9,142	-	-	9,142	16,789	-	1,534	27,465
Empire	316	262	-	46	624	-	-	624	-	-	-	624
Kern	138,906	23,917	707	43,205	206,735	-	-	206,735	75,979	129,629	6,280	418,623
Tulare	-	16,359	105	571	17,035	-	-	17,035	-	-	301	17,336
<b>Central Coastal</b>												
San Luis Obispo	3,446	-	-	-	3,446	-	-	3,446	-	-	27	3,473
Santa Barbara	5,047	-	55	1,055	6,157	-	-	6,157	-	-	282	6,439
<b>Southern California</b>												
AVEK	7,583	12,437	174	5,154	25,348	-	-	25,348	-	1,516	-	26,864
Castaic Lake	11,075	-	-	4,121	15,196	-	-	15,196	-	11,243	2,750	29,189
Coachella	27,670	-	-	-	27,670	-	-	27,670	-	9,500	426	37,596
Crestline	154	-	-	247	401	-	-	401	-	-	28	429
Desert	11,150	-	67	-	11,217	-	-	11,217	-	-	-	11,217
Littlerock	-	460	-	-	460	-	-	460	-	-	-	460
Metropolitan	380,577	410	1,374	35,675	418,036	-	-	418,036	-	131,550	15,318	564,904
Mojave	5,936	10,603	-	1,871	18,410	-	-	18,410	-	-	-	18,410
Palmdale	3,667	500	26	-	4,193	-	-	4,193	-	-	120	4,313
San Bernardino	14,388	3,350	123	9,017	26,878	-	-	26,878	-	-	352	27,230
San Gabriel	5,760	-	-	-	5,760	-	-	5,760	-	-	-	5,760
San Geronio	3,346	-	-	135	3,481	-	-	3,481	-	-	-	3,481
Ventura	1,000	-	-	-	1,000	-	-	1,000	-	-	-	1,000
<b>Total</b>	<b>640,444</b>	<b>75,804</b>	<b>3,000</b>	<b>132,255</b>	<b>851,503</b>	<b>690</b>	<b>728</b>	<b>852,921</b>	<b>128,871</b>	<b>347,852</b>	<b>46,303</b>	<b>1,375,947</b>

<sup>a</sup> Please note that the water delivery figures listed are accurate at the time of this Bulletin 132 publication, but small volumes of water may be reclassified over time pursuant to long-term water supply contract provisions. If your research requires more current data than was available at the time of publication, please consult the most recent publication of Bulletin 132 and/or contact DWR staff in the State Water Project Analysis Office.

<sup>b</sup> This table includes SWP water that was delivered to non-SWP agencies.

**Table 9-8 Total Amounts of Water Delivered in 2015, by Month (acre-feet)**

[illegible]

**Table 9-8 Total Amounts of Water Delivered in 2015, by Month (acre-feet)**

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2015 Total Deliveries
<i>SWP</i>	3	4	20	9	304	505	671	622	492	1,192	51	68	3,941
<i>Non-SWP</i>	164	240	13,112	27,776	123,187	116,874	126,617	88,577	34,290	71,989	58,073	12,191	673,090
<b>Feather River Area Total</b>	<b>167</b>	<b>244</b>	<b>13,132</b>	<b>27,785</b>	<b>123,491</b>	<b>117,379</b>	<b>127,288</b>	<b>89,199</b>	<b>34,782</b>	<b>73,181</b>	<b>58,124</b>	<b>12,259</b>	<b>677,037</b>
<b>NORTH BAY AREA</b>													
<i>SWP Agencies</i>													
Napa County Flood Control and Water Conservation District													
Table A	0	0	0	65	1,083	960	833	369	620	252	748	869	5,799
Table A Transferred to Others*	0	0	0	0	3	4	13	36	9	1	0	0	66
Pool Program Water	0	0	0	0	0	0	35	0	0	0	0	0	35
Article 21	437	0	0	0	253	0	0	0	0	0	0	0	690
Carryover	331	629	550	1,160	0	310	221	189	0	276	198	29	3,893
Non-SWP Water Transferred from Others	199	200	101	0	0	0	78	89	49	0	0	0	716
Napa Total (*excluded from total)	967	829	651	1,225	1,336	1,270	1,167	647	669	528	946	898	11,133
Solano County Water Agency													
Table A	0	0	0	0	8	244	220	251	350	516	431	0	2,020
Table A Transferred from Others	0	0	0	0	3	4	363	386	309	1	0	0	1,066
Carryover Water	0	0	0	491	2,192	1,853	1,615	3,154	2,871	3,158	384	0	15,718
Other SWP Water	66	425	20	0	0	0	0	0	0	0	0	217	728
Non-SWP Water	81	247	893	1,614	0	0	0	0	0	0	1,500	35	4,370
Non-SWP Water Transferred to Others*	199	200	101	0	0	0	0	0	0	0	0	0	500
Solano Total (*excluded from total)	147	672	913	2,105	2,203	2,101	2,198	3,791	3,530	3,675	2,315	252	23,902
<i>SWP</i>	834	1,054	570	1,716	3,539	3,371	3,287	4,349	4,150	4,203	1,761	1,115	29,949
<i>Non-SWP</i>	280	447	994	1,614	0	0	78	89	49	0	1,500	35	5,086
<b>North Bay Area Total</b>	<b>1,114</b>	<b>1,501</b>	<b>1,564</b>	<b>3,330</b>	<b>3,539</b>	<b>3,371</b>	<b>3,365</b>	<b>4,438</b>	<b>4,199</b>	<b>4,203</b>	<b>3,261</b>	<b>1,150</b>	<b>35,035</b>
<b>SOUTH BAY AREA</b>													
<i>SWP Agencies</i>													
Alameda County Flood Control and Water Conservation District, Zone 7													
Table A	0	0	0	43	360	518	0	1,510	1,276	647	294	38	4,686
Pool Program Water	0	0	0	0	0	0	0	97	0	0	0	0	97
Carryover Water	390	0	322	328	1,163	654	268	0	54	128	0	0	3,307
Water Bank Recovery	421	1,188	2,388	1,681	1,489	481	353	1,064	1,707	2,077	1,447	1,158	15,454
Delivery of Backup Water	710	0	0	1,158	671	2,247	1,478	0	0	0	0	0	6,264
Non-SWP Water	385	316	401	275	314	287	2,185	995	208	182	83	290	5,921
Non-SWP Water Transferred from Others	0	0	0	0	0	0	0	138	138	0	0	0	276
Alameda-Zone 7 Total	1,906	1,504	3,111	3,485	3,997	4,187	4,284	3,804	3,383	3,034	1,824	1,486	36,005



**Table 9-8 Total Amounts of Water Delivered in 2015, by Month (acre-feet)**

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2015 Total Deliveries
<b>Alameda County Water District</b>													
Pool Program Water	0	0	0	0	0	0	0	51	0	0	0	0	51
Carryover Water	0	0	0	0	0	0	0	0	0	2,233	0	0	2,233
Water Bank Recovery	310	553	4	563	610	714	523	1,579	2,532	749	1,315	728	10,180
Delivery of Backup Water	355	0	0	691	1,990	1,076	1,867	1,586	612	0	0	586	8,763
Non-SWP Water	0	0	0	0	0	1,000	769	0	0	0	0	0	1,769
<b>Alameda County Total</b>	<b>665</b>	<b>553</b>	<b>4</b>	<b>1,254</b>	<b>2,600</b>	<b>2,790</b>	<b>3,159</b>	<b>3,216</b>	<b>3,144</b>	<b>2,982</b>	<b>1,315</b>	<b>1,314</b>	<b>22,996</b>
<b>Santa Clara Valley Water District</b>													
Table A Transferred from Others	0	0	0	0	0	2,500	2,500	3,750	1,250	0	0	0	10,000
Pool Program Water	0	0	0	0	0	0	0	120	0	0	0	0	120
Carryover Water	0	0	0	0	237	0	347	0	1,314	257	995	0	3,150
Water Bank Recovery	728	1,994	3,894	1,313	1,424	1,666	1,221	1,477	5,908	7,188	7,407	4,560	38,780
Delivery of Backup Water	3,005	1,062	0	2,274	6,605	2,046	5,942	0	142	0	0	0	21,076
Non-SWP Water Transferred from Others	0	0	0	0	0	0	1,277	1,698	82	0	0	0	3,057
<b>Santa Clara Total</b>	<b>3,733</b>	<b>3,056</b>	<b>3,894</b>	<b>3,587</b>	<b>8,266</b>	<b>6,212</b>	<b>11,287</b>	<b>7,045</b>	<b>8,696</b>	<b>7,445</b>	<b>8,402</b>	<b>4,560</b>	<b>76,183</b>
<b>Non-SWP Agencies</b>													
<b>Byron Bethany Irrigation District</b>													
Regulated delivery of local supply	133	480	2,552	3,318	3,942	4,233	343	907	1,793	1,386	184	121	19,392
<b>Contra Costa Water District</b>													
Recreation/Fish and Wildlife (SWP)	2	0	6	4	5	6	0	0	10	8	2	0	43
Lake del Valle	392	0	328	375	1,765	3,678	3,115	5,528	3,904	3,273	1,291	38	23,687
<b>SWP</b>	<b>6,047</b>	<b>5,593</b>	<b>9,239</b>	<b>11,273</b>	<b>17,045</b>	<b>13,750</b>	<b>15,958</b>	<b>9,444</b>	<b>13,122</b>	<b>11,582</b>	<b>10,436</b>	<b>7,443</b>	<b>130,932</b>
<b>South Bay Area Total</b>	<b>6,439</b>	<b>5,593</b>	<b>9,567</b>	<b>11,648</b>	<b>18,810</b>	<b>17,428</b>	<b>19,073</b>	<b>14,972</b>	<b>17,026</b>	<b>14,855</b>	<b>11,727</b>	<b>7,481</b>	<b>154,619</b>
<b>SAN JOAQUIN VALLEY AREA</b>													
<b>SWP Agencies</b>													
<b>County of Kings</b>													
Table A	0	0	0	0	446	129	101	0	0	0	0	0	676
Table A Transferred to Others*	1	1	0	0	0	6	5	6	2	1	0	0	22
Pool Program Water	0	0	0	0	0	11	0	0	0	0	0	0	11
Carryover Water	0	0	0	143	0	0	0	0	0	0	0	0	143
Carryover Water Transferred to Others*	0	10	82	0	0	98	0	0	0	2	0	0	192
Non-SWP Water Transferred from Others	55	55	0	0	0	0	14	0	16	45	0	0	185
<b>Kings Total (*excluded from total)</b>	<b>55</b>	<b>55</b>	<b>0</b>	<b>143</b>	<b>446</b>	<b>140</b>	<b>115</b>	<b>0</b>	<b>16</b>	<b>45</b>	<b>0</b>	<b>0</b>	<b>1,015</b>

**Table 9-8 Total Amounts of Water Delivered in 2015, by Month (acre-feet)**

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2015 Total Deliveries
Dudley Ridge Water District													
Table A	0	0	0	0	0	0	3,065	71	73	0	0	0	3,209
Table A Transferred from Others	0	0	0	0	617	0	87	2,087	86	0	0	0	2,877
Table A Transferred to Others*	0	0	0	0	0	0	2,100	1,756	0	0	0	452	4,308
Pool Program Water	0	0	0	0	0	0	18	18	19	0	0	0	55
Carryover Water	27	56	156	222	735	369	0	5	0	0	0	0	1,570
Delivery of Backup Water	0	0	0	0	0	2,845	0	0	0	0	0	0	2,845
Delivery of Backup Water Transferred from Others	0	0	0	8,200	0	0	0	5,744	0	0	0	0	13,944
Non-SWP Water	0	7	0	0	0	0	0	0	0	0	0	0	7
Non-SWP Water Transferred from Others	0	0	0	0	0	0	1,281	115	51	1	29	50	1,527
Dudley Ridge Total (*excluded from total)	27	63	156	8,422	1,352	3,214	4,451	8,040	229	1	29	50	26,034
Empire West Side Irrigation District													
Table A	0	0	0	0	0	72	73	171	0	0	0	0	316
Table A Transferred to Others*	0	0	120	142	0	0	0	0	0	0	0	0	262
Carryover Water	0	0	34	12	0	0	0	0	0	0	0	0	46
Empire Total (*excluded from total)	0	0	34	12	0	72	73	171	0	0	0	0	362
Kern County Water Agency													
Table A	0	0	0	7,728	0	56,034	74,854	0	0	290	0	0	138,906
Table A Transferred from Others	0	0	0	0	0	0	1,250	1,756	0	0	0	1,554	4,560
Table A Transferred to Others*	0	35	1,572	1,776	64	92	18,159	2,094	72	53	0	0	23,917
Pool Program Water	0	0	0	0	0	0	0	0	707	0	0	0	707
Carryover Water	0	0	0	0	38,563	4,569	0	0	0	0	0	0	43,132
Carryover Water Transferred to Others*	23	0	0	0	0	0	0	0	0	0	24	26	73
Water Bank Recovery	4,593	12,145	20,391	21,992	20,796	12,180	1,952	10,003	10,535	12,632	0	2,410	129,629
Delivery of Backup Water	0	0	0	0	0	0	0	43,583	22,318	4,932	5,146	0	75,979
Delivery of Backup Water Transferred to Others*	0	0	0	8,200	0	0	0	5,744	0	0	0	0	13,944
Non-SWP Water	0	160	0	0	0	0	0	0	0	0	0	0	160
Non-SWP Water Transferred from Others	0	0	0	0	0	0	2,040	2,040	2,040	0	0	0	6,120
Non-SWP Water Transferred to Others*	0	2,750	0	0	0	0	0	0	0	0	0	0	2,750
Kern Total (*excluded from total)	4,593	12,305	20,391	29,720	59,359	72,783	80,096	57,382	35,600	17,854	5,146	3,964	399,193
Oak Flat Water District													
Table A	0	0	0	0	106	207	184	84	67	50	0	0	698
Carryover Water	1	26	46	132	101	42	0	0	0	0	0	0	348
Non-SWP Water Transferred from Others	0	0	0	0	0	0	18	6	3	4	0	0	31
Oak Flat Total	1	26	46	132	207	249	202	90	70	54	0	0	1,077

**Table 9-8 Total Amounts of Water Delivered in 2015, by Month (acre-feet)**

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2015 Total Deliveries
Tulare Lake Basin Water Storage District													
Table A Transferred to Others*	60	0	1,600	82	617	0	10,500	1,750	1,750	0	0	0	16,359
Pool Program Water	0	0	0	0	0	105	0	0	0	0	0	0	105
Carryover Water	0	0	0	32	0	243	58	238	0	0	0	0	571
Non-SWP	0	0	0	0	1	0	0	0	0	0	0	0	1
Non-SWP Water Transferred from Others	0	0	0	0	0	0	281	19	0	0	0	0	300
Tulare Total (*excluded from total)	0	0	0	32	1	348	339	257	0	0	0	0	977
Recreation/Fish and Wildlife (SWP)													
Department of Parks and Recreation, Cattle	0	0	0	0	0	1	0	0	0	0	0	0	1
Department of Fish & Wildlife, O'Neill	51	32	21	49	19	39	66	33	42	36	18	75	481
Department of Fish & Wildlife, Lateral 4	0	1	0	1	0	0	1	0	0	1	0	0	4
Parks and Recreation, O'Neill	1	0	0	0	1	1	0	1	0	0	1	0	5
Parks and Recreation, San Luis	1	0	0	1	0	0	0	1	0	1	0	1	5
Recreation/Fish and Wildlife (SWP) Total	53	33	21	51	20	41	67	35	42	38	19	76	496
Non-SWP Agencies													
CVP Annual Contractors													
Musco Family Olive Company	35	29	34	36	33	43	41	34	48	59	36	25	453
San Joaquin Valley National Cemetery	5	1	6	19	30	39	40	30	20	14	2	4	210
San Luis Water District	0	0	0	0	0	0	0	1,750	1,750	0	0	0	3,500
CVP Annual Contractors Total	40	30	40	55	63	82	81	1,814	1,818	73	38	29	4,163
Western Hills Water District													
Table A Point of Delivery from SWP	0	35	0	67	64	92	108	94	72	53	0	0	585
Carryover Point of Delivery from SWP	23	0	0	0	0	0	0	0	0	0	24	26	73
Western Hills Total	23	35	0	67	64	92	108	94	72	53	24	26	658
Westlands Water District													
Table A Transferred from Others	61	1	3,292	1,933	0	6	12,701	6	2	1	0	0	18,003
Carryover Transferred from Others	0	10	82	0	0	98	0	0	0	2	0	0	192
Water Bank Recovery	0	3,641	0	0	0	0	5,016	8,251	6,341	2,932	0	0	26,181
Non-SWP Water Transferred to Others*	0	0	0	0	0	0	0	0	0	2	0	0	2
Westlands Total (*excluded from total)	61	3,652	3,374	1,933	0	104	17,717	8,257	6,343	2,935	0	0	44,376
Bureau of Reclamation													
Non-SWP Water Transferred to Others*	0	0	0	0	0	0	16,705	0	0	0	0	0	16,705
Kern National Wildlife Refuge	1,341	888	0	0	0	0	0	0	0	2,640	3,532	2,054	10,455
Fish and Wildlife	42	25	17	40	16	32	54	28	33	30	14	61	392

**Table 9-8 Total Amounts of Water Delivered in 2015, by Month (acre-feet)**

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2015 Total Deliveries
Parks and Recreation	0	0	2	1	0	0	0	2	0	1	0	0	6
Reclamation Total (*excluded from total)	1,383	913	19	41	16	32	54	30	33	2,671	3,546	2,115	10,853
San Luis & Delta-Mendota Water Authority													
Non-SWP Water Transferred from Others	0	0	0	0	0	0	0	0	2,226	0	0	0	2,226
San Luis & Delta-Mendota Total	0	0	0	0	0	0	0	0	2,226	0	0	0	2,226
SWP	165	161	3,631	10,320	40,652	62,018	92,566	6,315	2,818	434	43	1,656	220,779
Non-SWP	6,071	16,951	20,450	30,288	20,876	15,139	10,737	69,855	41,405	23,290	8,759	4,604	268,425
<b>San Joaquin Valley Area Total</b>	<b>6,236</b>	<b>17,112</b>	<b>24,081</b>	<b>40,608</b>	<b>61,528</b>	<b>77,157</b>	<b>103,303</b>	<b>76,170</b>	<b>44,223</b>	<b>23,724</b>	<b>8,802</b>	<b>6,260</b>	<b>489,204</b>
<b>CENTRAL COASTAL AREA</b>													
SWP Agencies													
San Luis Obispo County Flood Control and Water Conservation District													
Table A	154	177	308	292	288	354	346	437	444	338	35	273	3,446
Non-SWP Water	0	27	0	0	0	0	0	0	0	0	0	0	27
San Luis Obispo Total	154	204	308	292	288	354	346	437	444	338	35	273	3,473
Santa Barbara County Flood Control and Water Conservation District													
Table A	369	423	686	249	391	463	573	575	492	552	20	254	5,047
Table A Transferred from Others	346	383	721	1,165	1,071	778	534	113	49	0	39	0	5,199
Pool Program Water	47	0	0	0	0	0	0	8	0	0	0	0	55
Carryover Water	85	123	145	113	15	10	16	24	102	265	38	119	1,055
Non-SWP Water	132	9	30	1	0	0	3	0	6	0	0	0	181
Non-SWP Water Transferred from Others**	0	0	0	0	0	0	74	27	0	0	0	0	101
Santa Barbara Total (*excluded from total)	979	938	1,582	1,528	1,477	1,251	1,200	747	649	817	97	373	11,638
SWP	1,001	1,106	1,860	1,819	1,765	1,605	1,469	1,157	1,087	1,155	132	646	14,802
Non-SWP	132	36	30	1	0	0	77	27	6	0	0	0	309
<b>Central Coastal Area Total</b>	<b>1,133</b>	<b>1,142</b>	<b>1,890</b>	<b>1,820</b>	<b>1,765</b>	<b>1,605</b>	<b>1,546</b>	<b>1,184</b>	<b>1,093</b>	<b>1,155</b>	<b>132</b>	<b>646</b>	<b>15,111</b>
<b>SOUTHERN CALIFORNIA AREA</b>													
SWP Agencies													
Antelope Valley-East Kern Water Agency													
Table A	0	373	0	476	0	1,352	578	1,394	1,612	1,017	281	500	7,583
Table A Transferred from Others	11	38	85	84	89	164	133	173	278	61	246	121	1,483
Table A Transferred to Others*	346	383	721	938	888	3,278	3,034	2,613	197	0	39	0	12,437
Pool Program Water	0	0	0	0	0	0	174	0	0	0	0	0	174
Carryover Water	386	0	714	409	1,074	421	1,000	571	0	0	0	0	4,575



**Table 9-8 Total Amounts of Water Delivered in 2015, by Month (acre-feet)**

Contracting Agency and Type of Service	2015												Total Deliveries
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Carryover Water Transferred to Others*	0	0	0	0	250	250	79	0	0	0	0	0	579
Water Bank Recovery	0	0	0	174	154	168	176	172	196	167	157	152	1,516
AVEK Total (*excluded from total)	397	411	799	1,143	1,317	2,105	2,061	2,310	2,086	1,245	684	773	15,331
Castaic Lake Water Agency													
Table A	224	0	0	815	613	1,675	1,177	153	767	2,295	1,843	1,513	11,075
Carryover Water	1,100	0	0	89	500	0	0	600	780	0	100	952	4,121
Water Bank Recovery	0	1,162	2,613	1,238	1,000	1,000	1,396	1,955	879	0	0	0	11,243
Non-SWP Water Transferred from Others*	0	2,750	0	0	0	0	0	0	0	0	0	0	2,750
Castaic Lake Total (*excluded from total)	1,324	3,912	2,613	2,142	2,113	2,675	2,573	2,708	2,426	2,295	1,943	2,465	29,189
Coachella Valley Water District													
Table A	0	0	0	0	4,852	5,086	6,424	6,916	4,392	0	0	0	27,670
Water Bank Recovery	0	0	0	0	0	0	0	0	0	3,000	3,000	3,500	9,500
Non-SWP Water Transferred from Others*	0	0	0	0	0	0	142	142	142	0	0	0	426
Coachella Total (*excluded from total)	0	0	0	0	4,852	5,086	6,566	7,058	4,534	3,000	3,000	3,500	37,596
Crestline-Lake Arrowhead Water Agency													
Table A	0	0	0	0	0	0	0	0	0	0	47	107	154
Table A Transferred from Others*	106	79	55	89	0	0	107	162	109	101	42	0	850
Carryover Water	0	0	0	0	130	117	0	0	0	0	0	0	247
Non-SWP Water	0	0	24	0	0	0	2	0	0	0	0	0	26
Non-SWP Water Transferred from Others*	0	0	0	0	0	0	0	0	0	2	0	0	2
Crestline Total (*excluded from total)	106	79	79	89	130	117	109	162	109	103	89	107	1,279
Desert Water Agency													
Table A	0	0	0	0	2,109	2,050	2,589	2,787	1,615	0	0	0	11,150
Pool Program Water	0	0	0	0	0	0	67	0	0	0	0	0	67
Desert Total	0	0	0	0	2,109	2,050	2,656	2,787	1,615	0	0	0	11,217
Littlerock Creek Irrigation District													
Table A Transferred to Others*	0	0	0	0	0	0	0	0	160	0	200	100	460
Littlerock Total (*excluded from total)	0	0	0	0	0	0	0	0	160	0	200	100	460
The Metropolitan Water District of Southern California													
Table A	0	31,623	50,744	51,492	34,487	36,104	16,838	27,142	13,560	24,883	28,240	65,464	380,577
Table A Transferred from Others	358	715	1,072	715	715	715	715	715	715	715	715	1,167	9,032
Table A Transferred to Others*	0	0	0	227	183	0	0	0	0	0	0	0	410
Pool Program Water	0	0	0	0	0	0	1,374	0	0	0	0	0	1,374
Carryover Water	34,500	1,175	0	0	0	0	0	0	0	0	0	0	35,675
Water Bank Recovery	9,471	9,562	9,688	6,741	5,454	4,524	5,078	7,875	16,632	16,786	18,797	20,942	131,550
Non-SWP Water Transferred from Others	0	0	0	0	0	0	10,949	2,185	2,184	0	0	0	15,318
Metropolitan Total (*excluded from total)	44,329	43,075	61,504	58,948	40,656	41,343	34,954	37,917	33,091	42,384	47,752	87,573	573,526

**Table 9-8 Total Amounts of Water Delivered in 2015, by Month (acre-feet)**

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2015 Total Deliveries
Mojave Water Agency													
Table A	121	613	0	0	0	693	465	816	1,522	1,089	617	0	5,936
Table A Transferred to Others*	369	753	1,157	799	804	879	1,198	1,238	1,133	776	761	736	10,603
Carryover	0	0	561	481	404	0	0	0	0	0	0	425	1,871
Mojave Total (*excluded from total)	121	613	561	481	404	693	465	816	1,522	1,089	617	425	7,807
Palmdale Water District													
Table A	969	30	0	636	44	190	128	808	862	0	0	0	3,667
Table A Transferred from Others	0	0	0	0	447	283	566	0	148	0	0	0	1,444
Table A Transferred to Others*	0	0	0	0	0	0	0	0	500	0	0	0	500
Pool Program Water	0	0	0	0	0	0	26	0	0	0	0	0	26
Carryover Transferred from Others	0	0	0	0	250	250	79	0	0	0	0	0	579
Non-SWP Water Transferred from Others	0	0	0	0	0	0	0	47	73	0	0	0	120
Palmdale Total	969	30	0	636	741	723	799	855	1,083	0	0	0	5,836
San Bernardino Valley Municipal Water District													
Table A	0	0	0	0	480	1,964	1,746	2,399	2,099	3,033	1,499	1,168	14,388
Table A Transferred from Others*	0	0	0	0	0	0	0	0	500	0	0	0	500
Table A Transferred to Others*	106	79	55	89	0	0	107	1,412	1,359	101	42	0	3,350
Pool Program Water	0	0	0	0	0	0	123	0	0	0	0	0	123
Carryover Water	19	9	818	1,181	1,133	689	1,972	1,496	1,700	0	0	0	9,017
Non-SWP Water Transferred from Others	0	0	0	0	0	0	150	158	44	0	0	0	352
San Bernardino Total (*excluded from total)	19	9	818	1,181	1,613	2,653	3,991	4,053	4,343	3,033	1,499	1,168	24,380
San Gabriel Valley Municipal Water District													
Table A	0	0	0	2	5	0	1,457	1,898	1,864	534	0	0	5,760
San Gabriel Total (*excluded from total)	0	0	0	2	5	0	1,457	1,898	1,864	534	0	0	5,760
San Geronio Pass Water Agency													
Table A	0	0	0	549	530	390	371	376	370	141	196	423	3,346
Carryover Water	0	0	0	0	50	0	0	0	0	0	85	0	135
San Geronio Total (*excluded from total)	0	0	0	549	580	390	371	376	370	141	281	423	3,481
Ventura County Watershed Protection District													
Table A	0	0	0	0	0	204	166	0	0	0	630	0	1,000
Ventura Total	0	0	0	0	0	204	166	0	0	0	630	0	1,000

**Table 9-8 Total Amounts of Water Delivered in 2015, by Month (acre-feet)**

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2015 Total Deliveries
<i>Non-Swp Agencies</i>													
Recreation/Fish and Wildlife (SWP)													
Castaic Lagoon	0	2	1	2	9	15	17	6	0	0	7	4	63
Lake Perris—Parks and Recreation	0	0	0	0	0	0	0	12	0	12	9	2	35
Pyramid Lake	1	1	1	1	1	2	0	4	0	4	2	0	17
Silverwood Lake	1	1	2	3	2	3	5	4	5	3	3	4	36
Recreation/Fish and Wildlife (SWP) Total	2	4	4	6	12	20	22	26	5	19	21	10	151
SWP	37,796	34,659	54,053	57,024	47,924	52,367	38,297	48,432	32,898	33,888	34,562	71,850	543,750
Non-SWP	9,471	13,474	12,325	8,153	6,608	5,692	17,893	12,534	20,150	19,955	21,954	24,594	172,803
<b>Southern California Area Total</b>	<b>47,267</b>	<b>48,133</b>	<b>66,378</b>	<b>65,177</b>	<b>54,532</b>	<b>58,059</b>	<b>56,190</b>	<b>60,966</b>	<b>53,048</b>	<b>53,843</b>	<b>56,516</b>	<b>96,444</b>	<b>716,553</b>
<b>SWP WATER</b>													
<i>SWP Long-term Water Supply Contracts</i>													
Table A	1,840	33,243	51,758	62,356	46,106	109,193	112,859	48,778	32,477	36,271	34,886	70,677	640,444
Transfer Table A and Exchanges	821	1,215	1,933	2,053	2,942	4,444	6,255	9,142	3,444	878	1,042	2,842	37,011
Pool Water	47	0	0	0	0	116	1,817	294	726	0	0	0	3,000
Carryover Water	36,839	2,018	3,346	4,793	46,547	9,527	5,576	6,277	6,821	6,875	1,846	1,525	131,990
Subtotal	39,547	36,476	57,037	69,202	95,595	123,280	126,507	64,491	43,468	44,024	37,774	75,044	812,445
<i>Other Water Supply Contracts</i>													
Article 21	437	0	0	0	253	0	0	0	0	0	0	0	690
Settlement Water	66	425	20	0	0	0	0	0	0	0	0	217	728
Delivery of Backup Water	4,070	1,062	0	12,323	9,266	8,214	9,287	50,913	23,072	4,932	5,146	586	128,871
Water Bank Recovery	15,523	26,604	38,978	33,702	30,927	20,733	10,699	24,125	38,389	42,599	32,123	33,450	347,852
Subtotal	20,096	28,091	38,998	46,025	40,446	28,947	19,986	75,038	61,461	47,531	37,269	34,253	478,141
<i>Non-SWP Water Supply Contracts</i>													
Parks and Recreation	0	0	0	0	0	1	0	1	0	0	0	0	2
Dry Year Purchase Program	0	0	0	0	0	0	4,108	4,036	3,873	8	0	0	12,025
Local	385	316	425	275	314	1,287	2,956	995	208	182	83	290	7,716
Vallejo Permit	280	447	994	1,614	0	0	0	0	0	0	1,500	35	4,870
Other Non-SWP Programs	322	3,125	185	185	180	248	12,544	3,026	1,282	263	204	126	21,690
Subtotal	987	3,888	1,604	2,074	494	1,536	19,608	8,058	5,363	453	1,787	451	46,303
<b>SWP Total</b>	<b>60,630</b>	<b>68,455</b>	<b>97,639</b>	<b>117,301</b>	<b>136,535</b>	<b>153,763</b>	<b>166,101</b>	<b>147,587</b>	<b>110,292</b>	<b>92,008</b>	<b>76,830</b>	<b>109,748</b>	<b>1,336,889</b>

**Table 9-8 Total Amounts of Water Delivered in 2015, by Month (acre-feet)**

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2015 Total Deliveries
<b>NON-SWP WATER</b>													
<i>Non-SWP Agencies</i>													
SWP Contracted Supply Delivered to Non-SWP Agencies	84	46	3,374	2,000	64	196	29,514	1,850	1,824	56	24	26	39,058
Water Bank Recovery	0	3,641	0	0	0	0	5,016	8,251	6,341	2,932	0	0	26,181
Regulated delivery of local supply	162	603	15,509	30,910	126,950	120,859	126,615	89,086	35,756	73,156	58,082	12,242	689,930
Parks and Recreation	6	4	12	12	18	28	22	30	15	29	24	11	211
Fish and Wildlife	93	58	38	90	35	71	121	61	75	67	32	136	877
CVP/Reclamation													
Kern National Wildlife Refuge	1,341	888	0	0	0	0	0	0	0	2,640	3,532	2,054	10,455
Annual Contracts	40	30	40	55	63	82	81	64	68	73	38	29	663
<b>Non-SWP Total</b>	<b>1,726</b>	<b>5,270</b>	<b>18,973</b>	<b>33,067</b>	<b>127,130</b>	<b>121,236</b>	<b>161,369</b>	<b>99,342</b>	<b>44,079</b>	<b>78,953</b>	<b>61,732</b>	<b>14,498</b>	<b>767,375</b>
<b>Grand Total</b>	<b>62,356</b>	<b>73,725</b>	<b>116,612</b>	<b>150,368</b>	<b>263,665</b>	<b>274,999</b>	<b>327,470</b>	<b>246,929</b>	<b>154,371</b>	<b>170,961</b>	<b>138,562</b>	<b>124,246</b>	<b>2,104,264</b>



**Table 9-9 Total Amounts of Annual Table A Water and Water Conveyed, by Type, 1962–2015 (acre-feet)**

Year	Annual Table A Amounts According to Long-term Water Supply Contracts							Water Conveyed							Total [16]			
								Deliveries										
								Table A Water [8]	Article 21, Surplus, and Unscheduled Water <sup>a</sup> [9]	Other Water <sup>b</sup> [10]	Feather River Diversions <sup>c</sup> [11]	Recreation/ Fish and Wildlife Water [12]	Subtotal [13]	Initial Fill Water [14]		Losses and Storage Changes <sup>d</sup> [15]		
	Upper Feather River Area [1]	North Bay Area [2]	South Bay Area [3]	San Joaquin Valley Area [4]	Central Coastal Area [5]	Southern California Area [6]	Total [7]											
1962	-	-	-	-	-	-	-	-	-	9,704	7,499	-	-	-	17,203	9	272	17,484
1963	-	-	-	-	-	-	-	-	-	13,212	16,049	-	-	-	29,261	71	185	29,517
1964	-	-	-	-	-	-	-	-	-	21,743	17,891	-	-	-	39,634	171	152	39,957
1965	-	-	-	-	-	-	-	-	-	35,985	27,425	-	-	-	63,410	93	729	64,232
1966	-	-	-	-	-	-	-	-	-	59,599	33,361	-	-	-	92,960	-	1,746	94,706
1967	-	-	11,538	-	-	-	11,538	-	-	45,225	24,639	-	-	-	81,218	8,328	4,212	93,758
1968	550	-	109,900	77,350	-	3,700	191,500	-	121,534	1,214	903,367	-	-	-	1,197,824	498,926	117,906	1,814,656
1969	620	-	98,700	163,075	-	5,000	267,395	-	193,020	8,692	832,454	-	-	-	1,106,563	510,614	72,196	1,689,373
1970	700	-	114,200	202,000	-	5,700	322,600	-	233,993	25,401	804,320	-	-	-	1,195,562	23,947	2,435	1,221,944
1971	890	-	116,200	251,800	-	6,700	375,590	-	357,340	35,438	825,886	8	-	-	1,513,253	7,853	5,812	1,526,918
1972	970	-	118,300	413,066	-	209,423	741,759	-	611,801	53,848	875,529	6,489	-	-	1,969,989	100,274	53,062	2,123,325
1973	1,100	-	120,400	383,652	-	481,100	986,252	-	692,888	29,540	851,285	1,155	-	-	1,869,784	204,638	53,798	2,128,220
1974	1,230	-	122,400	460,650	-	597,920	1,182,200	-	874,075	31,493	963,956	2,118	-	-	2,284,095	237,554	10,657	2,532,306
1975	1,610	-	124,500	545,809	-	714,950	1,386,869	-	1,223,990	46,995	924,696	3,377	-	-	2,819,743	103,352	(94,606)	2,828,489
1976	1,990	-	126,500	543,417	-	836,480	1,508,387	-	1,373,002	103,546	1,018,653	1,745	-	-	3,048,631	61,122	(681,025)	2,428,728
1977	2,420	-	128,600	581,400	-	954,901	1,667,321	-	573,896	410,991	624,497	1,111	-	-	1,610,495	-	(131,151)	1,479,344
1978	1,850	-	130,700	635,900	-	1,049,584	1,818,034	-	1,312,365	177,245	836,864	1,691	-	-	2,344,380	64,443	717,370	3,126,193
1979	2,130	-	132,700	702,685	-	1,190,573	2,028,088	-	1,404,292	431,693	933,067	1,766	-	-	3,417,648	12,302	(83,430)	3,346,520
1980	1,810	500	134,800	758,100	1,946	1,317,614	2,214,770	-	1,511,491	40,269	925,750	2,131	-	-	2,881,858	-	(26,606)	2,855,252
1981	1,940	650	137,000	818,000	2,813	1,432,065	2,392,468	-	1,889,125	283,310	993,785	4,688	-	-	4,079,336	-	(802,263)	3,277,073
1982	1,970	800	139,200	876,500	5,626	1,550,449	2,574,545	-	1,738,056	144,267	819,586	4,646	-	-	2,921,689	-	480,752	3,402,441
1983	2,000	950	141,400	867,118	8,439	1,681,257	2,701,164	-	1,184,119	172,030	633,778	7,849	-	-	2,010,795	-	(90,997)	1,919,798
1984	3,630	1,100	143,600	979,211	12,698	1,744,098	2,884,337	-	1,587,593	366,273	891,128	7,040	-	-	3,114,951	-	(140,182)	2,974,769
1985	3,760	1,250	145,800	1,019,049	21,138	1,864,849	3,055,846	-	1,912,765	474,417	924,049	4,033	-	-	3,617,108	-	92,885	3,709,993
1986	4,190	1,400	148,100	1,091,946	28,210	1,983,890	3,257,736	-	2,007,906	177,176	843,040	3,865	-	-	3,056,337	-	284,380	3,340,717
1987	4,620	1,550	150,300	1,188,500	35,204	2,103,941	3,484,115	-	2,113,915	375,810	882,301	7,672	-	-	3,494,605	-	(390,413)	3,104,192
1988	5,060	15,471	152,500	1,246,100	43,722	2,225,482	3,688,335	-	2,376,373	520,375	884,877	4,889	-	-	3,786,514	-	(92,850)	3,693,664
1989	5,500	24,615	156,700	1,290,400	56,342	2,424,633	3,958,190	-	2,853,747	474,559	830,500	8,135	-	-	4,166,941	-	447,917	4,614,858
1990	6,040	28,190	160,900	1,313,450	70,486	2,500,600	4,079,666	-	2,582,151	424,697	875,099	9,262	-	-	3,891,299	-	(528,869)	3,362,430
1991	11,880	29,590	166,400	1,338,011	70,486	2,510,200	4,126,567	-	549,113	543,582	565,395	4,879	-	-	1,666,490	-	167,435	1,833,925

**Table 9-9 Total Amounts of Annual Table A Water and Water Conveyed, by Type, 1962–2015 (acre-feet)**

Year	Annual Table A Amounts According to Long-term Water Supply Contracts							Water Conveyed							Total [16]	
								Deliveries					Initial Fill Water [14]	Losses and Storage Changes <sup>a</sup> [15]		
								Article 21, Surplus, and Unscheduled Water <sup>a</sup> [9]	Other Water <sup>b</sup> [10]	Feather River Diversions <sup>c</sup> [11]	Recreation/ Fish and Wildlife Water [12]	Subtotal [13]				
	Upper Feather River Area [1]	North Bay Area [2]	South Bay Area [3]	San Joaquin Valley Area [4]	Central Coastal Area [5]	Southern California Area [6]	Total [7]	Table A Water [8]								
1992	11,920	32,010	171,900	1,342,300	70,486	2,510,200	4,138,816	1,410,799	1,156	166,992	613,978	2,605	2,195,530	-	(63,541)	2,131,989
1993	11,960	34,620	177,400	1,342,300	70,486	2,510,200	4,146,966	2,313,236	-	256,853	822,589	2,609	3,395,287	-	726,123	4,121,410
1994	12,000	37,215	182,000	1,342,300	70,486	2,510,200	4,154,201	1,749,351	112,625	236,739	874,018	8,200	2,980,933	-	(295,405)	2,685,528
1995	12,050	44,030	184,000	1,342,300	70,486	2,510,200	4,163,066	1,967,093	64,330	85,560	860,077	2,575	2,979,635	-	69,536	3,049,171
1996	12,100	48,225	186,000	1,301,630	70,486	2,492,900	4,111,341	2,514,824	28,647	252,346	1,005,148	3,907	3,804,872	86	491,550	4,296,508
1997	12,150	49,315	188,000	1,297,300	45,201	2,492,900	4,084,866	2,260,383	21,432	322,000	993,211	4,146	3,601,172	527	(11,806)	3,589,893
1998	12,200	50,420	188,000	1,272,300	45,201	2,517,900	4,086,021	1,726,519	20,288	127,405	872,738	2,108	2,749,058	-	(132,491)	2,616,567
1999	13,940	55,020	188,000	1,272,300	70,486	2,519,900	4,119,646	2,738,903	158,070	85,312	1,108,672	4,324	4,095,281	-	(189,525)	3,905,756
2000	14,000	55,945	210,000	1,205,300	70,486	2,565,900	4,121,631	3,172,407	308,785	353,584	1,085,886	4,096	4,924,758	-	(20,103)	4,904,655
2001	14,670	66,561	220,000	1,185,519	70,486	2,566,900	4,124,136	1,579,291	48,145	632,403	1,077,997	2,942	3,340,778	-	159,983	3,500,761
2002	14,730	67,396	220,000	1,182,519	70,486	2,569,900	4,125,031	2,634,672	43,115	311,976	1,131,880	3,712	4,125,355	-	80,709	4,206,064
2003	14,790	68,231	220,400	1,182,119	70,486	2,570,900	4,126,926	2,975,817	59,828	160,087	1,006,995	2,862	4,205,589	-	459,377	4,664,966
2004	13,100	69,056	222,619	1,170,000	70,486	2,581,800	4,127,061	2,644,787	218,496	403,542	1,171,835	2,887	4,441,547	-	108,840	4,550,387
2005	10,800	69,481	222,619	1,170,000	70,486	2,582,300	4,125,686	2,827,256	731,083	92,858	1,074,706	1,515	4,727,418	-	529,347	5,256,765
2006	11,124	69,856	222,619	1,170,000	70,486	2,582,800	4,126,885	2,973,349	621,339	143,774	1,094,944	3,628	4,837,034	-	(119,981)	4,717,053
2007	11,520	70,231	222,619	1,170,000	70,486	2,584,450	4,129,306	2,180,751	309,973	598,789	1,193,237	2,581	4,285,331	-	(524,851)	3,760,480
2008	39,120	70,606	222,619	1,170,000	70,486	2,593,100	4,165,931	1,244,240	2,729	769,517	1,087,669	2,778	3,106,933	-	(758,813)	2,348,120
2009	39,190	70,981	222,619	1,170,000	70,486	2,593,100	4,166,376	1,385,266	6,032	709,885	1,125,147	2,047	3,228,377	-	(31,319)	3,197,058
2010	13,491	76,531	222,619	1,140,000	70,486	2,623,100	4,146,227	2,010,672	7,505	790,602	978,172	1,167	3,788,118	-	461,751	4,249,869
2011	14,388	76,581	222,619	1,140,000	70,486	2,623,100	4,147,174	2,847,572	420,691	388,632	1,028,542	1,593	4,687,030	-	358,354	5,045,384
2012	39,420	76,631	222,619	1,140,000	70,486	2,623,100	4,172,256	2,593,699	-	367,609	1,047,832	1,609	4,010,749	-	(537,209)	3,473,540
2013	39,510	76,681	222,619	1,140,000	70,486	2,623,100	4,172,396	1,623,212	-	579,512	1,166,635	1,641	3,371,000	-	(256,889)	3,114,111
2014	39,600	76,731	222,619	1,136,556	70,486	2,626,544	4,172,536	476,033	1,444	697,050	839,792	677	2,014,996	-	(222,460)	1,792,536
2015	39,700	76,781	222,619	1,133,556	70,486	2,629,544	4,172,686	851,503	690	580,841	670,538	692	2,104,264	-	(419,759)	1,684,505
Total	535,933	1,595,201	8,238,466	46,865,488	1,998,204	90,999,147	150,232,439	82,041,714	9,018,296	14,652,197	44,522,964	155,450	150,390,621	1,834,310	(687,073)	151,537,858

<sup>a</sup>Values include amounts of deliveries to short-term contractors (Mustang Water District, 1970–1972; Tracy Golf and Country Club, 1974, 1979, and 1980; Green Valley Water District, 1974, 1975, 1978, 1979, 1980, and 1985; and Granite Construction Company, 1980).

<sup>b</sup>Includes amounts of SWP and non-SWP water conveyed for SWP and non-SWP water contractors.

<sup>c</sup>Includes amounts of water diverted under various water rights agreements.

<sup>d</sup>Amounts reflect net effect of (1) operational losses from SWP transportation facilities; (2) changes in reservoir storage south of the Delta; (3) storable local inflows to SWP reservoirs; (4) side inflow to San Luis Canal; and (5) inflow into the California Aqueduct from the Kern River Intertie.

**Table 9-10 SWP Water Delivered by Category, 1962–2015 (acre-feet)**

Table A Water				Article 21/Unscheduled		Other SWP Water Deliveries				
Year	Municipal and Industrial	Agricultural	Total Table A <sup>a</sup>	Municipal and Industrial		Agricultural	Other Water <sup>b</sup>	Feather River Diversions <sup>c</sup>	Fish & Wildlife/ Recreation Water	Total Deliveries
				Industrial						
1962	0	0	0	0	0	0	9,704	7,499	0	17,203
1963	0	0	0	0	0	0	13,212	16,049	0	29,261
1964	0	0	0	0	0	0	21,743	17,891	0	39,634
1965	0	0	0	0	0	0	35,985	27,425	0	63,410
1966	0	0	0	0	0	0	59,599	33,361	0	92,960
1967	5,563	5,791	11,354	0	0	0	45,225	24,639	0	81,218
1968	86,541	85,168	171,709	10,000	111,534	1,214	903,367	0	0	1,197,824
1969	63,956	129,064	193,020	0	72,397	8,692	832,454	0	0	1,106,563
1970	83,415	150,578	233,993	0	131,848	25,401	804,320	0	0	1,195,562
1971	93,776	263,564	357,340	0	294,581	35,438	825,886	8	8	1,513,253
1972	186,796	425,005	611,801	0	422,322	53,848	875,529	6,489	6,489	1,969,989
1973	297,497	395,391	692,888	0	294,916	29,540	851,285	1,155	1,155	1,869,784
1974	423,982	450,093	874,075	0	412,453	31,493	963,956	2,118	2,118	2,284,095
1975	670,492	553,498	1,223,990	356	620,329	46,995	924,696	3,377	3,377	2,819,743
1976	631,876	741,126	1,373,002	4,147	547,538	103,546	1,018,653	1,745	1,745	3,048,631
1977	354,930	218,966	573,896	0	0	410,991	624,497	1,111	1,111	1,610,495
1978	782,625	529,740	1,312,365	0	16,215	177,245	836,864	1,691	1,691	2,344,380
1979	692,888	711,404	1,404,292	0	646,830	431,693	933,067	1,766	1,766	3,417,648
1980	726,545	784,946	1,511,491	52,200	350,017	40,269	925,750	2,131	2,131	2,881,858
1981	1,053,273	835,852	1,889,125	18,920	889,508	283,310	993,785	4,688	4,688	4,079,336
1982	916,014	822,042	1,738,056	140	214,994	144,267	819,586	4,646	4,646	2,921,689
1983	482,749	701,370	1,184,119	0	13,019	172,030	633,778	7,849	7,849	2,010,795
1984	725,799	861,794	1,587,593	3,663	259,254	366,273	891,128	7,040	7,040	3,114,951
1985	983,341	929,424	1,912,765	9,638	292,206	474,417	924,049	4,033	4,033	3,617,108
1986	998,611	1,009,295	2,007,906	2,595	21,755	177,176	843,040	3,865	3,865	3,056,337
1987	1,079,983	1,033,932	2,113,915	6,949	107,958	375,810	882,301	7,672	7,672	3,494,605
1988	1,308,071	1,068,302	2,376,373	0	0	520,375	884,877	4,889	4,889	3,786,514
1989	1,602,543	1,251,204	2,853,747	0	0	474,559	830,500	8,135	8,135	4,166,941
1990	1,876,072	706,079	2,582,151	0	90	424,697	875,099	9,262	9,262	3,891,299
1991	536,669	12,444	549,113	3,521	0	543,582	565,395	4,879	4,879	1,666,490
1992	955,687	455,112	1,410,799	1,156	0	166,992	613,978	2,605	2,605	2,195,530
1993	1,069,258	1,243,978	2,313,236	0	0	256,853	822,589	2,609	2,609	3,395,287
1994	1,134,992	614,359	1,749,351	48,150	64,475	236,739	874,018	8,200	8,200	2,980,933
1995	801,570	1,165,523	1,967,093	17,984	46,346	85,560	860,077	2,575	2,575	2,979,635
1996	1,143,638	1,371,186	2,514,824	12,091	16,556	252,346	1,005,148	3,907	3,907	3,804,872
1997	1,220,200	1,040,183	2,260,383	2,814	18,618	322,000	993,211	4,146	4,146	3,601,172
1998	865,795	860,724	1,726,519	9,982	10,306	127,405	872,738	2,108	2,108	2,749,058
1999	1,405,311	1,333,592	2,738,903	61,191	96,879	85,312	1,108,672	4,324	4,324	4,095,281
2000	1,949,922	1,222,485	3,172,407	170,302	138,483	353,584	1,085,886	4,096	4,096	4,924,758

**Table 9-10 SWP Water Delivered by Category, 1962–2015 (acre-feet)**

Year	Table A Water			Article 21/Unscheduled		Other SWP Water Deliveries			
	Municipal and Industrial	Agricultural	Total Table A <sup>a</sup>	Municipal and Industrial	Agricultural	Other Water <sup>b</sup>	Feather River Diversions <sup>c</sup>	Fish & Wildlife/ Recreation Water	Total Deliveries
2001	1,171,421	407,870	1,579,291	14,971	33,174	632,403	1,077,997	2,942	3,340,778
2002	1,918,094	716,578	2,634,672	15,478	27,637	311,976	1,131,880	3,712	4,125,355
2003	2,188,647	787,170	2,975,817	23,019	36,809	160,087	1,006,995	2,862	4,205,589
2004	2,001,278	643,509	2,644,787	103,890	114,606	403,542	1,171,835	2,887	4,441,547
2005	1,923,222	904,034	2,827,256	186,787	544,296	92,858	1,074,706	1,515	4,727,418
2006	1,973,662	999,687	2,973,349	293,358	327,981	143,774	1,094,944	3,628	4,837,034
2007	1,670,711	510,040	2,180,751	185,825	124,148	598,789	1,193,237	2,581	4,285,331
2008	1,024,147	224,012	1,248,159	2,729	0	769,517	1,087,669	2,778	3,110,852
2009	1,036,273	348,993	1,385,266	6,032	0	709,885	1,125,147	2,047	3,228,377
2010	1,503,908	506,764	2,010,672	7,158	347	790,602	978,172	1,167	3,788,118
2011	1,871,986	975,586	2,847,572	207,307	213,384	388,632	1,028,542	1,593	4,687,030
2012	1,879,350	714,349	2,593,699	0	0	367,609	1,047,832	1,609	4,010,749
2013	1,195,815	424,608	1,620,423	0	0	582,301	1,166,635	1,641	3,371,000
2014	406,314	69,719	476,033	1,444	0	697,050	839,792	677	2,014,996
2015	623,088	228,415	851,503	690	0	580,841	670,538	692	2,104,264
<b>Total</b>	<b>49,602,774</b>	<b>32,438,940</b>	<b>82,041,714</b>	<b>1,485,579</b>	<b>7,532,717</b>	<b>14,652,197</b>	<b>44,522,964</b>	<b>155,450</b>	<b>150,390,621</b>

<sup>a</sup> Includes Table A, Table A transfers, Table A exchanges, Carryover, and Pool Water.

<sup>b</sup> Includes water conveyed for SWP and non-SWP water contractors.

<sup>c</sup> Includes amounts of water diverted according to various water rights agreements.







## Chapter 10

# Power Resources

*Power lines near Victor Valley in the Mojave Desert.*

## Significant Events in 2015

Energy used at the 29 State Water Project (SWP) pumping and generating plants totaled 3.49 million megawatt hours (MWh). To meet SWP energy needs, the Department of Water Resources (DWR) purchased 2.59 million MWh of energy at a cost of \$81.33 million. This included: (1) 1.95 million MWh of WSPP short-term energy from four marketers (referred to as bilaterals) and two renewable-energy electric utilities at a combined cost of \$64.75 million; and (2) 0.64 million MWh of long-term energy at a cost of \$16.58 million. Additional energy-associated costs totaled \$117.87 million.

Pursuant to WSPP bilateral trades, transactions made under the Lodi Energy Center Power Sales Agreement, transactions under the California Independent System Operator (CAISO), and revenues from other long-term contracts, DWR received a total of \$83.35 million.

On November 5, 2015, DWR executed a power purchase agreement with sPower to provide solar power from the Solverde 1 Solar Facility, a solar photovoltaic renewable energy generation facility.

*Information for this chapter was provided by the State Water Project Analysis Office, the SWP Power and Risk Office, the Hydropower License Planning and Compliance Office, and the SWP Operations Control Office.*

Long-term State Water Project (SWP) water contractors depend on the SWP to obtain economical sources of power in order to deliver affordable water. Consequently, the Department of Water Resources (DWR) administers a comprehensive power resources program. Key elements of the program include studies of power resources for future needs, acquisition of long-term power resources and transmission services, short-term purchases or sales of power, and the strategic operation of generation and pumping facilities.

## Power Resources Program

The goals of the SWP power resources program are to:

- obtain reliable, environmentally sensitive, and competitively priced power resources and transmission services sufficient to operate the SWP;
- develop and manage power resources to minimize the cost of water deliveries to SWP water contractors;
- meet responsibilities and criteria of the Western Electricity Coordinating Council (WECC); and
- conform to regulations of the Federal Energy Regulatory Commission (FERC).

To achieve these goals, DWR constructed its own power facilities. Additionally, DWR enters into long-term contracts and short-term arrangements with other electric utilities and with the California Independent System Operator (CAISO) for transmission access and for power purchases and sales. DWR's generators and pumps provide a mix of regulation, spinning, and nonspinning reserves to the CAISO's ancillary services market. DWR's power resources program also takes advantage of SWP water storage and conveyance capacities, which cost-effectively control pump loads and generation.

## Major Electric Utility Industry Developments

In 2015, CAISO continued to address the impact of increasing renewable energy generation and the need for greater ramping capability to maintain grid reliability.

In April 2015, CAISO and PacifiCorp entered into a memorandum of understanding to explore the feasibility, costs, and benefits of PacifiCorp joining CAISO as a Participating Transmission Owner. In October 2015, the Governor signed Senate Bill 350, the Clean Energy and Pollution Reduction Act of 2015, which requires that the amount of electricity generated and sold to retail customers per year from eligible renewable energy resources be increased to 50 percent by 2030 and for CAISO to study the impacts of becoming a regional grid operator.

Throughout 2015, CAISO continued to work on governance of and enhancements to the Energy Imbalance Market (EIM), which allows other balancing area authorities to participate in CAISO's real-time market. The purpose of the EIM is to provide market efficiency by allowing other regions to share resources that are intended to be more economic. At the end of 2015, PacifiCorp, Puget Sound Energy, Arizona Public Service, and Portland General Electric had committed to CAISO EIM participation. The participation of these regional utilities with resources in California, Oregon, Washington, Utah, Wyoming, Idaho, Nevada, and Arizona



expanded the pool of generating resources bidding energy into the CAISO real-time market.

On April 29, 2015, FERC waived CAISO's requirement to reinstate convergence bidding at interties due to CAISO's findings related to potential market inefficiencies that could allow market gaming opportunities.

In June 2015, Peak Reliability completed its separation from WECC. Peak Reliability was formed as an independent company to perform the reliability coordinator services previously performed by WECC.

In July 2015, CAISO kicked off its stakeholder initiative on the Flexible Resource Adequacy Criteria and Must-Offer Obligation (Phase 2) as a continuation to the flexible capacity stakeholder process that was initiated in January 2012. Phase 2 is meant to enhance the Phase 1 processes, including flexible capacity from external resources through interties and from storage resources. It also kicked off its Reliability Services Initiative (Phase 2) to enhance resource adequacy provisions such as substitution of forced outages and Local Regulatory Authority interaction and process alignment.

In order to comply with the interregional planning requirements established by FERC Order 1000, the four planning regions—CAISO, ColumbiaGrid, Northern Tier Transmission Group, and WestConnect—agreed to hold at least one coordination meeting a year to inform stakeholders about each region's current planning activities and coordination efforts. During 2015, significant events included the completion of required regional planning processes by the four regional entities and ongoing dialog among the planning regions to develop a process for coordinating transmission planning information.

On October 23, 2015, CAISO released an issue paper to evaluate whether revisions

to its existing Transmission Access Charge rate structure are appropriate when adding a new large utility with a load service territory (e.g., PacifiCorp) to the CAISO's existing Balancing Authority Area, creating an expanded Balancing Authority Area footprint. This initiative's focus is on high-voltage transmission rate recovery only. The various alternatives presented in the issue paper are meant to initiate discussion of potential Transmission Access Charge structures for consideration as alternatives to the existing structure.

Also in 2015, CAISO, along with the California Energy Commission and California Public Utilities Commission, introduced the Renewable Energy Transmission Initiative 2.0 to facilitate electric transmission coordination and planning as the State looks to increase to a 50 percent renewable portfolio standard.

## DWR Participation in Electric Utility Industry Activities

DWR continued to participate in CAISO's stakeholder processes to help ensure that tariff and business practice manuals are compatible with SWP operations. DWR's participation in CAISO stakeholder processes focused on the following primary elements in 2015:

- Market Initiatives Roadmap;
- Stakeholder Initiatives Catalog;
- Intertie Convergence Bidding;
- 2-Tier Real-time Bid Cost Recovery;
- Energy Storage and Distributed Energy Resources, Phase 1;
- Grid Management Charge rate structure for 2016;
- Pay for Performance;
- Bidding Rules Enhancements FERC Order 809;
- Load Granularity Refinements;
- Barriers to demand response;
- FERC Order 764 compliance;

- Commitment Cost Enhancements, Phases 2 and 3;
- Pricing Enhancements;
- Flexible Ramping Product;
- EIM Enhancements;
- Generator Interconnection Process Enhancements;
- Reactive Power Requirements;
- Transmission planning;
- FERC Order 1000 compliance, Phase 2;
- Local capacity procurement for 2016 requirements;
- Annual Resource Adequacy processes including the Path 26 allocation, import allocation, and net qualifying capacity; and
- Flexible Capacity Procurement process for 2017—Capacity Procurement Mechanism tariff language.

In addition, DWR participated in the California Energy Commission's planning processes by submitting a demand forecast to the commission.

Besides CAISO and the California Energy Commission stakeholder processes, DWR participated in FERC proceedings to help ensure that various market requirements or cost allocation mechanisms were appropriately structured. This included the following major processes and litigations (with FERC docket numbers given in parenthesis, if applicable):

- CAISO's Multi-stage Generation enhancements (ER14-93, ER14-1004, ER15-1875);
- CAISO's Demand Response Report (ER06-615);
- CAISO's EIM (ER13-1372, ER14-1729, ER15-53, ER15-1196, ER15-1919);
- CAISO's Amendment to Participating Load Agreement (ER15-1805);
- CAISO's Two-tier Real-time Bid Cost Recovery (ER06-615);
- CAISO's Commitment Cost Enhancements (ER15-15);
- CAISO's Convergence Bidding at Interties (ER14-480, ER15-1451);
- CAISO's Order 1000 Compliance (ER13-1470);
- Pacific Gas & Electric Company's (PG&E) TO17 proposal to increase transmission revenue requirement rates for retail and wholesale customers of CAISO (ER15-2294);
- San Diego Gas & Electric's TO4—Cycle 3 proposal to increase transmission revenue requirement rates for retail and wholesale customers of CAISO (ER16-445);
- Southern California Edison's (SCE) fourth annual update to its approved formula rate (ER11-3697);
- SCE's proposed annual update to its Transmission Revenue Balancing Account (ER16-175) and Reliability Services tariff (ER16-174);
- San Diego Gas & Electric's proposed annual update to its Transmission Revenue Balancing Account Adjustment and Transmission Access Charge Balancing Account Adjustment (ER16-550);
- PG&E's proposed annual update to its Transmission Revenue Balancing Account (ER16-42);
- TransCanyon's initial transmission owner tariff, which includes a formula rate designed to calculate annual transmission revenue requirement (ER15-1682);
- NextEra Energy Transmission West's initial transmission owner tariff, which includes a formula rate designed to calculate annual transmission revenue requirement (ER15-2239); and
- PG&E's notice of termination of the Comprehensive Agreement between PG&E and the State of California Department of Water Resources State Water Project (Comprehensive Agreement) (ER15-223) and PG&E's filing of new load and generator interconnection agreements with DWR (ER15-227).



In April 2015, DWR submitted a motion to intervene in Cases No. 15-1057 and 15-1241 (consolidated) before the U.S. Court of Appeals for the District of Columbia Circuit, which were petitioned by the Transmission Agency of Northern California, Modesto Irrigation District, the City of Santa Clara, and the City of Redding. The petitioners are seeking to appeal FERC orders (EL14-44 and ER15-223) relating to a complaint versus PG&E, alleging a breach of PG&E's contractual obligations to them under the operating agreement for the California-Oregon Intertie resulting from the loss of DWR participation in PG&E's Pacific AC Intertie remedial action schemes with termination of the Comprehensive Agreement. Briefs will be due beginning in February 2016.

## Bulk Electric System Reliability Standards

### Background

The Energy Policy Act of 2005 assigned FERC the responsibility for bulk electric system reliability and required the creation of an Electric Reliability Organization. The North American Electric Reliability Corporation (NERC) was named the Electric Reliability Organization by FERC in July 2006 and was tasked with establishing reliability standards for the bulk electric system. Compliance with NERC reliability standards is mandatory.

WECC was named by NERC and approved by FERC as the regional entity responsible for enforcing a reliable bulk electric system in the Western Interconnection, which includes both western Canada and the western United States. WECC oversees implementation of standards and validation of compliance, including assessment of penalties and/or sanctions. Details of the NERC standards and the attributes of the compliance program appear in Bulletin 132-11.

## NERC Reliability Compliance—Internal Compliance Program Improvements

In March 2015, DWR executed a settlement agreement with WECC regarding possible violations of NERC's reliability standards. As a result of this settlement agreement, DWR improved its internal compliance program (ICP) to foster a culture of partnership with WECC by committing to:

- encourage communication and collaboration with WECC;
- provide all relevant information, as well as mitigating factors, when making self-reports to WECC if DWR discovers possible violations of NERC reliability standards;
- respond timely to WECC data requests, and promptly escalate unresolved issues to higher-level employees;
- ensure knowledgeable staff is readily available to respond to WECC by assigning properly trained owners to each applicable NERC standard and instituting advanced internal deadlines to reduce the need for extension requests.

Additionally, to ensure that DWR is adhering to NERC's reliability standards and DWR's own internal procedures, DWR modified existing policies and processes to incorporate annual internal spot-check/audits on 20 percent of applicable NERC reliability standards and on DWR's internal procedures that relate to compliance.

Pursuant to its ICP, DWR's Compliance and Regulatory Office conducted an internal audit of DWR's compliance to its nine existing ICP policies and associated processes and twelve NERC reliability standards, which is 20 percent of the standards applicable to DWR. DWR used the audit results to improve and strengthen the ICP.

In 2015, NERC implemented its Risk-Based Compliance Monitoring and Enforcement Program to replace its previous

zero-tolerance program. Under this new program, entities that have effective internal controls and low reliability risks may receive fewer audits from NERC and WECC, reduced audit scope, and reduced penalties for noncompliance.

NERC also continued to help the industry transition to Version 5 of the Critical Infrastructure Protection Reliability Standards (CIP Version 5) to further mitigate cyber risks to the bulk power system. In response, DWR developed its CIP Version 5 transition plan to ensure that DWR is in compliance by the implementation date.

In compliance with the requirements of the reliability standards, DWR also submitted its annual self-certification to WECC in February 2015. This was done to certify DWR's compliance with the requirements of a WECC-determined subset of standards or to provide a violation report supported by a mitigation plan to resolve outstanding items. Violations can lead to financial penalties or reduced operating flexibility.

In addition, NERC annually creates a 3-year plan to address reliability standards development and revision. DWR's Division of Operations and Maintenance monitors this plan to ensure compliance with standards as they change.

## Greenhouse Gas Management

In 2015, DWR reported its pump load, sulfur hexafluoride emissions, and generation for 2014 to the California Air Resources Board. DWR's sulfur hexafluoride emissions were below the maximum allowable limit; however, because the allowable limit will be lower in future years, DWR is developing plans to reduce its sulfur hexafluoride emissions. DWR also reported its greenhouse gas (GHG) emissions for 2014 to The Climate Registry and submitted its fossil fuel report for 2014 to the Governor's Office.

To meet its contractual obligation for the Lodi Energy Center's cap and trade compliance cost, DWR continued participating in allowance auctions conducted jointly by the California Air Resources Board and Québec's Ministry of Sustainable Development, Environment and the Fight against Climate Change.

## Hydropower License Planning and Compliance

DWR holds three hydropower licenses and two conduit exemptions issued by FERC: Oroville Facilities, FERC Project No. 2100; South SWP Hydropower, FERC Project No. 2426 (P-2426); Pine Flat Transmission Line, FERC Project No. 2876; Alamo Powerplant Project, FERC Project No. 14579; and Mojave Siphon Powerplant Project, FERC Project No. 14580. FERC licenses and conduit exemptions may contain terms and conditions related to operations, maintenance, engineering, dam safety, security, environmental and cultural resources, recreation, and public safety. FERC also conducts safety, security, and environmental inspections, and DWR is required to comply with all findings of the inspections. Compliance with FERC requirements is an important function of DWR organizations since FERC has the authority to levy fines for noncompliance. FERC also considers the record of compliance when considering the term of license renewals.

## Oroville Facilities Relicensing

On January 26, 2005, DWR filed an application with FERC requesting a new license for the Oroville Facilities. (More detailed information about the relicensing process is available in previous editions of Bulletin 132.) The existing 50-year license expired January 31, 2007; FERC is issuing annual licenses under the same terms and conditions as the expired license until the new license is issued. Issuance of the new

license has been delayed pending issuance of the National Marine Fisheries Service (NOAA Fisheries) biological opinion.

DWR certified the final environmental impact report on July 22, 2008. One month later, Butte and Plumas counties filed a lawsuit challenging the adequacy of the environmental impact report. The case was heard in January 2012, and the court ruled in DWR's favor. (More detailed information about the original lawsuit is available in previous editions of Bulletin 132). However, Butte and Plumas counties filed an appeal of the decision on August 6, 2012. Opening and responding briefs were filed on February 14, 2013, and June, 24, 2013, respectively. In addition, *State Water Contractors Inc., et al.* filed a respondent's brief on June 10, 2013, and Butte and Plumas counties filed an appellant's reply brief on July 31, 2013. In 2014 and 2015, the parties filed supplemental briefs in response to the court's request. A trial date to hear arguments has not yet been set.

The Habitat Expansion Agreement (HEA) submitted by DWR and PG&E to NOAA Fisheries for Central Valley salmon and steelhead in 2010 required preparation of a Habitat Expansion Plan (completed in 2010 with NOAA Fisheries consultation initiated in 2012) and annual reporting of activities undertaken to implement the HEA. On January 9, 2014, NOAA Fisheries provided DWR and PG&E with a letter explaining the bases for its determination that the measures contained in the Habitat Expansion Plan would not fulfill the fish enhancement goals of the HEA. On August 24, 2015, DWR submitted an annual report describing the activities of the previous 12 months toward implementing the HEA.

### **South SWP Hydropower**

In 2015, DWR initiated an extensive information gathering effort for the pre-application document for the FERC

relicensing of South SWP Hydropower. As a part of this effort, on July 8, 2015, DWR mailed a notice and a questionnaire to agencies and potential stakeholders who may have an interest in the relicensing process. The questionnaire solicited information pertaining to the existing environment and potential effects of continued operation and maintenance of the South SWP Hydropower facilities. This information will be included in the pre-application document. The pre-application document and notice of intent for relicensing are due to FERC by January 31, 2017.

On December 11, 2015, FERC issued an order approving DWR's request to permanently close Hardluck Campground and remove it as a requirement of the South SWP Hydropower license. Hardluck Campground has been closed to public use periodically since 2001, and to all camping use since 2008, to protect habitat for the Arroyo Toad (*Anaxyrus californicus*), which is listed as endangered under the federal Endangered Species Act. In the order, FERC also required DWR to file a demand analysis report by April 30, 2016, clearly specifying whether or not there is sufficient demand to replace Hardluck Campground with a similar camping facility.

## **Existing SWP Power Facilities**

Figure 10-1 shows the names, locations, and nameplate capacities of DWR's primary power facilities.

### **Hydroelectric**

Hydroelectric generation provides the largest share of SWP power resources. The combined Hyatt Pumping-Generating Plant and Robie Thermalito Pumping-Generating Plant (Hyatt-Thermalito) generate about 2.2 billion kilowatt hours (kWh) of energy in a median water year, while the 3 megawatts (MW) from the Thermalito Diversion Dam Powerplant adds another 24 million kWh per year.





**Figure 10-1 Names, Locations, and Nameplate Capacities of Primary Long-term Power Facilities**

Generation at California Aqueduct recovery plants—Alamo, Devil Canyon, Gianelli, Mojave Siphon, and Warne—varies with the amount of water conveyed. These five plants generate about one-sixth of the total energy used by the SWP.

### Renewables

Dominion's RE Camelot solar photovoltaic project near Mojave, California in southeastern Kern County began full commercial operation December 23, 2014, and began delivering renewable, GHG emission-free energy to the CAISO grid to meet a portion of the energy needs for operation of SWP pump loads. The facility's single-axis photovoltaic panels directionally track the sun's movement to maximize the panels' efficiency. The 45 MW plant is expected to deliver approximately 124,000 MWh of annual generation.

SunPower will design, build, operate, and maintain a 9.5 MW single-axis solar photovoltaic facility adjacent to the Pearblossom Pumping Plant. This solar facility is expected to begin commercial operation in December 2016. DWR will receive all of the energy and associated renewable credits from the facility. The plant is expected to deliver approximately 27,400 MWh of annual generation.

Solverde 1, a solar photovoltaic renewable energy generation facility, is expected to commence commercial operation on December 31, 2016. The 85 MW plant is expected to deliver approximately 230,000 MWh of annual generation.

### DWR Power Planning Activities

DWR does long-term power planning for the SWP through periodic development of an Integrated Resource Plan (IRP). The IRP concludes with plans for long-term and mid-term power procurements necessary to provide power to operate the SWP and ensure rate stability through energy market

disruptions. IRP 2013 will be succeeded by IRP 2016; development of the new IRP began in the fall of 2015. IRP 2016 will look at current and future SWP operational scenarios and the corresponding power portfolio needs and uncertainties. Findings and recommendations of previous plans will be updated based on current market developments and constraints.

DWR had completed a power planning study in 2011 of the economic viability of a second unit at the Alamo Powerplant, which would be a qualified renewable small hydroelectric facility. The project was shown to provide substantial energy and GHG reduction benefits to DWR. Following the power planning study, DWR initiated a design study in 2012 to determine whether a surge chamber would be required and to finalize the project cost estimates. A project implementation decision will be made following completion of the design and cost studies.

In May 2012, DWR's California Environmental Quality Act Climate Change Committee oversaw the completion of DWR's Climate Action Plan (CAP) Phase I: GHG Emissions Reduction Plan that established DWR's overall GHG emissions strategy. CAP Phase I assesses GHG emissions from on-going activities, sets goals for GHG reductions that will exceed State GHG mandates, and presents plans for how emissions reductions will be achieved. It memorialized the previously approved SWP Renewable Energy Procurement Plan, which had been completed in February 2010, as the method to achieve the SWP's CAP Phase I emission reduction goals. DWR initiated renewable energy procurements in late 2012 and 2013 in accordance with the CAP Phase I and Renewable Energy Procurement Plan.

In 2015, DWR procured GHG compliance instruments to meet its compliance and contractual obligations under the Cap



and Trade Program administered by the California Air Resources Board.

## Contractual Resource Arrangements

Through joint development, DWR obtains a significant amount of capacity and energy for SWP operations from other utilities throughout California and the Southwest. However, with the implementation of the CAISO Market Redesign and Technology Upgrade (MRTU) in April 2009, and implementation of CAISO's power markets that provide access to affordable day-ahead and real-time energy, DWR is less reliant on marketers and other utilities to meet its net energy needs.

### Joint Developments

In 1966, DWR entered into a contract with the Los Angeles Department of Water and Power (LADWP) for joint development of the West Branch of the California Aqueduct. LADWP constructed and operates Castaic Powerplant, which is a pumped-storage facility connected to the LADWP transmission system at the Sylmar Substation. DWR receives capacity and energy at the Sylmar Substation based on weekly water schedules through the West Branch.

Gianelli Pumping-Generating Plant is a joint-use facility owned and operated by DWR and the Bureau of Reclamation. DWR's share is 222 MW, and the Bureau of Reclamation's share is 202 MW.

### Long-term Purchase Agreements

In 1979, DWR entered into a contract with Kings River Conservation District to receive the output of the 165 MW hydroelectric Pine Flat Powerplant. The power plant supplies the SWP with about 400 million kWh of energy in median water years.

DWR also contracts for the energy output of five hydroelectric plants totaling 30 MW

owned and operated by The Metropolitan Water District of Southern California (Metropolitan).

In May 2010, DWR entered into an agreement with the Northern California Power Agency (NCPA) and various public agencies to finance, construct, operate, and maintain the Lodi Energy Center—a 280 MW natural gas combined cycle combustion turbine generation facility that NCPA would own and operate, and from which DWR would receive 33.5 percent of the output. The facility achieved its commercial operation date on November 27, 2012.

In an effort to add “green” generating resources to the SWP's energy portfolio, DWR entered into a renewable Power Purchase Agreement with Alameda Municipal Power that started in 2012. The contract provides certified renewable energy, with 28.3 MW from an existing geothermal project and 5.3 MW from landfill gas energy. Under this agreement, DWR receives an estimated 183,000 MWh of annual generation. The geothermal plants are owned and operated by NCPA and are located at The Geysers geothermal field in Middletown, California. The landfill gas energy under the new contract will come from the Republic Services Ox Mountain Landfill gas-to-energy plant in Half Moon Bay, California. The plant is owned and operated by a subsidiary of Ameresco, Inc. Landfill gas is created when organic waste decomposes, producing methane—the primary ingredient in natural gas and a GHG. The contract with Alameda Municipal Power helps DWR meet its goal of reducing emissions by 50 percent below 1990 levels by 2020. The agreement term is October 15, 2012, through December 31, 2016.

On March 13, 2014, DWR executed a consent and amendment agreement with RE Columbia and RE Camelot transferring the RE Columbia generation facility to RE Camelot. Under a 20-year power purchase

agreement through 2034, the 45 MW plant is expected to deliver approximately 124,000 MWh of annual generation.

On October 5, 2015, a 20-year power purchase agreement, with an optional 10-year extension, was executed between DWR and SunPower Corporation to provide solar photovoltaic renewable energy to the SWP. The solar facility will be located adjacent to the SWP Pearblossom pumping facility.

On November 5, 2015, DWR executed a 20-year power purchase agreement, through 2036, with Solverde 1 for solar photovoltaic renewable energy.

On December 16, 2015, DWR executed a WSPP agreement with Metropolitan for the purchase of 51.4 MW of capacity and renewable energy credits bundled with energy. The contract provides certified renewable energy from five small hydro plants, owned and operated by Metropolitan. Under this agreement, DWR will receive an estimated 54,574 MWh of annual energy and renewable energy credits. The agreement term is January 1, 2016, through December 31, 2020.

The renewable energy procured under these agreements will further increase the amount of renewable and zero GHG emission energy used by the SWP and will help DWR meet its 2020 GHG emission reduction goals.

### **Short-term Purchase Agreements**

DWR typically transacts with member utilities and energy marketers of the WSPP. In 2015, these transactions included energy and capacity to meet the requirements of resource adequacy, which is a planning and procurement process to ensure adequate resources.

In addition to transactions under the WSPP master agreement, DWR can purchase surplus energy from Metropolitan's Colorado

River Aqueduct system according to the terms of the 1988 coordination agreement between DWR and Metropolitan. This agreement also provides for monthly surplus firm and economy energy sales from DWR to Metropolitan and energy exchanges between DWR and Metropolitan.

### **Load Management**

DWR operates its pumps through an extensive computerized network. This control system, coupled with the operating flexibility of DWR's pumping and generating plants provided by storage reservoirs, allows DWR to maximize pumping during off-peak periods when power costs are lower—usually at night—and maximize power generation during on-peak periods when power costs are higher. By taking advantage of this scheduling flexibility, when not restricted by operating requirements, SWP pump load and generation are optimized to reduce the net cost of power needed for SWP water deliveries.

### **Demand Response**

DWR is the largest single supplier of demand response in the CAISO market via a participating load agreement under which DWR bids SWP load to be curtailed by CAISO when the price of energy in the CAISO market reaches DWR's bid price. Due to DWR's water delivery priority, these bids are normally restricted to contingency events.

### **Contractual Transmission Agreements**

DWR has contracts with CAISO, PG&E, and SCE for both transmission interconnections and network transmission service for SWP power resources and pumping loads.

The Comprehensive Agreement—a bilateral transmission agreement with PG&E, entered into in 1983, that covered transmission service, interconnection service, and other services—expired on December 31, 2014.

With the termination of the Comprehensive Agreement, all transmission service for DWR facilities in Northern and Central California transitioned to open-access transmission service under the CAISO tariff. For continuation of interconnection service, DWR entered into a successor load interconnection agreement, generation interconnection agreements, and transmission facilities agreements, effective January 1, 2015. The interconnection services for Pine Flat Powerplant are managed under a separate letter agreement with PG&E that does not expire until 2029. The letter agreement was revised, effective January 1, 2015, to remove references to the Comprehensive Agreement and other outdated provisions for consistency with current accepted practices. The DWR/PG&E Midway-Wheeler Ridge Transmission System agreement was revised in November 2015 to remove references to the Comprehensive Agreement and to reflect that transmission service is provided under CAISO.

With the termination of the Comprehensive Agreement on December 31, 2014, DWR's historic participation in PG&E's remedial action system, which allowed PG&E to shed DWR load under certain conditions, was also terminated. Under the new load interconnection agreement, DWR agreed to continue using the remedial action system equipment for an interim period at a limited group of facilities to provide load shed only in the event of a triple line outage of the California-Oregon Intertie 500 kV transmission lines. DWR load shed in this scenario supports the Southern Island Load Tripping plan and is in exchange for PG&E covering underfrequency load shedding requirements associated with SWP load under the WECC coordinated plan.

In Southern California, DWR receives transmission service for SWP loads and resources through CAISO, and DWR has interconnection agreements with SCE. Additionally, DWR has wholesale distribution

service agreements with SCE for service over SCE's distribution system from the CAISO interchange points to SWP loads and resources.

In 2015, DWR and SCE continued coordination on the engineering, design, and construction of the new interconnection facilities for Citrus Pump Station, located in San Bernardino County, which is expected to begin start-up in late 2016 and achieve commercial operation in early 2017. In addition, DWR and SCE entered into negotiations for a new distribution service agreement to cover Citrus Pump Station service over SCE's distribution network.

## SWP Power Operations in 2015

Tables 10-1 through 10-4, at the end of the chapter, present historical information about SWP power operations for calendar year 2015, including energy consumed, generated, purchased, and sold. Note that in some instances, these tables may not sum as expected due to rounding.

### Energy Consumed

In 2015, energy used for SWP operations at the 29 SWP pumping and generating plants totaled 3.49 million MWh. According to the terms and conditions of various water conveyance contracts and exchange agreements, some water belonging to the Central Valley Project is pumped through Banks and Dos Amigos pumping plants and Gianelli Pumping-Generating Plant. The Bureau of Reclamation furnishes additional energy for this purpose.

Table 10-1 shows the amount of energy used each month at SWP pumping and power generating plants to operate the SWP in 2015.

## Energy Generated and Purchased

Table 10-2 shows the amounts of energy generated at SWP facilities in 2015, as well as energy purchased for SWP operations.

### Hydroelectric and Natural Gas

The Hyatt-Thermalito power complex in Oroville generated 589,395 MWh of energy in 2015.

Energy generated at SWP aqueduct recovery plants—Gianelli, Alamo, Mojave Siphon, Devil Canyon, and Warne—totaled 685,311 MWh.

The SWP received generation from the Lodi Energy Center. SWP's 33.5 percent share of the Lodi Energy Center's energy output for 2015 was 566,888 MWh.

## Contractual Resource Arrangements in 2015

SWP power operations rely on contractual arrangements as well as SWP facilities. These contractual arrangements include joint development projects and energy purchases.

### Joint Developments

Through the *West Branch Cooperative Development Agreement* with LADWP, DWR receives energy based on the amount of water scheduled through the West Branch. In 2015, LADWP provided 424,024 MWh for DWR's share of energy generated at Castaic Powerplant.

DWR's share of Gianelli Pumping-Generating Plant used 156,027 MWh and generated 115,210 MWh of energy in 2015.

### Purchases and Costs

Table 10-3 shows the amounts of energy, transmission, and other services purchased in 2015. Amounts include contractual short-term and long-term energy trades and associated transactions of energy,

transmission, capacity, and ancillary services with CAISO, and miscellaneous energy-related costs.

DWR transacted 2.59 million MWh of energy at a cost of \$81.33 million. Other SWP-related costs include \$4.98 million for transmission service outside CAISO and \$112.90 million for operation, maintenance, and miscellaneous CAISO charges, among other things. Key costs associated with the latter amount are (1) \$4.35 million for debt service and \$3.84 million for operations and maintenance, both related to Pine Flat Powerplant; (2) \$9.42 million for debt service and \$7.93 million for capital improvement, management, operations, and maintenance, all connected to the Lodi Energy Center Project. The \$4.98 million for transmission service outside CAISO includes \$0.42 million for PG&E; \$2.72 million for SCE; and a total of \$1.84 million related to LADWP and NCPA.

**Long-term Purchase Agreements.** According to terms of the Kings River Conservation District contract, DWR receives the total output of the 165 MW Pine Flat Powerplant. In 2015, the power plant provided 20,951 MWh of energy to the SWP at an energy component cost of \$159,227.

Under the Metropolitan Small Hydro contract, DWR purchased 56,452 MWh of energy in 2015 from three small hydroelectric power plants on the Metropolitan system at a cost of \$3.23 million.

Also, under the Lodi Energy Center Power Sales Agreement with NCPA, DWR received a purchase credit of \$21.31 million based on 566,888 MWh generated at the Lodi Energy Center plant during 2015 and conveyed to the CAISO power grid. This amount is shown in Table 10-4.

Lastly, under renewable energy long-term contracts with Alameda Municipal Power



and RE Camelot, LLC, DWR received a total of 310,544 MWh at a cost of \$13.11 million.

### **Short-term Energy Purchase Agreements.**

Existing resources and long-term power and transmission contracts ensure that the SWP has enough power to meet long-term needs.

When SWP power requirements exceed resources during daily operations, short-term purchases make up the difference. In 2015, the SWP purchased 1.64 million MWh of short-term energy under the WSPP agreement from four WSPP marketers at a cost of \$51.64 million. These purchases are reflected in Table 10-3.

### **Contractual Sales of Excess Power**

In 2015, DWR received \$83.35 million in energy revenues. This includes (1) \$46.33 million connected to bilateral trades and \$14.90 million for ancillary service transactions, both made through CAISO; (2) \$11,563 in short-term sales; and (3) \$22.10 million associated with long-term contracts. This third item includes, among other things, \$21.31 million related to the Lodi Energy Center Power Sales Agreement with NCPA. It also includes \$134,221 for CAISO pass-through costs collected from the U.S. Department of Energy, Western Area Power Administration, in accordance with a contract executed June 27, 2012, with DWR for CAISO scheduling coordinator services. Under the terms of this contract, DWR acts as a scheduling coordinator for the joint-use facilities of the San Luis Unit and certain DWR pumping facilities occasionally used to pump federal water. See Table 10-4 for information about energy and other services sold and revenue received.

## **Forecasting Power Operations**

Each year, after reviewing the SWP water contractors' water delivery requests and the construction schedule for future facilities,

DWR forecasts the associated energy consumption and generation through 2035. Short-term power requirements, based on actual water supply and reservoir storage levels, are determined for the current and two ensuing years of operation. Long-term operational studies for the remaining years are based on median-year water supply conditions and optimal reservoir storage levels. The forecast also includes losses in reservoirs and aqueducts, recreation water, and water to replace storage in reservoirs south of the Delta.

Actual SWP power requirements may vary significantly from the forecast amounts. Those variations are due to the amount of water available and delivered in a given year. For example, dry conditions in Northern California could result in a reduction in the amount of water available for delivery and for generation. If full deliveries could not be made, less power would be used. Power requirements could also decrease during a wet year because of the availability of local water in the San Joaquin Valley or Southern California.

Conversely, power requirements could exceed the amount originally forecast if actual water deliveries are greater than the amounts estimated. For example, if additional pumping is needed to refill reservoirs south of the Delta after an unexpectedly dry year, more power would be used.

**Table 10-1 Energy Used at Pumping Plants and Power Plants in 2015, by Month (megawatt-hours)**

Pumping Plants and Power Plants	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Hyatt-Thermalito Power Complex (station service)	0	2	0	1	1	0	0	0	7	1	4	3	19
North Bay Interim Pumping Plant	0	0	0	0	0	0	0	0	0	0	0	0	0
Cordelia Pumping Plant	557	658	476	832	1,022	1,131	1,063	930	892	809	856	477	9,703
Barker Slough Pumping Plant	211	277	295	613	655	609	590	816	769	783	613	218	6,448
South Bay Pumping Plant	5,021	4,370	5,384	10,276	9,468	10,129	11,990	9,352	8,026	8,508	5,088	4,427	92,040
Del Valle Pumping Plant	13	12	13	358	11	6	6	8	8	6	12	14	466
Banks Pumping Plant	67,278	62,038	20,462	8,825	6,878	5,344	5,148	11,999	12,672	4,610	11,583	21,898	238,736
Gianelli Pumping-Generating Plant (SWP share)	64,313	56,311	15,397	154	75	113	0	1,254	1,373	1,018	3,913	12,106	156,027
Dos Amigos Pumping Plant (SWP share)	2,430	2,851	6,587	10,279	16,298	18,058	16,480	14,833	9,953	4,562	4,446	6,249	113,025
Buena Vista Pumping Plant	7,621	6,231	15,944	20,309	21,729	18,363	20,830	17,557	13,434	8,863	15,187	19,941	186,010
Teerink Pumping Plant	11,595	9,140	18,162	21,936	22,471	17,433	21,169	18,337	14,325	10,084	19,443	25,417	209,511
Chrisman Pumping Plant	25,216	20,529	40,627	48,356	49,354	37,416	46,646	40,476	31,839	22,490	43,178	57,135	463,260
Edmonston Pumping Plant	91,921	73,110	147,984	170,375	172,799	129,098	162,107	138,994	112,720	79,246	155,691	209,056	1,643,101
Alamo Powerplant (station service)	0	5	21	12	27	33	27	22	29	51	25	10	263
Pearblossom Pumping Plant	7,988	12,449	20,585	18,547	13,170	9,900	11,491	13,588	11,544	3,406	15,075	26,322	164,065
Pine Flat Powerplant (station service) <sup>a</sup>	0	0	0	0	0	0	0	0	0	0	0	0	0
Mojave Siphon Powerplant (station service)	64	42	28	36	47	63	56	50	48	83	42	13	571
Devil Canyon Powerplant (station service)	320	200	27	93	69	116	96	10	30	139	49	3	1,151
Oso Pumping Plant	7,656	3,653	8,830	12,605	15,261	11,068	14,360	10,394	8,092	7,996	12,464	14,200	126,580
Warne Powerplant (station service)	454	333	377	143	102	213	145	431	444	231	292	174	3,338
Las Perillas Pumping Plant	183	311	462	649	1,088	1,291	1,500	1,291	587	311	34	100	7,808
Badger Hill Pumping Plant	463	799	1,193	1,702	2,733	3,143	3,657	3,138	1,462	800	70	243	19,403
Devil's Den Pumping Plant	807	825	1,331	1,291	1,239	1,146	1,099	846	767	855	115	481	10,800
Bluestone Pumping Plant	755	771	1,239	1,204	1,154	1,059	1,023	793	716	799	103	450	10,064
Polonio Pass Pumping Plant	819	832	1,340	1,306	1,257	1,159	1,117	859	779	870	99	486	10,923
Greenspot Pump Station	61	54	161	711	710	752	692	672	762	607	661	731	6,573
Crafton Hills Pump Station	23	18	147	959	931	942	871	859	919	712	864	967	8,211
Cherry Valley Pump Station	10	9	11	44	46	41	33	41	42	23	23	38	361
<b>Total Energy Required for the SWP<sup>b</sup></b>	<b>295,781</b>	<b>255,828</b>	<b>307,081</b>	<b>331,615</b>	<b>338,593</b>	<b>268,625</b>	<b>322,197</b>	<b>287,549</b>	<b>232,239</b>	<b>157,863</b>	<b>289,930</b>	<b>401,156</b>	<b>3,488,457</b>

<sup>a</sup> Pine Flat station service energy provided by CAISO under MRTU operation.<sup>b</sup> Totals may not sum as expected due to rounding.

**Table 10-2 Energy Generated and Purchased in 2015, by Month (megawatt-hours)**

Sources of Energy	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
<b>SWP Energy Sources</b>													
Hyatt-Thermalito Power Complex	13,484	18,462	28,638	42,712	128,601	112,477	138,838	56,546	3,285	10,702	15,216	20,433	589,395
Gianelli Pumping-Generating Plant (SWP share)	0	140	4,997	12,868	22,571	24,813	22,998	12,190	3,952	4,283	1,522	4,875	115,210
Alamo Powerplant	0	0	2,841	3,221	2,303	1,918	1,813	2,266	2,196	444	2,668	4,145	23,814
Mojave Siphon Powerplant	595	1,006	2,077	1,980	1,151	822	1,038	1,209	871	133	1,559	2,875	15,316
Devil Canyon Powerplant	11,234	22,183	38,545	28,338	19,953	15,441	18,048	20,395	19,535	13,235	24,514	35,589	267,009
Warne Powerplant	15,635	6,352	19,155	26,795	31,194	23,833	30,597	20,364	16,289	17,314	25,775	30,658	263,962
<i>Subtotal</i>	<i>40,949</i>	<i>48,142</i>	<i>96,253</i>	<i>115,914</i>	<i>205,773</i>	<i>179,304</i>	<i>213,332</i>	<i>112,970</i>	<i>46,127</i>	<i>46,112</i>	<i>71,254</i>	<i>98,575</i>	<i>1,274,706</i>
<b>Energy Sources from Long-term Agreements</b>													
Castaic Powerplant	24,578	10,577	31,398	44,164	51,865	33,277	50,201	33,729	26,004	26,051	41,787	50,392	424,024
Metropolitan Small Hydro Generation	3,392	5,566	7,497	4,958	3,360	3,685	2,845	2,899	2,072	3,030	7,840	9,306	56,452
Pine Flat Powerplant (Kings River Conservation District)	0	0	0	0	0	5,106	14,332	1,513	0	0	0	0	20,951
Energy to Metropolitan for CRA <sup>a</sup> Pumping	0	0	0	0	0	0	0	0	0	0	0	0	0
Energy from Metropolitan for CRA <sup>a</sup>	0	0	0	0	0	0	0	0	0	0	0	0	0
Lodi Energy Center	65,666	50,786	61,809	60,716	30,507	47,662	34,800	45,984	44,089	55,521	25,202	44,146	566,888
<b>Purchases</b>													
Purchases (Firm and WSPP Contracts)	161,110	142,560	166,314	155,997	176,954	158,103	168,796	168,398	161,316	157,389	167,033	161,974	1,945,944
CAISO Energy <sup>b</sup>	65,752	48,982	5,620	10,581	(99,359)	(110,851)	(127,311)	(31,960)	(3,280)	(74,720)	2,015	80,910	(233,619)
<i>Subtotal</i>	<i>320,498</i>	<i>258,472</i>	<i>272,638</i>	<i>276,416</i>	<i>163,327</i>	<i>136,983</i>	<i>143,664</i>	<i>220,563</i>	<i>230,201</i>	<i>167,272</i>	<i>243,878</i>	<i>346,727</i>	<i>2,780,640</i>
Total Resources	361,447	306,614	368,890	392,331	369,100	316,287	356,997	333,533	276,328	213,384	315,132	445,302	4,055,346
Less Energy Sales <sup>c</sup>	(65,666)	(50,786)	(61,809)	(60,716)	(30,507)	(47,662)	(34,800)	(45,984)	(44,089)	(55,521)	(25,202)	(44,146)	(566,888)
<b>Total Energy Provided to the SWP<sup>a</sup></b>	<b>295,781</b>	<b>255,828</b>	<b>307,081</b>	<b>331,615</b>	<b>338,593</b>	<b>268,625</b>	<b>322,197</b>	<b>287,549</b>	<b>232,239</b>	<b>157,863</b>	<b>289,930</b>	<b>401,156</b>	<b>3,488,457</b>

<sup>a</sup> Contractual Resource Arrangement.

<sup>b</sup> Energy provided by CAISO for balancing the total SWP loads and resources.

<sup>c</sup> Received under the Lodi Energy Center Power Sales Agreement as a purchase credit.

<sup>d</sup> Totals may not sum as expected due to rounding.

**Table 10-3 Energy, Transmission, and Related Costs in 2015**

Category	Energy Trades (MWh)	Energy Cost (in dollars)	Transmission Cost Outside CAISO (in dollars)	Other Energy- Related Costs (in dollars)	Total Cost (in dollars)
CAISO–Bilateral Trades		76			76
CAISO–Other <sup>a</sup>				87,158,894	87,158,894
Energy Marketers–Bilaterals (WSPP)	1,635,400	51,641,839		178,750	51,820,589
Long-term Contracts <sup>b</sup>	644,289 <sup>c</sup>	16,581,104	4,975,682	25,560,816	47,117,603
Renewable Energy <sup>d</sup>	310,544	13,111,691			13,111,691
<b>Total</b>	<b>2,590,233</b>	<b>81,334,710</b>	<b>4,975,682</b>	<b>112,898,460</b>	<b>199,208,853</b>

<sup>a</sup> Transmission, capacity, imbalance energy, etc.

<sup>b</sup> California Power Exchange, Kings River Conservation District, Los Angeles Department of Water and Power, The Metropolitan Water District of Southern California, NV Energy, Northern California Power Agency, Pacific Gas & Electric Company, and Southern California Edison.

<sup>c</sup> Includes 566,888 MWh generated at the Lodi Energy Center.

<sup>d</sup> Alameda Municipal Power and RE Camelot LLC.

**Table 10-4 Energy and Energy-related Revenue in 2015 per Contract Agreements**

Category	Energy (MWh)	Energy Revenues (in dollars)	Other Energy-related Revenue (in dollars)	Total Sales (in dollars)
CAISO–Bilateral Trades		46,332,363		46,332,363
CAISO–Other <sup>a</sup>			14,901,675	14,901,675
Energy Marketers–Bilaterals (WSPP)			11,563	11,563
Long-term Contracts <sup>b</sup>	566,888	21,311,419	789,368	22,100,787
<b>Total</b>	<b>566,888</b>	<b>67,643,782</b>	<b>15,702,606</b>	<b>83,346,388</b>

<sup>a</sup> Transmission, capacity, imbalance energy, etc.

<sup>b</sup> Los Angeles Department of Water and Power, Northern California Power Agency, Western Area Power Administration, and the City of Santa Clara.





## Chapter 11

# Facilities Maintenance

*Many features along the California Aqueduct were inspected in 2015.*

## Significant Events in 2015

Potential Failure Mode Analyses (PFMAs) were conducted for Bidwell Bar Canyon Saddle, Parish Camp Saddle, Thermalito Diversion, Thermalito Forebay, and Thermalito Afterbay dams in January.

Sisk and O'Neill dams had Comprehensive Facility Review (CFR) inspections by the Bureau of Reclamation (Reclamation) in March 2015.

At the Castaic Dam outlet works, valves on the high intake tower were refurbished.

Reclamation inspected the spillway and intake structures at Little Panoche Detention Dam.

In June, Thermalito Afterbay Outlet Gate No. 3 was returned to service.

Oroville Dam Flood Control Outlet Gates No. 7 and No. 8 seal refurbishment was completed. This completed the refurbishment effort for all eight flood control outlet gates.

Hyatt Penstock No. 1 was dewatered and inspected.

*Information for this chapter was provided by the Division of Operations and Maintenance, the Division of Safety of Dams, the Division of Integrated Regional Water Management, and the State Water Project Analysis Office.*

The Department of Water Resources (DWR), through the Division of Operations and Maintenance (O&M), monitors all State Water Project (SWP) facilities to ensure safety and reliability. DWR is required, by federal and State law, to contract periodically with independent consultants to review the safety of SWP dams and power facilities.

## Inspecting and Maintaining Project Dams

DWR conducts several types of inspections on SWP facilities to ensure that each dam is safe for continued operation. The Dam Safety Branch (DSB), Division of Safety of Dams (DSOD), Federal Energy Regulatory Commission (FERC), and the Bureau of Reclamation conduct various inspections and safety analyses to ensure the safety of SWP dams.

O&M staff, through the DSB and field divisions, inspect, collect, and analyze data for all SWP dams and appurtenant structures. DSB also conducts performance and instrumentation analyses and prepares annual reports that are distributed to the field divisions for scheduling and maintenance. The reports are also sent to FERC and to DSOD for their review.

In accordance with Division 3 of the California Water Code, DSOD has regulatory authority over dams owned and operated by DWR.

DSOD is responsible for overseeing all design modifications and construction activities on jurisdictional SWP dams. In accordance with the California Code of Regulations (Title 23, Division 2, Chapter 1, Article 5), DSOD participates in the Director's Safety Review Board (DSRB) events and presents their findings to the DSRB.

Additionally, DSOD engineers inspect SWP dams annually, on a fiscal year basis, to ensure they remain safe, are performing as intended, and are not developing problems. These annual inspections also include

in-depth instrumentation review of dam surveillance data. DSOD engineers and geologists evaluate proposed modifications to existing dams, as well as designs for any proposed new jurisdictional dams. DSOD also oversees construction activities to ensure work is performed in accordance with approved plans and specifications.

FERC inspects all FERC-licensed SWP facilities annually. These inspections include a review of significant events, instrumentation data, and the visual appearance of each dam, penstock, or power plant. Under FERC's requirements, consulting engineers and geologists are retained to evaluate SWP dam facilities every 5 years.

DWR contracts periodically with independent consultants to review the safety of SWP dams and power facilities, except for Pearblossom Spill Basin. Pearblossom Spill Basin Dam was originally designed to be used during misoperation at the Pearblossom Pumping Plant; the spill basin was never fully completed and has never been used.

## Routine Inspections

During 2015, DSOD along with O&M staff conducted routine periodic inspections for all of the dams in the SWP. These inspections included Antelope, Frenchman, Grizzly Valley, Oroville, Bidwell Canyon Saddle, Parish Camp Saddle, Thermalito Diversion, Thermalito Forebay, Thermalito Afterbay, and Feather River Fish Barrier dams in the Oroville Field Division; Bethany, Clifton Court Forebay, Del Valle, Dyer, and Patterson dams in the Delta Field Division; and Castaic, Crafton Hills, Crafton Hills Reservoir Enlargement, Pyramid, Quail, Cedar Springs,



Devil Canyon Second Afterbay, and Perris dams in the Southern Field Division. Table 11-1 shows SWP dam inspections conducted in 2015.

## Joint-use Facility Inspection

The four dams in the San Luis Field Division (Sisk Dam, O'Neill Dam, Los Banos Detention Dam, and Little Panoche Detention Dam) are used jointly with the Bureau of Reclamation (Reclamation) and are not under DSOD jurisdiction.

Every 6 years, Reclamation conducts a Comprehensive Facility Review (CFR) of these joint-use facility dams. The CFRs for Sisk Dam, O'Neill Dam, Los Banos Detention Dam, and Little Panoche Detention Dam occurred in 2015.

Periodic Facility Reviews (PFRs) are also conducted by Reclamation every 6 years using an alternate schedule spaced between the CFRs. PFRs were conducted for the joint-use facilities in 2012. A joint annual inspection of the facilities with Reclamation, DSB, and San Luis Field Division was conducted in March 2015.

## Independent Reviews

### *Director's Safety Review Board*

Under California Water Code, Section 6056, DWR is required to retain a consulting board to review: (1) the adequacy of the design of any dam or reservoir DWR proposes to construct; and (2) the safety of the completed construction, including the terms and conditions for the Certificate of Approval. In accordance with this California Water Code requirement, DWR formed the DSRB.

The DSRB is a board of three independent consultants that meet at least once every 5 years to review the operational performance of DWR-owned dams and more frequently when consulting on new

dams. The DSRB independently reviews and assesses safety conditions of SWP dams.

DSRB consultants are selected based on their knowledge of geotechnical, structural, and civil engineering, including their experience evaluating dam performance. Their independent assessments include the review of dam performance during earthquakes, evaluation of instrumentation data, inspection of each dam, and evaluation of studies performed by DWR. The DSRB then prepares reports on each dam, approving dams as safe for continued operation and making recommendations. Based on DSRB recommendations, DWR prepares action plans. No DSRB inspections occurred on the SWP in 2015.

## FERC Reviews

FERC conducts dam safety inspections in conjunction with O&M on an annual basis for SWP dams under its jurisdiction. Every 5 years, a FERC Part 12D inspection is also conducted. The last Part 12D inspections occurred in 2014. SWP dams under FERC jurisdiction are reviewed under FERC-defined northern section, Project 2100 (P-2100) and southern section, Project 2426 (P-2426). P-2100 consists of dams associated with Oroville Field Division facilities, and P-2426 dams are associated with Pyramid, Quail, Cedar Springs, and Devil Canyon Second Afterbay facilities.

As a supplement to the FERC Part 12D safety inspection, FERC's Dam Safety Performance Monitoring Program requires that a Potential Failure Mode Analysis (PFMA) be performed for FERC-licensed dams. The PFMA involves document review and site visits to develop a comprehensive list of potential failure modes at each dam. From the FERC review process, two documents are generated: the FERC Part 12D Safety Inspection Report and the PFMA Report. FERC-licensed facilities are also inspected annually by DSB and FERC's Dam Safety engineer.



**Table 11-1 State Water Project Dam Inspections in 2015**

		Type of Inspection						
		Operations & Maintenance-Dam Safety Branch	Division of Safety of Dams	Federal Energy Regulatory Commission	Bureau of Reclamation Annual Inspection	Bureau of Reclamation 6-Year Comprehensive Facility Review	Director's Safety Review Board	Part 12D 5-Year Review
Field Division	Facility							
Oroville								
	Antelope Dam	X	X	-	-		-	-
	Frenchman Dam	X	X	-	-		-	-
	Grizzly Valley Dam	X	X	-	-		-	-
	Oroville Dam	X	X	X	-		-	-
	Bidwell Canyon Saddle Dam	X	X	X	-		-	-
	Parish Camp Saddle Dam	X	X	X	-		-	-
	Thermalito Diversion Dam	X	X	X	-		-	-
	Thermalito Forebay Dam	X	X	X	-		-	-
	Thermalito Afterbay Dam	X	X	X	-		-	-
	Feather River Fish Barrier Dam	X	X	X	-		-	-
Delta								
	Bethany Dams	X	X	-	-		-	-
	Clifton Court Forebay Dam	X	X	-	-		-	-
	Del Valle Dam	X	X	-	-		-	-
	Dyer Reservoir	X	X	-	-		-	-
	Patterson Dam	X	X	-	-		-	-
San Luis								
	Little Panoche Detention Dam	X	-	-	X	X	-	-
	Los Banos Detention Dam	X	-	-	X	X	-	-
	O'Neill Forebay Dam	X	-	-	X	X	-	-
	Sisk Dam	X	-	-	X	X	-	-
Southern								
	West Branch							
	Castaic Dam	X	X	-	-		-	-
	Pyramid Dam	X	X	X	-		-	-
	Quail Canal and Dam	X	-	X	-		-	-
	East Branch							
	Cedar Springs Dam	X	X	X	-		-	-
	Devil Canyon Second Afterbay Dam	X	X	X	-		-	-
	Perris Dam	X	X	-	-		-	-
	Crafton Hills Dam	X	X	-	-		-	-
	Crafton Hills Reservoir Enlargement Dam	X	X	-	-		-	-

## Supporting Technical Information

The Supporting Technical Information Document is a separate report that summarizes SWP project elements and details that do not change significantly over time. The document is updated as required but is not generated as part of any of the dam safety inspections.

## Arroyo Pasajero Program

The Arroyo Pasajero and its tributaries drain approximately 530 square miles of the Diablo Range of the coastal mountains west of the California Aqueduct in Fresno County. Its downstream juncture with the San Luis Canal segment of the California Aqueduct, between Highway 198 and Avenal Cutoff Road, poses a particularly difficult operational and maintenance problem for the SWP. Reclamation designed and constructed the San Luis Canal segment of the California Aqueduct, while DWR operates and maintains it, with all costs shared 45 percent and 55 percent, respectively.

During periods of heavy rainfall, high flows in the Arroyo Pasajero and its tributaries transport heavy sediment loads eroded from the Arroyo Pasajero watershed. Over a vast amount of time, sediment transported by arroyo floods formed a 450-square-mile alluvial fan extending from its apex at the eastern margin of Pleasant Valley (Anticline Ridge) to the San Joaquin Valley trough. The California Aqueduct traverses the arroyo's alluvial fan and forms a barrier to arroyo flood flows. Flood control facilities, designed to accommodate Arroyo Pasajero floodwater, include the West Side Detention Basin (designed to store floodwater and sediment west of the California Aqueduct), an evacuation culvert to release floodwater east of the California Aqueduct, and drain inlets to release floodwater into the California Aqueduct.

Since the floods of 1969, when nearly all of the detention basin's planned 50-year sediment storage capacity was filled by deposition, DWR and Reclamation have worked to mitigate the effects of heavy flooding and the diminished storage capacity of the detention basin. In 1980, asbestos discovered in The Metropolitan Water District of Southern California's water supply was traced to runoff from the Arroyo Pasajero and other Diablo Range streams. This discovery, in conjunction with the high cost of removing sediment from the California Aqueduct, led DWR to adjust operating procedures to minimize runoff entering the California Aqueduct. The volume of runoff and sediment transported by the Arroyo Pasajero is roughly 400 percent greater than was originally estimated during the design of the detention basin in the mid-1960s.

## DWR and DWR/Reclamation Alternative Long-term Solution

Construction to restore the storage capacity of the West Side Detention Basin started in August 2004, and many of the designed improvements were completed by the summer of 2005. These improvements restored the storage capacity to the detention basin and added control over releases of floodwater into the California Aqueduct and onto private farmland. The intended 50-year level of protection was achieved by raising levees, adding a control structure equipped with an inflatable rubber dam, installing flood gates, and acquiring flood easements. As of 2015, the basin's flood control features continued to function as expected.

Rating curve updates for the three aqueduct flood water inlet control structures (the evacuation culvert, flood gates, and rubber dam) were completed. Near the end of the year, construction was initiated on staff gages to allow field crews to better estimate aqueduct inflows.

In 2009, DWR signed the certificate of acceptance for the deeds for easements and lands acquired via litigation. The deeds were recorded, and the process to transfer the rights to Reclamation, as required by the joint-use agreement, was initiated. Work to address the transfer documents continued in 2015.

The West Side Detention Basin is an area of interest in the U.S. Environmental Protection Agency (EPA) Atlas Mine Area Operable Unit Record of Decision issued by the EPA in 1991. Five-year reviews of the Atlas Mine Area Operable Unit began in 2001 and have continued every 5 years since. In fall 2010, as a part of the upcoming 2011 review cycle, DWR toured the basin with representatives from the EPA and inspected all of the basin flood control features as well as soil berms, gates, locks, and signs used to deter soil disturbing activities. The EPA released its Five-Year Review Report in August 2011. The report contained various recommendations for DWR to take into consideration while operating the basin. As of 2015, DWR continued its standard operating procedures within the basin to comply with the EPA's Comprehensive Environmental Response Compensation and Liability Act (Superfund law).

## Related Activities

In September 2011, the California Department of Transportation (Caltrans) informed DWR that it had funding through final design on the proposed bridge project at Lassen Avenue (State Route 269) over Arroyo Pasajero. DWR provided comments on the current project study report in October 2011, which focused on flood control and the ongoing operations and maintenance needs of DWR's field division staff to properly maintain the channel. Throughout 2015, Caltrans continued to advance the California Environmental Quality Act/National Environmental Policy Act process and design of the project.

## Cantua Creek Stream Group

Planning for a restoration project similar to the West Side Detention Basin restoration project began in 2006 for the Cantua Creek Stream Group detention basins. The project goal is to improve aqueduct flood protection and water quality between Mileposts 128.48 and 141.57.

A feasibility-level study for the Cantua Creek Stream Group Improvements Project, completed in April 2011, identified actions such as raising embankments, making modifications to structures, and acquiring flood easements to provide a 50-year level of protection for the California Aqueduct. Improving water quality in the aqueduct was a significant goal of the study, since currently, several of the existing drain inlets are not gated, and sediment-laden floodwater flows directly into the aqueduct with little detention and decanting. Increasing flood storage and detention of this floodwater prior to releasing it into the California Aqueduct would provide a significant benefit to water quality in the aqueduct.

In 2015, environmental and real estate processes continued to move forward, which resulted in minor changes to the design plans. The project is planned for construction in the late summer and fall of 2016.

Rating curve updates for four aqueduct flood water inlet control structures (Cantua Creek drain inlet at Harlan Avenue, Cantua Creek flume near Mt. Whitney Avenue, Salt Creek weir near Mt. Whitney Avenue, and the Salt Creek drain inlet at Laguna Avenue) were updated. Near the end of 2015, construction began on a series of staff gauges that would allow field crews to better estimate aqueduct inflows.

## Repairs, Modifications, and Inspections

DWR continually monitors all SWP facilities and performs repairs, modifications, and inspections as necessary to ensure safe, reliable water delivery.

### Inspections

Condition Assessment Program inspections are scheduled annually, biennially, or every 5 years. Future inspections will aim to identify trends in maintenance and aging of the SWP.

In 2015, Condition Assessment Program inspections were performed on 31 different reaches of the SWP along more than 258 miles of canals. To aid in maintenance efforts, check structures, control buildings, compound grounds, roads, culverts, drain inlets, overchutes, turn-ins, turnouts, and utility crossings along the canal were inspected and rated.

#### *Oroville Field Division*

In the Oroville Field Division, four features along 2 miles of the Thermalito Power Canal were inspected.

Refurbishment efforts continued at Thermalito Powerplant from the damage that occurred during a fire in November 2012.

In June 2015, Thermalito Afterbay Outlet Gate No. 3 was returned to service.

#### *Delta Field Division*

In the Delta Field Division, features along 54 miles of the California Aqueduct were inspected. One hundred eighty-one California Aqueduct features were inspected, spanning 5 repayment reaches and 15 aqueduct pools.

The installation of the Clifton Court Forebay intake structure radial Gate No. 2 telemetry equipment was completed on

February 19, 2015. The special condition placed on operation of the gate on July 31, 2014, was removed.

#### *San Luis Field Division*

In the San Luis Field Division, features along 60 miles of the California Aqueduct were inspected. Two hundred thirty-three California Aqueduct features were inspected, spanning 3 repayment reaches and 6 aqueduct pools.

#### *San Joaquin Field Division*

In the San Joaquin Field Division, features along 44 miles of the California Aqueduct were inspected. One hundred thirty-two California Aqueduct features were inspected, spanning 5 repayment reaches and 11 aqueduct pools.

#### *Southern Field Division*

In the Southern Field Division, features along 98 miles of the West and East branches of the California Aqueduct were inspected, including Gorman Creek, Beartrap Road culverts in Tejon Ranch, and gauging stations for Castaic Lake inflow. Four hundred twelve California Aqueduct features were inspected, spanning 18 repayment reaches and 34 aqueduct pools.

At the Castaic Dam outlet works, valves on the high intake tower were refurbished. The refurbishment took place from April through August, 2015, and involved the top seven of the nine tiers of valves in the high intake tower. The refurbishment work occurred while the water surface elevation at Castaic Lake was low due to the drought. The water surface elevation reached approximately 100 feet below the normal operating level.

Perris Dam's emergency bulkhead bolts were exercised in the presence of DSOD. The Perris Dam seismic remediation of dam embankment project (Specification No. 14-03) began in September 2014 and continued in 2015.



This work was implemented to upgrade the seismic safety of Perris Dam. The outlet tower and penstock are on a 10-year inspection cycle.

## Other Inspections

In addition to the conveyance facilities, 65 bridges, along with 89 roofs of SWP buildings, were inspected as part of a regularly scheduled maintenance program. SWP access roads are routinely inspected by staff in each field division as they traverse the hundreds of miles of paved and unpaved roadways daily. Staff reports of distressed and problematic areas result in road repair projects.

## Outages for Maintenance and Repair of Facilities

Table 11-2 presents information, arranged chronologically, about significant scheduled and unscheduled outages at SWP pumping and power plants in 2015. The table includes information about incidents resulting in outages of 14 days or more.

**Table 11-2 Outages for Maintenance and Repair of Facilities in 2015, by Month**

1 of 6

Month	Facility	Unit	Outage Description
January	Banks Pumping Plant	5	January 1 to February 4 for lower guide bearing inspection and repair; continued from December 3, 2014
	Banks Pumping Plant	11	January 21 to March 1 for loss of synchronization
	Barker Slough Pumping Plant	7	January 1 to December 31 for excessive vibration
	Cordelia Pumping Plant	3	January 1 to June 16 for motor pump refurbishment
	South Bay Pumping Plant	3	January 1 to December 31 for motor pump coupling and alignment
	South Bay Pumping Plant	6	January 1 to December 31 for vibration testing and balancing; continued from June 2, 2014
	South Bay Pumping Plant	7	January 1 to December 31 for excessive vibration
	South Bay Pumping Plant	10	January 1 to March 27 for cooling water failure
	Hyatt Powerplant	1	January 1 to July 14 for river valve operation due to water temperature requirements
	Hyatt Powerplant	2	January 1 to February 26 for river valve operation due to water temperature requirements
	Robie Thermalito Pumping-Generating Plant	1	January 1 to December 31 for fire damage; continued from November 22, 2012
	Robie Thermalito Pumping-Generating Plant	2	January 1 to December 31 for fire damage; continued from November 22, 2012
	Robie Thermalito Pumping-Generating Plant	3	January 1 to December 31 for fire damage; continued from November 22, 2012
	Robie Thermalito Pumping-Generating Plant	4	January 1 to December 31 for fire damage; continued from November 22, 2012
	Alamo Powerplant	1	January 1 to March 5 for Condition Assessment Program inspection, current transformer replacement, and relay upgrade; continued from October 13, 2014
	Oso Pumping Plant	3	January 1 to December 31 to refurbish, overhaul, and rewind discharge valve; continued from December 4, 2013
	Oso Pumping Plant	4	January 1 to December 31 to refurbish, overhaul, and rewind, discharge valve; continued from December 4, 2013
	Pearblossom Pumping Plant	1	January 5 to February 6 for annual Condition Assessment Program inspection
	Buena Vista Pumping Plant	6	January 2 to May 6 for stator rewind, motor refurbishment, and discharge valve repairs
	Edmonston Pumping Plant	2	January 2 to April 3 for discharge valve repairs
	Edmonston Pumping Plant	4	January 2 to April 3 for discharge valve repairs
	Edmonston Pumping Plant	6	January 2 to April 3 for discharge valve repairs

**Table 11-2 Outages for Maintenance and Repair of Facilities in 2015, by Month**

2 of 6

Month	Facility	Unit	Outage Description
February	Edmonston Pumping Plant	8	January 2 to April 3 for discharge valve repairs
	Edmonston Pumping Plant	10	January 2 to April 3 for discharge valve repairs
	Edmonston Pumping Plant	12	January 2 to April 3 for discharge valve repairs
	Edmonston Pumping Plant	14	January 2 to April 3 for discharge valve repairs
	Dos Amigos Pumping Plant	1	January 1 to February 6 for field breaker replacement; continued from June 21, 2014
	Giannelli Pumping-Generating Plant	1	January 1 to June 18 for generator refurbishment; continued from September 13, 2012
	Giannelli Pumping-Generating Plant	2	January 1 to June 9 for butterfly valve installation; continued from October 24, 2014
	Pine Flat Powerplant	1	January 1 to February 28 for annual maintenance
	Pine Flat Powerplant	2	January 1 to February 28 for annual maintenance
	Pine Flat Powerplant	3	January 1 to February 28 for annual maintenance
	Barker Slough Pumping Plant	1	February 16 to March 20 because of an incomplete start
	South Bay Pumping Plant	5	February 12 to March 30 to repair bearing cooling water leak
	Hyatt Powerplant	3	February 23 to April 6 for transmission line #2 protective line relay replacement
	Hyatt Powerplant	4	February 23 to March 30 for transmission line #2 protective line relay replacement
	Hyatt Powerplant	5	February 26 to March 14 for penstock #2 runner inspection
	Hyatt Powerplant	6	February 26 to March 14 for penstock #2 runner inspection
	Badger Hill Pumping Plant	1	February 13 to April 25 for discharge line #1 recoat and flow meter installation
	Badger Hill Pumping Plant	2	February 13 to April 25 for discharge line #1 recoat and flow meter installation
	Badger Hill Pumping Plant	3	February 13 to April 25 for discharge line #1 recoat and flow meter installation
	Badger Hill Pumping Plant	4	February 13 to April 25 for discharge line #1 recoat and flow meter installation
March	Dos Amigos Pumping Plant	3	February 9 to February 24 for Condition Assessment Program inspection and exciter preventative maintenance
	Banks Pumping Plant	9	March 2 to July 23 for Condition Assessment Program inspection and preventative maintenance
	Hyatt Powerplant	2	March 17 to April 4 for penstock #1 for Unit 3 runner inspection and repair

**Table 11-2 Outages for Maintenance and Repair of Facilities in 2015, by Month**

3 of 6

Month	Facility	Unit	Outage Description
April	Chrisman Pumping Plant	8	March 19 to April 9 brakes failed to release
	Teerink Pumping Plant	8	March 2 to March 23 for replacement of motor bus
	Dos Amigos Pumping Plant	2	March 9 to November 13 for discharge line inspection
	Giannelli Pumping-Generating Plant	3	March 3 to March 23 for scroll case inspection
	Giannelli Pumping-Generating Plant	3	March 23 to May 7 for excessive noise in turbine pit and loss of nose cone
	Banks Pumping Plant	8	April 30 to May 17 for upstream seat position indicator oil leak
	Hyatt Powerplant	5	April 6 to May 19 for Oroville-Thermalito transmission line #3 protective line relay replacement
	Hyatt Powerplant	6	April 6 to May 15 for Oroville-Thermalito transmission line #3 protective line relay replacement
	Mojave Siphon Powerplant	3	April 13 to May 1 for annual Condition Assessment Program inspection
	Barker Slough Pumping Plant	6	May 21 to June 19 for ground fault
May	Mojave Siphon Powerplant	2	May 7 to May 27 for annual Condition Assessment Program inspection
	Oso Pumping Plant	5	May 29 to July 14 discharge valve failed to open
	Giannelli Pumping-Generating Plant	3	May 7 to December 31 for penstock #2 out of service
	Giannelli Pumping-Generating Plant	4	May 7 to August 25 for penstock #2 out of service
	Devil Canyon Powerplant	2	June 8 to October 1 for annual Condition Assessment Program inspection and relay replacement
June	Mojave Siphon Powerplant	1	June 1 to June 19 for annual Condition Assessment Program inspection
	Oso Pumping Plant	6	June 29 to July 14 for discharge valve refurbishment
	Badger Hill Pumping Plant	6	June 10 to October 6 for valve malfunction
	Chrisman Pumping Plant	4	June 8 to October 20 for Condition Assessment Program inspection and suction elbow inspection
	Chrisman Pumping Plant	7	June 1 to July 7 for Condition Assessment Program inspection, motor brake repair, and replacement of backfill piping
	Pine Flat Powerplant	1	June 2 to June 17 for penstock #1 work
	Pine Flat Powerplant	2	June 2 to June 17 for penstock #1 work
	Banks Pumping Plant	1	July 27 to August 11 for relay and instrumentation calibration
July	Banks Pumping Plant	5	July 24 to August 20 for motor pole replacement



**Table 11-2 Outages for Maintenance and Repair of Facilities in 2015, by Month**

4 of 6

Month	Facility	Unit	Outage Description
August	Cordelia Pumping Plant	3	July 21 to August 5 for excessive vibration
	Cordelia Pumping Plant	4	July 20 to August 6 for excessive vibration
	Buena Vista Pumping Plant	7	July 22 to August 21 for KYB transformer problem
	Buena Vista Pumping Plant	8	July 22 to August 10 for KYB transformer problem
	Buena Vista Pumping Plant	9	July 22 to August 10 for KYB transformer problem
	Buena Vista Pumping Plant	10	July 22 to August 10 for KYB transformer problem
	Chrisman Pumping Plant	5	July 8 to October 10 for Condition Assessment Program inspection and discharge line #2 dewatering
	Teerink Pumping Plant	3	July 13 to August 8 for KYA transformer secondary bus links removal
	Teerink Pumping Plant	4	July 13 to August 8 for KYA transformer secondary bus links removal
	Banks Pumping Plant	10	August 3 to September 5 for Condition Assessment Program inspection, preventative maintenance, and Doble testing
	South Bay Pumping Plant	13	August 27 to September 11 for excitation trouble
	Hyatt Powerplant	1	August 14 to December 31 for river valve operation due to water temperature requirements
	Hyatt Powerplant	2	August 14 to December 31 for river valve operation due to water temperature requirements
	Hyatt Powerplant	4	August 31 to December 31 for low lake level
	Hyatt Powerplant	6	August 24 to December 31 for low lake level
	Crafton Hills Pump Station	3	August 14 to September 12 breaker 146 tripped
	Pearblossom Pumping Plant	7	August 9 to September 11 discharge valve failed to open
	Chrisman Pumping Plant	1	August 16 to October 20 for 64F field ground trip
	Chrisman Pumping Plant	3	August 18 to September 10 for pump packing box excessive leakage
	Teerink Pumping Plant	6	August 17 to September 21 for discharge valve compressor and hydraulic system work
September	Pine Flat Powerplant	1	August 13 to December 31 for lack of water
	Pine Flat Powerplant	2	August 13 to December 31 for lack of water
	Pine Flat Powerplant	3	August 13 to December 31 for lack of water
	Giannelli Pumping-Generating Plant	5	September 2 to September 19 for exciter preventative maintenance and K5A transformer replacement
	Giannelli Pumping-Generating Plant	6	September 2 to September 19 for exciter preventative maintenance and K5A transformer replacement

**Table 11-2 Outages for Maintenance and Repair of Facilities in 2015, by Month**

5 of 6

Month	Facility	Unit	Outage Description
October	Devil Canyon Powerplant	1	October 5 to October 23 for penstock #1 drain and pipe inspection
	Devil Canyon Powerplant	2	October 5 to October 22 for penstock #1 drain and pipe inspection
	Devil Canyon Powerplant	3	October 26 to November 20 for annual Condition Assessment Program inspection and governor and cooling water system preventative maintenance
	Badger Hill Pumping Plant	1	October 30 to November 19 for annual coastal outage
	Badger Hill Pumping Plant	2	October 30 to November 19 for annual coastal outage
	Badger Hill Pumping Plant	3	October 30 to November 19 for annual coastal outage
	Badger Hill Pumping Plant	4	October 30 to December 3 for annual coastal outage
	Badger Hill Pumping Plant	5	October 30 to November 19 for annual coastal outage
	Badger Hill Pumping Plant	6	October 30 to November 19 for annual coastal outage
	Bluestone Pumping Plant	1	October 31 to November 22 for annual coastal outage
	Bluestone Pumping Plant	2	October 31 to November 22 for annual coastal outage
	Bluestone Pumping Plant	3	October 31 to November 22 for annual coastal outage
	Bluestone Pumping Plant	4	October 31 to November 22 for annual coastal outage
	Bluestone Pumping Plant	5	October 31 to November 21 for annual coastal outage
	Bluestone Pumping Plant	6	October 31 to November 21 for annual coastal outage
	Devils Den Pumping Plant	1	October 31 to November 21 for annual coastal outage
	Devils Den Pumping Plant	2	October 31 to November 21 for annual coastal outage
	Devils Den Pumping Plant	3	October 31 to November 21 for annual coastal outage
	Devils Den Pumping Plant	4	October 31 to November 21 for annual coastal outage
	Devils Den Pumping Plant	5	October 31 to November 20 for annual coastal outage
	Devils Den Pumping Plant	6	October 31 to November 21 for annual coastal outage
	Las Perillas Pumping Plant	1	October 30 to November 19 for annual coastal outage
	Las Perillas Pumping Plant	2	October 30 to November 19 for annual coastal outage
	Las Perillas Pumping Plant	3	October 30 to November 19 for annual coastal outage
	Las Perillas Pumping Plant	4	October 30 to November 19 for annual coastal outage
	Las Perillas Pumping Plant	5	October 30 to November 19 for annual coastal outage
	Las Perillas Pumping Plant	6	October 30 to November 19 for annual coastal outage
	Polonio Pass Pumping Plant	1	October 31 to November 22 for annual coastal outage
	Polonio Pass Pumping Plant	2	October 31 to November 22 for annual coastal outage

**Table 11-2 Outages for Maintenance and Repair of Facilities in 2015, by Month**

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Month	Facility	Unit	Outage Description
November	Polonio Pass Pumping Plant	3	October 31 to November 22 for annual coastal outage
	Polonio Pass Pumping Plant	4	October 31 to November 22 for annual coastal outage
	Polonio Pass Pumping Plant	5	October 31 to November 24 for annual coastal outage
	Polonio Pass Pumping Plant	6	October 31 to November 22 for annual coastal outage
	Teerink Pumping Plant	1	October 12 to November 4 to investigate and repair KYA transformer oil leak
	Teerink Pumping Plant	2	October 12 to October 28 to investigate and repair KYA transformer oil leak
	Teerink Pumping Plant	3	October 12 to October 27 to investigate and repair KYA transformer oil leak
	Teerink Pumping Plant	9	October 19 to November 5 to repair suction drain valve
	Banks Pumping Plant	2	November 20 to December 11 for overvoltage relay trip
	Banks Pumping Plant	3	November 16 to December 16 for 59x neutral overvoltage 86m motor lock out
	Banks Pumping Plant	6	November 9 to November 24 for relay and instrumentation calibration
	Banks Pumping Plant	10	November 30 to December 15 for headworks gate #5 control and power feed refurbishment
	Banks Pumping Plant	11	November 30 to December 15 for headworks gate #5 control and power feed refurbishment
	South Bay Pumping Plant	12	November 17 to December 7 for incomplete start sequence
	Hyatt Powerplant	3	November 16 to December 12 for runner band drain leak
	Devil Canyon Powerplant	4	November 30 to December 22 for annual Condition Assessment Program inspection
	Teerink Pumping Plant	7	November 9 to November 24 to replace pump packing and equalize vent lines
	Dos Amigos Pumping Plant	5	November 17 to December 29 to replace vane control oil
December	Pearblossom Pumping Plant	6	December 14 to December 31 for hydraulic oil loss
	Pearblossom Pumping Plant	7	December 14 to December 31 for head cover bolt failure
	Badger Hill Pumping Plant	3	December 2 to December 31 for shaft seal leak







## Chapter 12

# Engineering, Construction, and Real Estate

*Cement deep soil mixing at Perris Dam.*

## Significant Events in 2015

In 2015, engineering, construction, and real estate continued to work to enhance, expand, repair, and protect the State Water Project (SWP) and other facilities within the State. Significant projects included Perris Dam remediation, the East Branch Extension Phase I improvements and Phase II projects, Clifton Court Forebay radial gate repairs, the emergency drought barrier project, and the seismic retrofit of 23 bridges in the San Luis, San Joaquin, and Southern field divisions.

*Information for this chapter was provided by the Division of Engineering.*

Initial construction of the State Water Project (SWP) facilities began in 1957 with the relocation of the Western Pacific Railroad facilities and Highway 70 near the City of Oroville to accommodate the SWP Oroville Facilities. Oroville Dam was constructed between 1961 and 1967. Construction of the South Bay Aqueduct (SBA) facilities started in 1960, and the first SWP water was delivered through the SBA in 1962 to serve Alameda County.

In 1963, work began on the California Aqueduct, and by 1968, the SWP was delivering water to long-term SWP water contractors in the San Joaquin Valley. By 1973, with the completion of Edmonston Pumping Plant at the foot of the Tehachapi Mountains and other East Branch conveyance facilities, the SWP was delivering water to Lake Perris at the southernmost point in Riverside County.

Other water deliveries took place as follows:

- 1968—the first SWP water was delivered through the first phase facilities of the North Bay Aqueduct and through the first phase facilities of the Coastal Branch;
- 1974—the first SWP water was delivered through the West Branch facilities to Los Angeles County;
- 1988—SWP water was delivered through the second phase facilities of the North Bay Aqueduct to Solano County; and
- 1997—SWP water was delivered through the second phase facilities of the Coastal Branch Aqueduct to San Luis Obispo and Santa Barbara counties.

Prior to the completion of the initial facilities in 1973, work began on the Upper Feather River facilities to supply local water, recreation, and fish enhancement. Power plants, additional pumping units, and turbine-generators that had previously been deferred were built to ensure water quality and fish enhancement in the Delta.

From 1974 through 2015, design and construction activities included repairing concrete lining failures or potential failures of the canal system and concrete pipeline sections, replacing equipment components of existing facilities, enlarging or extending aqueduct reaches, refurbishing pump-turbine units, and adding pumps and motors to existing facilities. Specific projects included constructing the Devil Canyon Second Afterbay, constructing Phase II of the Coastal Branch, extending the SWP through the East Branch Extension to the San Geronio Pass service area in San Bernardino and Riverside counties with enlargements and expansions in later years, SBA enlargement, Perris Dam seismic remediation, and activities related to habitat restoration and water conveyance options in the Delta.

## Design Activities

In 2015, work to enhance, expand, repair, and protect SWP water delivery facilities continued. Engineering activities supported more efficient water deliveries within the confines of legal and environmental constraints and power availability. Significant projects included the Sisk Dam seismic reevaluation, North Bay Aqueduct alternate intake study, and Perris Dam emergency release facility design. Table 12-1 (at the end of the chapter) provides a list of completed and ongoing design work that was undertaken in 2015.

The Department of Water Resources' (DWR), Division of Engineering (DOE) continued



to design projects for development into the construction phase, including awarding construction contracts. DOE worked with many DWR divisions and offices, as well as local, State, and federal agencies. DOE prepared preliminary designs and estimates; developed and administered construction contract documents and carried out construction projects; and conducted special studies of dams, canal embankments, and other SWP facilities.

Study and design activities continued from previous reporting periods, or initiated in 2015, included the following:

- Oroville, Thermalito Afterbay, and Thermalito Forebay dams radial gate nondestructive examination of tendons—study;
- Lake Oroville reservoir rim inspection—study;
- Oroville Field Division roofing replacement—design;
- Thermalito Afterbay Dam, well replacement, phase II—design;
- Hyatt Powerplant, Thermalito Diversion Dam Powerplant, and Oroville Operations and Maintenance Center fire systems modernization—design;
- North Bay Aqueduct alternate intake—study;
- Clifton Court Forebay Dam stratigraphic model of foundation—study;
- Delta Field Division—Byron Road Bridge replacement—design;
- Delta Field Division embankment and liner repair (Milepost 62)—design;
- Sisk Dam seismic reevaluation—study;
- San Joaquin Field Division bridge hinge retrofits—design;
- Castaic Dam left abutment analysis—study;
- Castaic Dam tower nonlinear structural analysis—study; and
- Perris Dam emergency release facility—design and environmental documents.

In 2015, DOE staff completed the following projects:

- Oroville, Thermalito, and Pyramid dams radial gate structural reevaluation—design;
- Bidwell Canyon stage III boat ramp extension—design;
- Oroville Dam river outlet modification—design;
- Oroville Dam radial gates seal replacement—design;
- Oroville Field Division roofing replacement—design;
- Oroville Field Division fire systems modernization—design review;
- Hyatt and Thermalito power plants fire detection system—design;
- Thermalito Powerplant bypass gate reliability—design;
- Montezuma Slough Control Facility roofing replacement—design;
- Sherman and Twitchell islands new fish screens at existing siphons at 5 sites—final design;
- Del Valle Dam right abutment fault, phase 2 investigation—study;
- Delta Field Division canal repairs (Reaches 1 and 2A)—design;
- San Luis Field Division canal liner and embankment repair—design;
- Devil's Den, Bluestone, and Polonio Pass pumping plants insulated flange repair and vault construction—design;
- Los Robles Bridge—seismic analysis;
- East Branch Enlargement, Phase II—preliminary design and environmental documents; and
- Mojave Division replacement of standby emergency generators—design.

## California WaterFix

In 2008, the Delta Habitat Conservation and Conveyance Program was established to conduct activities related to assessing

potential habitat restoration and water conveyance options in the Delta for the Bay/Delta Conservation Plan. On April 30, 2015, State and federal agencies announced a new sub-alternative, Alternative 4A, to replace Alternative 4 (the proposed Bay Delta Conservation Plan) as the State's proposed project. Alternative 4A reflects the State's proposal to separate the conveyance facility and habitat restoration measures into two separate efforts: California WaterFix (Alternative 4A) and California EcoRestore.

In 2015, activities related to California WaterFix included the following:

- completing the phase 1 of system impact studies for Pacific Gas & Electric Company, Sacramento Municipal Utility District, and Western Area Power Administration regarding potential impacts to their systems to provide transmission service to the California Waterfix project;
- preparing a conceptual engineering report for the Dual Conveyance Facility Modified/Pipeline/Tunnel Option—Clifton Court Forebay Pumping Plant;
- completing initial draft design phase studies for the Clifton Court Pumping Plant;
- completing transmission system modeling for Western Area Power Administration for system impact study purposes;
- completing a draft agreement and exhibits to establish the Design and Construction Enterprise to support collaboration in the design and construction of California WaterFix; and
- completing phase 2 of system impact study for Sacramento Municipal Utility District.

More information can be found in Chapter 3, Environmental Programs, or on the California WaterFix and California EcoRestore websites.

## Construction Activities

DWR divides the California Aqueduct into the following construction divisions: North San Joaquin, San Luis, South San Joaquin, Tehachapi, Mojave, and Santa Ana divisions of the so-called “main line,” and the West and Coastal branches.

DOE worked on 65 construction contracts in various SWP construction divisions in 2015. Projects included pipeline repair, control system upgrades, fire systems modernization, equipment refurbishments and upgrades, seismic upgrades of bridges, maintenance facility improvements at dam and reservoir sites, and the addition of new pumping units and a reservoir. Table 12-2 (at the end of the chapter) provides a list of completed and ongoing construction contracts undertaken in 2015. Resolution of contract claims may extend the actual contract closeout beyond the completion or acceptance date.

Since the inception of the SWP, environmental issues have increased in magnitude with the enactment of numerous federal and State laws. DWR has complied with these laws by seeking appropriate permits, preparing environmental compliance documents, and incorporating environmental requirements and conditions into the design and execution of construction projects. Environmental scientists work with design engineers to produce projects that meet SWP objectives while having the least impact possible on the environment.

Construction contract specifications and plans are reviewed and modified with the environmental compliance requirements and sensitive resource protection needs in mind. Ongoing construction activities are monitored to ensure compliance with requirements outlined in environmental permits for each contract.



## **SWP—General**

### ***SWP Supervisory Control and Data Acquisition System***

A contract (Specification No. 08-12) to replace portions of the aging SWP supervisory control and data acquisition system began in May 2009. This contract furnishes and installs 176 controller assemblies for the replacement of remote terminal units located throughout the SWP and furnishes 16 controller assemblies for Devil Canyon Powerplant and DWR's development lab at the Joint Operations Center. The controller assemblies were built from components furnished by the contractor (programmable logic controllers, sequence-of-event recorders, fiber patch panels, modems, and other equipment). Work was completed in October 2015. Acceptance is expected in July 2016.

### ***California Aqueduct Copper Communications Cable and Voice and Data Equipment***

Work began on approximately 450 miles of California Aqueduct copper communications cable and voice data equipment monitoring, testing, and repair in March 2014 (Specification No. 13-17). The project includes providing monitoring, testing, leak detection, and routine and nonroutine cable repairs. Work is scheduled to be completed in March 2016. Acceptance is expected in May 2016.

## **Oroville Division**

### ***Robie Thermalito Pumping-Generating Plant***

Initial cleanup of the Robie Thermalito Pumping-Generating Plant (Specification No. 13-16) began in October 2013. The work involves cleaning and repairing all fire-impacted equipment; installing new roll-up doors; procedure testing essential systems; and installing a new heating, ventilation, and air-conditioning system. Work also includes

repairing spalled concrete, the roof, and skylights; cleaning electrical components in the switchyard; and other cleanup as deemed necessary by the engineer. Work is scheduled to be completed in May 2016. Acceptance is expected in July 2016.

### ***Bidwell Bar Bridge***

The Bidwell Bar Bridge access road repair (Specification No. 14-10) began in September 2014. Work included reinforcing embankment material. Work was completed in January 2015 and accepted in November 2015.

### ***Oroville Dam River Outlet Diversion Tunnel No. 2***

Baffle ring installation work (Specification No. 15-11) began in December 2015. This project includes furnishing and installing two water-filled tunnel plugs, providing support work for fixed cone valve replacement, and installing 12 DWR-furnished baffle ring segments at the Oroville Dam River Outlet Diversion Tunnel No. 2. Work is scheduled to be completed in April 2016. Acceptance is expected in June 2016.

### ***Bidwell Canyon Boat Ramp***

The stage III boat ramp extension (Specification No. 15-13) began in December 2015. Work includes a concrete paved boat ramp, earthwork, compacted backfill, reinforced concrete, rock slope protection, erosion control, and drill and bond dowels. Work is scheduled to be completed in January 2016. Acceptance is expected in May 2016.

### ***Hyatt Powerplant Fire System Modernization Project***

The goals of the fire system modernization project are to increase safety and property protection, while reducing business interruptions and environmental impacts. The project to furnish and install the new

fire detection and evacuation system project (Specification No. 15-06) began in October 2015.

Work includes:

- upgrading transformer, generator, high voltage tunnel, and Area Control Center communication room fire suppression systems;
- replacing Hyatt's oil purification/storage room and high voltage cable oil room carbon dioxide suppression system with a high pressure water mist system;
- installing water sprinkler and clean agent suppression at specific locations within Hyatt and the Area Control Center to meet probable maximum loss criteria;
- providing modifications within the plant and the dam core block that allow a safe outlet for staff during an emergency event and providing additional communications systems throughout the plant; and
- networking all fire detection and suppression systems at all facilities to remote workstations capable of monitoring and controlling the new and existing systems.

DWR assisted the contractor with the design work and are assisting the contractor during the construction phase of the project. Work is scheduled to be completed in June 2017. Acceptance is expected in July 2017.

### ***Hyatt Powerplant Diversion Tunnel No. 2***

Emergency repairs (Specification No. 14-07) began in March 2014 involving furnishing, installing, and commissioning video surveillance and telecommunications equipment; refurbishing the existing hydraulic system; and furnishing, installing, and commissioning new hydraulic system components for actuation.

Additional work included:

- furnishing and installing hydraulics and electronic controls to allow backup operation of the 72-inch spherical valve plug from Elevation 252 inside the Hyatt Powerplant;
- furnishing and installing an emergency actuation system for the 72-inch spherical valves;
- removing two 54-inch fixed cone valves for refurbishment and reinstalling them; and
- constructing other appurtenances and hydraulic structures as required.

Work was completed in July 2014 and accepted in September 2015.

### ***Feather River Fish Hatchery***

Repair of the raw water supply pipeline (Specification No. 14-01) began in April 2014. Work included removing and providing surface preparation of the delaminated lining area inside the existing 60-inch diameter steel pipe. Surface preparation and removal and replacement of mortar at various pipe joints was also completed for a 54-inch reinforced concrete pipe.

Additional work included:

- removing existing pipe access structures and concrete slabs;
- removing and salvaging existing combination air release valves, stand pipes, and valves;
- constructing two new manholes and concrete encasements;
- installing two new pipe access structures with hatch covers, ladders, and extension safety posts; and
- removing and replacing manhole lid gratings.

The work was completed in September 2014 and accepted in February 2015.

### **Feather River Spawning Gravel Supplementation**

A project (Specification No. 14-04) to enhance fish habitat began in May 2014 and consisted of three parts:

- (1) importing 13,300 cubic yards of gravel and stockpiling it adjacent to the fish hatchery;
- (2) clearing, grading, shaping, and maintaining an earth access ramp from the stockpile location down to the Feather River; and
- (3) constructing an access road in the river channel and placing 8,300 cubic yards of the stockpiled gravel in the river channel to construct riffles, berms, and channels.

This work was completed in September 2014 and accepted in February 2015.

### **South Bay Aqueduct**

#### ***SBA Enlargement and Improvement***

The SBA Enlargement and Improvement projects restored the first 16.38 miles of the SBA to the 300 cubic feet per second (cfs) design flow and increased the design capacity by up to 130 cfs. This work enlarged the South Bay Pumping Plant to accommodate four additional 45 cfs units, constructed a third discharge line, constructed Dyer Reservoir, enlarged the canal, and modified associated structures. Projects are described below.

**Canal Modifications.** Various modifications were performed along Dyer Canal, Livermore Canal, Alameda Canal, and Del Valle Pipeline under a contract that began in October 2010 (Specification No. 09-16). Work included raising the canal lining, canal embankment, and operating roads; removing, modifying, installing, and constructing various structures, including overchutes, inlets, pipes, bridges, trash racks, siphons, check structures, water-

level measurement systems, radial gates, motors, control systems, flowmeters, and valves; and raising/refurbishing Patterson Reservoir. Work was completed in June 2015. Acceptance is expected in February 2016.

**South Bay Pumping Plant.** The following contracts for the SBA Enlargement project at South Bay Pumping Plant continued throughout 2015.

Specification No. 04-05: furnishing 45 cfs pump and motor units for Unit Nos. 10 through 13 and one spare pump and motor. Work began in November 2004. In February 2015, DWR and the contractor agreed to terms for closing out the contract. Acceptance is expected in January 2016.

Specification No. 04-20: furnishing valves, actuators, and hydraulic power units. Work began in May 2005. The equipment was furnished in June 2007. Repairs to the butterfly valves were added to this contract by change order. Work was completed in October 2015, and acceptance is expected in January 2016.

Specification No. 06-04: enlarging pumping plant initial facilities. Work began in August 2006 and was completed in October 2011. Acceptance is expected in January 2016.

Specification No. 07-18: complete pumping plant enlargement. Work began in December 2007. Added work included repairs to a water system pipeline adjacent to Banks Pumping Plant. Work was completed in April 2014. Acceptance is expected in January 2016.

**Del Valle Dam.** The following contracts for Del Valle Dam continued in 2015.

Specification No. 12-14: bulkhead installation and removal. Work began in October 2012. Original contract work included labor, materials, and construction equipment;

hauling construction equipment for installation and removal of a DWR-furnished bulkhead gate; repairing cracks inside the flood control outlet works tunnel; applying coatings to the bulkhead gate and flood control outlet works tunnel slide gates; painting station markings on the inside of the Del Valle spillway tunnel; and installing a metal walkway.

In addition to the original contract work, additional tasks were performed under change order. These tasks included:

- urgent repair of leaks on the SBA Pipeline at Mileposts 38.90, 33.83, and 35.34;
- Thermalito Powerplant recovery efforts;
- Clifton Court Forebay gate repair;
- open channel flowmeter installation at Dyer Reservoir;
- Del Valle floodgate repair;
- Hyatt Powerplant clean-up; and
- furnishing WEKO-SEALs (internal joint seals).

Work was completed in April 2014. Acceptance is expected in July 2016.

Specification No. 14-17: repair leaks inside tier valve intake structure, conservation outlet works tunnel and access tunnel, Del Valle Branch Pipeline, and gate chamber access tunnel. Work began in October 2014. The contractor repaired damaged coatings of valves and steel pipe, installed pressure transducer conduits on the exterior of the tier valve intake structure, installed a remotely monitored weir for seepage measurement, and painted station markings on the inside of the tier valve intake structure and the conservation outlet works access tunnel. Work was completed in April 2015 and accepted in October 2015.

## North San Joaquin Division

### *Skinner Fish Science Building*

The Delta Fish Survival Improvements Program (Specification No. 12-15) began in December 2012. Work consisted of construction of a cold-formed steel frame building with restroom, office space, and break room facilities. The project included demolishing the following existing items:

- asphalt concrete paving;
- concrete and reinforcing steel;
- concrete curb and gutter;
- chain-link fencing;
- traffic gates;
- metal beam guardrail; and
- cathodic protection.

Work was completed in October 2014. Acceptance is expected in January 2016.

### *Clifton Court Forebay Dam*

On July 8, 2013, radial Gate No. 2 at the Clifton Court Forebay Dam intake structure failed catastrophically. With an advance directive under a contract that began in October 2012 (Specification No. 12-14), a contractor retrieved the gate from the reservoir and made immediate minor repairs to radial Gates No. 1, 3, 4, and 5 to minimize the potential for failure of additional gates. DOE issued and awarded Specification No. 13-15 in July 2013 to repair and reinstall Gate No. 2 and to identify and correct conditions to a level of acceptable operational risk on the four remaining gates. The contract also included removing, cleaning, and repairing five loading gates. Work was completed in February 2015 and accepted in July 2015.

### *Skinner Fish Facility*

**Fish Count and Transport Buckets.** Work began in June 2014 to furnish fish count and transport buckets (Specification No. 14-08) for the Skinner Fish Facility. Work was



completed in June 2015, and acceptance is expected in February 2016.

**Emergency Repair of Louvers.** On September 18, 2014, six louver supports in Bay 5 at the Skinner Fish Facility failed catastrophically. With an advance directive under a contract that began in October 2012 (Specification No. 12-18), a contractor recovered the broken louvers and performed a dive inspection and damage assessment. A contract (Specification No. 14-20) began in November 2014 to temporarily replace the failed aluminum frames in Bay 5 with steel ones, fabricate and install new louvers, perform additional condition assessment dive inspections of Bays 1 through 5, and make necessary temporary repairs based on conditions. In addition, the louver washing system was upgraded with new pumps, valves, and controls, and the flow meters were replaced. Work was completed in May 2015 and accepted in September 2015.

### ***Curtis Landing Fish Release Site***

Work for this project (Specification No. 14-02) began in March 2014. It involved two tasks related to the Curtis Landing fish release site. The first included selective demolition of the existing fish release system piping, support framing and piles, electrical system, and other miscellaneous facilities, and relocation of passive integrated transponder antennas, a submersible pump, and articulated mats. The second task included construction of a concrete slab, wall, and foundation; construction of a steel platform with metal grating, piping, valves, flowmeter, and submersible pump; construction of the structural steel framework to support the piping; and electrical work for the fish screen pump, lights, and gates. Work was completed in May 2015. Acceptance is expected in February 2016.

## **San Luis Division**

### ***Canal Milepost 86.69 to Milepost 138.29***

Turnout structure modifications (Specification No. 15-03) began in November 2015. Work includes installation of guide steel and thermoplastic polyolefin single-ply roofing at five locations, and head panel modification. The project is scheduled to be completed in March 2016. Acceptance is expected in July 2016.

### ***Delta and San Luis Field Divisions—Roads and Parking Areas***

Work began in July 2013 (Specification No. 13-06) to seal and pave roads and parking areas in Alameda, Contra Costa, Stanislaus, Santa Clara, Merced, Kings, and Fresno counties. Work was completed in January 2014 and accepted in February 2015.

## **Tehachapi Division**

### ***Edmonston Pumping Plant***

A contract to replace pump Units W2, W4, W6, and W8 (Specification No. 02-10) began in June 2003. Work was completed in March 2011. Delivery of additional spare parts was added later to the contract through a change order. Delivery and acceptance were completed in November 2015. Work consisted of:

- designing, fabricating, and testing a four-stage pump model and a single-stage pump model, and furnishing a pump model test program report;
- designing, manufacturing, delivering, storing, and installing four pumps to replace existing pumps;
- furnishing spare parts, auxiliary equipment, tools, and templates;
- applying coatings;
- providing liaison services; and
- furnishing additional spare parts requested via change order.



### ***Chrisman and Devil's Den Pumping Plants***

Site improvements (Specification No. 12-12) began in December 2012. The work included:

- repairing and coating water discharge pipe sleeve couplings and expansion joints;
- constructing temporary scaffolds with containment structures for sandblasting and cleaning the joints;
- removing sandblast dust and debris; and
- removing and replacing 160 feet of 12-inch diameter steel pipe.

Work was completed in February 2015 and accepted in December 2015.

### ***Antelope Valley-East Kern Water Agency Turnout***

Construction of the Antelope Valley-East Kern turnout (Specification No. 13-11) began in August 2013. The work involved excavation, constructing a temporary coffer dam, erosion control, installing steel pipe and fittings, concrete work, miscellaneous metal work, a trash rack, and backfilling. The contractor performed demolition of the concrete liner and existing drainage ditch and removal of an existing asphalt concrete road. Work was completed in August 2014 and accepted in May 2015.

### ***Mojave Division***

#### ***Canal Milepost 335.80***

The emergency canal lining repair project (Specification No. 15-16) began in October 2015. Work includes dewatering, removal of the concrete liner and unsuitable material, backfill, and concrete and joint sealant repair. Work is expected to be completed in January 2016. Acceptance is expected in June 2016.

#### ***Canal Milepost 342.65***

Repair at Milepost 342.65 (Specification No. 13-10) began in July 2013. The work

included dewatering of Pool 52, removal and repair of concrete panels, concrete repair and cleaning, replacement of bolt anchors and ladders, and repair of the access road. Work was completed in January 2014 and accepted in January 2015.

### ***Pearblossom Pumping Plant***

A contract to construct a new 20,000 square-foot Pearblossom Administration Building near Pearblossom Pumping Plant began in February 2011 (Specification No. 10-23). The new building, which received notification of Leadership in Energy and Environmental Design platinum certification in May 2015, is occupied by Southern Field Division staff and Lancaster Project Headquarters personnel. Work was completed in February 2013. Acceptance is expected in April 2016.

### ***Santa Ana Division***

#### ***East Branch Extension Phase I Improvements***

##### ***Crafton Hills Reservoir Enlargement.***

A construction contract (Specification No. 11-12) to increase the reservoir's operating storage from 85 acre-feet to approximately 225 acre-feet began in December 2011. The work included an earthen embankment dam with rock slope protection, access roads, grouting, a seepage collection system, geotechnical instrumentation, and mechanical aerators. The reservoir was filled in September 2014. Work was completed in June 2014 and accepted in March 2015.

#### ***East Branch Extension Phase II***

Phase II of the East Branch Extension will complete the planned capacity increase for the East Branch Extension. Phase II will allow San Geronio Pass Water Agency to receive its maximum annual Table A water and allow the San Bernardino Valley Municipal Water District to increase its distribution system capacity to its Redlands and Yucaipa Valley service areas. Principal Phase II features include approximately

6 miles of new 72-inch and 66-inch diameter pipe, a new reservoir (Citrus Reservoir), a new 160 cfs pump station (Citrus Pump Station), expansion of the existing Crafton Hills Pump Station, and installation of an additional pump at Cherry Valley Pump Station.

**Citrus Reservoir.** Construction of Citrus Reservoir (Specification No. 12-02) began in June 2012. The work to construct the reservoir included selective demolition, excavation, compacted soil liner, hydraulic asphalt concrete, inlet works, and environmental protection. Work was completed in February 2014 and accepted in February 2015.

**Mentone Pipeline.** Construction of Mentone Pipeline (Specification No. 12-03) began in July 2012. The work includes installation of approximately 2 miles of 72-inch buried steel pipe from Foothill Pump Station to Citrus Reservoir and approximately 3.5 miles of 66-inch buried steel pipe from Citrus Pump Station to Crafton Hills Pump Station. Work is scheduled to be completed in June 2015. Acceptance is expected in December 2016.

**Valves.** Manufacturing, testing, and delivery of three energy dissipating valve assemblies (including electric actuators) for Citrus Reservoir (Specification No. 10-10) began in September 2010. The valves were delivered to the site in October 2012. Spare parts and special tools were included in the contract work. Work was completed in March 2013. Acceptance is expected in July 2017.

Manufacturing, testing, and delivery of 14 ANSI (American National Standards Institute) butterfly valve assemblies with actuators for Citrus Pump Station, Crafton Hills Pump Station, and Cherry Valley Pump Station (Specification No. 10-16) began in January 2011. Spare parts and special tools were included in the contract work. Work was completed in July 2013. Acceptance is expected in July 2017.

Manufacturing, testing, and delivery of 12 AWWA (American Water Works Association) butterfly valve assemblies with actuators for Crafton Hills Pump Station, Cherry Valley Pump Station, and Mentone Pipeline (Specification No. 10-17) began in February 2011. Spare parts and special tools were included in the contract work. Work was completed in mid-2013. Acceptance is expected in July 2017.

Manufacturing, testing, and delivering 12 ANSI ball valve assemblies with actuators and 4 actuators for Citrus Pump Station, Crafton Hills Pump Station, and Cherry Valley Pump Station (Specification No. 10-18) began in January 2011. The valves were delivered to the site in October 2012. Spare parts and special tools were included in the contract work. Acceptance is expected in July 2017.

**Transformers.** Transformers, accessories, tools, and spare parts were manufactured, tested, and delivered for Citrus Pump Station under a contract (Specification No. 10-20) that began in March 2011. The equipment was delivered to the completion contractor in December 2015. Acceptance is expected in July 2017.

**5 kilovolt Switchgear.** Work includes manufacturing, factory testing, and commissioning equipment (Specification No. 13-12) for a prefabricated control building and associated equipment, accessories, tools, special tools, and spare parts. Also included are 5 kilovolt (kV), 4,000 amperes (A) switchgear motor breaker cubicle assemblies; 5 kV, 4000 A main and tie breaker switchgear cubicle assemblies; 5 kV, 4,000 A station service breaker switchgear cubicle assemblies; and 5 kV-class surge protection equipment in the main incoming bus compartments. Fabrication began in June 2014 and is scheduled to be completed in October 2016. Acceptance is expected in June 2017.

### ***Crafton Hills and Citrus Pump Stations***

Construction on the Crafton Hills Pump Station expansion and Citrus Pump Station initial work (Specification No. 12-10) began in October 2012. Work included construction of a prestressed concrete forebay water tank and pump station buildings; earthwork, shoring, and demolition; installation of a hydraulic asphalt concrete liner, steel pipe and appurtenances, DWR-furnished materials, and equipment; application of coatings; and testing. Work was completed in October 2014. Acceptance is expected in July 2016.

### ***Citrus, Crafton Hills, and Cherry Valley Pump Stations***

Work to provide pumps, motors, variable frequency drives, and excitation system equipment, and associated hardware, for the pump stations (Specification No. 13-01) began in June 2013. Units were delivered in December 2015. Acceptance is expected in July 2017.

### ***West Branch***

#### ***Oso Pumping Plant***

Work to construct a 14,400 square-foot civil maintenance and mobile equipment building at Oso Pumping Plant (Specification No. 07-22) began in December 2007. Work was completed in July 2012. Acceptance is expected in October 2016.

### ***Perris Dam***

The seismic remediation of Perris Dam (Specification No. 14-03) began in August 2014. The work involves construction of a new compacted berm; extension of the existing blanket drain; construction of a new drain line, a new toe drain, and a relief well system; cement deep soil mixing treatment of the alluvium beneath the footprint of the compacted berm; road work; and other related work. The rock material for the project is being produced on-site by using blasting methods and a rock processing

plant. The work is scheduled to be completed in November 2017. Acceptance is expected in March 2018.

**Oak Valley (Perris Dam).** Mitigation work for the Perris Dam seismic remediation project (Specification No. 15-01) began in June 2015. The work involves:

- excavation, grading, and revegetation of a new channel and floodplain system;
- protection of native trees and vegetation;
- monitoring well destruction;
- earthwork, including excavation, transport, stockpile, and placement of fill and rock structures for grade control;
- installing biotechnical structures;
- installing erosion control devices;
- installing a hog exclusion fence and gate; and
- planting, seeding, irrigating, and plant establishment.

The work is scheduled to be completed in January 2017. Acceptance is expected in April 2017.

### ***Coastal Branch***

#### ***Kern and San Luis Obispo Counties***

The cathodic protection rehabilitation project in Kern and San Luis Obispo counties (Specification No. 13-13) began in September 2013. Work included removing encasement at insulating coupling flanges and installing new insulating sleeve couplings inside new cast-in-place vaults. A portion of the work was completed in January 2014 and accepted in September 2014. The remaining work was completed under Specification No. 15-05. Acceptance is expected in July 2016.

### ***Devil's Den, Bluestone, and Polonio Pass Pumping Plants***

Work on cathodic protection rehabilitation and installation of insulated sleeve

couplings (Specification No. 15-05) began in September 2015 and was completed in December 2015. The project is expected to be accepted in July 2016.

## Construction Activities in Multiple Divisions

### *Temporary Rock Barriers 2013, 2014, and 2015*

Two tasks related to the South Delta Temporary Barriers Project (Specification No. 12-18) began in January 2013. The first task included the removal of temporary rock barriers and appurtenances at Middle River, Old River, and Grant Line Canal. Additional work included temporary pumping facilities, dredging in the South Delta, removing of aquatic weeds in Clifton Court Forebay, installing of stone protection in the South Delta, and structural maintenance and repair at the Curtis Landing and Horseshoe Bend release facilities. The second task included furnishing, installing, and removing a nonphysical barrier at the head of Georgiana Slough and at the east side of the Sacramento River (immediately downstream of the Walnut Grove Bridge). Work was completed in December 2015. Acceptance is expected in March 2016.

### *West False River*

The temporary rock barrier for the drought emergency (Specification No. 15-04) began in April 2015. Work included construction of a rock barrier at West False River, which included installing embankment rock to form the embankments of the barrier, aggregate base materials, and walers and attachments between the king pipe piles and sheet piles. The contractor also installed DWR-furnished materials such as warning signs and buoys, ball floats, and lights. Work was completed in June 2015 and was accepted in September 2015.

### *West False River and Rio Vista Storage Area*

The work (Specification No. 15-08) at West False River began in August 2015 and consists of removal of the drought barrier, including:

- removing of embankment rock and transporting the rock to the Rio Vista storage area;
- removing of warning signs, warning buoys, ball floats, and lights;
- cutting and removal of steel sheet; and
- applying seeding and erosion control methods.

The work at the Rio Vista storage area includes:

- demolition of selected existing features;
- clearing and grubbing, including tree removal, grading, imported backfill, and geotextile fabric;
- installing corrugated metal pipe, aggregate base, hot mix asphalt, pavement markings and signs, woven wire fence and gates, metal beam guardrail, bollards, and applying seeding and erosion control methods,
- installing a hot-tap water connection, piping, valves, backflow device, water meter, and appurtenances.

Work is scheduled to be completed in January 2016. Acceptance is expected in March 2016.

### *San Luis, San Joaquin, and Southern Field Divisions*

The seismic retrofit of bridges addressed existing seismic deficiencies in 23 bridges (9 DWR and 14 Reclamation) located in the San Luis, San Joaquin, and Southern field divisions. There are 22 structures that carry local streets and roads over the California Aqueduct, and one that supports the aqueduct operational road over a local



county road. The work included constructing of shear keys at bridge piers and abutments, replacing some existing reinforced concrete bridge deck, installing hot mix asphalt pavement and dikes, and installing metal beam guard railing. The seismic retrofit was required to prevent potential collapse during an earthquake, and deck replacement work is required due to deterioration of the concrete decks from heavy truck traffic.

**Phase I.** Work on the Duncan Road Bridge, Goss Road (Goodwin Drive) Bridge, Maple Avenue Bridge, Mesquite Street Bridge, and the Rancho Road Bridge in the Southern Field Division (Specification No. 14-09) began in August 2014. The bridge decks were replaced at the Maple Avenue and the Rancho Road bridges. Work was completed in September 2015. Acceptance is expected in August 2016.

**Phase II.** Work on the Butts Road Bridge, McCabe Road Bridge, and Mervel Avenue Bridge in the San Luis Field Division (Specification No. 14-14) began in September 2014. Work was completed in February 2015 and accepted in April 2015.

**Phase III.** Work on the 15 bridges located in Fresno, Kings, and Kern counties in the San Luis and San Joaquin field divisions (Specification No. 14-13) began in September 2014. Work was completed in March 2015 and accepted in April 2015.

### ***Edmonston, Chrisman, Teerink, and Buena Vista Pumping Plants***

Work at these pumping plants involved the following contracts.

Specification No. 11-10: furnish and install 230 kV SF6 power circuit breakers. Work began in March 2012, was completed in March 2015, and accepted in November 2015.

Specification No. 13-09: replace 57 annunciator panels and the associated hardware for the equipment at the pumping plants. Work began in November 2013, was completed in February 2015, and accepted in August 2015.

Specification No. 11-04: replace the septic tanks, sewage piping, and pumps. Work began in April 2012, was completed in August 2014, and accepted in February 2015.

### ***San Joaquin Field Division***

Replacement of the existing standby engine generators with new liquefied petroleum gas and diesel standby engine generators (Specification No. 14-19) began at 21 check sites and 8 pumping plant sites in the San Joaquin Field Division in May 2015. Work also includes installing new fuel tanks, transfer switches, and load banks to support operation of the new standby engine generators. The sites include all of the Coastal Branch pumping plants and check sites; all check sites from Check 22 to 39 on the California Aqueduct; and Teerink, Buena Vista, and Edmonston pumping plants. Work is estimated to be completed in October 2016. Acceptance is expected in November 2016.

### ***Badger Hill Pipeline***

Work began in the San Joaquin and Southern field divisions (Specification No. 13-14) in November 2013. Work included removing and replacing the existing lining in manifolds and pipeline, constructing a flow metering vault, removing and replacing a joint at Check 66, and removing and reinstalling pipe spool pieces. Because of emergency work in Specification No. 15-16, work under this contract (Specification No. 13-14) is suspended through October 2016. Work is scheduled to be completed in June 2017. Acceptance is expected in June 2017.



### ***Southern Field Division—Seal and Pave Roads and Parking Areas***

This project (Specification No. 14-05) began in July 2014 and covered areas in Los Angeles and San Bernardino counties.

The work included:

- traffic stripes and pavement markings;
- pavement repairs;
- hot mix asphalt paving and overlays;
- earthwork including excavation and compacted backfill;
- wheelstops; and
- miscellaneous metalwork.

The work was completed in September 2015. Acceptance is expected in March 2016.

## **Real Estate Activities**

DWR processed a net total of \$7.02 million in payments in 2015 in support of right-of-way activities required for the construction, operation, and maintenance of the SWP. This amount represents direct payments made for the cost of real property rights, damages, temporary entry permits, licenses, leases, and relocation expenses.

DWR conducted the following real estate activities from January 1 through December 31, 2015.

### **SWP Acquisitions**

Activities related to SWP acquisitions were as follows:

- recorded two easements and secured one encroachment permit for the 2009 National Marine Fisheries Service biological opinion for the Sherman Island Little Baja and Manzo Ranch fish release sites project;
- secured two agreements with East Bay Regional Park District and the Department of Fish and Wildlife for

use of the Bureau of Reclamation fish release site for the 2009 National Marine Fisheries Service biological opinion for the Sherman Island Little Baja and Manzo Ranch fish release sites project;

- processed three payments to the Delta Ferry Authority for costs related to boat repair for the emergency drought barrier project;
- secured two encroachment permits with the city of Tracy for the South Delta salinity study;
- processed six permits for the California Irrigation Management Information System;
- secured one encroachment permit with the city of Rio Vista for the Delta Flood Emergency Preparedness, Response, and Recovery Program;
- recorded one grant deed for DWR Parcel No. SGP-85 as required for the East Branch Extension Phase I Improvements, mitigation project;
- recorded three permanent easement deeds and one Director's quitclaim deed as required for the East Branch Extension Phase II Improvements Project;
- retrieved condemnation deposit monies from the State Treasurer for the East Branch Extension and SBA, Dyer Reservoir Project;
- secured one damage agreement, one lease agreement, one easement deed, and one encroachment permit as required for the 2015 emergency drought barrier project;
- processed two license and hold harmless agreements as required for the emergency drought barrier project;
- processed payment for a landowner claim for damages as related to the emergency drought barrier project;
- secured a damage agreement with the delta ferry authority for the emergency drought barrier project;
- processed agreement for access as required for the Division of

Environmental Services, Interagency Ecology Program, delta compliance monitoring;

- completed property exchange with the Port of West Sacramento for the Decker Island and Prospect Island habitat restoration projects;
- secured the right-of-way contract for spoil site as required for the Milepost 62 canal embankment repair project;
- secured one special use permit and two access agreements as required for the Division of Operation and Maintenance (O&M) earthquake engineering project;
- secured one encroachment permit as required for the San Joaquin Fish Hatchery access and trail project;
- secured one right-of-way contract and one utility modification agreement as required for the SBA Improvement and Enlargement Project; and
- processed three payments for water monitoring compliance related to the Suisun Marsh water monitoring project.

## Temporary Entry Permits

In 2015, DWR obtained 28 temporary entry permits including:

- Bay Delta Office—South Delta salinity study, 1;
- Cantua Creek Stream Group Improvements Project, 1;
- Del Valle fault survey project, 2;
- East Porterville emergency well project, 1;
- emergency drought barrier project—water information monitoring station, 1;
- emergency drought barrier project—boundary survey, 1;
- FloodSAFE Environmental Stewardship and Statewide Resources Office Delta ecosystem enhancement—levees project, 1;
- Fish Restoration Program, 1;

- Fish Restoration Program—Decker Island land management project, 2;
- Fish Restoration Program—flood systems repair project, 1;
- Perris Dam Remediation—Oak Valley mitigation project, 1;
- North Central Region Office, O&M delta operation project, 1;
- O&M—Coastal Branch maintenance, 1;
- O&M—earthquake engineering permits, 1;
- Prospect Island Restoration Project, 1;
- San Joaquin River Restoration Program, 1;
- SBA—erosion repair project, 2;
- Suisun Marsh compliance program, 1;
- South Delta Temporary Barriers Project, 2;
- Division of Environmental Services—water quality monitoring stations, 1;
- Yolo Bypass habitat restoration, 4; and
- Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project, 1.

## SWP Property Management

Property management activities during 2015 were as follows:

- managed leasing activities of SWP nonoperating properties, which produced \$728,662;
- processed 44 encroachment permit applications and executed 22;
- collected fees of \$217,390.50 for review and inspection costs related to encroachment permit applications; and
- coordinated review of 21 tentative tract map developments within 1 mile of the California Aqueduct.

## SWP Appraisals

In 2015, 54 percent of total appraisal assignments (27 of 50) completed by

DWR were exclusively for the SWP. These assignments included the following:

- East Branch Extension Phase I, Crafton Hills Reservoir enlargement project—completed two appraisals and three appraisal reviews;
- Cantua Creek Stream Group Improvements Project—completed five appraisals;
- Fish Restoration Program—completed four appraisals, one agricultural lease rate, and one review;
- West Sacramento Corporation Yard Agreement—completed two appraisals;
- Perris Dam seismic remediation—completed one appraisal review;
- Decker Island acquisition project—completed one appraisal;
- SWP property management—reviewed one appraisal and completed one appraisal and one license rate;
- Dutch Slough Tidal Marsh Restoration Project—completed two appraisals;
- North Bay Aqueduct—completed one review; and
- Winter Island acquisition, tidal habitat restoration—completed one appraisal.

In addition, two Architectural Revolving Fund accounts were established at the Department of General Services to finance appraisals for the Fish Restoration Program and the Perris Dam Emergency Release Facility Project.

**Table 12-1 Design Activities, 2015**

Construction Division and Facility	Design Activity	Date Design Began	Design Actual/ Estimated Completion Date
<b>Oroville Division</b>			
Oroville, Thermalito Afterbay, and Thermalito Forebay dams	Radial gate nondestructive examination of tendons study	July 2015	December 2017
Lake Oroville	Reservoir rim inspection study	November 2015	June 2016
Bidwell Canyon	Stage III boat ramp extension	June 2015	August 2015
Oroville Dam	River outlet modification	December 2013	December 2015
	Radial gates seals replacement	July 2011	March 2015
Oroville Field Division	Fire systems modernization (design review)	September 2014	October 2015
	Roofing replacement	May 2015	November 2015
Hyatt and Thermalito power plants	Fire detection system	March 2013	June 2015
Thermalito Powerplant	Bypass gate reliability	October 2013	November 2015
Thermalito Afterbay Dam	Well replacement, phase II,	June 2013	January 2016
Hyatt Powerplant, Thermalito Diversion Dam Powerplant, and Oroville Operations & Maintenance Center	Fire systems modernization	August 2013	October 2015
<b>Suisun Marsh Facilities</b>			
Montezuma Slough Control Facility	Roofing replacement	April 2014	May 2015
<b>Delta Facilities</b>			
Georgiana Slough	Salmon protection technology (preliminary design)	October 2015	December 2015
Sherman and Twitchell islands	New fish screens at existing siphons—5 sites	July 2014	June 2015
Middle River, Old River, Grant Line Canal	Temporary rock barrier	July 2015	October 2015
<b>North Bay Aqueduct</b>			
North Bay Aqueduct	Alternate intake study	October 2008	June 2016
<b>South Bay Aqueduct</b>			
Del Valle Dam	Right abutment fault phase 2 investigation study	May 2015	September 2015
<b>North San Joaquin Division</b>			
Clifton Court Forebay Dam	Stratigraphic model of foundation study	July 2014	July 2015
Delta Field Division	Byron Road bridge replacement	January 2014	July 2016
	Canal repairs (Reaches 1 and 2A)	February 2015	May 2015
	Embankment and liner repair (Milepost 62)	July 2015	January 2016
<b>San Luis Division</b>			
Sisk Dam	Seismic reevaluation	July 2007	September 2016
San Luis Field Division	Canal liner and embankment repair	February 2013	May 2015
<b>South San Joaquin Division</b>			
San Joaquin Field Division	Bridge hinge retrofit	July 2015	January 2016



**Table 12-1 Design Activities, 2015***(continued)*

Construction Division and Facility	Design Activity	Date Design Began	Design Actual/ Estimated Completion Date
<b>Coastal Branch</b>			
Devil's Den, Bluestone, Polonio Pass pumping plants	Insulated flange repair and vault construction	December 2014	March 2015
<b>West Branch</b>			
Castaic Dam	Left abutment analysis study	November 2015	December 2017
	Tower nonlinear structural analysis study	January 2015	February 2016
Los Robles Bridge (not part of seismic program)	Seismic analysis	August 2005	June 2015
<b>East Branch</b>			
Southern Field Division	Pools 47–49 canal repair and restoration design	October 2015	November 2015
<b>East Branch Enlargement</b>			
East Branch Enlargement Phase II	Preliminary design and environmental documents	March 2007	June 2015
<b>Mojave Division</b>			
Various Sites	Replace standby emergency generators at 19 check sites, 8 pumping plants, and 2 special locations	April 2012	May 2015
<b>Santa Ana Division</b>			
Perris Dam	Emergency release facility preliminary design and environmental documents	October 2006	July 2017
<b>Miscellaneous</b>			
Oroville, Thermalito, Pyramid dams	Radial gate structural reevaluation	July 2011	March 2015

**Table 12-2 Construction Activities, 2015**

Sheet 1 of 3

Construction Division and Facility	Construction Contract (Specification Number)	Starting Date (Notice to Begin Work)	Acceptance Date (expected or actual)	Estimated Total Contract Costs (in thousands of dollars)
<b>State Water Project—General</b>				
SWP Supervisory Control and Data Acquisition System	Replace remote terminal units (08-12)	May 2009	July 2016	12,112
California Aqueduct	Copper communications cable and voice and data equipment—monitoring, testing, and repair (13-17)	March 2014	May 2016	877
<b>Oroville Division</b>				
Robie Thermalito Pumping- Generating Plant	Initial cleanup and restoration—clean and repair fire-impacted equipment (13-16)	October 2013	July 2016	1,218
Bidwell Bar Bridge	Repair access road erosion (14-10)	September 2014	November 2015	433
Oroville Dam Outlet Diversion Tunnel No. 2	Baffle ring installation (15-11)	December 2015	June 2016	2,621
Bidwell Canyon Boat Ramp	Stage III boat ramp extension (15-13)	December 2015	May 2016	319
Hyatt Powerplant	Fire systems modernization (15-06)	October 2015	July 2017	15,000
Hyatt Powerplant Diversion Tunnel No. 2	Emergency repair—video surveillance and telecommunications equipment, refurbish existing/furnish new hydraulic system components (14-07)	March 2014	September 2015	5,404
Feather River Fish Hatchery	Water supply pipeline repair—remove and provide surface prep to existing steel pipe and associated structures (14-01)	April 2014	February 2015	356
Feather River Spawning Gravel Supplementation	Spawning gravel supplementation for fish habitat enhancement (14-04)	May 2014	February 2015	851
<b>South Bay Aqueduct</b>				
South Bay Aqueduct Enlargement and Improvement				
Dyer Canal, Livermore Canal, Alameda Canal, and Del Valle Pipeline	Perform canal modifications (09-16)	October 2010	February 2016	29,468
South Bay Pumping Plant	Furnish four 45 cfs pump and motor units and one spare pump and motor (04-05)	November 2004	January 2016	5,530
	Furnish valves, actuators, and hydraulic power unit (04-20)	May 2005	January 2016	2,039
	Construct pumping plant enlargement—initial facilities (06-04)	August 2006	January 2016	16,424
	Enlarge pumping plant (07-18)	December 2007	January 2016	24,436
Del Valle Dam	Bulkhead installation and removal (12-14)	October 2012	July 2016	76,658
	Tier valve intake repairs (14-17)	October 2014	October 2015	1,348
<b>North San Joaquin Division</b>				
Skinner Fish Science Building	Delta Fish Survival Improvements Program (12-15)	December 2012	January 2016	6,104
Clifton Court Forebay Dam	Emergency radial gate repairs (12-14) [Remaining work will finish under 13-15]	October 2012/ July 2013	July 2015	1,241

**Table 12-2 Construction Activities, 2015**

Construction Division and Facility	Construction Contract (Specification Number)	Starting Date (Notice to Begin Work)	Acceptance Date (expected or actual)	Estimated Total Contract Costs (in thousands of dollars)
<b>North San Joaquin Division</b> (continued)				
Skinner Fish Facility	Fish count and transport buckets (14-08)	June 2014	February 2016	177
	Emergency louver repair (12-18) [Remaining work will finish under 14-20]	October 2012/ November 2014	September 2015	1,230
Curtis Landing Fish Release Site	Site improvements (14-02)	March 2014	February 2016	1,179
<b>San Luis Division</b>				
Mileposts 86.69–138.29	Turnout structure modifications at 15 locations (15-03)	November 2015	July 2016	714
Various counties	Seal and pave roads and parking areas (13-06)	July 2013	February 2015	9,251
<b>Tehachapi Division</b>				
Edmonston Pumping Plant	Replace pumps, Units W2, W4, W6, and W8 (02-10)	June 2003	November 2015	36,916
Chrisman and Devil's Den pumping plants	Site improvements (12-12)	December 2012	December 2015	3,530
Antelope Valley-East Kern Water Agency Turnout	Construct turnout (13-11)	August 2013	May 2015	969
<b>Mojave Division</b>				
Milepost 335.80	Emergency canal lining repair (15-16)	October 2015	June 2016	1,052
Milepost 342.65	Pool 52 repair (13-10)	July 2013	January 2015	1,333
Pearblossom Pumping Plant	Construct new administration building (10-23)	February 2011	April 2016	13,243
<b>Santa Ana Division</b>				
East Branch Extension Phase I Improvements				
Crafton Hills Reservoir Enlargement	Increase operating storage of the reservoir (11-12)	December 2011	March 2015	10,890
East Branch Extension Phase II				
Citrus Reservoir	Construct new reservoir (12-02)	June 2012	February 2015	19,310
Mentone Pipeline	Construct 5.5 miles of pipeline (12-03)	July 2012	December 2016	42,729
Valves	Manufacture, test, and deliver 3 energy dissipating valves for Citrus Reservoir (10-10)	September 2010	July 2017	626
	Manufacture, test, and deliver 14 ANSI butterfly valves for Citrus, Crafton Hills, and Cherry Valley pump stations (10-16)	January 2011	July 2017	1,320
	Manufacture, test, and deliver 12 AWWA butterfly valves for Crafton Hills and Cherry Valley pump stations and Mentone Pipeline (10-17)	February 2011	July 2017	550
	Manufacture, test, and deliver 12 ANSI ball valves for Citrus, Crafton Hills, and Cherry Valley pump stations (10-18)	January 2011	July 2017	3,300

**Table 12-2 Construction Activities, 2015**

Sheet 3 of 3

Construction Division and Facility	Construction Contract (Specification Number)	Starting Date (Notice to Begin Work)	Acceptance Date (expected or actual)	Estimated Total Contract Costs (in thousands of dollars)
<b>Santa Ana Division</b> (continued)				
Transformers	Manufacture, test, and deliver transformers and accessories for Citrus Pump Station (10-20)	March 2011	July 2017	793
5 kV switchgear	Manufacture, factory test, and commission equipment (13-12)	June 2014	June 2017	5,001
Crafton Hills and Citrus pump stations	Pump station expansion and initial construction (12-10)	October 2012	July 2016	25,566
Citrus, Crafton Hills, and Cherry Valley pump stations	Furnish equipment and hardware (13-01)	June 2013	July 2017	2,144
<b>West Branch</b>				
Oso Pumping Plant	Construct civil maintenance and mobile equipment building (07-22)	December 2007	October 2016	4,048
Perris Dam	Seismic remediation of dam embankment (14-03)	August 2014	March 2018	75,539
Oak Valley—Perris Dam	Mitigation for Perris Dam seismic remediation impacts (15-01)	June 2015	April 2017	2,357
<b>Coastal Branch</b>				
Kern and San Luis Obispo counties	Cathodic protection rehabilitation (13-13) [Remaining work will finish under 15-05]	September 2013	September 2014	552
Devil's Den, Bluestone, and Polonio Pass pumping plants	Cathodic protection rehabilitation (15-05)	September 2015	July 2016	180
<b>Multiple Divisions</b>				
Temporary rock barriers, 2013, 2014, and 2015	Installation and removal at various Delta locations (12-18)	January 2013	March 2016	11,834
West False River	Emergency drought barrier installation (15-04)	April 2015	September 2015	13,800
West False River and Rio Vista Storage Area	Emergency drought barrier removal and various work in storage area (15-08)	August 2015	March 2016	14,618
San Luis, San Joaquin, and Southern field divisions	Phase I seismic retrofit of bridges (14-09)	August 2014	August 2016	433
	Phase II seismic retrofit of bridges (14-14)	September 2014	April 2015	2,794
	Phase III seismic retrofit of bridges (14-13)	September 2014	April 2015	2,306
Edmonston, Chrisman, Teerink, and Buena Vista pumping plants	Furnish and install circuit breakers (11-10)	March 2012	November 2015	2,306
	Replace annunciator panels and hardware (13-09)	November 2013	August 2015	809
	Replace septic tanks, sewage piping, and pumps (11-04)	April 2012	February 2015	1,634
San Joaquin Field Division	Replace standby engine generators (14-19)	May 2015	November 2016	5,000
Badger Hill Pipeline	Pipeline repair (13-14)	November 2013	June 2017	3,325
Southern Field Division	Seal and pave roads and parking areas (14-05)	July 2014	March 2016	2,715







## Chapter 13 Recreation

*Low water at Lake Oroville during the fourth year of drought.*

## Significant Events in 2015

The fourth year of drought in California continued to negatively impact recreation at many State Water Project (SWP) facilities. Two Catch A Special Thrill (C.A.S.T.) for Kids events and the popular Apple Festival at Silverwood Lake were cancelled in Southern California due of the lack of water.

Despite low water levels, several reservoir draw-downs, and the start of the Perris Dam remediation project, Lake Perris remained open, and the campgrounds remained full throughout the summer. Other regional reservoirs were closed mid-summer due to low water levels.

The Department of Water Resources (DWR), along with the California Department of Parks and Recreation (California State Parks), the California Conservation Corps, and the California Department of Forestry and Fire Protection, held a third annual C.A.S.T. for Kids event at Brannan Island State Recreation Area in the Delta.

DWR supported the 2015 Independence Day celebration and fireworks show on Lake Oroville, which included a “Red, White, and You” party at the upper overlook parking lot at the south end of Oroville Dam. More than 5,000 participants attended the event, and an estimated 10,000 people watched the enhanced fireworks show, the largest in many years.

*Information for this chapter was provided by the Division of Integrated Regional Water Management, the Public Affairs Office, the Division of Environmental Services, the Division of Operations and Maintenance, and the State Water Project Analysis Office.*

The State Water Project (SWP) is a multipurpose project that provides recreational benefits to millions of Californians. In addition to providing water supply, flood control, and habitat for fish and wildlife, the SWP offers extensive and varied recreational opportunities—tours, sightseeing, fishing, hunting, picnicking, camping, boating, water skiing, bicycling, hiking, and swimming. Under the Davis-Dolwig Act (DDA), these recreational opportunities, as well as fish and wildlife enhancements, are not allocable as water and power costs to the SWP water contractors. The DDA, together with the Burns-Porter Act, provide financing for SWP recreational facilities and fish and wildlife enhancement projects, declaring that these projects benefit all the people of California and should be paid for by all Californians. The Department of Water Resources (DWR) coordinates with the California Department of Parks and Recreation (California State Parks) and the Department of Fish and Wildlife (DFW) to assure that the recreation and fish and wildlife enhancement potential at SWP facilities is fully realized.

## Recreation Areas

The SWP has 37 developed recreation areas, or sites, throughout California, including 18 developed fishing access sites. Figure 13-1 shows the name and location of each area.

## Recreation Use

Since the SWP began delivering water in 1962, more than 243 million recreation days have been recorded at SWP recreation facilities. A recreation day is defined as one individual user visiting a recreation site along the SWP within all or part of a 1-day period.

In 2015, SWP facilities supported an estimated 4.4 million recreation days of use, up 12.9 percent from the 3.9 million recorded in 2014. Most of the SWP recreation use was concentrated at the major reservoirs, with approximately 47 percent occurring in the Oroville Field Division and 38 percent occurring in the Southern Field Division.

California experienced a fourth year of significant drought in 2015, negatively impacting recreation throughout the SWP. The major reservoirs in the Southern Field Division were especially hard hit, with both low water levels and cancelled events.

Silverwood Lake's popular annual Apple Festival was cancelled due to a lack of apples on the trees of the historic apple orchard. But despite the low water levels and draw-downs during dam repairs, recreation at Lake Perris remained steady throughout the year while other regional reservoirs, such as Diamond Valley Lake, were closed to recreation by mid-summer due to low water levels.

SWP facilities around the Oroville Field Division received 9 percent more recreational use than those around the Southern Field Division, the opposite of previous years when the southern reservoirs have typically received more recreational use. This may have been due to the unusually low drawn-down water levels experienced at two major southern SWP reservoirs—Castaic Lake and Lake Perris.

Visitation at DWR's three SWP educational visitors centers, in recreation days, totaled approximately 356,500. This included:

- 95,900 at Lake Oroville Visitors Center;
- 134,700 at Romero Overlook Visitors Center, San Luis Reservoir; and
- 125,900 at Vista del Lago Visitors Center, Pyramid Lake.





**Figure 13-1** Names and Locations of SWP Recreation Areas



Overall, recreation usage of more than 4.4 million recreation days at the SWP reservoirs listed in Table 13-1 contributed significantly to the total day-use visitors reported at the 280 units of the California State Park System.

## Facilities

### Planning

#### *Lake Oroville State Recreation Area*

In 2015, DWR and California State Parks planned a number of future improvements. One of these was the addition of three new floating campsites designed to accommodate users with disabilities. The new campsites are expected to be available for public use in 2017.

California State Parks plans to install 10 new shade ramadas at the South Thermalito Forebay day-use area. Additionally, installation of 1,300 feet of Class 1 trail and four shade ramadas with concrete picnic tables for visitors with disabilities are planned on the Brad Freeman Trail near North Thermalito Forebay. These improvements will enhance the visitors' experience; they will now have the opportunity to use a picnic site that can be reached by trail or by water.

California State Parks also plans to extend the existing Wyk Island Trail, a trail in the Bidwell Canyon Recreation Area designed for visitors with disabilities, by an additional 2,700 feet. And in the Spillway Recreation Area, there are plans to update the parking lot striping to accommodate users with disabilities.

DWR and California State Parks staff are also in the process of updating and improving the Lake Oroville State Recreation Area Trail Map.

#### *San Luis Reservoir State Recreation Area*

The California State Parks Planning, Research and Support Section, along with local district superintendents, develops plans for future park needs and addresses issues such as removing overgrowth and improving visitor access and staff accommodations. The following planned improvements are scheduled to begin in either late 2015 or 2016, depending on funding:

- seal cracks and slurry campground roads at San Luis Creek;
- install a recirculation pump at the Basalt Water Treatment Plant; and
- replace a 30-year-old employee housing trailer.

### New Facilities

#### *Lake Oroville State Recreation Area*

A DWR project to extend the Bidwell Canyon Stage 3 Boat Ramp 106 feet farther into Lake Oroville was completed in December 2015. The boat ramp extension project will now allow boat launching and retrieval on a three-lane concrete ramp down to lake elevation 665 feet (235 feet below full pool). Construction crews took advantage of near-record-low lake levels to extend the ramp to elevation 660 feet, which is 16 feet deeper into the lake than the ramp reached after initial construction in 2008–2009. Plans are to eventually extend the ramp to elevation 640 feet as lake levels allow.

The boat ramp project improves safe access to Lake Oroville for emergency responders and law enforcement, marina operators, the public, and California State Parks and DWR operations and maintenance staff during drought conditions. Aquatic habitat and cultural resource mitigation projects were also initiated in compliance with terms of the project's permit.

**Table 13-1 Estimated Recreation Days in 2015, by Field Division and Facility**

Field Division and Facility	Recreation Days (rounded)	
Oroville Field Division		
Frenchman Lake	21,000	e
Antelope Lake	35,000	e
Lake Davis	45,000	e
Lake Oroville, Thermalito Diversion Pool, and Thermalito Forebay	1,162,000	e(2)
Thermalito Afterbay and Oroville Wildlife Area	332,000	e(2)
Feather River Fish Hatchery	226,700	e(2)
Lake Oroville Visitors Center	95,900	e(2)
Subtotal	1,917,600	
Delta Field Division		
Lake del Valle	535,500	
Bethany Reservoir	2,800	e(1)
Fishing Access Site:		
Niels Hansen	200	e(1)
California Aqueduct:		
Walk-in Fishing	200	e(1)
Bikeway	100	e(1)
White Slough Wildlife Area	13,000	e(1)
Subtotal	551,800	
San Luis Field Division		
San Luis Reservoir SRA: San Luis Reservoir, O'Neill Forebay, and Los Banos Reservoir	275,300	
Romero Overlook Visitors Center	134,700	
Subtotal	410,000	
San Joaquin Field Division		
Fishing Access Sites: Kettleman City, Lost Hills, Buttonwillow, and California Aqueduct Walk-in		
Fishing	21,800	e(1)
Subtotal	21,800	
Southern Field Division		
Silverwood Lake	335,300	
Lake Perris	535,900	
Vista del Lago Visitors Center	125,900	
Pyramid Lake	161,300	
Castaic Lake and Castaic Lagoon	370,200	
Fishing Access Sites:		
Quail Lake	1,700	e(1)
Longview Road	100	e(1)
California Aqueduct:		
Walk-in Fishing	2,500	e(1)
Bikeway	4,700	e(1)
Subtotal	1,537,600	
Total for Recreational Sites	4,082,300	
Total for Visitors Centers	356,500	
Grand Total	4,438,800	

Note: These values are provided by facility operators and numerous other sources and vary in their degree of accuracy. Recreation days are based on counts, except those marked "e," which are based on partial data. Locations marked "e(1)" are not regularly monitored and are only visually monitored. It is likely that these areas are used significantly more than what is represented in this table, but it is difficult to ascertain a realistic annual use. Rows marked "e(2)" are estimates for locations at Lake Oroville State Recreation Area and Oroville Wildlife Area using trends in preliminary data between years 2014 and 2015. Official attendance data will be published in a March 2017 Technical Information Record, which will be submitted to FERC as part of the 2017 Biennial Record consistent with FERC Order 2100-054 requirements.

## Improvements to Facilities

### *Lake Oroville State Recreation Area*

The Bidwell Canyon Stage 3 Boat Ramp parking lot striping was redesigned to provide safer vehicle and boat-trailer parking and improve traffic flow. Additionally, the California State Parks Division of Boating and Waterways funded a new boarding float for the boat ramp.

DWR continued to work on wildfire fuel load reduction within the Loafer Creek Recreation Area, Lime Saddle Recreation Area, and the Saddle Dam area. The work involves the removal and thinning of trees, shrubs, and grasses to create a shaded fuel break.

DWR improved the swim beach at the Monument Hill Boat Ramp and Day Use Area at Thermalito Afterbay with the addition of 350 tons of sand. A chain-link fence separating the parking lot from the beach was removed to provide easier access to the beach, and picnic tables were moved to enhance access to them. The parking lot striping was also redesigned and wheel stops were added to improve traffic flow and enhance safety.

California State Parks staff rebuilt the bridge at North Thermalito Forebay near the swim beach. They also rebuilt Bidwell Canyon Bridge #1, widening it to accommodate emergency equipment and bringing the railings up to date.

California State Parks also installed a new puncheon on the Roy Rogers Trail.

### *Lake del Valle State Recreation Area*

In 2015, a total of 23 work orders were handled at Lake del Valle State Recreation Area by the East Bay Regional Park District. These included:

- replacing flooring in the camp and marina stores;

- grading the hiking trails around the facilities;
- replacing two manhole concrete collars in the campgrounds;
- repairing irrigation lines and leaking water lines to the kiosk;
- repairing a broken isolation valve for the womens' restroom in Westside Building No. 1;
- performing emergency tree work in Campsite 101 and throughout the park as a result of the drought, which has killed many of the trees that were planted when the reservoir was built; and
- installing rock around the culvert of the campground.

### *Silverwood Lake State Recreation Area*

During 2015, California State Parks completed a project at Cleghorn Day Use Area, which included walkways to picnic tables and to the lake and a new pathway. These facilities were designed and built to accommodate visitors with disabilities.

A project was started in the New Mesa Campground with an emphasis on making the facilities accessible for visitors with disabilities. This included 28 comfort stations, 3 campsites, and several parking spaces. A new fish-cleaning station was also built in the boat lot.

### *Lake Perris State Recreation Area*

California State Parks and DWR made a number of improvements to the Lake Perris State Recreation Area facilities, including:

- crack-sealing and repaving 2 miles of park roads;
- updating kiosks with new carpentry;
- initiating a new contract that added large trash cans and eliminated 1,200 smaller cans. The large cans are less likely to be affected by wind or animals, keeping the park cleaner;

- towing out several sunken boats, removing hazards to vessel navigation;
- adding 20,000 tons of sand to the swim beaches;
- replacing several navigational buoys; and
- converting an old beach snack bar into a new group picnic site.

## Recreation Activities

The SWP, with its many reservoirs and hundreds of miles of aqueducts, offers Californians extensive and varied recreational opportunities. From Antelope Lake in Northern California to Lake Perris in Southern California, the SWP includes facilities for anglers, boaters, campers, hikers, cyclists, and many others. While DWR manages the routing of water through the aqueducts and reservoirs, the recreational facilities are operated variously by federal, State, and local agencies and, in many cases, their private concessionaires. Visitors to SWP recreation facilities can swim, water ski, picnic, and enjoy many other recreational activities. See Figure 13-2 for the various types of recreation available along the SWP.

### Lake Oroville State Recreation Area

DWR, California State Parks, and other agencies sponsored a number of activities at Lake Oroville State Recreation Area in 2015.

DWR and California State Parks helped support, through a contract with the Oroville Chamber of Commerce, the annual Oroville Salmon Festival. This one-day fall event was held at the Feather River Fish Hatchery, downtown Oroville, and the Feather River Nature Center. It was attended by an estimated 22,000 participants.

A Native Ways Celebration, attended by 400 visitors, was held by California State Parks at the Lake Oroville Visitors Center.

California State Parks hosted Bidwell Bar Days at Bidwell Canyon Day Use Area's

historic Toll House. The event treats park visitors to a day in the life of the old west.

Kiwanis hosted a "Hooked on Fishing, Not on Drugs" free kids' fishing day at Bedrock Park in the spring with support from DWR staff. Approximately 1,000 people attended the half-day event.

An estimated 22,000 visitors attended the annual 24 Hours of Gold Bicycle Race, which was held on the Lake Oroville trail system and based out of the Loafer Creek Campground.

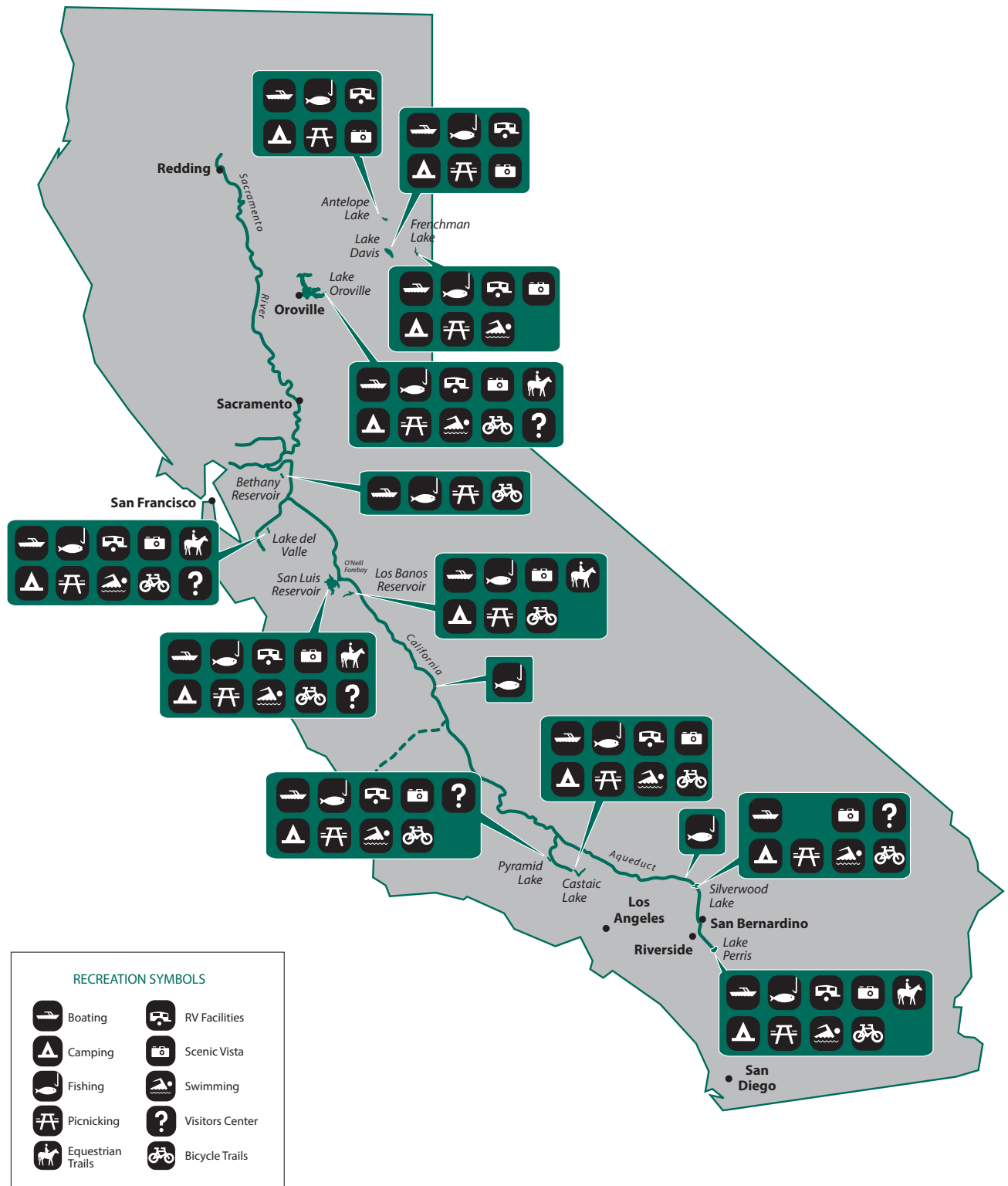
California State Parks hosted the annual Frontier Christmas at the Lake Oroville Visitors Center. Visitors learned how to make pioneer crafts and pan for gold.

DWR, California State Parks, and the California Department of Forestry and Fire Protection hosted a C.A.S.T. (Catch A Special Thrill) for Kids fishing event for children with special needs. The event, which treated the children to a day of fishing on the lake, had a reported attendance of 135 people including 39 children, experienced fishermen, and volunteers.

### Lake del Valle State Recreation Area

The East Bay Regional Park District sponsored or co-sponsored the following activities at the Lake del Valle State Recreation Area in 2015:

- two Aquatic Adventure Camps, co-sponsored by DWR and the Richmond Police Athletic League, that served 82 children;
- Coastal Cleanup 2015, where 201 volunteers cleaned up the Lake del Valle shoreline by contributing 706 hours removing 1,000 pounds of trash and 3 large bags of recyclable materials;
- 31 Regional in Nature programs led by naturalists serving 348 individuals, and 52 other nature programs serving 571 individuals;



**Figure 13-2** Types of Recreation along the SWP



- 16 campfire programs, which served 1,934 attendees;
- 15 boat tours of Lake del Valle serving 571 attendees; and
- 119 Community Outreach Overnight Programs serving eight Youth Employment Programs, co-sponsored by the YMCA and other local agencies.

## San Luis Reservoir State Recreation Area

California State Parks sponsored the “Path of the Padres,” hike funded by the Four Rivers Association. During March and April, 700 hikers were exposed to wildflowers, geology, cultural and historical areas, and Native American sites along a 35-mile trail. (As early as 1805, the Mission Padres and accompanying soldiers rested at Los Banos del Padre Arroyo, now known as Los Banos Creek.) Water conservation and the reservoir systems at Los Banos and San Luis reservoirs were discussed on a boat ride to the trailhead.

California State Park employees from San Luis Reservoir State Recreation Area set up interpretative booths and displays and provided the public with information and pamphlets at several local fairs in addition to the California State Fair. In 2015, park employees volunteered at the Merced County Fair and the River Dance Farms Fair, promoting aquatic safety and providing additional water conservation information.

DWR and its partners, including California State Parks, the California Department of Forestry and Fire Protection, the San Joaquin River Exchange Contractors Water Authority, the San Luis & Delta-Mendota Water Authority, and the Bureau of Reclamation, hosted special-needs children at a C.A.S.T. for Kids fishing event at O’Neill Forebay. Fourteen local children were treated to a day of fishing with five of the area’s top Delta tournament fishermen.

California State Parks hosted the Central Valley’s first Junior Lifeguard Program at San Luis Creek on O’Neill Forebay. The 3-week program provided training, activities, and education for the 16 young people that participated. The Junior Lifeguard Program provides children ages 9 to 14 with entry-level training to become a lifeguard. It promotes aquatic safety and awareness in addition to teaching skills to remain safe while performing aquatic rescues.

## Castaic Lake State Recreation Area

The County of Los Angeles Department of Parks and Recreation sponsored the following activities at Castaic Lake State Recreation Area in 2015:

- 12 “Splash in the Water” events with 875 children ages 7 to 14 who learned about water safety, kayaking, canoeing, standup paddleboarding, and sailing;
- three moonlight kayak classes in which 65 participants ages eight and older learned about the environment at Castaic Lake, the SWP, water safety, and boating safety;
- 52 standup paddleboarding classes to a total of 200 participants;
- two Junior Lifeguard Program sessions, with co-sponsorship from Teague Custom Marine, for a total of 409 participants ages 9 to 17 who learned lifeguarding, first aid, CPR, and water safety skills;
- 11 sessions of FamCamp (formerly Aquatic Adventure Camp) for 576 participants ages 17 and under, which taught boating safety, camping, and team-building principles;
- 64 drop-in kayak clinics provided to 450 participants ages 8 and up; and
- a new program offering early evening paddle sports demonstration activities open to all ages at no charge from May through September, with a total of 450 participants.

## Silverwood Lake State Recreation Area

In 2015, California State Parks sponsored the following activities at Silverwood Lake State Recreation Area:

- Bald Eagle Barge Tours for 600 park visitors on Saturdays and Sundays from January through March, where monthly eagle counts were taken;
- an Adopt-a-School program serving 125 children;
- a Coastal Cleanup Day with 75 volunteers who cleaned up the lake shoreline;
- Earth Day with approximately 100 volunteers who helped park employees install a drip irrigation line in the apple orchard and install a new ramada;
- Veterans Appreciation Day, co-sponsored by the Mojave River Natural History Association, which included a raffle and barbecue and was attended by approximately 200 participants;
- three CAPS Program days (Creative Before and After School Programs for Success, San Bernardino City Unified School District), which served 300 children per day and consisted of lake tours, nature hikes, and making animal tracks;
- 13 Campfire Programs on various park topics, hosted by California State Parks from Memorial Day through Labor Day, which were attended by an estimated 125 visitors per program throughout the summer;
- a group of church volunteers from Victorville cleared brush and repaired and painted various facilities in the Baranca Group Camp; and
- a C.A.S.T. for Kids fishing event, which paired 40 special-needs children with 30 experienced bass fishermen for a day of fishing on the lake, co-hosted by DWR.

## Lake Perris State Recreation Area

California State Parks and other agencies sponsored a number of activities at Lake Perris State Recreation Area in 2015, which included the following:

- 300 children attended outdoor education activities, including geocaching; and
- DFW helped children raise fish, which were later released into the lake.

## Oroville Recreation Plan

The Oroville Facilities, including Lake Oroville State Recreation Area, Oroville Wildlife Area, and adjacent DWR facilities, are operated in conformance with the 1993 Amended Recreation Plan that was approved by the Federal Energy Regulatory Commission (FERC) in its 1994 Order 2100-054. In 2006, DWR and its Settlement Agreement signatories submitted the Settlement Agreement Recreation Management Plan (SARMP, March 2006) for FERC approval. The approved SARMP will be implemented when the new hydropower license is issued by FERC, currently expected sometime in 2017 or later.

Additional recreation improvements identified and proposed in the SARMP are anticipated to be constructed after the new FERC license is issued. The new license terms and conditions are expected to be consistent with the proposed SARMP. In the meantime, DWR, California State Parks, and DFW—Davis-Dolwig Act (DDA) collaborating partners—continue to operate the Oroville Facilities recreation facilities consistent with the existing FERC license (renewed annually) and its associated 1993 Amended Recreation Plan.

## Fish Plantings

In 2015, DFW planted 534,300 fish in SWP reservoirs (see Table 13-2). This was 40.3 percent less fish than the 895,500 planted in 2014 and is the lowest number of fish planted in 10 years. The 4-year average for fish planted from 2012 through 2015 was 714,200. Thermalito Afterbay received 56.4 percent more steelhead trout than it received in 2014, the only SWP location to have more fish planted in 2015 than in the previous year.

## SWP Deliveries for Recreation

DWR has an agreement with California State Parks to provide onshore recreation water at several SWP facilities in an amount prorated to the yearly SWP Table A allocation. Per the 20 percent SWP Table A allocation for 2015, maximum diversion amounts under the onshore recreation agreement were allocated at 20 percent, or a total of 1,356 acre-feet (af), as follows: 550 af at San Luis Reservoir; 80 af at Lake del Valle; 466 af at Castaic Lake and Castaic Lagoon; 250 af at Lake Perris; and 10 af at Bethany Reservoir. Actual deliveries under the agreement totaled 151 af, as follows: 10 af at San Luis Reservoir; 43 af at Lake del Valle; 63 af at Castaic Lake and Castaic Lagoon; 35 af at Lake Perris; and 0 af at Bethany Reservoir. Additional SWP recreation deliveries included 36 af at Silverwood Lake and 17 af at Pyramid Lake. Details about these deliveries are provided in Chapter 9, Water Contracts and Deliveries.

## Recreation Financing

Prior to 2001, DWR reported capital costs allocated to fish and wildlife enhancement and recreation in Bulletin 132, Appendix D, *Costs of Recreation and Fish and Wildlife Enhancement*. With the passage of Senate Bill (SB) 1191 in October 2001, this report was no longer mandated by the Legislature. DWR

initially began reporting recreation capital cost information in this bulletin for fiscal year 2000–2001.

The approach to financing recreation and fish and wildlife enhancement (RFWE) in connection with the SWP is provided in the DDA (California Water Code [CWC] Sections 11900–11925) and the Burns-Porter Act (CWC Section 12937). Additionally, as early as 1953, financing for RFWE was addressed in CWC Sections 233, 345, 346, 12581, and 12582. These statutes declare that recreation at the SWP is a benefit to all the people of California and that the associated costs should be borne by all Californians. While this intent is cited in the DDA, no specific appropriation or funding source was defined. Consequently, Assembly Bill (AB) 12 in 1966; SB 1268 in 1970; and the Environmental Water Act—AB 1441 and AB 1442—in 1989 were all enacted to provide the necessary State funding for this SWP purpose. The DDA does, however, explicitly preclude DWR from including RFWE costs in the SWP charges for water and power billed to the public water agencies contracting for SWP water supply.

The Legislature has intermittently appropriated monies to meet State obligations to fund RFWE at the SWP. AB 12 appropriated \$5 million per year to DWR from \$90 million in tidelands oil and gas revenues. By the early 1980s, DWR had expended the entire \$90 million toward funding SWP RFWE obligations. SB 1268 appropriated \$55 million to California State Parks and \$5 million to DFW specifically for their responsibilities under the DDA at SWP facilities. Finally, AB 1442 appropriated \$172 million to reimburse DWR for SWP RFWE costs incurred over the previous 12 years as an offset to DWR's California Water Fund repayment, and an additional \$30 million for SWP RFWE through 1994.

In 2012, the DDA was amended to continuously appropriate \$10 million per

**Table 13-2 Fish Planted by the Department of Fish and Wildlife in 2015 (thousands)<sup>a</sup>**

Location and Size	Eagle Lake Trout	Brook Trout	Rainbow Trout	Chinook Salmon	Steelhead Trout	Kokanee Salmon	Total for Lake
<b>Antelope Lake</b>							
Subcatchable	10.1						
Catchable		7.3	9.5				26.9
<b>Lake Davis</b>							
Fingerling	99.2						99.2
<b>Frenchman Lake</b>							
Subcatchable	119.9						119.9
<b>Lake Oroville</b>							
Catchable				139.4			139.4
<b>Thermalito Afterbay</b>							
Yearling					17.2		17.2
<b>Lake del Valle</b>							
Catchable			14.0				14.0
<b>Los Banos Reservoir</b>							
Catchable			11.8				11.8
<b>Pyramid Lake</b>							
Catchable			19.4				19.4
<b>Castaic Lake</b>							
Catchable			53.2				53.2
<b>Silverwood Lake</b>							
Catchable			13.7				
Super Catchable			12.1				25.8
<b>Lake Perris</b>							
Catchable			7.5				7.5
<b>Total</b>	<b>229.2</b>	<b>7.3</b>	<b>141.2</b>	<b>139.4</b>	<b>17.2</b>	<b>0.0</b>	<b>534.3</b>

<sup>a</sup> Information provided by DFW, using the following size classes: yearling = a maximum of 20.0 fish per pound; fingerling = 16.1 fish per pound or smaller; subcatchable = between 16.0 and 6.1 fish per pound; catchable = between 6.0 and 1.0 fish per pound; supercatchable = larger than 1.0 fish per pound and up to 0.34 fish per pound; and trophy = 0.33 fish per pound or larger (or greater than 2.99 pounds per fish).

year to DWR. The funding was sourced from the Harbors and Watercraft Revolving Fund that is funded by fuel taxes at marinas statewide; this continuous SWP RFWE funding is essentially a user-funded source. Of the \$10 million, \$2.5 million per year is for past unreimbursed SWP RFWE costs incurred by DWR through December 31, 2011, and the remaining \$7.5 million per year is primarily intended to fund DWR's ongoing annual joint SWP RFWE costs that are generated through DWR's statutory mandate to allocate

SWP costs to their respective purposes, including RFWE. These joint costs are those for facilities such as dams, which were constructed to provide multiple benefits such as flood control, water supply, power generation, and RFWE. DWR is required to determine and allocate shares of such facilities to all of the respective purposes. Moreover, the DDA prohibits SWP RFWE purpose costs from being included in charges for water and power to SWP customers, so

the 2012 amendment filled a long-standing shortfall in SWP RFWE funding.

The 2012 DDA amendment was the result of several years of close, cooperative solution development that involved the Natural Resources Agency, the Department of Finance, the Legislative Analyst's Office, legislative staff, DWR, and many of DWR's long-term SWP water contractors.

As another part of the cooperative solution to the long-standing DDA funding difficulties, DWR reexamined the joint RFWE allocation for SWP transportation facilities located south of Dos Amigos Pumping Plant, and beginning January 1, 2013, made revisions to the RFWE allocations described in Table 2 of Appendix B (located at the end of this bulletin).

### Capital Cost Allocations

Table 13-3 shows capital costs allocated to RFWE and overall costs of lands acquired for recreation development through 2015. Total capital costs increased by \$11,750,775 over those reported in Bulletin 132-15 due to an increase of \$11,342,303 in 2015, and an upward adjustment of \$408,472 in years prior to 2015. The increase in 2015 included \$10,904,126 in joint costs and \$438,177 in specific costs. These costs are budgeted by DWR from funds available for financing project construction costs. Recreation and enhancement costs not reported in this table are budgeted by several State departments and are financed by appropriations from a variety of funds.



**Table 13-3 Recreation and Enhancement Capital Costs of the State Water Project (in dollars)**

Facility	Joint Costs Allocated to Recreation and Enhancement			Specific Costs Allocated to Recreation and Enhancement			Total
	1952-2014 Updated	2015	Subtotal	1952-2014 Updated	2015	Subtotal	
Frenchman Dam and Lake (78.5%) <sup>a</sup>							
California Water Resources Development Bond Fund	102,997	0	102,997	3,379	0	3,379	106,376
All Other Funds	2,719,924	0	2,719,924	49,950	0	49,950	2,769,874
Antelope Dam and Lake (100%) <sup>a</sup>							
California Water Resources Development Bond Fund	1,033,261	0	1,033,261	3,167	0	3,167	1,036,428
All Other Funds	4,626,085	0	4,626,085	201,137	0	201,137	4,827,222
Grizzly Valley Dam and Lake Davis (99.0%) <sup>a</sup>							
California Water Resources Development Bond Fund	4,003,092	0	4,003,092	204,475	0	204,475	4,207,567
All Other Funds	4,170,913	20,285	4,191,198	554,246	0	554,246	4,745,444
Other Feather River Projects (100%) <sup>a</sup>							
California Water Resources Development Bond Fund	0	0	0	9	0	9	9
All Other Funds	746,174	0	746,174	9,921	0	9,921	756,095
Delta Facilities (3.4%) <sup>a</sup>							
California Water Resources Development Bond Fund	0	0	0	0	0	0	0
All Other Funds	14,124,573	426,759	14,551,332	0	0	0	14,551,332
San Luis Dam and Reservoir, O'Neill Forebay, and Los Banos Reservoir (3.4%) <sup>a</sup>							
California Water Resources Development Bond Fund	988,910	0	988,910	395,284	0	395,284	1,384,194
All Other Funds	4,944,927	(214,958)	4,729,969	867,243	0	867,243	5,597,212
California Aqueduct, Delta to Dos Amigos Pumping Plant (3.4%) <sup>a</sup>							
California Water Resources Development Bond Fund	4,467,667	0	4,467,667	422,681	0	422,681	4,890,348
All Other Funds	5,826,611	362,778	6,189,389	(91,879)	0	(91,879)	6,097,510
Oroville Division (2.9%) <sup>a</sup>							
California Water Resources Development Bond Fund	5,725,216	0	5,725,216	7,809,509	0	7,809,509	13,534,725
All Other Funds	6,932,453	138,281	7,070,734	6,021,441	313,940	6,335,381	13,406,115
Del Valle Dam and Lake del Valle (48.0%) <sup>a</sup>							
California Water Resources Development Bond Fund	10,546,762	0	10,546,762	519,425	0	519,425	11,066,187
All Other Funds	4,382,165	9,353	4,391,518	(32,202)	0	(32,202)	4,359,316
California Aqueduct, Dos Amigos Pumping Plant to Termini (0.4%–32.3%) <sup>a,b</sup>							
California Water Resources Development Bond Fund	48,382,162	0	48,382,162	3,880,547	0	3,880,547	52,262,709
All Other Funds	98,473,493	10,161,628	108,635,121	6,942,795	124,237	7,067,032	115,702,153
<b>Total</b>	<b>222,197,385</b>	<b>10,904,126</b>	<b>233,101,511</b>	<b>27,761,128</b>	<b>438,177</b>	<b>28,199,305</b>	<b>261,300,816</b>

<sup>a</sup> Percentages are the share of joint costs.

<sup>b</sup> Specific costs for Dos Amigos Pumping Plant to Termini include \$2,905,649 for Castaic Dam and Lake, \$795,130 for Cedar Springs Dam and Silverwood Lake, \$6,348,741 for Perris Dam and Lake Perris, and \$898,059 for the California Aqueduct.





## Chapter 14

# Financial Analysis

*Pyramid Lake and Dam.*

## Significant Events in 2015

**O**n September 2, the Department of Water Resources (DWR) delivered \$109.275 million of Water System Revenue Bonds, Series AU. The proceeds were presold on August 25 to refinance commercial paper and pay bond financing costs.

*Information for this chapter was provided by the State Water Project Analysis Office in conjunction with the Division of Fiscal Services.*



This chapter presents both a summary and a detailed explanation of the State Water Project's (SWP) current financial analysis, capital costs and requirements, revenues and expenses, and bond activities for years 2015 through 2025.

The Department of Water Resources (DWR) performs a financial analysis annually to ensure the SWP financing program will have sufficient funds to meet construction obligations; project operation, maintenance, power, and replacement costs; and debt service payments for bonds expended for construction. The results of the current financial analysis, dated December 31, 2015, are presented in Tables 14-1 and 14-2, located at the end of this chapter. (Please note that, in some instances, the tables and text figures in this chapter may not sum as expected due to rounding.)

Future contingencies may change the financial analysis, some of which include:

- alterations in schedules of currently planned construction for future facilities;
- changes in economic conditions, including changes in interest rates and in SWP water contractor Table A amounts due to changes in amounts of water needed, conserved, or reclaimed;
- development of additional sources of water not foreseen at this time;
- deviations from the assumptions regarding actual rates of price escalations for future construction from those currently assumed for cost estimates;
- increases in capital costs related to additional conservation facilities; and
- outcome of lawsuits now pending before the courts.

## Capital Requirements and Financing

In conducting the current financial analysis, DWR projected future construction costs through the year 2025 including reimbursement of \$123 million interim financing for prior expenditures will total \$1.16 billion. Special capital requirements for revenue bond financing of these construction costs are projected at \$87 million for a total capital requirement of \$1.25 billion. This projection includes construction and financing costs for the following significant SWP projects planned for completion by 2025:

- Perris Dam remediation;
- Phase II enlargement of the East Branch of the California Aqueduct;
- Phase II of the East Branch Extension; and
- a new intake to the North Bay Aqueduct.

Most of these capital requirements will be financed from the projected sale of \$1.2 billion of revenue bonds. SWP water contractors will directly be paying \$2.6 million. The remaining \$45 million of the total capital requirement of \$1.25 billion will be financed from capital resources revenues and the transfer of excess revenues not needed for operation costs or debt service.

The analysis of capital requirements and financing presented in Table 14-1 does not include the costs and financing of all facilities needed to develop the remaining yield necessary to meet the



total 4.2 million acre-foot contractual commitment to long-term SWP water contractors. Table 14-1 also excludes the costs of associated facilities financed and constructed by local interests or State agencies other than DWR. Those facilities are essential for realizing full benefits from the SWP and include on-shore recreational developments at SWP facilities and local distribution facilities.

The allocation of capital expenditures for various SWP purposes is detailed in Table 14-3.

## Capital Requirements

Lines 1 through 20 in Table 14-1 show actual and projected SWP capital requirements through 2025. Estimates of future capital expenditures include allowances for construction cost escalation of 5 percent per year from 2016 through 2025. Right-of-way costs are escalated at 4 percent per year from 2016 through 2025. Capital expenditures for the SWP also include requirements other than those for construction, such as disbursements made as part of the Davis-Grunsky Act Program (Line 16) and special capital requirements under revenue bond financing (Line 17). DWR will decide whether to construct facilities only after examining alternatives and completing environmental documentation and other review processes.

*Line 1, Initial Project Facilities*, includes only those facilities completed in the initial construction program, which concluded December 31, 1973 (see Bulletin 132-74, Chapter 2). Additional costs after 1973, and estimated costs of remaining work on the initial SWP facilities, are not included.

*Line 2, North Bay Aqueduct*, consists of the costs for Phase II, improvements, and the Alternate Intake Project. Operational in May 1988, Phase II connected with the Phase I facilities, which were completed in 1968 (Phase I costs are included in the initial

project facilities discussed in Line 1). Phase II included costs for pipelines, pumping plants, and a small reservoir necessary to divert water from the western Delta to Napa and Solano counties for urban use. The improvements consist of replacing the existing tank with two 5-million gallon tanks. Construction of the new tanks began in 2007 and was completed in 2010. The Alternate Intake Project includes a new point of diversion along the Sacramento River or its tributaries, a new pumping plant, an in-line storage tank, and an underground pipeline connection to the existing North Bay Aqueduct. The project is expected to be completed in 2025.

*Line 3, Delta and Suisun Marsh Facilities*, shows historical costs that include planning for general Delta facilities and the previously planned peripheral canal and overland water delivery facilities for the western Delta. Also included are historical planning costs for Suisun Marsh as well as construction costs for the Suisun Marsh Salinity Control Gates and an access road. The projected amounts include projected planning costs plus projected costs for fish screens at Sherman and Twitchell islands.

*Line 4, Final Four Units at Banks Pumping Plant*, includes costs of the final four 1,067 cubic feet per second units, which became operational in spring 1992.

*Line 5, Coastal Branch Aqueduct*, includes all costs for the planning, design, and construction of Phase II of the Coastal Branch of the California Aqueduct. Phase II construction began in October 1993 and was completed in 1997. Water deliveries from Phase II facilities began in July 1997.

*Line 6, West Branch Aqueduct*, shows costs for all facilities on the West Branch except Warne Powerplant. Those costs are included in Line 11.

**Table 14-3 Allocation of Capital Expenditures (in thousands of dollars)**

Facilities and Construction Divisions	Expenditures Incurred Through 2015	Future Expenditures	Total	Preliminary Allocation Among Project Purposes			
				Water Supply and Power Generation	Flood Control <sup>a</sup>	Recreation and Fish and Wildlife Enhancement	Other <sup>b</sup>
Project Construction Expenditures							
Upper Feather Division	20,233	0	20,233	1,784	0	18,449	0
Oroville Division (excludes Small Hydro)	830,317	262,830	1,093,148	994,501	71,690	26,957	0
Delta Facilities Division	458,926	294,769	753,695	721,752	0	31,944	0
North Bay Aqueduct	120,069	2,630	122,700	122,700	0	0	0
South Bay Aqueduct	404,053	8,530	412,582	388,856	8,301	15,425	0
California Aqueduct							
North San Joaquin Division	316,349	39,412	355,761	343,438	0	12,323	0
San Luis Division	321,709	53,115	374,824	360,318	0	14,506	0
South San Joaquin Division	342,796	35,212	378,008	360,162	0	17,845	0
Tehachapi Division	383,022	24,997	408,019	387,132	0	20,888	0
Mojave Division (excludes Small Hydro)	378,774	13,148	391,922	351,837	0	40,084	0
Santa Ana Division	357,309	93,367	450,676	378,915	0	71,761	0
West Branch	568,778	25,436	594,214	559,912	0	34,302	0
Coastal Branch	499,549	12,253	511,802	511,802	0	0	0
Subtotal, California Aqueduct	3,168,285	296,940	3,465,225	3,253,516	0	211,709	0
Other Project Facilities							
Small Hydroelectric Power							
Generating Facilities	100,066	0	100,066	100,066	0	0	0
Off-Aqueduct Power							
Generating Facilities	491,574	110,600	602,174	602,174	0	0	0
East Branch Enlargement	462,031	0	462,031	462,031	0	0	0
East Branch Extension	360,775	49,804	410,580	410,580	0	0	0
Coastal Power Allocation	30,708	0	30,708	30,708	0	0	0
Agricultural Drainage Facilities	86,471	18,566	105,037	0	0	0	105,037
Planning and Pre-operations	76,542	30,000	106,542	106,542	0	0	0
Unassigned/Miscellaneous	54,685	(33,435)	21,250	0	0	0	21,250
Subtotal, Project Construction Expenditures	6,664,737	1,041,235	7,705,971	7,195,210	79,990	304,484	126,287
Other Capital Requirements							
Davis-Grunsky Act Program	130,000	0	130,000	0	0	0	130,000
Total Capital Expenditures	6,794,737	1,041,235	7,835,971	7,195,210	79,990	304,484	256,287

<sup>a</sup> Reflects DWR's allocation to this purpose irrespective of federal payments.<sup>b</sup> Includes costs currently unassigned to purpose, planning costs of deleted features of project facilities, initial costs of inventoried items, and costs assigned to the Davis-Grunsky Act Program.

*Line 7, East Branch Enlargement*, includes expenditures for Phases I and II of the East Branch Enlargement. Phase I included the enlargement share of power plant costs at Mojave Siphon and Devil Canyon. (The remaining power plant costs are included in Line 11.) East Branch Enlargement costs for Phase I, by facility, are presented in Table 14-4. Costs for Alamo Powerplant consist of expenditures for Unit 1 facilities allocated to enlargement.

Work on the draft environmental impact report, mapping, and conceptual design for Phase II of the enlargement began in March 2007 and ceased in 2013 at the request of the participating contractors. Project costs include raising the canal embankment and concrete lining, constructing additional siphon barrels, adding bays to check structures, constructing Unit 2 at Alamo Powerplant, and adding two pump/motor units and a discharge line at Pearblossom Pumping Plant. Construction of Unit 2 at Alamo Powerplant is expected to be completed in 2023, all other Phase II construction has been postponed indefinitely.

All costs in Line 7 are allocated to and repaid by the seven Southern California contractors participating in the East Branch Enlargement.

*Line 8, East Branch Improvements*, shows all aqueduct costs on the East Branch not allocated to the enlargement project. Those costs include improvements constructed concurrently with the enlargement work, the reconstruction of the San Bernardino Tunnel Intake, and the construction of the Tehachapi East Afterbay. Costs for power plant construction at Alamo, Mojave Siphon, and Devil Canyon are not included in this line.

*Line 9, East Branch Extension*, shows expenditures for Phases I and II of the extension of the East Branch of the California Aqueduct. The East Branch Extension extends the California Aqueduct east from the Devil Canyon Powerplant to a terminus

at Noble Creek near Beaumont in Riverside County. The extension provides water service to the San Geronio Pass Water Agency and the San Bernardino Valley Municipal Water District. Construction of Phase I began in February 1999 and was completed in 2003. Phase I improvements include enlargement of the Crafton Hills Reservoir and construction of the Yucaipa Connector Pipeline. Construction of this phase was completed in 2014. Phase II will increase the pumping capacity to 100 percent of design capacity. Construction of Phase II began in 2012 and is scheduled to be completed in 2017. All costs in Line 9 will be allocated to and repaid by the two participating contractors.

*Line 10, South Bay Aqueduct Improvements and Enlargement*, shows expenditures for providing additional capacity required to meet increases in water demands for the service area of Alameda County Flood Control and Water Conservation District, Zone 7, and increasing the existing capacity of the SBA to its original design capacity. Construction began in 2006, and overall project work was completed in 2014.

*Line 11, Power Generation and Transmission Facilities*, does not include the East Branch Enlargement share of costs for Alamo, Mojave Siphon, and Devil Canyon powerplants shown in Line 7 of Table 14-1. The capital costs for facilities included in Line 11 are shown in Table 14-5.

*Line 12, Additional Conservation Facilities*, shows projected costs to plan and study additional conservation facilities. Specific planning activities and projected spending amounts for 2016 through 2025 are shown in Table 14-6. Expenditures for these items are being reviewed. Construction costs of additional conservation facilities are not included in the financial analysis.

Line 12 does not include the Bay Delta Conservation Plan costs. DWR's share of the

**Table 14-4 East Branch Enlargement Phase I Capital Costs by Facility**

Facility	Amount (in millions of dollars)
Aqueduct and Siphons	128.1
Pearblossom Pumping Plant	70.1
Alamo Powerplant	5.0
Mojave Siphon Powerplant	47.3
Devil Canyon Powerplant and Second Afterbay	202.9
<b>Total</b>	<b>453.4</b>

**Table 14-5 Estimated Capital Costs for Power Generation and Transmission Facilities**

Power Plants and Transmission Lines	Amount (in millions of dollars)
<b>Power Plants</b>	
Reid Gardner, Unit 4	314.2
Bottle Rock	120.9
South Geysers	49.6
Devil Canyon	36.8
Warne	84.5
Alamo	44.9
Mojave Siphon	41.1
Hyatt	46.2
Robie Thermalito	113.5
<i>Subtotal</i>	<i>851.6</i>
<b>Transmission Lines</b>	
Midway–Wheeler Ridge	10.7
Geysers–Lakeville	6.9
<i>Subtotal</i>	<i>17.6</i>
<b>Total</b>	<b>869.2</b>

**Table 14-6 Estimated Future Costs for Planning Additional Conservation Facilities**

Activity	Amount (in millions of dollars)
SWP Future Water Supply	30.0
Other Planning Costs	0.0
<b>Total</b>	<b>30.0</b>

Bay Delta Conservation Plan expenditures for preliminary planning and environmental impact report preparation are currently financed by participating contractors.

*Line 13, Agricultural Drainage Facilities*, includes projected costs of the Agricultural Drainage Program. The activities in this program are monitoring, evaluating, reducing, and treating drainage, as well as investigating treatment and reuse of drainage water.

DWR assumes that future costs of the drainage program will be financed by revenue transfers (Line 37).

*Line 14, Other Costs*, includes items such as general design and construction costs, costs of completing operation and maintenance facilities, and costs of other completion activities for the initial facilities of the California Aqueduct. Portions of those costs ultimately will be allocated to California Aqueduct units described in the preceding paragraphs.

*Line 15, Total Project Construction Expenditures*, is the total of Lines 1 through 14.

*Line 16, Davis-Grunsky Act Program Costs*, shows costs of the Davis-Grunsky Act Program, a financial assistance program to provide grants and loans to public agencies for constructing local water projects.

As of December 31, 2015, DWR had disbursed \$130 million (including \$8.5 million for administration) in grants and loans to local agencies throughout the State.

*Line 17, Special Capital Requirements Under Revenue Bond Financing*, presents special capital requirements at the time revenue bonds are sold. The financial analysis assumes that proceeds from any future revenue bonds will be used to pay for bond

discounts, bond issuance costs, and debt service reserve requirements.

Information about the application of proceeds to these special requirements for actual and assumed revenue bond sales is presented in Table 14-7.

*Line 18, Total Capital Requirements*, is the total of Lines 15, 16, and 17.

*Line 19, Power Facilities Capital Requirements*, shows the total capital requirements for power facilities included in Line 18.

*Line 20, Water Facilities Capital Requirements*, shows the total capital requirements for water facilities included in Line 18.

## Capital Financing

The SWP was constructed using three general types of financing: Burns-Porter Act, revenue bonds, and capital resources. Lines 21 through 37 of Table 14-1 present specific information about these financing sources.

### Burns-Porter Act

Burns-Porter Act financing is derived from the sale of California Water Resources Development Bonds (general obligation bonds) and State tideland oil revenues deposited in the California Water Fund as authorized by the Burns-Porter Act (California Water Code Sections 12930–12944), approved by voters in November 1960. The Burns-Porter Act authorized an issuance of \$1.75 billion of general obligation State bonds, which are repaid by revenues received according to the water supply contracts. Of that authorization, \$130 million was reserved specifically for the Davis-Grunsky Act Program.

Proceeds from the sale of general obligation bonds were deposited in the California Water Resources Development Bond Fund—Bond Proceeds Account, from which monies were



**Table 14-7 Application of Revenue Bond Proceeds (in millions of dollars)**

Bond Series <sup>a</sup>	Construction Expenditures	Other Capital Requirements				Subtotal	Total Principal Amount of Bonds
		Reimbursement of General Fund	Capitalized Interest	Capitalized Operating Costs	Bond Financing and Refunding Costs <sup>b</sup>		
Oroville	218.0	2.6	19.9	1.5	3.0	27.0	245.0
Devil Canyon-Castaic	126.4	0.0	10.0	0.7	2.1	12.8	139.2
Pyramid Series A	74.0	0.0	19.2	1.0	1.6	21.8	95.8
Reid Gardner Series B	146.1	0.0	41.9	0.0	12.0	53.9	200.0
Reid Gardner Series C	91.1	0.0	17.9	7.9	8.1	33.9	125.0
Small Hydro-South Geysers Series D	49.6	0.0	19.9	0.0	5.5	25.4	75.0
Bottle Rock Series E	96.9	0.0	22.0	3.7	2.4	28.1	125.0
Alamo-South Geysers Series F	59.1	0.0	14.2	0.0	1.7	15.9	75.0
Reid Gardner Series G	1.6	0.0	0.0	0.0	237.9	237.9	239.5
Power Facilities Series H	22.2	0.0	0.0	0.0	184.5	184.5	206.7
East Branch Enlargement Series A	108.3	0.0	12.6	0.0	11.1	23.7	132.0
Water System Facilities Series B	97.4	0.0	0.0	0.0	2.6	2.6	100.0
Water System Facilities Series C	0.6	0.0	0.0	0.0	8.4	8.4	9.0
Water System Facilities Series D	95.9	0.0	2.9	0.0	1.2	4.1	100.0
Water System Facilities Series E	0.4	0.0	0.0	0.0	8.6	8.6	9.0
Water System Facilities Series F	0.0	0.0	0.0	0.0	160.0	160.0	160.0
Water System Facilities Series G	86.8	0.0	4.6	0.0	8.6	13.2	100.0
Water System Facilities Series H	85.5	0.0	5.7	0.0	8.8	14.5	100.0
Water System Facilities Series I	158.9	0.0	5.8	0.0	15.3	21.1	180.0
Water System Facilities Series J	0.0	0.0	0.0	0.0	649.8	649.8	649.8
Water System Facilities Series K	88.6	0.0	3.1	0.0	8.3	11.4	100.0
Water System Facilities Series L	0.0	0.0	0.0	0.0	537.8	537.8	537.8
Water System Facilities Series M	166.3	0.0	9.9	0.0	13.8	23.7	190.0
Water System Facilities Series N	137.4	0.0	6.0	0.0	8.6	14.6	152.0
Water System Facilities Series O	156.5	0.0	8.4	0.0	170.1	178.5	335.0
Water System Facilities Series P	141.6	0.0	5.2	0.0	13.2	18.4	160.0
Water System Facilities Series Q	135.0	0.0	8.0	0.0	123.6	131.6	266.6
Water System Facilities Series R	0.0	0.0	0.0	0.0	20.7	20.7	20.7
Water System Facilities Series S	78.2	0.0	5.8	0.0	116.2	122.0	200.2
Water System Facilities Series T	0.0	0.0	0.0	0.0	135.7	135.7	135.7
Water System Facilities Series U	98.7	0.0	5.3	0.0	103.2	108.5	207.2
Water System Facilities Series V	0.0	0.0	0.0	0.0	20.6	20.6	20.6
Water System Facilities Series W	41.0	0.0	1.3	0.0	218.7	220.0	261.0
Water System Facilities Series X	0.0	0.0	0.0	0.0	160.2	160.2	160.2
Water System Facilities Series Y	0.0	0.0	0.0	0.0	329.9	329.9	329.9
Water System Facilities Series Z	0.0	0.0	0.0	0.0	170.7	170.7	170.7
Water System Facilities Series AA	0.0	0.0	0.0	0.0	108.7	108.7	108.7
Water System Facilities Series AB	92.2	0.0	3.9	0.0	93.6	97.5	189.7
Water System Facilities Series AC	13.7	0.0	0.6	0.0	257.7	258.3	272.0
Water System Facilities Series AD	12.4	0.0	0.9	0.0	99.1	100.0	112.4
Water System Facilities Series AE	383.9	0.0	9.5	0.0	239.5	249.0	632.9
Water System Facilities Series AF	33.4	0.0	1.3	0.0	253.1	254.4	287.7
Water System Facilities Series AG	9.9	0.0	0.4	0.0	158.8	159.2	169.1
Water System Facilities Series AH	71.7	0.0	3.6	0.0	22.3	26.0	97.7
Water System Facilities Series AI	0.0	0.0	0.0	0.0	92.3	92.3	92.3

**Table 14-7 Application of Revenue Bond Proceeds (in millions of dollars)****(continued)**

Bond Series <sup>a</sup>	Construction Expenditures	Other Capital Requirements				Subtotal	Total Principal Amount of Bonds
		Reimbursement of General Fund	Capitalized Interest	Capitalized Operating Costs	Bond Financing and Refunding Costs <sup>b</sup>		
Water System Facilities Series AJ	69.3	0.0	3.7	0.0	143.9	147.6	216.9
Water System Facilities Series AK	32.0	0.0	0.9	0.0	3.4	4.3	36.3
Water System Facilities Series AL	0.0	0.0	0.0	0.0	105.9	105.9	105.9
Water System Facilities Series AM	0.0	0.0	0.0	0.0	184.0	184.0	184.0
Water System Facilities Series AN	44.8	0.0	0.3	0.0	4.4	4.7	49.5
Water System Facilities Series AO	0.0	0.0	0.0	0.0	317.5	317.5	317.5
Water System Facilities Series AP	47.7	0.0	1.2	0.0	(3.5)	(2.4)	45.3
Water System Facilities Series AQ	122.6	0.0	7.2	0.0	(9.6)	(2.4)	120.2
Water System Facilities Series AR	168.1	0.0	5.4	0.0	(12.1)	(6.7)	161.4
Water System Facilities Series AS	0.0	0.0	0.0	0.0	645.8	645.8	645.8
Water System Facilities Series AT	139.5	0.0	5.9	0.0	3.9	9.8	149.2
Water System Facilities Series AU	104.6	0.0	3.4	0.0	1.3	4.7	109.3
<b>Subtotal</b>	<b>3,907.9</b>	<b>2.6</b>	<b>297.9</b>	<b>14.8</b>	<b>6,194.4</b>	<b>6,509.7</b>	<b>10,417.5<sup>c</sup></b>
Future East Branch Enlargement Bonds	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Future East Branch Extension Bonds	34.9	0.0	1.9	0.0	2.5	4.4	39.3
Future SBA Enlargement Bonds	4.7	0.0	0.2	0.0	0.2	0.4	5.0
Future Water System Facilities Bonds	1,073.0	0.0	36.0	0.0	45.9	81.9	1,154.9
<b>Total</b>	<b>5,020.5</b>	<b>2.6</b>	<b>336.0</b>	<b>14.8</b>	<b>6,243.0</b>	<b>6,596.3</b>	<b>11,616.8</b>

<sup>a</sup> Actual bond issue for all except future East Branch Enlargement, future East Branch Extension, future South Bay Aqueduct Improvements and Enlargement, and future Water System Facilities bonds.

<sup>b</sup> Bond financing and refunding costs include funds applied to debt service reserve requirements.

<sup>c</sup> Includes \$5,911.2 million of refunded principal, leaving a net principal obligation of \$4,506.4 million.

expended only for the construction of SWP facilities and for the Davis-Grunsky Act Program. Approximately 24 percent of the expenditures through 2015 for construction and the Davis-Grunsky Act Program were financed with general obligation bonds.

Monies deposited in the California Water Fund were appropriated for purposes outlined in the Burns-Porter Act. Such deposits were derived from a portion of the State tideland oil revenues, in accordance with a continuing authorization. The California Water Fund was used to finance \$508 million, or approximately 7 percent, of the construction expenditures through 2015.

### Revenue Bonds

Revenue bond financing is derived from the sale of revenue bonds as authorized by the Central Valley Project Act (California Water Code Sections 11100–11925). DWR's authority to issue revenue bonds was

confirmed by a decision of the California Supreme Court in 1963 (*Warne v. Harkness*, 60 Cal. 2d 579).

Proceeds from the sale of revenue bonds are deposited in the Central Valley Water Project Construction Fund, from which money is expended only for purposes specified in the resolution authorizing each bond sale. Those purposes, in addition to paying construction, planning, and right-of-way costs, may include funding the Debt Service Reserve Account, paying interest on bonds, and paying water system operating expenses during a specified period.

As of December 31, 2015, DWR had sold \$10.4 billion of revenue bonds. That amount includes \$5.9 billion of refunded bonds, leaving a total principal obligation of \$4.5 billion.

## Capital Resources

Capital resources financing is derived from payments and appropriations (including a portion of the State tideland oil revenues) authorized by a variety of special contracts, cost-sharing agreements, and legislative actions concerning the SWP, plus accrued interest on these funds. Capital resources revenues are deposited in the Central Valley Water Project Construction Fund and may be expended for interest on general obligation bonds and costs of constructing SWP facilities.

According to DWR's financial management policy, the capital resources revenues are used first to cover any general obligation bond debt service that exceeds available revenues.

## Capital Financing Sources

Capital financing sources include power revenue bonds, East Branch Enlargement bonds, East Branch Extension bonds, SBA Enlargement bonds, water system facilities bonds, initial project facilities bonds, bond proceeds from the Davis-Grunsky Act Program, California Water Fund monies, and capital resources revenues.

*Line 21, Power Facilities Revenue Bonds through Series H*, includes the proceeds applied from power revenue bonds for Oroville, Devil Canyon, Castaic, Warner, Reid Gardner, Bottle Rock, Alamo, South Geysers, and small hydro projects.

No future power revenue bond sales are projected for this financial analysis.

*Line 22, East Branch Enlargement, Current Bonds*, shows that \$482 million of Water System Revenue Bond proceeds has been applied to the East Branch Enlargement project through December 31, 2015. Of this total, \$424 million was used for construction expenditures and \$58 million was used for bond discounts, interest costs, and debt service reserve requirements.

*Line 23, East Branch Enlargement, Future Bonds*, shows no projected bond sales for this financial analysis.

*Line 24, East Branch Extension, Current Bonds*, shows that \$383 million of Water System Revenue Bond proceeds has been spent through December 31, 2015.

*Line 25, East Branch Extension, Future Bonds*, shows DWR's estimate of \$39 million of additional bonds required to complete construction of the East Branch Extension and to pay for bond discounts, capitalized interest, and debt service reserve requirements.

*Line 26, South Bay Aqueduct Enlargement, Current Bonds*, shows that \$219 million of Water System Revenue Bond proceeds had been spent through December 31, 2015.

*Line 27, South Bay Aqueduct Enlargement, Future Bonds*, shows DWR's estimate of \$5 million of additional bonds required to complete construction of the SBA Enlargement and to pay for bond discounts, capitalized interest, and debt service reserve requirements.

*Line 28, Water System Facilities, Current Bonds*, shows that through December 31, 2015, \$2.2 billion of proceeds from Water System Revenue Bonds, Series A through Series AU, was applied to SWP projects other than the East Branch Enlargement, the East Branch Extension, and the SBA Enlargement. Of this total, \$2.0 billion was used to pay for construction expenditures and \$0.2 billion was used to pay for bond discounts, capitalized interest, and debt service reserve requirements.

*Line 29, Water System Facilities, Future Bonds*, shows that \$1.2 billion of future water revenue bonds is needed to provide \$1.1 billion for construction of SWP water system facilities and \$0.1 billion for bond discounts, interest costs, and debt service reserve requirements.

*Line 30, Subtotal, Water System Revenue Bonds*, is the total of Lines 22 through 29.

*Line 31, Initial Project Facilities Bond Proceeds*, shows the amount of general obligation bonds sold to provide financing costs for initial SWP facilities and for costs of planning certain additional conservation facilities.

Financing initial facilities from general obligation bonds was completed in mid-1972 and totaled \$1.444 billion—\$1.750 billion Burns-Porter Act authorization less \$130 million reserved for the Davis-Grunsky Act Program and \$176 million “offset” for additional conservation facilities. (The Burns-Porter Act provides that to the extent California Water Fund monies are expended, an equal amount of general obligation bonds are reserved [offset] for financing the construction of additional conservation facilities in certain watersheds.)

In mid-1972, the reservation of offset bonds was effectively limited to \$176 million, the total amount of California Water Fund monies expended up to that time. By mid-1972, all general obligation bonds authorized by the Burns-Porter Act had been offset, reserved for the Davis-Grunsky Act Program, or used for SWP construction.

Approximately \$8.5 million of the offset bonds was used to finance planning studies of the Middle Fork Eel River Development. This financial analysis is not based on the use of any offset bond proceeds to meet capital requirements. If, at some time, the State constructs an additional conservation facility, as specified in California Water Code Section 12938, the remaining offset bonds could be sold.

*Line 32, Davis-Grunsky Act Program Bond Proceeds*, shows, for simplification, the entire \$130 million of capital expenditures authorized for the Davis-Grunsky Act Program, according to the Burns-Porter Act, as being funded by proceeds from the

sale of general obligation bonds. In fact, \$102 million originated from bond proceeds while \$28 million from the California Water Fund was used for the program in lieu of bond proceeds prior to 1969. Since the final offset in 1994, DWR has accumulated \$44.6 million in capital costs through fiscal year 2006–2007.

*Line 33, Application of California Water Fund Monies*, shows the amount of SWP costs financed under the Burns-Porter Act. The act provides that any available money in the California Water Fund must be used for construction in lieu of proceeds from the sale of general obligation bonds.

When the Burns-Porter Act became effective in late 1960, approximately \$97 million had been accumulated in the fund. That balance, plus subsequent appropriations, interest earnings, and other miscellaneous income to the fund through December 31, 2015, was used to finance a total of \$508 million of SWP costs.

*Line 34, Interim Financing*, shows the net annual amounts of funds flowing into and out of the Water Revenue Commercial Paper Notes program. This program was established in March 1993 to provide an ongoing source of interim financing for water system projects prior to permanent financing from the sale of long-term revenue bonds. DWR has authority to issue up to \$150 million of Water Revenue Commercial Paper Notes. A positive number indicates money borrowed from the program to finance construction costs. A negative number indicates money repaid to the program. The financial analysis assumes that all funds borrowed from the program will be repaid before the end of the analysis period.

*Line 35, Direct Pay*, shows the revenues received directly from the contractors rather than financing through bonds for certain SWP project construction expenditures. At this time, the North Bay Aqueduct Alternate Intake is funded this way.



*Line 36, Application of Capital Resources Revenues to Construction*, presents the Capital Resources Revenues applied for capital expenditures.

*Line 37, Revenue Transfers Applied*, shows monies assumed to be transferred to the California Water Fund, according to provisions of the Burns-Porter Act, and subsequently reappropriated to construction (see Line 40 of Table 14-2). Projected amounts for the years 2016 through 2025 include funds to finance expenditures for agricultural drainage facilities, as indicated in Line 13 of Table 14-1, and expenditures for additional conservation facilities, as indicated in Line 12.

*Line 38, Subtotal, Other Capital Financing*, is the total of Lines 31 through 37.

*Line 39, Total Financing of Capital Requirements*, totals Lines 21, 30, and 38.

## Annual Revenues and Expenditures

After financial analysis of SWP operations, DWR concluded that projected payments by contractors and other revenues will be adequate to pay annual operations, maintenance, power, and replacement (OMP&R) costs and meet all repayment obligations on funds used to finance SWP construction and other authorized costs during the period 2016 through 2025. Data on annual revenues and expenditures are presented in Table 14-2. A detailed discussion of each line item follows.

### Project Revenues

Project revenues primarily consist of SWP water contractor payments required under their individual long-term water supply contracts. Those revenues are deposited in two funds: the Central Valley Water Project Revenue Fund, where all revenues pledged to revenue bonds are placed, and the

California Water Resources Development Bond Fund—Systems Revenue Account, where all other SWP operating revenues are placed. Use of those funds is limited to paying operating costs and debt service; except that revenues in excess of those costs may be deposited to a reserve for future SWP construction, since the California Water Fund has been repaid (see Line 39).

*Line 1, Capital Resources Revenues*, includes the following:

- federal payments for SWP capital expenditures;
- appropriations for capital costs allocated to recreation;
- appropriations for SWP capital expenditures prior to passage of the Burns-Porter Act and according to Senate Bill 261 (1968);
- payments from Los Angeles Department of Water and Power for Castaic power development;
- advances from contractors for construction of requested work;
- investment earnings on the Capital Resources Account; and
- investment earnings on unexpended revenue bond proceeds.

Historically, appropriations for capital costs allocated to recreation and fish and wildlife enhancement amounted to \$5 million per year and were appropriated by the California Legislature from the State tideland oil revenues. There have been no appropriations from this fund since 1985.

Legislation enacted in 1989 offset a portion of the amount owed to the SWP by the State for costs allocated to recreation and fish and wildlife enhancement against the amount the SWP owed to the California Water Fund (see Line 39). Since the final offset in 1994, DWR has accumulated \$68.3 million in capital costs through December 31, 2015.



In 2012, the Davis-Dolwig Act was amended to appropriate \$10 million per fiscal year from the Harbors and Watercraft Revolving Fund to cover a portion of the OMP&R and capital costs allocated to recreation and fish and wildlife enhancement. Starting in fiscal year 2012–2013, \$7.5 million is being appropriated for on-going OMP&R and capital costs and \$2.5 million is being appropriated to reimburse for past unreimbursed OMP&R and capital costs.

*Lines 2 through 12, Water Contractor Payments*, show amounts of the separate elements of water contractor payments.

Amounts in Line 4 also include revenues sufficient to cover costs associated with sales of excess power. Appendix B of this bulletin presents a detailed explanation of payments identified in Lines 2 through 12.

OMP&R costs are repaid as they are incurred as part of the Transportation Charge; therefore, no interest charges are included. Construction costs included in the Transportation Charge, and all construction and annual OMP&R costs included in the Delta Water Charge, are to be repaid with interest at the Project Interest Rate.

The Project Interest Rate, as defined in Article 1(r) of the standard provisions of the long-term water supply contracts, is the weighted average of the rates paid on certain securities issued and loans obtained to finance SWP facilities.

According to the original water supply contract provisions, the basis for determining the Project Interest Rate was the weighted average of rates paid on general obligation bond sales only. In 1969, after Oroville Revenue Bonds were issued, the contracts were amended to expand the basis to include rates on all other securities sold and loans obtained thereafter for financing SWP facilities, including revenue bonds (see Bulletin 132-70, page 28).

However, not all proceeds from the sale of revenue bonds are melded into the calculation of the Project Interest Rate. Only those proceeds applied to construction costs (the only application of general obligation bonds permitted by law) and those consumed by the bond discount (a component of the total interest cost of a revenue bond issue) are included in the calculation (see Table 14-8).

Calculations for determining the Project Interest Rate do not include proceeds from the sale of revenue bonds for Off-Aqueduct Power facilities, the East Branch Enlargement facilities, SBA, or water system facilities defined in the Water Revenue Bond Amendment. Table 14-9 lists all bond sales by date and presents basic information used in the calculation of the Project Interest Rate.

Information about contractor water charges in Appendix B, which can be found in the back of this bulletin, is based on known conditions and substantiates DWR's determination of 2017 water charges to be billed on July 1, 2016. However, information about significant differences between the sum of future charges included in Lines 2 through 12 of Table 14-2 and the substantiation of 2016 charges included in Appendix B are as follows.

- Future capital costs in Appendix B are based on the prevailing prices as of December 31, 2015. Those costs presented in the financial analysis include allowances for price escalation.
- Pre-2016 charges in Appendix B represent charges as they should have been, according to currently known conditions. Pre-2016 charges included in Table 14-2 are those actually paid as part of previously determined bills.
- Charges in Appendix B are unadjusted for past overpayments or underpayments. Charges included in Table 14-2 for 2016 and thereafter have been adjusted for any apparent overpayments or underpayments of pre-2016 charges.

**Table 14-8 Revenue Bond Proceeds Affecting Project Interest Rate (in millions of dollars)**

Project	Proceeds Included in Project Interest Rate				Total Principal Amount of Bonds	Percentage of Total Amount Included in Calculating Project Interest Rate [4] / [5]
	Applied to Construction Costs	Less Portion of Proceeds Derived from Interest Earnings Prior to Delivery of Bonds	Plus Bond Financing and Refunding Costs	Subtotal, Proceeds Included in Calculating Project Interest Rate [1] - [2] + [3]		
	[1]	[2]	[3]	[4]	[5]	[6]
Devil Canyon-Castaic Project Revenue Bonds	125.3	1.5	1.4	125.2	139.2	90
Pyramid Project Revenue Bonds (Series A)	71.2	0.5	1.1	71.8	95.8	75
Alamo Project Bond Anticipation Note	16.8	0.1	0.3	17.0	24.4	70
Small Hydro Project I Revenue Bonds (Series D)	25.4	0.2	1.5	26.7	37.5	71
Alamo Project Revenue Bonds (Series F)	38.9	0.3	0.7	39.3	50.0	79
Power Facilities Revenue Bonds (Series H)						
Pyramid Project	5.0	0.0	0.1	5.1	5.1	100
Alamo Project	1.7	0.0	0.0	1.7	1.7	100
Small Hydro Project I	25.2 <sup>a</sup>	0.2	0.4	25.4	35.6	71
Water System Revenue Bonds (Series J)						
Pyramid Project	0.0	0.0	75.9 <sup>b</sup>	75.9	99.2 <sup>b</sup>	77
Alamo Project	0.0	0.0	45.6 <sup>b</sup>	45.6	57.1 <sup>b</sup>	80
Small Hydro Project I	0.0	0.0	27.8 <sup>b</sup>	27.8	38.8 <sup>b</sup>	72
Water System Revenue Bonds (Series L)						
Small Hydro Project I	0.0	0.0	1.5 <sup>b</sup>	1.5	2.1 <sup>b</sup>	71
Water System Revenue Bonds (Series Q)						
Pyramid Project	0.0	0.0	3.0 <sup>b</sup>	3.0	3.9 <sup>b</sup>	77
Alamo Project	0.0	0.0	4.8 <sup>b</sup>	4.8	6.0 <sup>b</sup>	80
Water System Revenue Bonds (Series S)						
Pyramid Project	0.0	0.0	8.0 <sup>b</sup>	8.0	10.4 <sup>b</sup>	77
Alamo Project	0.0	0.0	7.6 <sup>b</sup>	7.6	9.5 <sup>b</sup>	80
Water System Revenue Bonds (Series U)						
Pyramid Project	0.0	0.0	2.4 <sup>b</sup>	2.4	3.2 <sup>b</sup>	75
Alamo Project	0.0	0.0	3.2 <sup>b</sup>	3.2	4.0 <sup>b</sup>	80
Water System Revenue Bonds (Series W)						
Pyramid Project	0.0	0.0	27.7 <sup>b</sup>	27.7	36.0 <sup>b</sup>	77
Alamo Project	0.0	0.0	11.8 <sup>b</sup>	11.8	14.7 <sup>b</sup>	80
Small Hydro Project (construction)	3.4	0.0	0.0	3.4	3.7	92
Small Hydro Project (refunding)	0.0	0.0	16.3 <sup>b</sup>	16.3	22.7 <sup>b</sup>	72
Water System Revenue Bonds (Series X)						
Pyramid Project	0.0	0.0	8.5 <sup>b</sup>	8.5	11.0 <sup>b</sup>	77
Alamo Project (Series H refunding)	0.0	0.0	0.3 <sup>b</sup>	0.3	0.3 <sup>b</sup>	100
Alamo Project (Series F refunding)	0.0	0.0	3.9 <sup>b</sup>	3.9	4.9 <sup>b</sup>	79
Small Hydro Project	0.0	0.0	4.6 <sup>b</sup>	4.6	6.4 <sup>b</sup>	72

<sup>a</sup> Amount consists of 71 percent of proceeds deposited in escrow to refund portion of Series D bonds (\$35.1 million plus deposits to construction account [\$0.3 million]).

<sup>b</sup> Represents amount of principal used to refund portions of prior bond issues.

**Table 14-9 Actual Bond Sales and Project Interest Rates, by Date of Sale**

Bond Sales	Date of Sale	Delivery Date	Dollar-Years <sup>a</sup> (thousands)	Interest Cost (thousands)	Issue Interest Rate <sup>b</sup> (percent)	Project Interest Rate <sup>c</sup> (percent)
\$ 50,000,000 Bond Anticipation Notes	11/21/63	11/21/63	26,944	531	1.971	1.971
\$100,000,000 Series A Water Bonds	2/18/64	2/18/64	3,402,000	119,750	3.520	3.508
\$ 50,000,000 Series B Water Bonds	5/5/64	5/5/64	1,726,000	60,986	3.533	3.516
\$100,000,000 Series C Water Bonds	10/7/64	10/7/64	3,452,000	123,764	3.585	3.544
\$100,000,000 Series D Water Bonds	2/16/65	2/16/65	3,497,900	122,403	3.499	3.531
\$100,000,000 Series E Water Bonds	11/23/65	11/23/65	3,497,900	130,029	3.717	3.573
\$100,000,000 Series F Water Bonds	6/8/66	6/8/66	3,497,900	137,359	3.927	3.638
\$100,000,000 Series G Water Bonds	11/22/66	11/22/66	3,497,900	143,788	4.111	3.711
\$100,000,000 Series H Water Bonds	3/21/67	3/21/67	3,497,900	129,261	3.695	3.709
\$100,000,000 Series J Water Bonds	7/18/67	7/18/67	3,497,900	143,199	4.094	3.754
\$100,000,000 Series K Water Bonds	11/14/67	11/14/67	3,497,900	163,887	4.685	3.853
\$150,000,000 Revenue Bonds, Oroville Division, Series A	4/3/68	4/3/68	5,228,700	270,289	5.169	
\$100,000,000 Series L Water Bonds	7/11/68	7/11/68	3,497,900	166,918	4.772	3.941
\$100,000,000 Series M Water Bonds	10/22/68	10/22/68	3,497,900	169,989	4.860	4.021
\$ 94,995,000 Revenue Bonds, Oroville Division, Series B	4/1/69	4/1/69	3,423,460	195,902	5.722	
\$ 46,761,000 Cumulative 1970 General Fund Borrowing, repaid 7/10/70	-		4,938	346	7.007	
\$200,000,000 Series N and P Bond Anticipation Notes	6/16/70	6/16/70	200,000	11,660	5.830	4.030
\$100,000,000 Series N Water Bonds	2/2/71	2/2/71	3,447,900	190,292	5.519	4.148
\$100,000,000 Series Q Bond Anticipation Notes	3/10/71	3/10/71	100,000	2,349	2.349	4.143
\$100,000,000 Series P Water Bonds	4/21/71	4/21/71	3,397,900	193,377	5.691	4.255
\$150,000,000 Series Q and R Water Bonds	11/9/71	11/9/71	5,171,850	265,734	5.138	4.342
\$ 40,000,000 Series S Water Bonds	3/28/72	3/28/72	1,399,160	76,509	5.468	4.371
\$139,165,000 Devil Canyon-Castaic Revenue Bonds	8/8/72	8/8/72	4,776,204	258,839	5.419	4.457
\$ 10,000,000 Series T Water Bonds	3/20/73	3/20/73	185,265	9,491	5.123	4.459
\$ 10,000,000 Series U Water Bonds	1/13/76	1/13/76	158,750	8,731	5.500	4.462
\$ 10,000,000 Series V Water Bonds	11/15/77	11/15/77	158,750	7,573	4.770	4.462
\$ 95,800,000 Pyramid Hydroelectric Revenue Bonds	10/23/79	10/23/79	2,260,072	172,495	7.632	4.584
\$150,000,000 Reid Gardner Project, Series A Bond Anticipation Notes	7/1/81	7/1/81	347,906	29,572	8.500	
\$ 75,600,000 Bottle Rock Project, Bond Anticipation Notes	12/1/81	12/1/81	264,600	25,137	9.500	
\$ 24,400,000 Alamo Project, Bond Anticipation Notes	12/1/81	12/1/81	24,266	2,305	9.499	4.589
\$200,000,000 Reid Gardner Project, Series B Revenue Bonds	7/7/82	7/7/82	4,623,137	553,793	11.979	
\$125,000,000 Reid Gardner Project, Series C Revenue Bonds	11/16/82	11/16/82	2,720,045	255,744	9.402	
\$ 37,500,000 Small Hydro Project I, Series D Revenue Bonds	11/16/82	11/16/82	837,769	84,587	10.097	4.666
\$ 37,500,000 South Geysers Project, Series D Revenue Bonds	11/16/82	11/16/82	930,325	90,021	9.676	
\$125,000,000 Bottle Rock Project, Series E Revenue Bonds	4/27/83	4/27/83	2,624,805	225,102	8.576	
\$ 50,000,000 Alamo Project, Series F Revenue Bonds	4/27/83	4/27/83	1,190,763	100,836	8.468	4.727
\$ 25,000,000 South Geysers Project, Series F Revenue Bonds	4/27/83	4/27/83	608,550	52,578	8.640	
\$239,505,000 Reid Gardner Project, Series G Revenue Bonds	3/15/85	3/15/85	4,524,136	425,840	9.413	
\$206,690,000 Power Facilities Series H Revenue Bonds	6/20/86	6/20/86	4,430,520	347,745	7.849	4.713
\$132,000,000 East Branch Enlarg., Series A Water System Revenue Bonds	7/15/86	7/15/86	3,427,165	254,915	7.438	
\$100,000,000 Series B Water System Revenue Bonds	5/5/87	5/5/87	2,564,012	194,817	7.598	
\$ 9,000,000 Series C Water System Revenue Bonds	12/1/87	12/1/87	324,000	31,995	9.875	
\$100,000,000 Series D Water System Revenue Bonds	6/14/88	6/14/88	2,640,510	201,253	7.622	
\$ 9,000,000 Series E Water System Revenue Bonds	11/29/88	12/5/88	324,000	31,995	9.875	
\$160,030,000 Series F Water System Revenue Bonds	3/15/89	4/20/89	2,779,838	189,261	6.808	
\$100,000,000 Series G Water System Revenue Bonds	3/6/90	3/6/90	2,434,175	172,277	7.077	
\$100,000,000 Series H Water System Revenue Bonds	1/10/91	1/10/91	2,459,172	168,857	6.866	

**Table 14-9 Actual Bond Sales and Project Interest Rates, by Date of Sale**

Bond Sales	Date of Sale	Delivery Date	Dollar-Years <sup>a</sup> (thousands)	Interest Cost (thousands)	Issue Interest Rate <sup>b</sup> (percent)	Project Interest Rate <sup>c</sup> (percent)
\$180,000,000 Series I Water System Revenue Bonds	5/14/91	5/14/91	4,366,680	294,090	6.735	
\$649,835,000 Series J Water System Revenue Bonds	1/16/92	1/28/92	12,422,222	745,198	5.999	
\$100,000,000 Series K Water System Revenue Bonds	5/12/92	6/4/92	2,366,783	147,064	6.214	
\$ 9,000,000 Series W Water Bonds	8/19/92	8/19/92	95,250	6,172	6.480	4.621
\$537,830,000 Series L Water System Revenue Bonds	5/19/93	6/2/93	11,414,859	640,518	5.611	4.620
\$ 2,000,000 Series X Water Bonds	9/1/93	9/1/93	26,000	1,247	4.796	4.621
\$ 1,400,000 Series Y Water Bonds	11/30/94	11/30/94	19,483	1,249	6.411	
\$190,000,000 Series M Water System Revenue Bonds	12/9/93	12/21/93	3,911,846	194,981	4.984	
\$152,000,000 Series N Water System Revenue Bonds	3/3/95	3/14/95	2,241,606	122,658	5.472	
\$335,000,000 Series O Water System Revenue Bonds	12/5/95	12/20/95	7,528,890	375,667	4.990	
\$160,000,000 Series P Water System Revenue Bonds	5/7/96	5/22/96	3,553,823	204,524	5.755	
\$266,630,000 Series Q Water System Revenue Bonds	11/5/96	12/4/96	5,481,815	299,846	5.470	4.620
\$ 20,700,000 Series R Water System Revenue Bonds	3/10/97	3/12/97	564,125	36,627	6.493	
\$200,205,000 Series S Water System Revenue Bonds	7/30/97	8/13/97	4,093,110	203,755	4.978	4.615
\$135,665,000 Series T Water System Revenue Bonds	7/30/97	3/4/98	1,310,620	66,942	5.108	
\$207,180,000 Series U Water System Revenue Bonds	11/19/98	12/1/98	4,032,075	200,758	4.979	
\$ 20,580,000 Series V Water System Revenue Bonds	11/19/98	12/1/98	525,100	32,819	6.250	
\$260,995,000 Series W Water System Revenue Bonds	5/1/01	5/17/01	3,659,312	195,822	5.351	4.613
\$160,225,000 Series X Water System Revenue Bonds	5/1/02	6/4/02	2,732,785	139,109	5.090	4.610
\$329,885,000 Series Y Water System Revenue Bonds	7/25/02	3/5/03	4,422,973	222,654	5.034	
\$170,655,000 Series Z Water System Revenue Bonds	10/1/02	10/16/02	1,706,132	75,696	4.437	
\$108,705,000 Series AA Water System Revenue Bonds	10/4/02	3/5/03	2,114,341	104,220	4.929	
\$189,625,000 Series AB Water System Revenue Bonds	3/9/04	3/18/04	4,344,942	173,788	4.000	
\$272,070,000 Series AC Water System Revenue Bonds	12/15/04	1/6/05	4,479,436	209,150	4.669	
\$112,390,000 Series AD Water System Revenue Bonds	6/14/05	7/7/05	1,827,449	90,461	4.950	4.608
\$632,890,000 Series AE Water System Revenue Bonds	4/23/08	5/1/08	8,884,000	436,216	4.910	
\$287,735,000 Series AF Water System Revenue Bonds	3/11/09	3/19/09	2,980,895	431,199	14.465	
\$169,115,000 Series AG Water System Revenue Bonds	11/17/09	12/2/09	2,907,605	311,889	10.727	
\$ 97,675,000 Series AH Water System Revenue Bonds	10/27/10	11/9/10	1,432,014	72,176	5.040	4.610
\$ 92,275,000 Series AI Water System Revenue Bonds	10/27/10	9/7/11	698,716	34,936	5.000	
\$216,930,000 Series AJ Water System Revenue Bonds	10/6/11	10/13/11	2,080,429	100,663	4.839	
\$ 36,370,000 Series AK Water System Revenue Bonds	2/28/12	3/13/12	495,566	23,466	4.735	
\$105,875,000 Series AL Water System Revenue Bonds	2/28/12	9/5/12	739,447	36,972	5.000	
\$183,960,000 Series AM Water System Revenue Bonds	2/28/12	3/5/13	1,440,539	72,027	5.000	
\$ 49,525,000 Series AN Water System Revenue Bonds	9/19/12	9/27/12	646,489	31,783	4.916	
\$317,505,000 Series AO Water System Revenue Bonds	9/19/12	9/27/12	2,830,185	71,219	2.516	
\$45,340,000 Series AP Water System Revenue Bonds	3/12/13	3/26/13	621,111	25,008	4.026	
\$120,205,000 Series AQ Water System Revenue Bonds	5/21/13	6/18/13	2,120,496	85,993	4.055	
\$161,445,000 Series AR Water System Revenue Bonds	2/25/14	3/6/14	2,126,626	91,827	4.318	
\$645,795,000 Series AS Water System Revenue Bonds	9/30/14	10/30/14	7,285,936	363,246	4.986	
\$149,245,000 Series AT Water System Revenue Bonds <sup>d</sup>	10/29/14	11/6/14	2,784,834	83,541	3.000	
\$109,275,000 Series AU Water System Revenue Bonds <sup>d</sup>	8/25/15	9/2/15	1,946,180	40,285	2.070	
<b>Total</b>			<b>241,343,414</b>	<b>13,811,541</b>		
<b>Portion allocated to Project Interest Rate</b>			<b>63,903,487</b>	<b>2,945,789</b>	<b>4.610</b>	<b>4.610</b>

<sup>a</sup> A unit equivalent to one dollar of principal amount outstanding for one year.

<sup>b</sup> The total interest rate (without regard to discounts paid or to premiums received) divided by the total dollar-years, expressed as a percent.

<sup>c</sup> Cumulative interest costs divided by cumulative dollar-years, expressed as a percent. (Excluding Oroville Division bonds and revenue bonds for Off-Aqueduct Power Facilities, East Branch Enlargement Facilities, East Branch Extension Facilities, Water System Facilities as defined in the Water Revenue Bond Amendment, Coastal Extension Facilities, or South Bay Aqueduct Enlargement Facilities.)

<sup>d</sup> Variable rate issue. Assumed an interest rate. Actual interest cost and rate will vary.

- Charges in Appendix B for East Branch Enlargement costs include the amounts for debt service and 25 percent cover for the East Branch Enlargement share of the Series A through Series AU bonds. Charges in Table 14-2 apply to Series A through Series AU bonds and also include amounts of the debt service and cover for assumed future bonds.
- The water revenue bond surcharge in Appendix B applies only to the Series B through Series AU bonds. Surcharge values included in Table 14-2 apply to Series B through Series AU bonds and to assumed future issues required to finance SWP construction costs included in Table 14-1.

*Line 13, Subtotal, Water Contractor Payments,* is the total of Lines 2 through 12.

*Line 14, Revenue Bond Cover Adjustments,* represents the credit to contractors resulting from the cover of 25 percent of the annual debt service for Power Facilities Revenue Bonds and Water System Revenue Bonds. Cover is collected as required by the bond resolutions to provide security to the bondholders. If not needed to meet annual bond service, the cover is credited to the contractors in the following year. The annual charges for the following cost components include an amount for bond cover:

- minimum OMP&R component of the Transportation Charge for Off-Aqueduct Power Facilities;
- Water System Revenue Bond Surcharge;
- capital cost component of the Transportation Charge for East Branch Enlargement Facilities;
- capital cost component of the Transportation Charge for Coastal Branch Extension Facilities;
- capital cost component of the Transportation Charge for East Branch Extension Facilities;
- capital cost component of the Transportation Charge for Tehachapi Afterbay; and
- capital cost component of the Transportation Charge for SBA Enlargement.

*Line 15, Rate Management Adjustments,* shows the projected amount of revenue reductions allocated to contractors after repayment of the California Water Fund (see Line 39). Under provisions of the Monterey Amendment, the reduction amount allocated to agricultural contractors is deposited into a trust fund to stabilize payments in water-short years. The urban contractor allocation is applied as a direct reduction in charges.

*Line 16, Federal Payments for Project Operating Costs,* shows federal payments made in accordance with the December 31, 1961, agreement between California and the United States providing for DWR to operate and maintain the San Luis Joint-Use Facilities. According to the January 12, 1972, supplement to the agreement, the Bureau of Reclamation (Reclamation) initially paid 45 percent of operations, maintenance, and replacement (OM&R) costs for those activities. (The percentage does not apply to power costs; Reclamation and DWR each provide their own power to pump water through the joint facilities.)

The percentage paid by Reclamation is periodically reviewed by Reclamation and DWR. A review of the percentage paid by Reclamation was completed in 1987 and resulted in a federal share of 44.09 percent. During the most recent review concluded in August 2015, DWR agreed to reevaluate Reclamation's percentage every five years based on the preceding five years of actual operating expenditures. Operating expenditures for calendar years 2006 through 2010 were reviewed, and the percentage paid by Reclamation for calendar years 2011 through 2015 was retroactively reduced to 39.72 percent. The amounts in



Line 16 are based on the assumption that the federal share will continue at this level for calendar years 2016 through 2025. However, it is anticipated that the percentage paid by Reclamation for calendar years 2016–2020 will be revised once all expenditures through 2015 are known and a new percentage can be determined.

*Line 17, Appropriations for Operating Costs Allocated to Recreation*, shows appropriations made under the Davis-Dolwig Act. In passing the Davis-Dolwig Act, the California Legislature declared its intent that, except for funds provided according to Assembly Bill 12 (1966), DWR's budget will include appropriations of monies from the General Fund necessary for enhancement of fish and wildlife and recreation in connection with State water projects.

Annual OMP&R costs allocated to recreation and fish and wildlife enhancement are to be paid by annual appropriations from the General Fund. Through fiscal year 1982–1983, these appropriations totaled \$16.7 million. No additional appropriations have been made from this fund since fiscal year 1982–1983.

Legislation enacted in 1989 offset a portion of the amount owed to the SWP by the State for costs allocated to recreation and to fish and wildlife enhancement against the amount the SWP owed to the California Water Fund (see line 39). Since the final offset in 1994, DWR has accumulated \$201.3 million in OMP&R costs through December 31, 2015.

In 2012, the Davis-Dolwig Act was amended to appropriate \$10 million per fiscal year from the Harbors and Watercraft Revolving Fund to cover a portion of the OMP&R and capital costs allocated to recreation and fish and wildlife enhancement. Starting in fiscal year 2012–2013, \$7.5 million is being appropriated for ongoing OM&R and capital recreation and fish and wildlife enhancement

costs and \$2.5 million is being appropriated to reimburse DWR for past unreimbursed OMP&R and capital costs.

*Line 18, Davis-Grunsky Loan Repayments*, shows the repayments by local agencies of \$76.3 million of loans disbursed as of December 31, 2015. Repayment on any future loans was assumed to be beyond the period covered by the financial analysis.

*Line 19, Revenue Bond Proceeds*, includes bond proceeds classified as special reserves according to the description of revenue bond financing in Line 17 of Table 14-1. Those proceeds, used for capitalized OMP&R costs, revenue bond debt service, and debt service reserves, are not classified as revenue but are included in this line to simplify the financial presentation.

*Line 20, Interest Earnings on Operating Revenues*, includes interest earnings on unexpended proceeds from the sale of general obligation bonds, interest on operating reserves, and other short-term investment earnings on SWP revenues.

*Line 21, Oroville-Thermalito Payments*, shows payments from Pacific Gas & Electric Company, Southern California Edison, and San Diego Gas & Electric Company for power generation at the Oroville facilities. Those utilities purchased all power generation from Hyatt and Thermalito powerplants before April 1, 1983, in accordance with a power sale contract dated November 29, 1967. The historic amount includes the amounts of final settlement of payments made according to the contract.

*Line 22, Miscellaneous Revenues*, includes all other operating revenues not included in Lines 2 through 21.

*Line 23, Subtotal, Other Revenues*, is the total of Lines 16 through 22.

*Line 24, Total Operating Revenues*, is the total of Lines 13, 14, 15, and 23.

*Line 25, Total Operating Revenues and Capital Resources Revenues*, is the total of Lines 1 and 24.

## Project Expenses

Project expenses include the following:

- operations, maintenance, and power costs;
- deposits to replacement reserves;
- deposits to special reserves;
- capital resources expenditures; and
- debt service.

Revenue bond proceeds earmarked for debt service during construction and the first year's operating expenses are deposited in the Central Valley Water Project Construction Fund and disbursed in accordance with resolutions authorizing the issuance of such bonds.

Water contractor revenues associated with operating costs and debt service attributable to projects financed by revenue bonds are deposited in the Central Valley Water Project Revenue Fund for appropriate disbursement. All other operating revenues are deposited in the California Water Resources Development Bond Fund—Systems Revenue Account and are disbursed in accordance with the following four priorities of use, as specified in the Burns-Porter Act:

- SWP OMP&R costs;
- general obligation bond debt service;
- repayment of expenditures from the California Water Fund; and
- deposits to a reserve for future SWP construction.

Project expenses are presented in Lines 26 through 36 of Table 14-2.

*Line 26, Project Operations, Maintenance, Power, and Replacement Costs*, shows the OMP&R portion of the historical and projected costs presented in Table 14-10.

Table 14-10 and Line 26 of Table 14-2 also include the amounts of the operations and maintenance costs for the federal share of joint facilities and those OMP&R costs allocated to recreation, which are intended to be offset by revenues listed in Lines 16 and 17.

Allowances for cost escalations are included in OMP&R costs through 2015. Allowances for additional long-term price escalations in the future are not included in these estimates, because changes in OMP&R costs do not substantially affect the overall results of the financial analysis. (For the most part, changes in OMP&R costs cause direct offsetting changes in operating revenues.)

Power costs make up the largest component of annual operating expenses for the SWP. Assumptions about future power sources and costs are discussed in Chapter 10, Power Resources. Line 26 also includes costs associated with power transactions that result in the sale of power not required for the delivery of water.

*Line 27, Deposits to Replacement Reserves*, shows funds set aside as required by contract for replacing existing SWP facilities. By December 31, 2015, a net deposit (which includes returned deposits) of \$98.2 million had been made. \$91.7 million had been spent for replacement costs. The balance of the replacement reserve as of that date was \$27.9 million.

*Line 28, Deposits to Special Reserves Under Revenue Bond Financing*, includes two significant components: special reserve deposits related to revenue bonds and capital resources revenue carryover from prior years used for construction in the current year. Special reserve deposits are the

**Table 14-10 Operations, Maintenance, Power, and Replacement Costs, by Facility, Composition, and Purpose (in thousands of dollars)**

Feature	Calendar Year															TOTAL
	1962-2013	2014	2015	1962-2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026-2035	
Project Facility																
Feather River facilities	1,464,425	75,962	72,083	1,612,344	68,758	72,303	74,145	74,173	73,439	74,680	74,727	75,713	76,303	76,910	820,979	3,174,474
North Bay Aqueduct	97,420	8,029	7,497	113,242	7,575	9,008	8,450	8,200	8,134	8,237	8,246	8,335	8,391	8,453	89,353	285,624
Delta facilities	854,355	45,592	69,934	969,938	84,261	56,230	81,170	73,212	64,420	65,509	65,550	66,415	66,932	67,465	720,153	2,381,255
Suisun Marsh	56,369	5,332	(1,351)	60,592	6,902	7,840	7,737	7,418	7,345	7,469	7,474	7,572	7,631	7,692	82,108	217,780
South Bay Aqueduct	352,673	20,683	23,306	396,876	27,927	26,014	23,414	25,844	25,671	25,967	25,998	26,260	26,432	26,621	280,678	937,702
California Aqueduct																
Delta to Edmonston	4,136,074	172,549	184,120	4,488,083	223,945	253,302	251,170	252,199	244,199	250,933	251,857	249,744	248,518	250,013	2,643,890	9,607,854
Edmonston to Perris	3,676,007	191,195	199,349	4,066,286	219,805	254,406	254,215	253,211	258,657	257,409	260,645	261,400	259,147	263,876	2,730,290	9,339,347
West Branch	99,600	36,574	30,095	169,478	40,566	38,198	29,533	34,775	34,418	35,197	35,215	35,790	36,014	36,715	392,028	917,927
Coastal Branch	305,976	19,748	23,781	349,875	19,344	19,956	20,575	21,399	21,271	21,467	21,497	21,685	21,816	21,963	230,301	791,149
East Branch Enlargement	115,043	9,594	10,555	135,554	9,063	10,298	10,031	9,935	9,739	9,806	9,715	9,746	9,724	9,705	98,036	331,352
East Branch Extension	40,188	5,035	4,337	49,859	4,124	6,036	5,105	5,182	5,144	5,198	5,205	5,254	5,288	5,325	56,004	157,724
Off-Aqueduct power-generating facilities	1,587,556	2,265	111	1,589,933	110	110	111	111	112	112	113	113	114	115	1,177	1,592,231
Recreation, planning, and CVP negotiations	7,934	724	572	9,230	690	720	720	720	720	720	720	720	720	720	7,200	23,600
Water quality monitoring	412,293	12,683	12,683	437,659	12,683	12,683	12,683	12,683	11,379	11,379	11,379	11,379	11,379	11,379	113,790	670,455
Davis-Grunsky Act Program	5,727	237	131	6,094	268	288	288	288	288	288	288	288	288	288	2,880	11,834
Subtotal	13,211,639	606,202	637,202	14,455,044	726,021	767,392	779,347	779,350	764,936	774,371	778,629	780,414	778,697	787,240	8,268,867	30,440,308
Payments to/credits from PG&E under Comprehensive Agreement	(59,848)	0	0	(59,848)	0	0	0	0	0	0	0	0	0	0	0	(59,848)
Total OMP&R Costs	13,151,791	606,202	637,202	14,395,196	726,021	767,392	779,347	779,350	764,936	774,371	778,629	780,414	778,697	787,240	8,268,867	30,380,460
Composition																
Salaries and expenses of headquarters personnel	3,539,945	232,190	146,112	4,013,267	187,201	195,724	205,311	199,691	192,952	195,141	200,045	197,428	199,145	205,635	2,202,869	8,194,409
Salaries and expenses of field personnel	5,274,295	214,141	153,393	5,546,810	196,530	205,478	215,543	209,643	202,568	204,866	210,015	207,267	209,069	215,883	2,312,651	9,936,323
Pumping power																
Used by pumping plants	3,580,952	162,408	345,497	4,088,857	381,437	411,543	396,535	394,939	392,884	397,947	392,158	400,649	395,535	390,546	3,963,991	12,007,021
Produced by generation plants	(663,871)	(5,079)	(8,188)	(677,139)	(39,534)	(45,740)	(38,430)	(25,311)	(23,857)	(23,972)	(23,979)	(25,320)	(25,443)	(25,216)	(214,591)	(1,188,532)
Off-Aqueduct power-generating facilities requirement	1,587,556	2,265	111	1,589,933	110	110	111	111	112	112	113	113	114	115	1,177	1,592,231
Oroville-Thermalto insurance premiums	13,813	277	277	14,367	277	277	277	277	277	277	277	277	277	277	2,770	19,907
Less portion of costs incurred during construction	(121,051)	-	0	(121,051)	0	0	0	0	0	0	0	0	0	0	0	(121,051)
Payments to/credits from PG&E under Comprehensive Agreement	(59,848)	-	0	(59,848)	0	0	0	0	0	0	0	0	0	0	0	(59,848)
Total OMP&R Costs	13,151,791	606,202	637,202	14,395,196	726,021	767,392	779,347	779,350	764,936	774,371	778,629	780,414	778,697	787,240	8,268,867	30,380,460
Project Purpose																
Water supply and power generation	12,750,049	579,374	611,516	13,940,939	699,937	741,158	753,076	753,079	738,665	748,100	752,358	754,143	752,426	760,969	8,006,155	29,401,003
Recreation and fish and wildlife enhancement	258,435	17,572	16,775	292,783	16,775	16,775	16,775	16,775	16,775	16,775	16,775	16,775	16,775	16,775	167,754	628,291
Flood control	10,005	900	732	11,637	732	732	732	732	732	732	732	732	732	732	7,324	26,285
Miscellaneous purposes																
Federal share: San Luis and Delta facilities	157,052	6,558	6,639	170,249	6,598	6,598	6,598	6,598	6,598	6,598	6,598	6,598	6,598	6,598	65,984	302,217
Other (Davis-Grunsky, drainage, City of Los Angeles)	36,098	1,799	1,539	39,436	1,978	2,128	2,165	2,165	2,165	2,165	2,165	2,165	2,165	2,165	21,650	82,512
Payments to/credits from PG&E under Comprehensive Agreement	(59,848)	0	0	(59,848)	0	0	0	0	0	0	0	0	0	0	0	(59,848)
Total OMP&R Costs	13,151,791	606,202	637,202	14,395,196	726,021	767,392	779,347	779,350	764,936	774,371	778,629	780,414	778,697	787,240	8,268,867	30,380,460

net of several income and expenditure items. Income items related to revenue bonds are:

- proceeds set aside to pay bond interest during construction (capitalized interest);
- proceeds set aside for first year operating costs (capitalized operations and maintenance);
- water contractor payments or bond proceeds set aside for debt service reserves;
- water contractor payments for revenue bond cover requirements; and
- deposits to and withdrawals from operating reserves to meet day-to-day cash flow requirements.

The 1952–2015 column also includes advances to DWR’s revolving fund for working funds to purchase mobile equipment and to meet day-to-day operating expenses.

The expenditure items related to revenue bonds include:

- debt service cover payments returned to contractors;
- debt service reserve interest payments returned to contractors;
- surplus account funds returned to contractors or applied to meet expenses;
- total capitalized interest paid out; and
- total capitalized operations and maintenance paid out.

Special reserves, reduced over time as reserved amounts, are used for their respective purposes. The amount indicated each year in Line 28 reflects the change from the previous year. A negative number indicates a withdrawal of special reserves to meet expenses, while a positive number indicates a deposit.

*Line 29, Capital Resources Expenditures*, includes the amount of capital resources revenues applied to construction that

is shown in Line 36 of Table 14-1. In Table 14-2, these expenditures are funded out of withdrawals from the reserves in Line 28 and do not affect net revenues shown in Line 38.

*Lines 30 and 31, Payment of Debt Service on Bonds Sold through December 31, 2015*, show the total principal and interest payments, respectively, on bonds sold to date. Table 14-11, at the end of this chapter, summarizes payments on general obligation bonds (Series A through Y water bonds), power revenue bonds by project, and water system revenue bonds (Series A through AU).

*Lines 32 and 33, Payments on Projected Future Water Bonds*, include the projected annual bond debt service amounts for future water revenue bonds included on Lines 23, 25, 27, and 29 of Table 14-1 for the East Branch Enlargement, East Branch Extension, SBA Enlargement, and other water system facilities. Assumptions about the bond debt service on these future bonds are that interest costs for the water revenue bonds average 3.15 percent; and that bonds are to be repaid by the end of the project repayment period (2035) or sooner, with maturities commencing in the year following the date of sale and with equal annual bond debt service for the principal repayment period.

*Lines 34 and 35, Total Payments of Bond Debt Service*, show the total of principal payments indicated on Lines 30 and 32, and the total of interest repayments indicated on Lines 31 and 33.

*Line 36, Subtotal, Bond Debt Service*, is the total of Lines 34 and 35.

*Line 37, Total Operating Expenses and Bond Debt Service*, is the total of Lines 26, 27, 28, 29, and 36.



*Line 38, Net System Revenues*, shows the annual amounts of revenues remaining after the payment of operating costs and bond debt service costs.

*Line 39, California Water Fund Repayment*, shows the total amount of repayments made to the California Water Fund to reimburse the fund for monies expended for construction of the State Water Resources Development System.

Repayment of the California Water Fund was completed in 1998. The \$508 million includes the \$306 million of repayments shown in Line 39 and the \$202 million of reimbursement that was credited to the SWP as offsets for recreation and fish and wildlife enhancement expenditures.

*Line 40, Revenues Used for Capital Expenditures*, includes the amounts required annually for financing scheduled capital expenditures. Revenues not needed for operating costs or bond debt services are available for financing SWP capital expenditures.

## Future Costs of Water Service

Estimates of future water costs are useful to contractors for short-range and long-range planning of water needs, operations, and budgets. Unit water charges shown in Table 14-12 represent estimated costs of water delivery by service area for calendar years 2017 and 2022. The unit rates include costs of existing and future SWP facilities accounted for in Table 14-1 and Table 14-7. The unit water charges are based on the assumption that in 2017 and 2022, the SWP will be able to deliver the entire amount of water requested by each contractor. The unit water charges included in Table 14-12 are listed both as 2017 dollars and as escalated rates reflecting assumed future inflation of 7.5 percent in 2016 and 4.5 percent from 2017 through 2022.

**Table 14-12 Estimated Unit Water Charges for 2017 and 2022, by Service Area (in dollars per acre-foot)**

Service Area and Charge	2017	2022
	(in 2017 dollars)	(in 2022 dollars)
<b>Feather River Area</b>		
Capital; Operations, Maintenance, and Replacement (OM&R)	481	486
<b>North Bay Area</b>		
Capital; OM&R	459	507
Power	31	31
<b>Total</b>	<b>490</b>	<b>538</b>
<b>South Bay Area</b>		
Capital; OM&R	390	449
Power	53	61
<b>Total</b>	<b>443</b>	<b>510</b>
<b>Coastal Area</b>		
Capital; OM&R	1,116	1,202
Power	125	182
<b>Total</b>	<b>1,241</b>	<b>1,384</b>
<b>San Joaquin Area</b>		
Capital; OM&R	193	219
Power	28	32
<b>Total</b>	<b>221</b>	<b>251</b>
<b>Southern California Area</b>		
Capital; OM&R	399	426
Power	162	188
<b>Total</b>	<b>561</b>	<b>614</b>





**Table 14-1 Capital Requirements and Financing, December 31, 2015 (in thousands of dollars)**

Line Number/Item	Calendar Year															
	1952–2013	2014	2015	1952–2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2016–2025	1952–2025
<b>CAPITAL REQUIREMENTS</b>																
1. Initial Project Facilities	2,202,316	0	0	2,202,316	0	0	0	0	0	0	0	0	0	0	0	2,202,316
2. North Bay Aqueduct	112,782	1,800	1,272	115,853	1,566	1,064	0	0	0	0	0	0	0	0	2,630	118,484
3. Delta and Suisun Marsh Facilities	296,335	12,734	12,773	321,842	71,404	82,759	109,564	31,043	0	0	0	0	0	0	294,769	616,611
4. Final Four Units at Banks Pumping Plant	43,673	0	0	43,673	0	0	0	0	0	0	0	0	0	0	0	43,673
5. Coastal Branch Aqueduct	511,561	2,639	2,085	516,284	2,614	1,027	0	0	0	0	0	0	0	0	3,641	519,925
6. West Branch Aqueduct	210,981	3,135	5,130	219,247	5,191	4,461	5,475	5,708	0	0	0	0	0	0	20,835	240,082
7. East Branch Enlargement	461,828	147	57	462,031	0	0	0	0	0	0	0	0	0	0	0	462,031
8. East Branch Improvements	409,139	15,970	36,915	462,024	44,030	30,085	21,797	16,609	0	0	0	0	0	0	112,522	574,546
9. East Branch Extension	261,137	64,242	35,397	360,775	28,327	14,018	4,801	2,659	0	0	0	0	0	0	49,804	410,580
10. South Bay Aqueduct Improvements and Enlargement	255,709	4,223	8,248	268,179	4,546	0	0	0	0	0	0	0	0	0	4,546	272,725
11. Power Generation and Transmission Facilities	833,086	24,693	11,435	869,214	32,679	42,218	35,236	468	0	0	0	0	0	0	110,600	979,814
12. Additional Conservation Facilities	164,459	2,545	3,100	170,103	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	30,000	200,103
13. Agricultural Drainage Facilities	83,501	1,562	1,409	86,471	1,710	1,840	1,877	1,877	1,877	1,877	1,877	1,877	1,877	1,877	18,566	105,037
14. Other Costs	468,590	62,890	38,851	570,331	109,684	101,593	118,490	63,556	0	0	0	0	0	0	393,322	963,653
<b>15. Total Project Construction Expenditures</b>	<b>6,315,096</b>	<b>196,578</b>	<b>156,671</b>	<b>6,668,344</b>	<b>304,750</b>	<b>282,065</b>	<b>300,239</b>	<b>124,919</b>	<b>4,877</b>	<b>4,877</b>	<b>4,877</b>	<b>4,877</b>	<b>4,877</b>	<b>4,877</b>	<b>1,041,235</b>	<b>7,709,579</b>
16. Davis-Grunsky Act Program Costs	130,000	0	0	130,000	0	0	0	0	0	0	0	0	0	0	0	130,000
17. Special Capital Requirements Under Revenue Bond Financing	575,262	3,091	4,654	583,007	26,863	23,888	25,549	10,384	0	0	0	0	0	0	86,683	669,690
<b>18. Total Capital Requirements</b>	<b>7,020,358</b>	<b>199,668</b>	<b>161,325</b>	<b>7,381,351</b>	<b>331,612</b>	<b>305,953</b>	<b>325,788</b>	<b>135,303</b>	<b>4,877</b>	<b>4,877</b>	<b>4,877</b>	<b>4,877</b>	<b>4,877</b>	<b>4,877</b>	<b>1,127,918</b>	<b>8,509,269</b>
19. Power Facilities Capital Requirements	833,086	24,693	11,435	869,214	32,679	42,218	35,236	468	0	0	0	0	0	0	110,600	979,814
20. Water Facilities Capital Requirements	6,187,272	174,975	149,890	6,512,137	298,934	263,735	290,552	134,835	4,877	4,877	4,877	4,877	4,877	4,877	1,017,318	7,529,455
<b>FINANCING OF CAPITAL REQUIREMENTS</b>																
<b>Power Facilities Revenue Bond Proceeds</b>																
21. Power Facilities Revenue Bonds through Series H	1,162,458	0	0	1,162,458	0	0	0	0	0	0	0	0	0	0	0	1,162,458
<b>Water System Revenue Bond Proceeds</b>																
22. East Branch Enlargement, Current Bonds	473,451	8,330	155	481,936	0	0	0	0	0	0	0	0	0	0	0	481,936
23. East Branch Enlargement, Future Bonds	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24. East Branch Extension, Current Bonds	339,545	43,200	0	382,745	0	0	0	0	0	0	0	0	0	0	0	382,745
25. East Branch Extension, Future Bonds	0	0	0	0	16,008	15,231	5,216	2,889	0	0	0	0	0	0	39,344	39,344
26. South Bay Aqueduct Enlargement, Current Bonds	201,283	13,725	4,035	219,043	0	0	0	0	0	0	0	0	0	0	0	219,043
27. South Bay Aqueduct Enlargement, Future Bonds	0	0	0	0	5,024	0	0	0	0	0	0	0	0	0	5,024	5,024
28. Water System Facilities, Current Bonds	2,080,602	44,020	105,085	2,229,707	0	0	0	0	0	0	0	0	0	0	0	2,229,707
29. Water System Facilities, Future Bonds	0	0	0	0	427,665	285,158	316,072	127,914	377	377	377	377	377	377	1,159,070	1,159,070
30. <i>Subtotal, Water System Revenue Bonds</i>	3,094,882	109,275	109,275	3,313,432	448,697	300,389	321,288	130,803	377	377	377	377	377	377	1,203,438	4,516,870
<b>Other Capital Financing</b>																
31. Initial Project Facilities Bond Proceeds	1,452,452	0	0	1,452,452	0	0	0	0	0	0	0	0	0	0	0	1,452,452
32. Davis-Grunsky Act Program Bond Proceeds	130,000	0	0	130,000	0	0	0	0	0	0	0	0	0	0	0	130,000
33. Application of CA Water Fund Monies (Tideland Oil Revenues)	508,056	0	0	508,056	0	0	0	0	0	0	0	0	0	0	0	508,056
34. Interim Financing	(8,922)	85,340	46,733	123,151	(123,151)	0	0	0	0	0	0	0	0	0	(123,151)	0
35. Direct Pay	6,173	554	817	7,544	1,566	1,064	0	0	0	0	0	0	0	0	2,630	10,174
36. Application of Capital Resources Revenues to Construction	566,269	0	0	566,269	0	0	0	0	0	0	0	0	0	0	0	566,269
37. Revenue Transfers Applied	108,990	4,500	4,500	117,990	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	45,000	162,990
38. <i>Subtotal, Other Capital Financing</i>	2,763,018	90,393	52,050	2,905,462	(117,085)	5,564	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	(75,521)	2,829,941
<b>39. Total Financing of Capital Requirements</b>	<b>7,020,358</b>	<b>199,668</b>	<b>161,325</b>	<b>7,381,351</b>	<b>331,612</b>	<b>305,953</b>	<b>325,788</b>	<b>135,303</b>	<b>4,877</b>	<b>4,877</b>	<b>4,877</b>	<b>4,877</b>	<b>4,877</b>	<b>4,877</b>	<b>1,127,918</b>	<b>8,509,269</b>

Table 14-2 State Water Project Revenues and Expenditures, December 31, 2015 (in thousands of dollars)

Line Number/Item	Calendar Year															
	1952–2013	2014	2015	1952–2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2016–2025	1952–2025
<b>PROJECT REVENUES</b>																
1. Capital Resources Revenues	814,701	0	0	814,701	0	0	0	0	0	0	0	0	0	0	0	814,701
<b>Water Contractor Payments</b>																
2. Transportation Capital	4,806,248	174,004	179,247	5,159,499	183,654	186,410	184,076	180,496	175,012	164,485	156,378	153,721	151,417	150,183	1,685,833	6,845,332
3. Transportation Minimum	4,222,988	260,281	252,612	4,735,881	278,271	305,796	300,415	297,930	298,626	301,612	304,629	307,675	310,752	313,859	3,019,564	7,755,445
4. Transportation Variable	5,821,618	194,999	233,088	6,249,705	247,904	278,462	280,896	297,191	302,806	302,652	309,589	304,411	299,791	305,353	2,929,054	9,178,760
5. Off-Aqueduct Power Facilities	2,928,593	34,699	21,207	2,984,499	4,649	4,300	3,300	200	200	200	200	200	200	200	13,649	2,998,147
6. Delta Water Charge	3,181,442	183,479	249,669	3,614,591	298,433	287,567	287,567	287,567	287,567	287,567	287,567	287,567	287,567	287,567	2,886,533	6,501,124
7. East Branch Enlargement	935,307	41,209	46,672	1,023,188	45,970	48,457	47,405	47,495	46,633	47,443	46,011	39,512	40,993	45,294	455,214	1,478,403
8. East Branch Extension	156,925	17,742	18,304	192,971	34,188	38,102	36,520	37,587	38,036	38,114	37,884	37,662	37,889	37,735	373,718	566,689
9. Coastal Extension	51,468	4,137	4,605	60,210	4,594	4,347	3,345	2,534	3,531	3,656	4,531	3,406	3,406	2,764	36,113	96,322
10. South Bay Aqueduct Improvements and Enlargement	67,124	16,156	19,949	103,228	20,637	19,635	19,458	19,413	19,303	19,249	19,248	19,471	19,471	19,299	195,184	298,413
11. Tehachapi East Afterbay	33,533	5,310	6,771	45,613	6,815	6,319	6,159	6,168	6,157	6,145	6,148	6,218	6,226	6,115	62,471	108,084
12. Water Revenue Bond Surcharge	686,471	47,157	45,204	778,831	81,446	85,949	87,340	95,587	92,371	92,401	89,294	90,278	88,099	83,429	886,192	1,665,023
13. <i>Subtotal, Water Contractor Payments</i>	22,891,717	979,172	1,077,327	24,948,217	1,206,561	1,265,342	1,256,482	1,272,167	1,270,241	1,263,525	1,261,477	1,250,121	1,245,811	1,251,798	12,543,525	37,491,742
14. Revenue Bond Cover Adjustments	(960,097)	(47,600)	(57,444)	(1,065,141)	(58,350)	(58,819)	(53,659)	(54,991)	(53,769)	(53,013)	(52,773)	(49,428)	(48,495)	(46,595)	(529,893)	(1,595,035)
15. Rate Management Adjustments	(461,621)	(40,470)	(40,470)	(542,562)	(40,470)	(40,470)	(40,470)	(40,470)	(40,470)	(40,470)	(40,470)	(40,470)	(40,470)	(40,470)	(404,705)	(947,266)
<b>Other Revenues</b>																
16. Federal Payments for Project Operating Costs	389,191	19,061	8,175	416,426	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	180,000	596,426
17. Appropriations for Operating Costs Allocated to Recreation	26,342	11,182	5,071	42,596	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	100,000	142,596
18. Davis-Grunsky Loan Repayments	73,657	1,236	1,359	76,252	1,367	1,206	1,013	967	897	890	890	875	796	733,209	742,109	818,361
19. Revenue Bond Proceeds	652,977	0	0	652,977	0	0	0	0	0	0	0	0	0	0	0	652,977
20. Interest Earnings on Operating Revenues	576,594	269	487	577,350	380	380	380	380	380	510	510	510	510	510	4,450	581,800
21. Oroville-Thermalito Payments	249,279	0	0	249,279	0	0	0	0	0	0	0	0	0	0	0	249,279
22. Miscellaneous Revenues	184,264	0	0	184,264	0	0	0	0	0	0	0	0	0	0	0	184,264
23. <i>Subtotal, Other Revenues</i>	2,152,304	31,748	15,093	2,199,144	29,747	29,586	29,393	29,347	29,277	29,400	29,400	29,385	29,306	761,719	1,026,559	3,225,704
<b>24. Total Operating Revenues</b>	<b>23,622,303</b>	<b>922,849</b>	<b>994,506</b>	<b>25,539,658</b>	<b>1,137,487</b>	<b>1,195,639</b>	<b>1,191,745</b>	<b>1,206,052</b>	<b>1,205,279</b>	<b>1,199,442</b>	<b>1,197,633</b>	<b>1,189,607</b>	<b>1,186,151</b>	<b>1,926,451</b>	<b>12,635,486</b>	<b>38,175,144</b>
<b>25. Total Operating Revenues and Capital Resources Revenues</b>	<b>24,437,004</b>	<b>922,849</b>	<b>994,506</b>	<b>26,354,359</b>	<b>1,137,487</b>	<b>1,195,639</b>	<b>1,191,745</b>	<b>1,206,052</b>	<b>1,205,279</b>	<b>1,199,442</b>	<b>1,197,633</b>	<b>1,189,607</b>	<b>1,186,151</b>	<b>1,926,451</b>	<b>12,635,486</b>	<b>38,989,845</b>
<b>PROJECT EXPENSES</b>																
26. Project Operations, Maintenance, Power, and Replacement Costs	13,151,791	606,202	637,202	14,395,196	726,021	767,392	779,347	779,350	764,936	774,371	778,629	780,414	778,697	787,240	7,716,398	22,111,593
27. Deposits to Replacement Reserves	86,794	9,826	1,607	98,227	0	0	0	0	0	0	0	0	0	0	0	98,227
28. Deposits to Special Reserves Under Revenue Bond Financing	817,248	23,270	48,329	888,847	82,867	102,740	97,709	90,652	98,524	97,202	98,192	110,972	115,062	853,978	1,747,898	2,636,745
29. Capital Resources Expenditures	686,932	0	0	686,932	0	0	0	0	0	0	0	0	0	0	0	686,932
<b>Payments of Bond Debt Service</b>																
30. Principal Repayments on Bonds Sold Through December 31, 2015 (Current Bonds)	3,152,186	173,566	186,252	3,512,004	188,275	181,650	157,172	159,649	161,356	154,900	154,511	138,790	140,138	138,625	1,575,066	5,087,070
31. Interest on Bonds Sold Through December 31, 2015 (Current Bonds)	6,127,298	105,485	116,616	3,442,368	113,070	106,932	98,474	92,659	86,188	78,660	71,961	65,055	57,839	52,153	822,991	4,265,359
32. Future Water Bond Principal Repayments	0	0	0	0	9,435	16,866	30,112	45,700	53,616	55,390	57,224	59,121	61,083	63,111	451,658	451,658
33. Future Water Bond Interest Payments	0	0	0	6,232,783	13,319	15,559	24,431	33,542	36,159	34,418	32,616	30,755	28,832	26,844	276,475	6,509,258
<b>34. Total Principal</b>	<b>3,152,186</b>	<b>173,566</b>	<b>186,252</b>	<b>3,512,004</b>	<b>197,710</b>	<b>198,516</b>	<b>187,284</b>	<b>205,349</b>	<b>214,972</b>	<b>210,290</b>	<b>211,735</b>	<b>197,911</b>	<b>201,221</b>	<b>201,736</b>	<b>2,026,724</b>	<b>5,538,728</b>
<b>35. Total Interest</b>	<b>6,127,298</b>	<b>105,485</b>	<b>116,616</b>	<b>9,675,151</b>	<b>126,389</b>	<b>122,491</b>	<b>122,905</b>	<b>126,201</b>	<b>122,347</b>	<b>113,078</b>	<b>104,577</b>	<b>95,810</b>	<b>86,671</b>	<b>78,997</b>	<b>1,099,466</b>	<b>10,774,617</b>
36. <i>Subtotal, Bond Debt Service</i>	9,279,484	279,051	302,868	13,187,155	324,099	321,007	310,189	331,550	337,319	323,368	316,312	293,721	287,892	280,733	3,126,190	16,313,345
<b>NET REVENUES</b>																
<b>37. Total Operating Expenses and Bond Debt Service</b>	<b>24,022,249</b>	<b>918,349</b>	<b>990,006</b>	<b>29,256,356</b>	<b>1,132,987</b>	<b>1,191,139</b>	<b>1,187,245</b>	<b>1,201,552</b>	<b>1,200,779</b>	<b>1,194,942</b>	<b>1,193,133</b>	<b>1,185,107</b>	<b>1,181,651</b>	<b>1,921,951</b>	<b>12,590,486</b>	<b>41,846,842</b>
38. Net System Revenues	414,755	4,500	4,500	(2,901,997)	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	45,000	(2,856,997)
<b>Application of Net System Revenues</b>	<b>0</b>	<b>0</b>	<b>0</b>													
39. California Water Fund Repayment	305,765	0	0	305,765	0	0	0	0	0	0	0	0	0	0	0	305,765
40. Revenues Used for Capital Expenditures	108,990	4,500	4,500	117,990	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	45,000	162,990

Table 14-11 Annual Debt Service on Bonds Sold through December 31, 2015 (in thousands of dollars)

Calendar Year	Series A through Y Water Bonds		Oroville Revenue Bonds <sup>a</sup>		Pyramid Project Revenue Bonds <sup>b</sup>		Alamo Project Revenue Bonds <sup>b</sup>		Small Hydro Project Revenue Bonds <sup>b</sup>		Water System Facilities Water System Revenue Bonds <sup>c</sup>		Subtotal		Devil Canyon-Castaic Project Revenue Bonds		Reid Gardner Project Revenue Bonds <sup>b,c</sup>		South Geysers Project Revenue Bonds <sup>b</sup>		Bottle Rock Project Revenue Bonds <sup>b</sup>		East Branch Enlargement Project Water System Revenue Bonds <sup>c</sup>		Coastal Extension Facilities Water System Revenue Bonds		East Branch Extension Facilities Water System Revenue Bonds <sup>c</sup>		South Bay Enlargement Facilities Water System Revenue Bonds <sup>c</sup>		Tehachapi East Afterbay Facilities Water System Revenue Bonds <sup>c</sup>		Grand Total		
	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	
1964	0	3,333	0	0	0	0	0	0	0	0	0	0	0	3,333	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3,333	
1965	0	11,114	0	0	0	0	0	0	0	0	0	0	0	11,114	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11,114	
1966	0	18,764	0	0	0	0	0	0	0	0	0	0	0	18,764	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18,764	
1967	0	26,911	0	0	0	0	0	0	0	0	0	0	0	26,911	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26,911	
1968	0	37,761	0	3,876	0	0	0	0	0	0	0	0	0	41,637	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41,637	
1969	0	47,460	0	10,448	0	0	0	0	0	0	0	0	0	57,908	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	57,908	
1970	0	53,290	0	13,145	0	0	0	0	0	0	0	0	0	66,435	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66,435	
1971	0	63,035	0	13,145	0	0	0	0	0	0	0	0	0	76,180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	76,180	
1972	0	69,149	1,260	13,112	0	0	0	0	0	0	0	0	1,260	82,261	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,260	82,261		
1973	1,200	69,347	1,330	13,042	0	0	0	0	0	0	0	0	2,530	82,389	0	7,708	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,530	90,097	
1974	3,000	69,533	1,400	12,969	0	0	0	0	0	0	0	0	4,400	82,502	0	7,708	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4,400	90,210		
1975	5,000	69,366	1,475	12,893	0	0	0	0	0	0	0	0	6,475	82,259	0	7,708	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6,475	89,967		
1976	7,000	69,657	1,555	12,811	0	0	0	0	0	0	0	0	8,555	82,468	0	7,708	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8,555	90,176		
1977	10,200	69,298	1,635	12,727	0	0	0	0	0	0	0	0	11,835	82,025	0	7,708	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11,835	89,733		
1978	12,700	69,286	5,775	12,537	0	0	0	0	0	0	0	0	18,475	81,823	0	7,708	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18,475	89,531		
1979	13,650	68,660	11,585	12,275	0	0	0	0	0	0	0	0	25,235	80,935	0	7,708	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25,235	88,643		
1980	16,050	67,941	3,265	11,739	0	7,900	0	0	0	0	0	0	19,315	87,580	0	7,708	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19,315	95,288		
1981	18,050	67,078	4,885	11,444	0	7,292	0	0	0	0	0	0	22,935	85,814	0	7,708	0	5,312	0	0	0	0	0	0	0	0	0	0	0	0	0	22,935	98,834		
1982	19,250	66,130	17,920	10,968	0	7,292	0	0	0	0	0	0	37,170	84,390	0	7,708	0	14,347	0	0	0	0	0	0	0	0	0	0	0	0	0	37,170	106,445		
1983	20,520	65,111	21,110	10,147	0	7,292	0	2,449	0	3,727	0	0	41,630	88,726	900	7,708	0	35,719	0	4,777	0	6,017	0	0	0	0	0	0	0	0	0	42,530	142,947		
1984	21,785	64,036	10,005	9,013	640	7,292	0	4,198	0	3,727	0	0	32,430	88,266	955	7,647	0	35,719	0	5,647	0	10,315	0	0	0	0	0	0	0	0	0	33,385	147,594		
1985	22,555	62,892	12,700	8,628	675	7,238	0	4,198	0	3,727	0	0	35,930	86,683	1,010	7,583	9,425	27,209	0	5,647	0	10,315	0	0	0	0	0	0	0	0	0	46,365	137,437		
1986	23,830	61,705	11,435	7,859	715	7,377	0	4,263	0	3,537	0	0	35,980	84,741	1,070	7,515	3,805	32,882	0	5,516	1,240	10,315	0	4,021	0	0	0	0	0	0	0	42,095	144,990		
1987	25,495	60,452	11,715	7,188	790	7,513	265	4,329	0	3,348	0	4,952	38,265	87,782	1,135	7,442	4,860	32,605	0	5,386	1,305	10,253	0	9,651	0	0	0	0	0	0	0	45,565	153,119		
1988	26,770	59,120	6,685	6,664	830	7,447	280	4,314	345	3,348	710	11,037	35,620	91,930	1,205	7,366	5,065	32,295	580	5,521	1,390	10,849	995	9,875	0	0	0	0	0	0	0	44,855	157,836		
1989	28,145	57,790	33,705	5,513	875	7,378	295	4,298	365	3,328	1,148	14,373	64,533	92,680	1,275	7,284	7,820	27,557	709	5,646	1,565	11,592	1,078	10,104	0	0	0	0	0	0	0	76,980	154,863		
1990	29,385	56,436	10,385	4,301	930	7,305	320	4,279	405	3,304	1,227	19,555	42,652	95,180	1,355	7,198	6,675	29,781	761	5,596	1,678	11,491	1,134	10,048	0	0	0	0	0	0	0	54,255	159,294		
1991	30,365	55,034	12,055	3,922	980	7,227	335																												

Table 14-11 Annual Debt Service on Bonds Sold through December 31, 2015 (in thousands of dollars)

(continued)

Calendar Year	Series A through Y Water Bonds		Oroville Revenue Bonds <sup>a</sup>		Pyramid Project Revenue Bonds <sup>b</sup>		Alamo Project Revenue Bonds <sup>b</sup>		Small Hydro Project Revenue Bonds <sup>b</sup>		Water System Facilities Water System Revenue Bonds <sup>c</sup>		Subtotal		Devil Canyon-Castaic Project Revenue Bonds		Reid Gardner Project Revenue Bonds <sup>b,c</sup>		South Geysers Project Revenue Bonds <sup>b</sup>		Bottle Rock Project Revenue Bonds <sup>b</sup>		East Branch Enlargement Project Water System Revenue Bonds <sup>c</sup>		Coastal Extension Facilities Water System Revenue Bonds		East Branch Extension Facilities Water System Revenue Bonds <sup>c</sup>		South Bay Enlargement Facilities Water System Revenue Bonds <sup>c</sup>		Tehachapi East Afterbay Facilities Water System Revenue Bonds <sup>c</sup>		Grand Total	
	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest
2018	25,435	3,011	0	0	4,844	1,078	2,842	716	2,516	541	67,940	51,263	103,577	56,609	6,910	2,045	104	273	707	210	1,228	542	19,271	9,805	1,680	996	10,431	13,902	7,418	7,782	2,616	2,271	153,942	94,435
2019	16,975	1,804	0	0	4,504	882	2,736	607	2,184	430	76,730	49,289	103,129	53,012	7,325	1,682	109	269	746	189	1,243	500	21,446	9,053	1,094	933	10,787	13,467	7,659	7,505	2,721	2,172	156,259	88,782
2020	17,405	956	0	0	5,518	681	3,327	491	2,797	322	72,194	46,649	101,241	49,099	7,765	1,298	113	263	873	163	1,455	453	22,383	8,147	1,926	898	11,287	12,952	7,912	7,165	2,841	2,043	157,796	82,481
2021	8,595	318	0	0	2,636	446	1,680	354	1,150	197	77,163	43,060	91,224	44,375	8,230	890	957	258	927	131	2,248	396	22,459	7,153	2,090	834	11,801	12,415	8,258	6,774	2,971	1,905	151,165	75,131
2022	1,885	60	0	0	5,241	339	4,962	289	1,204	145	74,424	39,818	87,716	40,651	8,725	458	1,003	211	853	95	2,194	298	23,097	6,138	2,852	773	12,376	11,853	8,653	6,382	3,117	1,760	150,586	68,619
2023	85	7	0	0	1,024	96	550	55	635	90	81,068	36,652	83,362	36,900	0	0	554	161	555	59	1,881	196	20,738	5,086	2,052	673	12,954	11,258	9,243	5,968	3,326	1,607	134,665	61,908
2024	35	3	0	0	661	50	380	31	427	60	82,261	32,235	83,764	32,379	0	0	346	133	441	32	1,498	93	20,830	4,107	2,135	589	13,596	10,622	9,707	5,503	3,496	1,442	135,813	54,900
2025	0	0	0	0	149	23	106	16	170	41	78,190	29,255	78,615	29,335	0	0	137	116	62	10	61	9	25,671	3,136	1,709	502	14,248	9,974	10,006	5,068	3,571	1,279	134,080	49,429
2026	0	0	0	0	153	18	110	13	178	33	75,479	25,110	75,920	25,174	0	0	244	109	64	8	63	7	9,320	1,865	1,787	426	14,439	9,296	11,451	4,561	4,333	1,100	117,621	42,546
2027	0	0	0	0	397	13	283	9	263	25	86,420	21,602	87,363	21,649	0	0	314	97	166	6	162	5	8,632	1,424	1,782	346	18,217	8,577	12,523	3,998	4,860	886	134,019	36,988
2028	0	0	0	0	0	0	0	0	139	14	70,829	17,687	70,968	17,701	0	0	421	81	0	0	0	0	8,909	1,015	2,725	280	23,802	7,671	14,054	3,379	5,612	645	126,491	30,772
2029	0	0	0	0	0	0	0	0	148	7	80,035	13,762	80,183	13,769	0	0	439	60	0	0	0	0	7,328	594	2,881	144	24,836	6,490	14,712	2,674	5,880	364	136,259	24,095
2030	0	0	0	0	0	0	0	0	0	0	51,250	10,467	51,250	10,467	0	0	103	38	0	0	0	0	1,315	257	0	0	19,490	5,260	7,788	1,980	324	77	80,270	18,079
2031	0	0	0	0	0	0	0	0	0	0	52,530	9,236	52,530	9,236	0	0	110	33	0	0	0	0	1,335	231	0	0	20,280	4,469	8,160	1,649	335	68	82,750	15,686
2032	0	0	0	0	0	0	0	0	0	0	54,605	7,173	54,605	7,173	0	0	120	27	0	0	0	0	1,395	174	0	0	21,105	3,645	8,530	1,269	350	53	86,105	12,341
2033	0	0	0	0	0	0	0	0	0	0	56,315	5,466	56,315	5,466	0	0	125	21	0	0	0	0	1,435	132	0	0	21,960	2,788	6,480	886	365	41	86,680	9,334
2034	0	0	0	0	0	0	0	0	0	0	58,070	3,706	58,070	3,706	0	0	130	14	0	0	0	0	1,480	90	0	0	22,855	1,896	6,770	604	380	28	89,685	6,338
2035	0	0	0	0	0	0	0	0	0	0	59,880	1,885	59,880	1,885	0	0	140	7	0	0	0	0	1,525	45	0	0	23,790	967	7,060	309	390	14	92,785	3,227
Total	1,582,400	2,386,523	244,995	246,522	107,639	195,719	60,748	100,924	49,125	81,976	2,041,247	1,985,749	4,086,154	4,997,413	139,165	283,872	448,266	570,610	74,460	115,803	156,316	227,907	485,877	613,677	43,771	46,195	370,931	292,566	215,624	146,226	68,336	45,132	6,088,900	7,339,401

<sup>a</sup>Principal and interest schedule adjusted to reflect early redemption of bonds.

<sup>b</sup>Allocated portions of Power Facilities Revenue Bonds and Water System Revenue Bonds.

<sup>c</sup>Interest includes a minimum fee for Water System Revenue Bonds Series AB.





## Chapter 15

### SWP Education and Information

*Visitors at the California State Fair learn water conservation and drought-tolerant landscaping tips at the Department of Water Resources' outdoor exhibit.*

## Significant Events in 2015

On April 1, immediately following the Department of Water Resources' (DWR) fourth annual snow survey of the winter, which found bare ground and historically low water content, the Governor issued Executive Order B-29-15. The order mandated water restrictions statewide and directed DWR, along with other State agencies, to work with cities and counties to implement statewide water saving programs. The order also streamlined the government review process for major drought-related water infrastructure projects and water transfers.

On April 30, the Governor's Office announced a dual approach to improving water conveyance and ecosystem health in the Sacramento-San Joaquin Delta through two projects, California WaterFix and California EcoRestore.

*Save Our Water*, a partnership between DWR and the Association of California Water Agencies (ACWA), launched the *Let it Go* and the *Turn it Off* campaigns in the summer, and the *Fix it for Good* campaign in the fall. These campaigns featured billboard, radio, Internet, theater, and outdoor advertisements urging continued water conservation efforts.

*Information for this chapter was provided by the Public Affairs Office.*

The Department of Water Resources' (DWR) Public Affairs Office (PAO) produces and distributes news and program information describing California's water resources and DWR's mission, programs, and activities. PAO disseminates information by way of news releases, interviews, Internet posts, and both printed and electronic publications. Other avenues include artwork, films, graphics, exhibits, press conferences, photography, public meetings, social media, and special events.

## News Topics

Selected highlights below provide examples of PAO's 2015 outreach efforts and news media responses related to DWR's water policy, programs, and activities.

### Drought

In 2015, PAO observed an increase in public and media interest regarding California water supply and drought-related activities. To address the various interests, PAO increased its public outreach efforts related to the drought.

#### *Executive Order B-29-15*

On April 1, prompted by a fourth consecutive year of drought, the Governor issued Executive Order B-29-15, directing the first-ever statewide, mandatory water use reductions. Key provisions in the order included:

- ordering the State Water Resources Control Board to impose restrictions to achieve a 25 percent reduction in potable urban water usage through February 28, 2016;
- directing DWR to lead a statewide initiative, in partnership with local agencies, to collectively replace 50 million square feet of lawns and ornamental turf with drought-tolerant landscapes; and
- directing the California Energy Commission to implement a statewide appliance rebate program to provide monetary incentives for the replacement of inefficient household devices.

#### **Model Water Efficient Landscape Ordinance.**

On July 15, the California Water Commission approved the updated Model Water Efficient Landscape Ordinance after DWR was directed in the Governor's April 1 Executive Order to revise the existing model landscape ordinance through expedited regulation. DWR developed the revised ordinance, held public workshops on the revisions, and conducted a 15-day public comment period.

The revised ordinance is expected to reduce a new home's water use by 12,000 gallons a year, or 20 percent. Water use on new commercial landscapes will be cut by approximately 35 percent. The ordinance took effect in December 2015.

**Turf and Toilet Rebate Programs.** On August 12, DWR announced two new rebate programs, financed by Proposition 1, which enabled DWR to carry out the Governor's April 1 Executive Order to further reduce water use in homes. DWR oversaw the two rebate programs: one that provided a \$100 consumer rebate to replace one inefficient toilet per household; and one that provided up to \$2 per square foot to remove lawns and replace them with water-efficient landscaping.

#### **Emergency Drought Barrier**

On February 12, DWR staff organized an informational meeting in Clarksburg about preparations for emergency drought barriers in Delta channels. The overview of the proposal was followed by a question-and-answer period. Several print, television, and radio outlets attended.



In May, installation of the emergency temporary rock barrier began. The barrier was installed on West False River to deter saltwater intrusion from the San Francisco Bay and to conserve water in upstream reservoirs that would be needed for the Delta to protect water quality. Barrier dismantling was completed in November. Project updates were delivered to the public and media via news releases, website updates, and social media.

For more information about the Emergency Drought Barrier, see Chapter 4, Water Quality Programs and Chapter 7, Water Supply Development and Reliability.

### Save Our Water

On June 30, *Save Our Water*, a 13-year partnership between DWR and the Association of California Water Agencies, launched a summer campaign with the messages of *Let It Go* and *Turn it Off*, encouraging Californians to continue to conserve water by allowing grass to turn brown and by turning off sprinklers.

The fall campaign, *Fix It for Good*, urged Californians to make permanent changes to save water such as drought-resistant landscapes, water-efficient appliances, and fixture replacements.

The two campaigns included social media messaging, billboards, radio spots, direct mail, theater ads, and outdoor media.

### Snow Surveys

Beginning in late December or early January, DWR conducts five monthly snow surveys to obtain an estimate of snow water content. Data collected in the snow surveys are used to estimate spring and summer snowmelt runoff. The melting snowpack provides much of the State's irrigation and drinking water as demand peaks during the summer months.

In 2015, due to the severity of the drought and lack of snow, DWR conducted only four media-oriented snow surveys in the Sierra Nevada, with the final April 1 survey reporting a record-low measurement at the Phillips Station survey site near Lake Tahoe.

Statewide snowpack water content on April 1 was just 5 percent of the historical average for the date. In 2014, water content was 33 percent of average, and 47 percent of average in 2013.

Media interest was high for all manual snow surveys. PAO distributed news releases on the snow survey findings, historical data, and video and photo links. PAO spoke to many media outlets about the severity of the drought and California's water supply and shared snow survey results on DWR's main website and on social media.

### State Water Project Allocations

On December 1, 2014, DWR announced an initial allocation of 10 percent for the 29 State Water Project (SWP) water contractors that collectively serve more than 25 million Californians and about 750,000 acres of irrigated farmland. On January 15, 2015, DWR announced an increase in the allocation to 15 percent. With the help of mid-December and early February storms, SWP allocations increased to 20 percent on March 2.

The 2014 final allocation of 5 percent was the lowest allocation in SWP history. The final SWP allocation in 2013 was 35 percent of the SWP water contractor requests. In 2012, the first year of the ongoing drought, the final allocation was 65 percent.

### Bay Delta Conservation Plan/California WaterFix

California WaterFix is a collaborative effort by State and federal agencies to improve California's aging water delivery system.

On April 30, the Governor's Office announced a plan to fix the SWP's aging infrastructure and restore the Delta's ecosystem by splitting the multifaceted Bay Delta Conservation Plan project into two different efforts, California WaterFix and California EcoRestore.

On July, 9, the partially recirculated draft environmental impact report/supplemental draft environmental impact statement for the Bay Delta Conservation Plan/California WaterFix was released. The public comment period that began July 10 was scheduled to end August 31, but was extended an additional 60 days to October 30.

Additional information can be found in Chapter 3, Environmental Programs.

## Solverde I Solar Facility

On December 15, DWR announced a new 20-year power purchase agreement to provide solar power to the SWP from the Solverde I Solar Facility. The facility will be located in Lancaster, and is expected to be fully operational by December 2016. The facility is part of DWR's long-term effort to reduce greenhouse gas emissions.

## SWP Publications

PAO creates and maintains approximately 40 brochures describing the SWP, its mission, and its facilities. The brochures are periodically updated and distributed statewide to educate the public about the SWP.

Brochures distributed to stakeholders, the public, and DWR's Visitors Centers during 2015 included updated versions of the *SWP Visitors Centers* and *History of California Water Development*. Spanish translations were completed for the *Easy Ways to Save Water* brochure and *The Water Cycle* handout. A new *Water Safe for Life with Albert & Einstein Along the California State Water Project* brochure in Spanish was created.

## E-News

Each weekday, PAO compiles and electronically distributes news articles, blogs, and commentaries on water-related issues to more than 5,000 subscribers. These news clips inform DWR staff of water issues relevant to DWR and its programs.

Topics highlighted in the weekday news clips include water supply, water quality, drought, watersheds and programs, and agencies and people.

## Spotlight Stories and Social Media

On DWR's main website and on DWR's Facebook page, many Spotlight Stories were featured in 2015. Subjects included how California coped with the fourth year of drought, how green power energizes the SWP, snow surveys, emergency groundwater wells, and the salmon passage project at Knights Landing.

DWR increased Facebook and Twitter messaging in 2015. PAO posted four to five messages per week on Facebook and Twitter about various DWR projects, updates, and activities of interest to the public and DWR employees. In 2015, DWR's Facebook followers increased to 5,577.

## DWR Magazine

Published three times a year, this news magazine features articles describing DWR programs, staff, and activities.

In 2015, articles covered how Californians were mandated to save water, the Emergency Drought Barrier installation in the Delta, the Clifton Court Forebay predation study, how the Division of Environmental Services monitors turbidity in the Delta, and the installation of a weather buoy at Folsom Lake to study evaporation.



## DWR Tours Program

The DWR tours program regularly attracts foreign and domestic tour groups. The SWP and its water supply mission is the major attraction.

Strong interest in SWP operations among foreign and domestic organizations continued in 2015 as California's historic drought intensified. The DWR tours program arranged visits by academics and water managers from Asia, Europe, the Middle East, and the Americas, who were all interested in how DWR was managing the State's water resources during an extended dry period.

Teachers and students from high school through law school visited DWR as they sought information about the SWP and the drought. The schools included: the University of California, Davis; Humboldt State University; McGeorge School of Law, University of the Pacific; the Urban School of San Francisco; and schools from the Tuolumne County school system.

As a basic component of DWR's Training Program, tours to the Sacramento–San Joaquin Delta and to Oroville Dam and Lake Oroville were provided for recently hired DWR employees.

During 2015, foreign agencies sending visitors to DWR and the SWP included: the Environmental Protection Association and the Ministry of Agriculture and Rural Community Cooperation of South Korea; the Ministries of Energy, Water, and Agriculture from Afghanistan; Taiwan's Ministry of Economic Affairs and Water Resources Agency; the Shanxi Grand Water Network of China; and Singapore's Public Utilities Board, among others.

In 2015, several visits were highlighted among foreign and domestic tour groups.

- The Ministry of Environment, Republic of Korea, sent a delegation seeking information about how DWR and other agencies in California cooperate to protect sources of drinking water.
- Representatives of the Environment Agency-Abu Dhabi visited DWR to compare how environmental programs are designed and implemented, with a focus on groundwater resources management.
- The World Food Center sponsored a visit to Oroville Dam for water experts from private and public sectors who had met at the University of California, Davis to discuss food security from a global perspective.
- The Northern California World Trade Center brought water managers from Afghanistan and Pakistan to DWR to discuss climate change impacts and the drought's effect on SWP hydroelectric power operations.

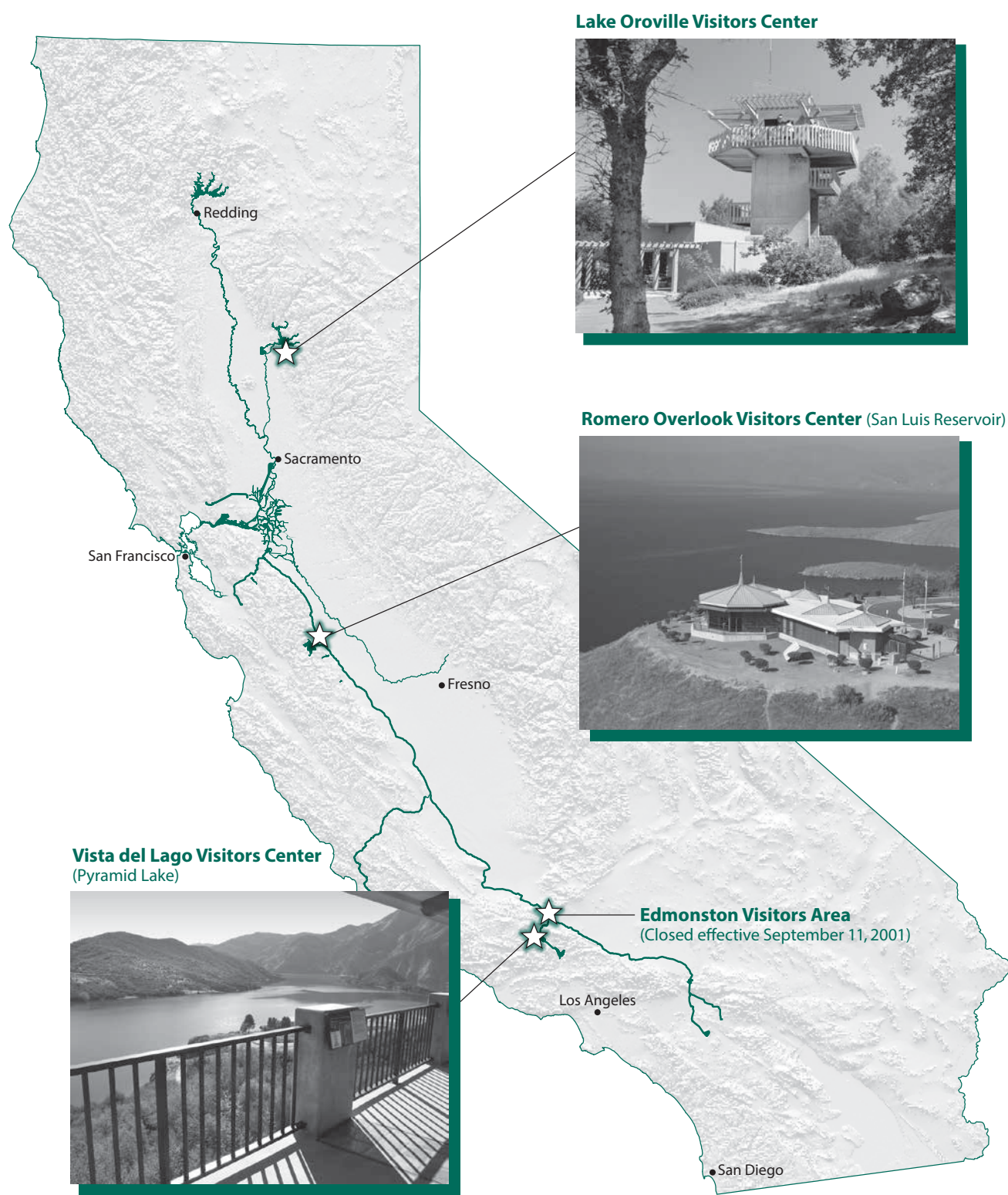
Figure 15-1 shows the SWP visitors center locations.

## Community Relations and Recreational Safety

In 2015, PAO staff continued to educate the public about the drought, water conservation, and the *Save Our Water* program through DWR's award-winning, water-efficient gardens and exhibits at the California State Fair, which ran from July 10 through July 26.

PAO staff also provided exhibits at the following events:

- San Francisco Flower & Garden Show;
- International Sportsmen's Exposition, Sacramento;
- Healthy Kids Day, Oroville;
- Sacramento Area Creeks Council Creek Week Event;



**Figure 15-1** Visitors Centers on the SWP

- Feather Fiesta Days, Oroville;
- YMCA Kids Adventure Day, Oroville;
- Sacramento Earth Day;
- World Ag Expo, Tulare;
- CalSTRS Earth Day, West Sacramento;
- CalEPA Earth Day, Sacramento;
- Walk on the Wildside, Sacramento;
- Hooked on Fishing, Not on Drugs, Oroville;
- California State Fair, Sacramento;
- Big Fresno Fair;
- 6th Annual Sacramento Banana Festival;
- Department of Social Services Emergency Preparedness Fair 2015, Sacramento;
- Office of Emergency Services National Preparedness Month, California Day of Preparedness, Sacramento;
- 48th Annual Native American Day, California State Capitol, Sacramento;
- Oroville Salmon Festival; and
- Grape, Raisin & Nut Expo, Fresno.

DWR also co-sponsors and coordinates “Catch A Special Thrill” (C.A.S.T.) fishing events for children with special needs. During 2015, C.A.S.T. events were held at Lake Oroville, Brannan Island State Recreation Area near Rio Vista, O’Neill Forebay at San Luis State Recreation Area, and Silverwood Lake.

DWR continued its partnerships with communities to offer nine Aquatic Adventure Camps throughout the summer months, teaching water safety to young people. In 2015, the camps utilized SWP facilities at Lake del Valle and Castaic Lake.

### SWP Recreation Outreach Program

The goal of the SWP recreation outreach program is to educate the public about the many recreational opportunities available at SWP facilities. PAO staff attends community events; State and county fairs; State and federally sponsored events; and forms partnerships with State, federal, and community groups.

### SWP Recreation Outreach Events

DWR, the California Department of Parks and Recreation, and several partner agencies co-sponsored or attended the following recreation outreach events in 2015:

- International Sportsmen’s Exposition, Sacramento;
- Jack Splash Club/Oroville YMCA Fit-N-Fun Day;
- Feather Fiesta Days, Oroville;
- Healthy Kids Day, Oroville;
- Hooked on Fishing, Not on Drugs, Oroville; and
- Oroville Salmon Festival.

The Jack Splash Club was created by PAO as a way to interest and educate kids and their families in the Oroville area about safe water recreation. The Oroville YMCA helps manage the club because of its water safety programs, fitness programs, and community standing.

### School Education Program

The School Education Program’s goal is to provide students and educators with a statewide perspective on water issues such as conservation, conveyance systems, and the water cycle. PAO staff develops and promotes high-quality materials, providing them free of charge to schools, educators, and water districts. Program achievements for 2015 are described below.

### Public Events and Outreach

In 2015, PAO staff provided displays of DWR’s interactive children’s exhibits and other educational materials at the:

- 48th Annual Native American Day, California State Capitol, Sacramento;
- Sacramento Area Creeks Council Creek Week Event;
- Water Conservation Presentation, St. Philomene School, Sacramento;



- CalEPA Earth Day, Sacramento; and
- State Scientist Day, Sacramento.

PAO staff organized a team of DWR judges from multiple divisions and provided a special award at the Sacramento Regional Science and Engineering Fair in Sacramento.

PAO staff also assisted at the *Save Our Water* booths at two events in Sacramento: the Office of Emergency Services National Preparedness Month, California Day of Preparedness; and the California State Fair.

## Publications and Materials

Curriculum materials and children's videos were provided to California teachers and water agencies through the *Water Facts & Fun* online catalog and order form and during promotional events. During 2015, the following materials were purchased or reprinted:

- 1,500 *Teacher's Guide for Hands-on Water Activities* booklets;
- 5,000 *Water & Me* color and activity booklets; and
- 5,000 hamburger activity sheets.

## Collaboration and Partnerships

DWR's School Education Program seeks to partner with other entities with similar interests and goals to pool resources in educating California's youth on the importance of water resources.

During 2015, PAO staff participated in the following collaborative activities/meetings:

- DWR's Water Education Committee meeting;
- Project Water Education for Teachers (WET) Advisory Committee, the California Environmental Education Interagency Network Committee;
- Creek Week Planning Committee and the Kids' Art Contest Winner Selection Subcommittee; and

- Caring for Our Watersheds contest, sponsored by Agrium Inc. and the Center for Land-Based Learning.

Additional collaborative efforts included PAO staff working with the following:

- California Department of Education's California Regional Environmental Education Community network;
- California Environmental Education Foundation;
- California Project WET program;
- Floodplain and Delta Ecology Institute for teachers, co-sponsored with the San Joaquin County Office of Education;
- Floodplain and Riparian Ecology Institute for teachers, co-sponsored with California State University, Chico;
- Central Valley Floodplain Ecology Institute for Educators, co-sponsored with the SAM Academy and the Central Valley Science Project, California State University, Fresno; and
- Delta Studies Institute for teachers, co-sponsored with the San Joaquin County Office of Education.





## Glossary

This glossary contains terms used in the text of Bulletin 132-16 as well as additional terms related to water resources.

### A

**abundance** The number of organisms of a particular kind in a population. (See also, abundance index.)

**abundance index** (fisheries) A relative measure of the weight or number of fish in a stock, a segment of the stock (e.g. the spawners), or an area. Often available in time series, the information is collected through scientific surveys or inferred from fishery data.

**acre-foot** The volume of water that would cover one acre to a depth of one foot; equal to 43,560 cubic feet or 325,851 gallons.

**adaptive management** The process of improving management effectiveness by learning from the results of carefully designed decisions or experiments.

**adipose fin** A small fleshy fin with no rays on the topside of a fish located between the fin on the back and the tail fin.

**afterbay** A storage reservoir downstream of a power plant or large reservoir that regulates fluctuating discharges from a spillway, hydroelectric power plant, or a pumping plant.

**agricultural drainage** (1) The process of directing excess water away from root zones by natural or artificial means, such as by using a system of drains placed below ground surface level (also called subsurface drainage); (2) the water drained away from irrigated farmland.

**alluvium** Unconsolidated soil strata deposited over time by flowing water.

**amphipod** A small crustacean with a flat (laterally compressed) body belonging to the group Amphipoda, found in both marine and freshwater environments.

**anadromous** Fish that live the majority of their life cycle in the sea and return to freshwater streams to spawn.

**anion** An atom or a molecule in which the total number of electrons is greater than the total number of protons, giving it a net negative electrical charge.

**aquifer** A geologic formation that stores water underground (called groundwater), especially one that yields significant quantities of water to wells or springs.

**arid** Describes a climate or region in which precipitation is so deficient in quantity or occurs so infrequently that intensive agricultural production is not possible without irrigation.

**artificial recharge** The addition of surface water to a groundwater basin by human activity, such as putting surface water into spreading basins.

**atmospheric river** A short-lived, narrow stream of high-velocity wind that carries large amounts of water vapor from tropical oceans to mid-latitude land areas resulting in large amounts of precipitation in those areas.

**average annual runoff** The average value of annual runoff volume calculated for a selected period of record, at a specified location, such as a dam or stream gauge.

**average year water demand** Demand for water under average hydrologic conditions for a defined level of development.

## **B**

**balanced water conditions** These exist when upstream reservoir storage releases, plus other inflows, approximately equal the water supply needed to (1) satisfy Sacramento Valley and Sacramento-San Joaquin Delta in-basin needs, including Delta water quality requirements, and (2) meet export needs. DWR and the Bureau of Reclamation jointly decide when balanced or excess water conditions exist.

**beach seine** A rectangular net with poles attached to the ends that is held vertically in the water and dragged through the water a short distance to capture fish.

**beneficial use** Water quality beneficial use categories for water are designated by State law. Beneficial uses of the waters of the State that may be protected against water quality degradation include, but are not limited to, domestic, municipal, agricultural, and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves.

**benthic organisms** Aquatic animals without backbones that dwell on or in the bottom sediments of fresh or salt water.

**biological assessment** A document prepared as part of the Endangered Species Act, Section 7 process to determine whether a proposed major

construction activity under the authority of a federal action agency is likely to adversely affect listed species, proposed species, or designated critical habitat.

**biological opinion** A scientific assessment issued by the U.S. Fish and Wildlife Service or National Marine Fisheries Service, required by the Endangered Species Act for listed species. Determines the likelihood of a federal action to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat.

**biota** Living organisms of a region, as in a stream or other body of water.

**brackish water** Water containing dissolved minerals in amounts that exceed normally acceptable standards for municipal, domestic, and irrigation uses. Considerably less saline than seawater.

**bromide** A salt which naturally occurs in small quantities in seawater; a compound of bromine.

**Burns-Porter Act** (California Water Code Section 12930 et seq.) Formally known as the California Water Resources Development Bond Act, this act passed the Legislature in 1959 and was approved by voters in 1960. It provided initial funding of \$1.75 billion in general obligation bonds and authorized construction of the State Water Project facilities.

**bypass** As part of a flood management system, a natural overflow area or channel that allows excessive floodwaters to flow or be diverted from a main river channel to prevent water from overflowing the main river channel.

## C

**CALFED Bay-Delta Program** (CALFED) A federal and State multiagency program established by the 1994 Bay-Delta Accord. CALFED's mission was to develop and implement a long-term comprehensive plan that would restore ecological health and improve water management in the Bay-Delta system. In 2010, all functions and responsibilities of CALFED were assumed by the Delta Stewardship Council.

**California Data Exchange Center** (CDEC) CDEC installs, maintains, and operates an extensive hydrologic data collection network including automatic snow reporting gauges for the DWR Cooperative Snow Surveys Program and precipitation and river stage sensors for flood forecasting. CDEC provides a centralized location to store and process real-time hydrologic information gathered cooperatively throughout the State.

**California Irrigation Management Information System** (CIMIS) A network of automated weather stations that are owned and operated cooperatively between DWR and local agencies. The stations are installed in

most of the agricultural and urban areas of the State and provide farm and large landscape irrigation managers and researchers with “real-time” weather data to estimate crop and landscape evapotranspiration rates and make irrigation management decisions.

**California Water Resources Simulation Model (CALSIM)** A computer model that simulates operations of SWP and Central Valley Project water delivery systems. CALSIM II is a planning tool that was jointly developed by DWR and the Bureau of Reclamation. The model’s inputs include hydrologic data for specified study planning years, water demands, infrastructure and regulatory change, and other factors. Outputs include deliveries to water contractors, river flows, reservoir changes, Delta hydrologic parameters, and other data.

**cation** An atom or a molecule in which the total number of protons is greater than the total number of electrons, giving it a net positive electrical charge.

**Central Valley Project deliveries** The volume of water imported to a given area through the Central Valley Project.

**ciliates** Single-celled organisms, characterized by the presence of many hair-like structures called cilia used for locomotion and for feeding.

**climate change** Any significant change in the measures of climate lasting for an extended period of time. This includes major changes in temperature, precipitation, or wind patterns, among other things, that occur over several decades or longer.

**coded wire tag** A small piece of stainless steel wire injected into the snout of juvenile salmon and steelhead. Each tag is etched with a binary code that identifies a fish release group.

**conjunctive use** Application of surface water and groundwater to meet the demand for a beneficial use. Coordinated and planned management of both surface water and groundwater resources to maximize the efficient use of the resources; that is, the planned and managed operation of a groundwater basin and a surface water storage system combined through a coordinated conveyance infrastructure. Water is stored in the groundwater basin for later planned use by intentionally recharging the basin during years of above-average surface water supply.

**conservation facilities** Reservoir facilities that store water and make it available for later use.

**consultation** The process required of a federal agency under Section 7 of the Endangered Species Act when any activity authorized, carried out, or conducted by that agency may affect a listed species or designated critical

habitat; consultation is with the U.S. Fish and Wildlife Service or National Marine Fisheries Service and may be either informal or formal.

**conveyance** Provides for the movement of water and includes the use of natural watercourses and constructed facilities including open channels, pipelines, diversions, fish screens, distribution systems, and pump lifts.

**conveyance facilities** Canals, pipelines, pump lifts, ditches, etc., used to move water from one area to another.

**cryptomonad** A single-celled, photosynthetic organism with two flagella that inhabits both marine and freshwater environments.

**cyanobacteria** Photosynthetic, nitrogen-fixing, colonial bacteria found in a wide variety of terrestrial and aquatic habitats, often referred to as “blue-green algae.”

## D

**Davis-Grunsky Act** Authorized in 1960 as part of the Burns-Porter Act, this act provides construction loans for local domestic water projects and agricultural water conservation projects.

**Delta outflow** Freshwater outflow from the Sacramento-San Joaquin Delta to protect the beneficial uses within the Delta from the incursion of saline water.

**Delta outflow index** A calculated approximation of the seaward freshwater outflow as it passes Chipps Island near Pittsburg, beyond the confluence of the Sacramento and San Joaquin rivers.

**desalting** A process to reduce the salt concentration of seawater or brackish water.

**diatom** Microscopic marine or freshwater colonial algae that have cell walls made out of silica.

**dinoflagellate** A small, single-celled organism with flagella and an internal skeleton of cellulose-like plates found in both marine and freshwater environments and best known as causers of harmful algal blooms.

**discount rate** The interest rate used to calculate the present value of future benefits and future costs or to convert benefits and costs to a common time basis.

**dissolved organic compounds** Carbon-based substances dissolved in water.



**dissolved oxygen** The amount of oxygen dissolved in water or wastewater, usually expressed in milligrams per liter, parts per million, or percent of saturation.

**distinct population segment** A subdivision of a species that is treated as a species for purposes of listing under the Endangered Species Act. The smallest division of a taxonomic species that can be protected under the Endangered Species Act.

**drainage area** The area of land from which water drains into a river; for example, the Sacramento River Basin, in which all land area drains into the Sacramento River. Also called a watershed, drainage basin, or river basin.

**drought preparedness** The magnitude and probability of economic, social, or environmental consequences that would occur as a result of a sustained drought under a given study plan.

**drought condition** Hydrologic conditions during a defined period, greater than one dry year, when precipitation and runoff are much less than average.

**drought year supply** The average annual supply of a water development system during a defined drought period.

**Delta Simulation Model 2 (DSM2)** A hydrodynamic and water quality simulation model used to simulate water flow and quality conditions in the Sacramento-San Joaquin Delta. The model is frequently used to evaluate potential changes in Delta conditions (salinity, flow, and water level) associated with changes in flow patterns in the Delta.

## E

**ecosystem restoration** The activity of improving the condition of natural landscapes and biotic communities.

**effluent** Wastewater or other liquid, treated or in its natural state, flowing from a treatment plant or process.

**electrical conductivity** The measure of the ability of water to conduct an electrical current, the magnitude of which depends on the dissolved mineral content of the water.

**endangered species** An animal or plant species in danger of extinction throughout all or a significant portion of its range.

**entrainment** The unintended diversion of fish (or other aquatic organisms) into an unsafe passage route. The incidental trapping of any life stage of fish within waterways or structures that carry water being diverted for use

elsewhere. Fish are considered “entrained” when they enter a diversion point, which for the SWP is Clifton Court Forebay.

**environmental impact report** A report done to analyze project or program impacts on a variety of resources under the California Environmental Quality Act.

**environmental impact statement** A report done to analyze project or program impacts on a variety of resources under the National Environmental Policy Act.

**environmental water** The water for wetlands, for the instream flow in a major river or the Bay-Delta, or for a designated wild and scenic river.

**escapement** The portion of an anadromous fish population that escapes commercial and recreational fisheries and reaches its freshwater spawning grounds.

**estuary** A semi-closed coastal body of water where the lower course of a river enters the sea, influenced by tidal action where the tide meets the river flow, resulting in brackish water.

**evapotranspiration** The amount of water transpired by plants, retained in plant tissues, and evaporated from plant tissues and surrounding soil surfaces. (See also, reference evapotranspiration.)

**excess water conditions** Periods when it is agreed that releases from upstream reservoirs plus unregulated flow exceeds Sacramento Valley in-basin uses plus exports. DWR and the Bureau of Reclamation jointly decide when balanced or excess water conditions exist. During excess water conditions, sufficient water is available to meet all beneficial needs, and the SWP and Central Valley Project are not required to supplement the supply with water from reservoir storage.

**export** An amount of water transported from one source or location to another.

## F

**firm yield** The maximum annual supply of a water development project under drought conditions, for some specified level of demand.

**flagellates** Organisms with one or more whip-like structures called flagella, which are used for locomotion or feeding.

**floodplain** A strip of relatively level land bordering a stream or river that is often inundated during times of high water.

**forages** Food for animals, especially crops grown to feed horses, cattle, and other livestock.

**forebay** A reservoir at the intake of a pumping plant or power plant to stabilize water levels; also a storage basin for regulating water for percolation into groundwater basins.

**fork length** A measurement used frequently for fish length when the tail has a fork shape; projected straight distance between the tip of the snout and the fork of the tail.

**freeboard** The height of the physical top of a levee above a specified water surface elevation. This serves as a factor of safety for containing water in the stream or reservoir without overtopping the levee or dam.

**fry** Young, recently hatched fish that are able to swim and catch their own food.

## G

**greenhouse gas emissions** Also referred to as carbon intensity or carbon footprint, greenhouse gases trap heat in the atmosphere and contribute to climate change. They include carbon dioxide, methane, nitrous oxide, and fluorinated gases.

**grilse** A term that generally refers to young adult salmonids of a certain length and age. Grilse are often 55–65 centimeters (22–26 inches) in length. They are assumed to be two years old, and adults are assumed to be age three and older.

**groundwater** Water located beneath the land surface that fills the pore spaces of the alluvium, soil, or rock formation in which it is situated. It excludes soil moisture, which refers to water held by capillary action in the upper unsaturated zones of soil or rock.

**groundwater bank** Groundwater banking refers to the practice of recharging specific amounts of water in a groundwater basin during wet or above-average years, which can later be withdrawn and used by the depositing entity.

**groundwater basin** An alluvial aquifer or a stacked series of alluvial aquifers with reasonably well-defined boundaries in a lateral direction and having a definable bottom.

**groundwater recharge** The natural or intentional infiltration of surface water into the zone of saturation of an aquifer (i.e., into groundwater).

**groundwater storage capacity** The volume of void space that can be occupied by water in a given volume of a formation, aquifer, or groundwater basin.

**groundwater table** The upper surface of the zone of saturation in an unconfined aquifer.

## H

**habitat** The place or environment where a plant or animal naturally lives and grows with a group of particular environmental conditions.

**habitat conservation plan** A plan that outlines ways of maintaining, enhancing, and protecting a given habitat type needed to protect species; it usually includes measures to minimize impacts, and may include provisions for permanently protecting land, restoring habitat, and relocating plants or animals to another area. Required before a federal Endangered Species Act incidental take permit may be issued.

**halophyte** A plant capable of growing in salty soil.

**haptophyte** A kind of unicellular marine phytoplankton typically covered in tiny scales or plates composed of carbohydrates and calcium deposits.

**hydraulic barrier** (1) A barrier created by injecting fresh water to control seawater intrusion in an aquifer, or created by water injection to control migration of contaminants in an aquifer. (2) A barrier developed in the estuary (the Delta) by release of fresh water from upstream reservoirs to prevent intrusion of seawater into the body of fresh water.

**hydrologic balance** An accounting of all water inflow to, water outflow from, and changes in water storage within a hydrologic unit over a specified period of time.

**hydrologic basin** Where, conceptually, any drop of water that falls in the basin will flow to a stream or groundwater basin within it. It is a larger set of which a subset is the groundwater basin that can be within a hydrologic basin. DWR's hydrologic regions are collections of the larger hydrologic basins.

**hydrologic region** DWR divides California into 10 hydrologic regions, corresponding to the state's major water drainage basins: North Coast, San Francisco Bay, Central Coast, South Coast, Sacramento River, San Joaquin River, Tulare Lake, North Lahontan, South Lahontan, and Colorado River.

**hydrology** The science dealing with the occurrence, circulation, distribution, and properties of the waters of the earth and its atmosphere.

**I**

**in-lieu recharge** The practice of providing surplus surface water to historic groundwater users, thereby leaving groundwater in storage for later use.

**ion exchange** Processes of purification, separation, and decontamination of aqueous and other ion-containing solutions with solid ion exchangers (such as sodium carbonate used for water softening).

**instream use** Use of water within its natural watercourse as specified in an agreement, water rights permit, etc. For example, the use of water for navigation, recreation, fish and wildlife, aesthetics, and scenic enjoyment.

**integrated regional water management** A comprehensive approach for determining the appropriate mix of demand and supply management options to provide long-term, reliable water supply at the lowest reasonable cost and with the highest possible benefits to customers, economic development, environmental quality, and other social objectives.

**invertebrate** An animal that lacks a backbone.

**J**

**joint points of diversion** The ability of the SWP to use Jones Pumping Plant as a point of diversion and the Central Valley Project to use Banks Pumping Plant as a point of diversion. The SWP and Central Valley Project may use one another's diversion facilities under certain conditions.

**joint powers agreement** An agreement entered into by two or more public agencies that allows them to jointly exercise any power common to the contracting parties. This is defined in Chapter 5 (commencing with Section 6500) of Division 7 of Title 1 of the California Government Code.

**joint-use facilities** Those portions of the SWP that serve both SWP and Central Valley Project functions, and in which both State and federal agencies participate in the construction and use; specifically, the San Luis complex and Reaches 3, 4, 5, 6, and 7 of the California Aqueduct.

**jurisdictional dam** Artificial barriers, together with appurtenant works, which are 25 feet or more in height or have an impounding capacity of 50 acre-feet or more, which are regulated by the DWR Division of Safety of Dams.

**K**

**kathablepharid** A specific type of cryptomonad.



## L

**land subsidence** The lowering of the natural land surface in response to: earth movements; the lowering of fluid pressure or groundwater level; consolidation of underlying soils; removal of underlying supporting materials by mining (e.g., oil and gas extraction); compaction caused by wetting; or oxidation of organic matter in soils (e.g., peat soil being converted to gas).

**legal Delta** The legal geographical boundaries of the Sacramento-San Joaquin Delta, as established by the Delta Protection Act of 1959, and as defined in California Water Code Section 12220.

**listed species** A species, subspecies, or distinct population segment that has been added to the federal list of endangered and threatened wildlife and plants. The term also applies to a species or subspecies added to the California list of endangered or threatened plants and animals.

## M

**maximum contaminant level** The highest drinking water contaminant concentration allowed under federal and State Safe Drinking Water Act regulations.

**mitigation** (1) An action or set of actions designed to avoid, minimize, reduce, eliminate, or compensate for adverse environmental impacts due to an agency activity or program. (2) Reduction of human activities that affect global climate change, including strategies to reduce greenhouse gas emissions.

**Monterey Agreement** An agreement executed in December 1994 among DWR and the SWP water contractors to address fundamental contract issues by amending the long-term water supply contracts.

**Monterey Amendments** Amendments to the long-term water supply contracts for the SWP entered into by DWR and most (27 of 29) of the SWP water contractors in 1995 and 1996 as implementation of the terms of the Monterey Agreement.

**multipurpose project** A project, usually a reservoir, designed to serve more than one purpose, whose costs are normally allocated among the different functions it provides. For example, a project that provides water supply, flood control, and generates hydroelectricity.

**N**

**natural community conservation planning (NCCP)** A process that promotes multispecies and multihabitat management and conservation through cooperative efforts among public agencies, private landowners, and other interests within a plan area. It provides a framework for minimizing impacts on plant communities and wildlife from proposed development projects.

**natural recharge** Natural replenishment of an aquifer generally from snowmelt and runoff through seepage from the surface.

**net groundwater** The amount of groundwater extraction in excess of deep percolation.

**nonreimbursable costs** The part of project costs allocated to general statewide or national beneficial purposes and funded from general revenues, rather than by water users.

**normalized demand** The process of adjusting actual water use in a given year to account for unusual events such as dry weather conditions, government price support programs for agriculture, rationing programs, or other unusual conditions.

**O**

**operational yield** An optimal amount of groundwater that should be withdrawn from an aquifer system or a groundwater basin each year. It is a dynamic quantity that must be determined from a set of alternative groundwater management decisions subject to goals, objectives, and constraints of the management plan.

**Operations Criteria and Plan (OCAP)** (1) The document titled, "Long-Term Central Valley Project Operations Criteria and Plan," that serves as a baseline description of the facilities and operating environment of the Central Valley Project and the SWP and identifies factors influencing the physical and institutional conditions and decision-making processes under which the projects currently operate. Regulatory and legal requirements are explained and alternative operating models and strategies described. (2) The document titled, "Central Valley Project Operations Criteria and Plan" (CVP-OCAP, 2004), that describes the laws, regulations, and other criteria applicable to operations of the Central Valley Project that were in effect from 1991 through 2003.

**Operations Criteria and Plan biological opinion** (1) The document titled, "Biological Opinion and Conference Opinion on the Long-Term Operations of the Central Valley Project and the State Water Project" (NOAA Fisheries, 2009).

(2) The December 15, 2008, memorandum from the U.S. Fish and Wildlife Service to the Bureau of Reclamation that comprises the U.S. Fish and Wildlife Service biological opinion on the coordinated operations of the Central Valley Project and the SWP.

**ostracod** A type of bivalve (with a hinged, two-part shell) crustacean, mostly microscopic to small in size, found in aquatic and marine habitats occurring as benthic or planktonic organisms.

**otolith** Ear bone of a fish. Otoliths often show seasonal or annual rings that can be used to determine age.

**outflow** The amount of applied water and conveyance water leaving the service area. Also conveyance outflow.

## P

**parr** The developmental life stage of salmon and trout when the young have developed parr marks (vertical bars or spots on the sides of the fish) and are actively feeding in fresh water.

**pelagic** Inhabiting the water column as opposed to being associated with the bottom; generally occurring anywhere from the water's surface down to, but not including, the bottom.

**pelagic fish** Fish that live in open water, often near the surface.

**perched groundwater** Groundwater supported by a zone of material of low permeability located above an underlying main body of groundwater.

**perennial yield** The maximum quantity of water that can be annually withdrawn from a groundwater basin over a long period of time without developing an overdraft condition.

**permeability** The capability of soil or other geologic formations to transmit water.

**phytoplankton** Minute plants, such as algae, that live suspended in bodies of water and drift with the current.

**precipitation** A deposit on the earth of hail, rain, mist, sleet, or snow. It is the common process by which atmospheric water becomes surface or subsurface water.

**project yield** The water supply attributed to all features of a project, including integrated operation.

**proposal solicitation package (PSP)** As part of the formal solicitation for grant applications, a PSP provides detailed instructions on the mechanics of submitting proposals and specific information on submittal requirements.

**public trust doctrine** A legal doctrine recognizing public rights in the beds, banks, and waters of navigable waterways, and the State's power and duty to exercise continued supervision over them as trustee for the benefit of the people.

**pump lift** (1) The vertical distance that a pump will raise water. (2) The distance between the groundwater table and the overlying land surface.

**pumped storage project** A hydroelectric power plant and reservoir system using an arrangement whereby water released for generating energy during peak load periods is stored and pumped back into the upper reservoir, usually during periods of reduced power demand.

**pumping-generating plant** A plant that can either pump water or generate electricity, depending on the direction of water flow.

**punch list** A list of tasks or "to-do" items necessary for the completion of a construction project.

## Q

**Quantification Settlement Agreement** A complex package of agreements that defines the rights to a portion of Colorado River water for four water agencies in Southern California, provides for water transfers, and establishes a Joint Powers Authority to oversee restoration of the Salton Sea. The *Colorado River Water Delivery Agreement: Federal Quantification Settlement Agreement* was signed in October 2003 by Coachella Valley Water District, Imperial Irrigation District, The Metropolitan Water District of Southern California, the San Diego County Water Authority, and the federal government.

## R

**radial gates** Gates used to control the flow of water into or from a reservoir, canal, or pipeline, or through a channel. Each gate can close under its own weight and is operated independently by remote control.

**radio-telemetry** Automatic measurement and transmission of data from remote sources via radio to a receiving station for recording and analysis.

**rate structure** Designates the rate basis for cost recovery (e.g., flat, uniform, tiered, etc.). Block/tiered rates are assumed to provide cost signals to

consumers. Costs can include capital, operation and maintenance, financing, environmental compliance (documentation, permitting, and mitigation), etc.

**raw water** Water found in the environment, such as rainwater, surface water (e.g., lakes, streams, and the ocean), or groundwater, that has not been treated. Most water is considered raw until it is treated for consumption or used for agriculture or industry.

**reach** On the California Aqueduct, a specific segment of the canal, identified by a number, which is the smallest unit of the SWP identified in water supply contracts for cost allocation and repayment purposes.

**rearing** Refers to the amount of time that juvenile fish spend feeding in nursery areas of rivers, lakes, streams, and estuaries before migration.

**reasonable and prudent alternatives** Alternative actions that can be implemented in a manner consistent with the intended purpose and scope of a project, are economically and technologically feasible, and would avoid the likelihood of jeopardizing the continued existence of listed species or resulting in the destruction or adverse modification of critical habitat.

**recharge** Water added to an aquifer or the process of adding water to an aquifer. Groundwater recharge occurs either naturally as the net gain from precipitation or artificially as the result of human influence.

**recharge basin** A surface facility constructed to infiltrate surface water into a groundwater basin.

**recreation** Water-dependent recreation activities that are consumptive (e.g., parks), flat-water (e.g., boating), or flow-based (e.g., whitewater rafting).

**recycled water** (1) The application of treated water/reclaimed water to meet a beneficial use, supplanting a potable or potentially potable supply. (2) Treated municipal, industrial, or agricultural wastewater to produce water that can be reused.

**redd** A shallow nest of fish eggs covered with gravel in a streambed.

**reference evapotranspiration** ( $ET_0$ ) The evapotranspiration rate from an extended surface of 3 to 6 inch (8 to 15 centimeter) tall green grass cover of uniform height, actively growing, completely shading the ground, and not short on water.

**reliability planning** Water reliability management planning is done by comparing the costs of taking actions to maintain or increase reliability to the costs of accepting less reliability. On this basis, accepting the costs of the adverse effects of less than 100 percent reliability could be a legitimate planning decision. Providing full water supply to meet 100 percent of



projected future water demand is not the planning goal, rather, the goal is to find the justified level of reliability.

**reoperation** See system reoperation.

**repayment reach** California Aqueduct reaches are delineated for the purpose of making project repayment as equitable as possible. The reaches are generally numbered consecutively from the Delta, with Reach 1 being first. Repayment reaches vary greatly in length. (See also, reach.)

**required instream flow** The amount of water required for instream use by agreement, water rights permit, or State/federal acts.

**reused water** The application of previously used water to meet a beneficial use, whether treated or not prior to the subsequent use. (See also, recycled water.)

**return flow** The portion of withdrawn water not consumed by evapotranspiration or system losses which returns to its source or to another body of water.

**reverse osmosis** A method to remove salts and other constituents from water by forcing water through membranes.

**riparian area** The area of land adjacent to a stream, lake, or wetland with vegetation that, due to the presence of water, is distinctly different from the vegetation of adjacent upland areas. Riparian areas provide important fish and wildlife habitat.

**riparian (water) right** A right to use surface water derived from the fact that the land in question abuts the banks of a stream or other water source (lake or pond). These rights are senior to most appropriative water rights.

**riprap** A layer of large uncoursed stones, broken rock, boulders, or precast blocks placed in random fashion on the upstream and downstream faces of embankment dams, stream banks, on a reservoir shore, on the sides of a channel, or other land surfaces to protect them from erosion caused by current, wind, wave, and/or ice action. Very large riprap is sometimes referred to as "armoring."

**run (of fish)** A group of fish of the same species whose upstream spawning migration timing is associated with the seasons, e.g., fall, spring, summer, and winter runs. Members of a run may interbreed with fish of another run.

**runoff** The volume of surface flow from an area during a specified period. Natural runoff is the portion of precipitation that runs off the land and makes up the natural flow in rivers. Incidental runoff is the portion of precipitation that would have been used by natural vegetation but now contributes to

runoff. This is a result of roads, paved areas, building roofs, land drainage systems, fields developed for irrigation, and other changes in land use.

## S

**sabellid polychaete** A segmented marine worm that lives in a tube that it builds.

**saline intrusion** The movement of salt water into a body of fresh water. It can occur in either surface water or groundwater bodies.

**salinity** Generally, the concentration of mineral salts dissolved in water. Salinity may be expressed in terms of a concentration, weight (total dissolved solids), electrical conductivity, or osmotic pressure. When describing salinity influenced by seawater, salinity often refers to the concentration of chlorides in the water. (See also, total dissolved solids.)

**salmonid** A fish species belonging to the salmon family, including salmon and trout.

**salt-water barrier** A physical facility or method of operation designed to prevent the intrusion of salt water into a body of fresh water.

**salvage (fish)** At the SWP and Central Valley Project fish protective facilities, fish are removed from export water, transported, and released away from the influence of the water diversion facilities.

**sediment** Soil or mineral material transported by water and deposited in streams or other bodies of water.

**seepage** The gradual movement of water into, through, or from a porous medium. Also, the infiltration of water into the soil from canals, ditches, laterals, watercourses, reservoirs, storage facilities, or other bodies of water, or from a field.

**service area** The geographic area served by a water agency.

**smolt** A juvenile salmonid fish that has assumed the silvery color of the adult and, while migrating toward the ocean, is undergoing physiological changes that will allow it to live in salt water.

**snowpack** The annual accumulation of snow in mountain areas.

**soluble minerals** Naturally occurring substances capable of being dissolved.

**special status species** Plants or animals legally protected under either the federal or California Endangered Species Act or the California Fish and Game Code; those species not currently protected by statute but considered to be rare or endangered under the California Environmental Quality Act; and species considered by the scientific community to be sufficiently rare to qualify for legal protection (e.g., candidate species for listing as threatened or endangered, species of concern to the Department of Fish and Wildlife or U.S. Fish and Wildlife Service, or rare plants identified by the California Native Plant Society).

**species of concern** An informal term referring to a species that might be in need of conservation action.

**spillway** The section of a dam designed to permit water to pass over its crest; a weir or channel taking overflow from the dam. The spillway serves as a safety channel to prevent erosion or overtopping of the dam.

**sprinkler irrigation** A method of irrigation in which the water is sprayed, or sprinkled, through the air to the ground surface.

**stakeholder** Individuals or groups who can affect or be affected by an organization's activities; individuals or groups with an interest or "stake" in what happens as a result of a decision or action.

**State Water Project deliveries** The volume of water imported to a given area through the State Water Project.

**statewide water management systems** These include physical facilities (more than 1,200 State, federal, and local reservoirs, as well as canals, treatment plants, and levees), which make up the backbone of water management in California; and statewide water management programs, which include water-quality standards, monitoring programs, economic incentives, water-pricing policies, and statewide water-efficiency programs such as appliance standards, labeling, and education.

**strategic plan** The long-term goals of an organization or program and an outline of how the goals will be achieved (e.g., adopting specific strategies, approaches, and methodologies).

**stocking** Releasing hatchery-raised fish into a water body for the purposes of supplementing existing populations or creating new ones for fishing (also referred to as "planting").

**streamflow** The rate of water flow past a specified point in a channel.

**subsidence** See land subsidence.

**surface storage** Surface storage uses reservoirs to collect water for later release and use.

**surface supply** Water supply obtained from streams, rivers, lakes, and reservoirs.

**system reoperation** Changes to existing water system operations and management procedures for existing reservoirs and conveyance facilities to increase their water-related benefits.

## T

**temporary urgency change petition** A formal request to the State Water Resources Control Board for conditional, temporary changes to the terms and conditions of a water right. Temporary urgency change orders issued by the State Water Resources Control Board allow water right holders to temporarily deviate from the terms of their existing water right.

**threatened species** An animal or plant species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

**tidal wetlands** The margins of an estuary that are periodically inundated by tides; includes all habitats within the elevation range between the lowest and highest tides: intertidal mudflats, regularly inundated tidal marsh plains, tidal channels within the marsh, and infrequently inundated wetland-upland transition zones at the edge of the upland.

**total capital cost** The total monetary cost of options required for “turnkey” implementation, including environmental and third-party impact mitigation, storage, conveyance, energy, capitalized operations and maintenance, administrative costs, planning costs, legal costs, and engineering costs.

**total dissolved solids** The quantity of the residual minerals dissolved in water that remain after evaporation of a solution.

**transpiration** An essential physiological process in which plant tissues give off water vapor into the atmosphere.

**tributary** A stream that flows into a larger stream or other body of water.

**tubificid worm** An aquatic worm with a small, thin, segmented body.

**turbidity** A measure of the cloudiness of water caused by the presence of suspended particles in the water that attenuate or reduce light penetration. Turbidity in natural waters may be composed of organic and/or inorganic constituents and may have direct implications to drinking water treatment.

**turnout** The point at which water is diverted from a main channel or water delivery facility to a distributing facility; a structure through which a water contractor takes delivery of water.

## U

**unimpaired flow** The flow past a specified point on a natural stream that is unaffected by stream diversion, storage, import, export, return flow, or change in use caused by modifications in land use.

**unimpaired runoff** A representation of the natural water production of a river basin, unaltered by upstream diversions, storage, or by export or import of water to or from other watersheds.

**Urban Water Management Planning Act** Sections 10610 through 10657 of the California Water Code. The act requires urban water suppliers to prepare urban water management plans that describe and evaluate sources of water supplies, efficient uses of water, demand management measures, implementation strategies and schedules, and other relevant information and programs within their water service areas. Urban water suppliers (Section 10617) are either publicly or privately owned and provide water for municipal purposes, either directly or indirectly, to more than 3,000 customers or supply more than 3,000 acre-feet of water annually.

**urban water use** The use of water for urban purposes, including residential, commercial, industrial, recreation, energy production, military, and institutional classes. The term is applied in the sense that it is a kind of use rather than a place of use.

**urban water use efficiency** Methods or technologies resulting in the same beneficial residential, commercial, industrial, and institutional uses with less water or increased beneficial uses from existing water quantities.

## V

**vernal pools** A type of wetland that occurs in shallow foothill and valley depressions. Water remains in pools and swales until it evaporates, usually within a few days to a few months, mainly in late winter and spring.

**volatile organic compound (VOC)** A man-made organic compound that readily vaporizes in the atmosphere. These compounds are often highly mobile in the groundwater system and are generally associated with industrial activities.



## W

**wastewater** Domestic or municipal sewage or effluent from an industrial process.

**water demand** The desired quantity of water that would be used if the water were available and if a number of other factors, such as price, did not change. Demand is not static.

**water exchange** Typically, water delivered by one water user to another water user; the receiving water user will return the water at a specified time or when the conditions of the parties' agreement are met. (See also, water transfer.)

**water quality** Description of the chemical, physical, and biological characteristics of water, usually with regard to its suitability for a particular purpose or use.

**water quality objectives** Specific, legally enforced levels of water quality desired for identified uses including drinking, recreation, fish production or propagation of other aquatic life, agriculture, industry, and urban use.

**water recycling** The process of treating wastewater, rendering it suitable for beneficial use.

**water right** In water law, the right of a user to use water from a water source (e.g., a river, stream, pond, or source of groundwater).

**water service reliability** The degree to which a water service system can successfully manage water shortages.

**water supply exports** The amount of water that a region transfers to another to meet needs.

**water table** See groundwater table.

**water transfer** A temporary or long-term change in the point of diversion, place of use, or purpose of use due to a transfer or exchange of water or water rights. A more general definition is that water transfers are a voluntary change in the way water is usually distributed among water users in response to water scarcity.

**water year** A continuous 12-month period for which hydrologic records are compiled and summarized. Different agencies may use different calendar periods for their water years. For DWR, a water year is October 1 through September 30.

**watershed** The land area from which water drains into a stream, river, or reservoir. Also called drainage area, drainage basin, or river basin.

**watershed management** The process of evaluating, planning, managing, restoring, and organizing land and other resource use within an area that has a single common drainage point.

**weir** (1) Any structure across a watercourse used to control, raise, or measure flows. (2) A barrier constructed to catch upstream migrating adult fish.

**wetlands** Lands including swamps, marshes, bogs, and similar areas such as wet meadows, river overflows, mud flats, and natural ponds. An area characterized by periodic inundation or saturation, certain types of soils, and vegetation adapted for life in saturated soil conditions.

**Wild and Scenic River systems** State and federally designated river systems under the 1968 national Wild and Scenic Rivers Act and the 1972 California Wild and Scenic Rivers Act. Seventeen rivers in California, including many forks and tributaries, are designated wild, scenic, or recreational.

**wheel** As applied to water and power, to provide the use of one agency's conveyance facilities for the purpose of transporting another agency's supply.

## X

**X2** Delta outflow interaction with tides determines the location of the X2 isohaline salinity gradient. X2 is the location in the Bay-Delta where the tidally averaged bottom salinity is 2 parts per thousand. It is expressed as the distance in kilometers from the Golden Gate Bridge. X2 is used as a primary indicator in managing Delta outflow.

## Z

**zooplankton** Small aquatic animals that are suspended or swimming in water.

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## Appendix B

### Data and Computations Used to Determine 2017 Water Charges

Appendix B, Data and Computations Used to Determine 2017 Water Charges, was previously printed and distributed under an August 2016 cover letter from Pedro Villalobos, Acting Chief of SWPAO, to State Water Project water contractors to document and support DWR's calculation of the contractors' annual charges. Appendix B appears on the following pages as it was published in August 2016. However, Table B-7 was not published in the August 2016 version of Appendix B because the data were not available at the time of publication. Table B-7 now appears in its entirety on page B-78.



## Appendix B

### Data and Computations

### Used to Determine 2017 Water Charges

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## SWP Water Contractors

The State Water Project water supply contractors are listed below, followed by shortened forms of their names that are used in Bulletin 132.

Alameda County Flood Control and Water Conservation District, Zone 7	Alameda-Zone 7
Alameda County Water District	Alameda County
Antelope Valley-East Kern Water Agency	AVEK
Castaic Lake Water Agency	Castaic Lake
City of Yuba City	Yuba City
Coachella Valley Water District	Coachella
County of Butte	Butte
County of Kings	Kings
Crestline-Lake Arrowhead Water Agency	Crestline
Desert Water Agency	Desert
Dudley Ridge Water District	Dudley Ridge
Empire West Side Irrigation District	Empire
Kern County Water Agency	Kern
Littlerock Creek Irrigation District	Littlerock
The Metropolitan Water District of Southern California	Metropolitan
Mojave Water Agency	Mojave
Napa County Flood Control and Water Conservation District	Napa
Oak Flat Water District	Oak Flat
Palmdale Water District	Palmdale
Plumas County Flood Control and Water Conservation District	Plumas
San Bernardino Valley Municipal Water District	San Bernardino
San Gabriel Valley Municipal Water District	San Gabriel
San Geronio Pass Water Agency	San Geronio
San Luis Obispo County Flood Control and Water Conservation District	San Luis Obispo
Santa Barbara County Flood Control and Water Conservation District	Santa Barbara
Santa Clara Valley Water District	Santa Clara
Solano County Water Agency	Solano
Tulare Lake Basin Water Storage District	Tulare
Ventura County Watershed Protection District	Ventura





## Appendix B

### Data and Computations

### Used to Determine 2017 Water Charges

The Department of Water Resources (DWR) annually furnishes Statements of Charges to the 29 State Water Project (SWP) water supply contractors. Article 29(e) of the *Standard Provisions for Water Supply Contract*, approved August 3, 1962, describes those statements:

“All such statements shall be accompanied by the latest revised copies of the document amendatory to Article 22 and of Tables B, C, D, E, F, and G of this contract, together with such other data and computations used by the State in determining the amounts of the above charges as the State deems appropriate.”

To comply with Article 29(e), DWR performs an annual comprehensive review and redetermination of all water supply and financial aspects of the SWP for the entire project repayment period. This annual redetermination is performed in accordance with Article 22(f) and Article 28 of the water supply contracts, which concern the Delta Water Rate and annual transportation charges, respectively.

Appendix B includes data used to document the redetermination of water charges to be paid by contractors during calendar year 2017. The information is based on established data about the SWP, both known and projected, as of June 2016; however, small volumes of water may be reclassified over time pursuant to water supply contract provisions. If research requires more current data than was available at the time of

production of Bulletin 132, please contact the State Water Project Analysis Office. Where applicable, the projected data values shown in this appendix are shaded and the bill year data are in **bold** type.

The computational procedures and interrelationships between tabulations in this appendix are outlined on *Figures B-1* and *B-2*. All tables referenced on Figures B-1 and B-2 follow this text.

## Types of Water Charges

Charges to SWP water supply contractors include the costs of facilities for the conservation and development of a water supply and the conveyance of such supply to SWP service areas. These facilities are classified as “Project Conservation Facilities” and “Project Transportation Facilities” in the *Standard Provisions for Water Supply Contract*. Names of the main facilities in each classification follow.

### Project Conservation Facilities

- Frenchman Dam and Lake
- Grizzly Valley Dam and Lake Davis
- Antelope Dam and Lake
- Oroville Dam and Lake Oroville
- Oroville power facilities
- Delta facilities
- Suisun Marsh facilities
- Yolo Bypass
- A portion of the California Aqueduct from the Delta to Dos Amigos Pumping Plant

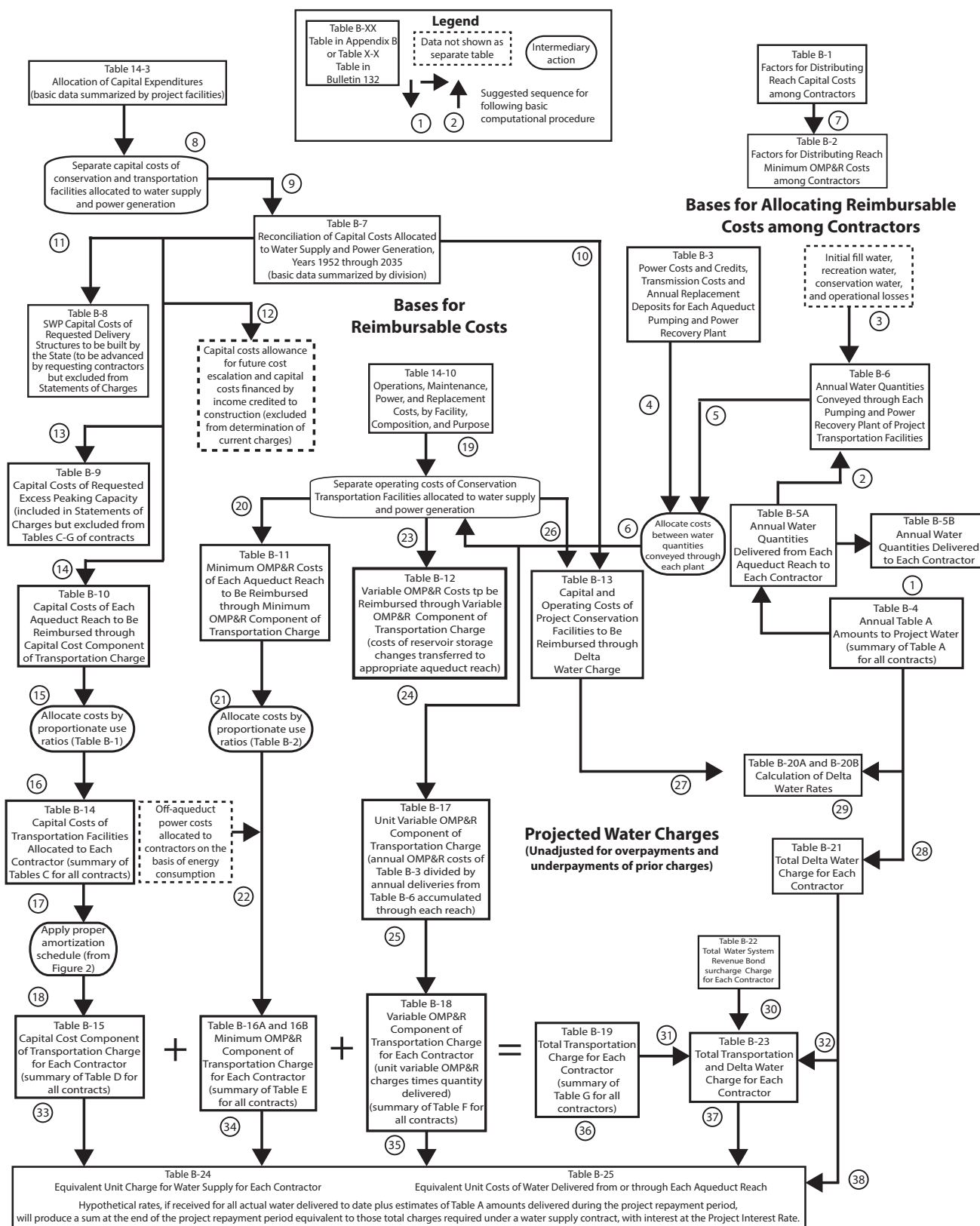
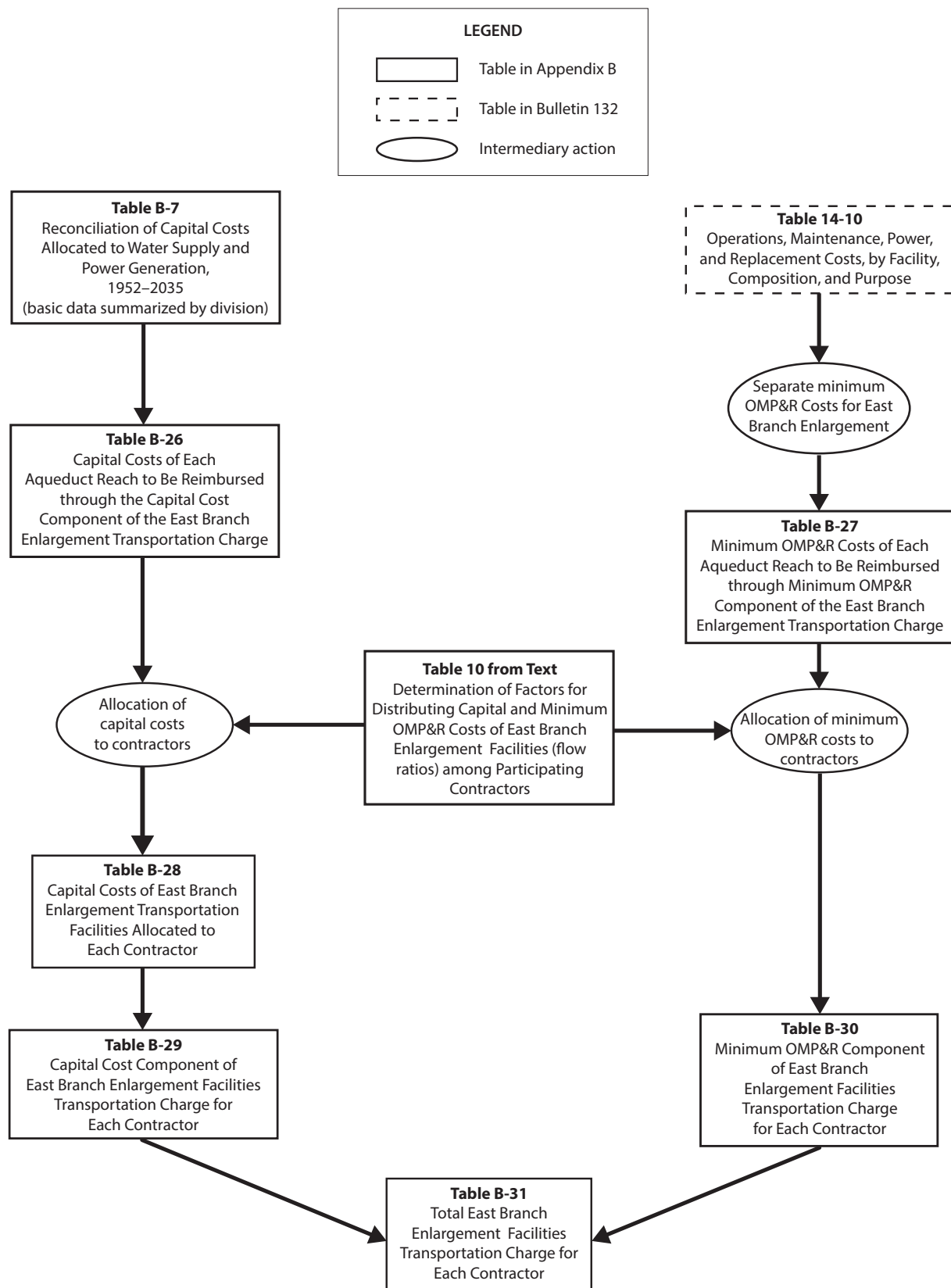


Figure B-1 Relationships of Data Used to Substantiate Statements of Charges



**Figure B-2 Relationships of Data Used to Substantiate East Branch Enlargement Charges**

- Sisk Dam, San Luis Reservoir, and Gianelli Pumping-Generating Plant

#### Project Transportation Facilities

- Grizzly Valley Pipeline
- North Bay Aqueduct
- South Bay Aqueduct, including Del Valle Dam and Lake del Valle
- the remainder of the California Aqueduct from the Delta to Dos Amigos Pumping Plant and all facilities south, including dams and lakes in Southern California
- Off-Aqueduct Power Facilities (Reid Gardner Unit No. 4, Bottlerock Powerplant, and South Geysers Powerplant)

The standard provisions provide for a Delta Water Charge and a Transportation Charge for project water.

The Delta Water Charge is a unit charge applied to each acre-foot of SWP water the contractors are to receive, in accordance with their contracts. The unit charge, if applied to each acre-foot of all such allocations for the remainder of the project repayment period, is calculated to result in repayment of all outstanding reimbursable costs of the Project Conservation Facilities, with appropriate interest, by the end of the repayment period (2035).

The Transportation Charge is for use of facilities to transport water to the vicinity of each contractor's turnout(s). Generally, the annual charge represents each contractor's proportionate share of the reimbursable capital costs and operating costs of the Project Transportation Facilities.

Each contractor's allocated share of those reimbursable capital costs is amortized for repayment to the State, and certain variations are allowed in the amortization methods. Contractors' shares of

reimbursable operating costs are repaid in the year such costs are incurred by the State.

The East Branch Enlargement Transportation Charge is paid by the seven Southern California contractors participating in the enlargement. San Bernardino Valley Municipal Water District advanced funds to pay the district's allocated capital costs for the East Branch Enlargement. The remaining six contractors pay an allocated share of the debt service on revenue bonds sold to finance the enlargement. Each contractor will also pay an allocated share of the minimum operation, maintenance, power, and replacement (OMP&R) costs of the East Branch Enlargement.

Transportation charges for the Coastal Branch Extension, East Branch Extension, and South Bay Enlargement are being repaid by contractors in their respective service areas.

Transportation charges for the Tehachapi Afterbay are repaid by those contractors using electrical power for delivery of their Table A water downstream of the Tehachapi Afterbay.

## Composition and Timing of Water Charges

As shown on *Figure B-3*, the Delta Water Charge and the Transportation Charge consist of the following three components:

- (1) conservation and transportation capital cost components, which will return to the State all reimbursable capital costs;
- (2) conservation and transportation minimum OMP&R components, which will return to the State all reimbursable operating costs that do not depend on or vary with quantities of water actually delivered to the contractors; and
- (3) a transportation variable OMP&R component, which will return to

## Delta Water Charge

### *Capital Cost Component*

1. Planning, design, right-of-way, and construction costs of Conservation Facilities
2. Operations and maintenance (O&M) costs for newly constructed Conservation Facilities prior to initial operations
3. Activation costs for newly constructed Conservation Facilities
4. Power costs allocated to initial filling of San Luis Reservoir
5. Capitalized O&M costs (major repair work and so forth) for Conservation Facilities
6. Program costs (portion) to mitigate impacts on current Delta fishery population due to State Water Project (SWP) pumping prior to 1986 (Department of Water Resources-Department of Fish and Game agreement)

### *Minimum Operations, Maintenance, Power, and Replacement (OMP&R) Component*

1. Direct O&M costs of Conservation Facilities
2. General O&M costs allocated to Conservation Facilities
  - a. Contractor Accounting Office (portion)
  - b. Financial and contract administration (portion)
  - c. Water rights
  - d. Power planning for SWP facilities (portion)
3. Replacement deposits for SWP control centers (portion)
4. Credits for a portion of Hyatt-Thermalito power generation
5. Power costs and credits related to pumping water to San Luis Reservoir for project operations (storage changes)
6. Value of power used and generated by Gianelli Pumping-Generating Plant
7. Program costs (portion) to offset annual fish losses resulting from pumping at Banks Pumping Plant (Department of Water Resources-Department of Fish and Game agreement)

## Transportation Charge

### *Capital Cost Component*

1. Planning, design, right-of-way, and construction costs of Transportation Facilities
2. Operations and maintenance (O&M) costs for newly constructed Transportation Facilities prior to initial operation
3. Activation costs for newly constructed Transportation Facilities
4. Power costs allocated to initial filling of Southern California reservoirs
5. Capitalized O&M costs (e.g., major repair work) for Transportation Facilities
6. Program costs (portion) to mitigate impacts on current Delta fishery population due to SWP pumping prior to 1986 (Department of Water Resources-Department of Fish and Game agreement)

### *Minimum OMP&R Component*

1. Direct O&M costs of Transportation Facilities
  - a. Headquarters and field divisions (portion)
  - b. Insurance and Federal Energy Regulatory Commission (FERC) costs (portion)
2. General O&M costs related to Transportation Facilities
  - a. Contractor Accounting Office (portion)
  - b. Financial and contract administration (portion)
  - c. Power planning for SWP facilities (portion)
3. Power costs and credits related to pumping water to Southern California reservoirs for project operations (storage changes)
4. Power costs for pumping water to replenish losses from Transportation Facilities (downstream costs)
5. Other power costs
  - a. Station service at Transportation Facility power and pumping plants
  - b. Certain transmission service costs (transmission access charges, downstream costs, etc.)
6. Replacement deposits for SWP control centers (portion)
7. Off-Aqueduct Power Facility costs—bond service, bond cover costs (25 percent of bond service), bond reserves, transmission service costs, fuel costs, taxes, and O&M—less power sales allocated to Off-Aqueduct Power Facilities
8. Program costs (portion to offset annual fish losses resulting from pumping at Banks Pumping Plant (Department of Water Resources-Department of Fish and Game agreement)

### *Variable OMP&R Component*

1. Power purchase costs
  - a. Capacity
  - b. Energy
  - c. Pine Flat Powerplant bond service, O&M, and transmission costs allocated to aqueduct pumping plants
2. Alamo, Devil Canyon, Warne, and Castaic power generation credited at the power plant reach and charged to aqueduct pumping plants
3. Hyatt-Thermalito Diversion Dam Powerplant generation charged to aqueduct pumping plants (credits for this generation are reflected in the Delta Water Rate)
4. Replacement deposits for equipment at pumping plants and power plants
5. Credits from sale of excess SWP system power
6. Program costs (portion) to offset annual fish losses resulting from pumping at Banks Pumping Plant (Department of Water Resources-Department of Fish and Game agreement)

Note: Excludes costs recovered under the East Branch Enlargement Transportation Charge.

**Figure B-3 Composition of Delta Water Charge and Transportation Charge**



the State all reimbursable operating costs that depend on and vary with quantities of water actually delivered to the contractors.

The formula for computing the Delta Water Rate, Article 22(f) of the *Standard Provisions for Water Supply Contract*, was designed to ensure that all adjustments for prior overpayments or underpayments of the Delta Water Charge are accounted for in a redetermination of the rate. Since the redetermined rate applies to all future allocations, such adjustments are amortized during the remainder of the project repayment period. This appendix includes a redetermination of the Delta Water Rate for 2017.

Article 28 of the standard provisions stipulates that Transportation Charges be redetermined each year. The tables in Appendix B include the numerical data used in this redetermination. Transportation Charges for prior years through 2016, included in those tables, are the redetermined amounts and do not equal the amounts actually paid by contractors.

As provided under the Water System Revenue Bond Amendment to the water supply contracts, differences between actual payments under the Transportation capital cost component and amounts computed in this redetermination are accumulated with interest and amortized during the remaining years of the contract repayment period. All computations for adjustments are included in the attachments accompanying each contractor's Statement of Charges and are reflected in revised copies of Table C through Table G of the contract, which are also furnished to each SWP contractor in its annual Statement of Charges.

These redeterminations exclude four charges associated with water service other than the Delta Water Charge and the Transportation Charge. The excluded charges (and the

manner in which they are treated in this appendix) are outlined below.

- (1) Advances of funds pursuant to Article 24(d) of the standard provisions for excess capacity constructed by the State at the request of contractors.
- (2) Advances of funds pursuant to Article 10(d) of the standard provisions for delivery structures (turnouts) constructed by the State at the request of contractors. Partial information concerning actual and projected capital costs of such delivery structures is included in this appendix. Statements concerning these costs and data are furnished to the appropriate contractors at various times and are not part of the annual statements.
- (3) Payments for sale and service of surplus water to entities other than contractors, pursuant to Article 21 of the standard provisions, are also excluded. Those payments are generally based on the unit rates shown in Table B-25. Net revenues resulting from noncontractor service are applied as indicated on page 24 of Bulletin 132-71.
- (4) Payments under the Devil Canyon-Castaic contract for costs of the Devil Canyon-Castaic facilities allocable to power generation. Charges billed as a result of the contract are billed separately from those billed as a result of the water supply contract. Information about the treatment of such charges in relation to redetermined Transportation Charges is included in special attachments to the bills of the six participating contractors.

Time and method of payment for corresponding components of the Delta Water Charge and the Transportation Charge are as follows:

- (1) The capital cost components of the Delta Water Charge and the

Transportation Charge are paid in two semiannual installments, due January 1 and July 1 of each year, based on statements furnished by the State on or before July 1 of the preceding year.

- (2) The minimum OMP&R components of the Delta Water Charge and the Transportation Charge are paid in 12 equal installments due the first of each month and based on statements furnished by the State on or before July 1 of the preceding year.
- (3) The variable OMP&R component of the Transportation Charge is paid in varying monthly amounts and is due the fifteenth day of the second month following actual water delivery. The charges are projected based on a unit charge per acre-foot established on or before July 1 of the preceding year. Those unit charges may be revised during the year to reflect current power costs and revenues. The unit charges are applied to actual monthly delivery quantities as determined by the State on or before the fifteenth day of the month following actual water delivery.

## Bases for Allocating Reimbursable Costs among Contractors

This section describes procedures for allocating reimbursable costs of Project Transportation Facilities among contractors (see upper right portion of Figure B-1). Those costs do not include annual costs of Off-Aqueduct Power Facilities, which are explained in the “Project Water Charges” section.

### Capital and Minimum OMP&R Costs

Figure B-4 includes information about the repayment reaches that form the basis for allocating reimbursable costs of the Project Transportation Facilities among contractors.

Allocations of reimbursable capital costs and minimum OMP&R costs of each reach are based on the proportionate maximum use of that reach by respective contractors under planned conditions of full development.

The derivation of ratios that represent the proportionate maximum use of each aqueduct reach by the respective contractors was first reported in Bulletin 132-70. The ratios in Bulletin 132-70 were subsequently revised for the North Bay Aqueduct, the South Bay Aqueduct, the California Aqueduct from the Delta to Castaic Lake, and the Coastal Branch.

All the revisions reported in previous bulletins regarding the derivation of ratios that represent the proportionate maximum use of each aqueduct reach by the respective contractors were last reported in Tables B-1 and B-2 of Bulletin 132-91. Under Article 53 of the Monterey Amendment, agricultural contractors may sell up to 130,000 acre-feet of aqueduct capacity to municipal and industrial contractors. The first permanent transfer occurred in 1998. Currently, 114,000 acre-feet of the allowable capacity has been transferred. *Table 1* shows the permanent capacity transfers that have taken place since the Monterey Amendment was implemented in 1995.

*Table B-1* presents the reach ratios currently applicable to reimbursable capital costs. These reach ratios do not reflect the permanent capacity transfers.

*Table B-2* presents corresponding ratios for allocating 2016 and after reimbursable minimum OMP&R costs among contractors. Requested excess capacity is omitted when deriving ratios applicable to capital costs because the capital costs for the excess capacity are paid on an incremental-cost basis and not a proportionate-use basis. However, requested excess capacity is accounted for in the ratios applicable to minimum OMP&R costs.

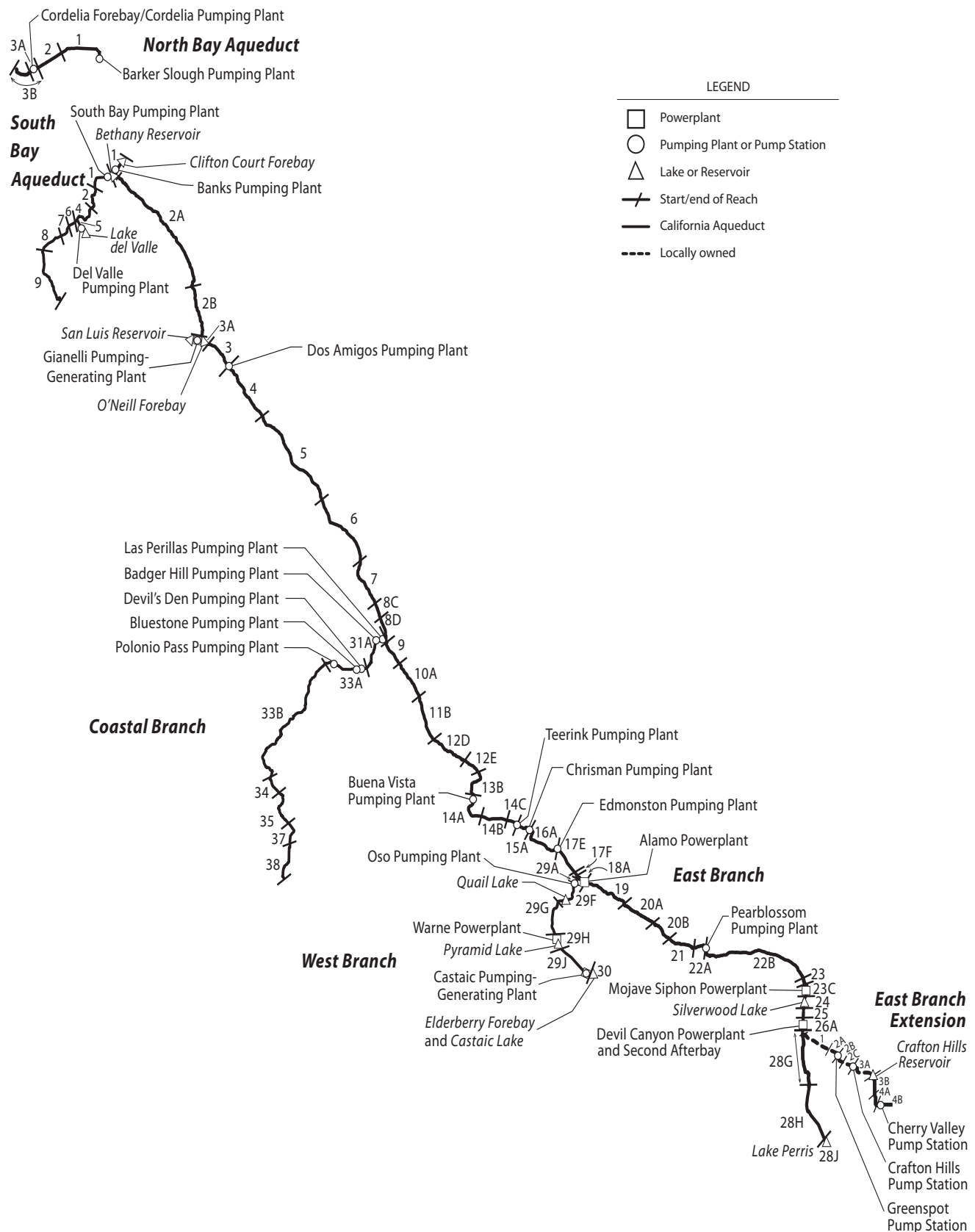


Figure B-4 Repayment Reaches and Descriptions

**North Bay Aqueduct**

- 1 Barker Slough through Fairfield/Vacaville Turnout
- 2 Fairfield/Vacaville Turnout to Cordelia Forebay
- 3A Cordelia Forebay through Benicia and Vallejo Turnouts
- 3B Cordelia Forebay through Napa Turnout Reservoir

**South Bay Aqueduct**

- 1 Bethany Reservoir through Altamont Turnout
- 2 Altamont Turnout through Patterson Reservoir
- 4 Patterson Reservoir to Del Valle Junction
- 5 Del Valle Junction through Lake del Valle
- 6 Del Valle Junction through South Livermore Turnout
- 7 South Livermore Turnout through Vallecitos Turnout
- 8 Vallecitos Turnout through Alameda-Bayside No. 1 Turnout
- 9 Alameda-Bayside No. 1 Turnout through Santa Clara Terminal Facilities

**California Aqueduct****North San Joaquin Division**

- 1 Delta through Bethany Reservoir
- 2A Bethany Reservoir to Orestimba Creek
- 2B Orestimba Creek to O'Neill Forebay

**San Luis Division**

- 3A Sisk Dam, San Luis Reservoir, and Gianelli Pumping-Generating Plant
- 3 O'Neill Forebay to Dos Amigos Pumping Plant
- 4 Dos Amigos Pumping Plant to Panoche Creek
- 5 Panoche Creek to Five Points
- 6 Five Points to Arroyo Pasajero
- 7 Arroyo Pasajero to Kettleman City

**South San Joaquin Division**

- 8C Kettleman City through Milham Avenue
- 8D Milham Avenue through Avenal Gap
- 9 Avenal Gap through Twisselman Road
- 10A Twisselman Road through Lost Hills
- 11B Lost Hills to 7th Standard Road
- 12D 7th Standard Road through Elk Hills Road
- 12E Elk Hills Road through Tupman Road
- 13B Tupman Road to Buena Vista Pumping Plant
- 14A Buena Vista Pumping Plant through Santiago Creek
- 14B Santiago Creek through Old River Road
- 14C Old River Road to Teerink Pumping Plant
- 15A Teerink Pumping Plant to Chrisman Pumping Plant
- 16A Chrisman Pumping Plant to Edmonston Pumping Plant

**Coastal Branch, California Aqueduct**

- 31A Avenal Gap to Devil's Den Pumping Plant
- 33A Devil's Den Pumping Plant through Tank 1
- 33B Tank 1 through Chorro Valley Turnout
- 34 Chorro Valley Turnout through Lopez Turnout
- 35 Lopez Turnout through Guadalupe Turnout
- 37 Guadalupe Turnout to SPRR crossing near Casmalia
- 38 SPRR crossing near Casmalia through terminous at Tank 5 (Outlet Vault)

**Tehachapi Division**

- 17E Edmonston Pumping Plant to Porter Tunnel
- 17F Porter Tunnel to Junction, West Branch

**Mojave Division**

- 18A Junction, West Branch through Alamo Powerplant
- 19 Alamo Powerplant to Fairmont
- 19C Buttes Junction through Buttes Reservoir
- 20A Fairmont through 70th Street West
- 20B 70th Street West to Palmdale
- 21 Palmdale to Littlerock Creek
- 22A Littlerock Creek to Pearblossom Pumping Plant
- 22B Pearblossom Pumping Plant to West Fork Mojave River
- 23 West Fork Mojave River to Silverwood Lake (excluding Mojave Siphon Powerplant)
- 23C Mojave Siphon Powerplant
- 24 Cedar Springs Dam and Silverwood Lake

**Santa Ana Division**

- 25 Silverwood Lake to South Portal, San Bernardino Tunnel
- 26A South Portal, San Bernardino Tunnel through Devil Canyon Powerplant and Second Afterbay
- 28G Devil Canyon Powerplant and Second Afterbay to Barton Road
- 28H Barton Road to Lake Perris
- 28J Perris Dam and Lake Perris

**East Branch Extension**

- 1 Devil Canyon Powerplant to Junction, Foothill Pipeline near Cone Camp Road
- 2A Junction, Foothill Pipeline near Cone Camp Road to Greenspot Pump Station
- 2B Greenspot Pump Station to Morton Canyon Valve Vault
- 2C Morton Canyon Valve Vault to Crafton Hills Pump Station
- 3A Crafton Hills Pump Station to Carter Street Valve Vault
- 3B Carter Street Valve Vault to Garden Air Creek, South of San Bernardino/Riverside County Line
- 4A Garden Air Creek to Cherry Valley Pump Station
- 4B Cherry Valley Pump Station to Terminus at Noble Creek

**West Branch, California Aqueduct**

- 29A Junction, California Aqueduct through Oso Pumping Plant
- 29F Oso Pumping Plant through Quail Embankment
- 29G Quail Embankment through Warne Powerplant
- 29H Pyramid Dam and Lake
- 29J Pyramid Lake through Castaic Powerplant
- 30 Castaic Dam and Lake

## Variable OMP&R Costs

Article 26(a) includes provisions to ensure that the variable OMP&R component of the Transportation Charge will result in a return to the State of those costs that depend on and vary with the amount of SWP water deliveries. (The minimum OMP&R component results in a return of those operating costs that do not vary with deliveries.) Under Article 26(a) all such costs for a reach for a given year will be allocated among contractors in proportion to the actual annual use of that reach by the respective contractors.

*Table B-3* summarizes the total power costs, credits, and transmission costs for each aqueduct pumping and power recovery plant. Variable costs are the following:

- Costs of capacity and energy used exclusive of associated power transmission and station service charges (transmission and station service costs that are independent and vary with power usage are classified as minimum OMP&R costs).
- Credits for capacity and energy produced at aqueduct power recovery plants (treated as negative costs).
- Payments for replacement of major plant machinery components having economic lives shorter than the project repayment period. (In 1997, DWR discontinued charging for a sinking fund for replacements. Replacement costs, for 1999 and thereafter, are to be paid on an annual basis as the costs are incurred.)
- Beginning in 2005, a portion of transmission expenditures that will depend on and vary with water and power usage. These costs will be included as part of the variable component.

Table B-3 excludes plant capacity and energy costs associated with surplus and unscheduled water service after May 1, 1973.

Prior to that date, surplus water service was charged the same unit variable OMP&R component as allocated water service. An amendment to the water supply contracts in 1973 significantly changed the rate structure for surplus water service. Capacity and energy costs for pumping surplus and unscheduled water were allocated directly to those SWP contractors receiving surplus and unscheduled water service. A contract amendment in 1991 again revised the rate structure to provide for payment of costs through a melded power rate. These revisions to charges for surplus and unscheduled water are effective from the date of the amendments and are not applied to past charges.

An interruptible water program was established in 1994. This program, later renamed as the Article 21 program, is based on individual annual contracts; costs for Article 21 water actually delivered are included in Table B-3.

## Water Conveyance

Tables B-4, B-5A, B-5A-Adj, B-5B, and B-6 present water conveyance quantities that form the basis for allocating costs.

*Table B-4* presents the schedules of annual allocations as set forth in Table A and Article 6(a) of each water supply contract.

*Table B-5A* shows amounts of actual and projected allocated water quantities delivered from each aqueduct reach to each contractor. Projected deliveries for years 2016 through 2035 are based on contractors' requests for future water deliveries. The quantities included in Table B-5A also include nonproject water delivered to contractors, surplus water deliveries prior to May 1, 1973, and actual Article 21 water deliveries in 1994 and thereafter.



**Table 1 Summary of Permanent Aqueduct Capacity Transfers**

Contractor		Capacity Transfer		
Seller	Buyer	Amount (acre-feet)	Effective Year	Transfer Description
<b>Transfers under Monterey Amendment</b>				
Kern	Mojave	25,000	1998	Purchased capacity upstream of Reach 31A
Kern	Castaic Lake	41,000	2000	Purchased capacity upstream of Reach 16A
Kern	Palmdale	4,000	2000	Purchased capacity upstream of Reach 11B
Kern	Alameda-Zone 7	7,000	2000	Purchased capacity upstream of Reach 10A
Kern	Alameda-Zone 7	15,000	2000	Purchased capacity upstream of Reach 10A
Kern	Alameda-Zone 7	10,000	2001	Purchased capacity upstream of Reach 11B
Kern	Solano	5,756	2001	Purchased capacity upstream of Reach 11B and Reach 31A
Kern	Napa	4,025	2001	Purchased capacity upstream of Reach 11B and Reach 31A
Kern	Alameda-Zone 7	2,219	2004	Purchased capacity upstream of Reach 11B
<i>Subtotal under Article 53</i>		<i>114,000</i>		
<b>Transfers outside of Monterey Amendment</b>				
Tulare	Dudley Ridge	3,973	2002	Purchased capacity upstream of Reach 8D
Tulare	AVEK	3,000	2002	Purchased capacity upstream of Reach 8D
Tulare	Alameda-Zone 7	400	2003	Purchased capacity upstream of Reach 8D
Tulare	Kings	5,000	2004	Purchased capacity upstream of Reach 8D
Tulare	Coachella	9,900	2004	Purchased capacity upstream of Reach 8D
Metropolitan	Coachella	88,100	2005	Purchased capacity upstream of Reach 28J
Metropolitan	Desert	11,900	2005	Purchased capacity upstream of Reach 28J
Tulare	Kings	305	2006	Purchased capacity upstream of Reach 31A
Tulare	Desert	1,750	2010	Purchased capacity upstream of Reach 17F
Tulare	Coachella	5,250	2010	Purchased capacity upstream of Reach 17F
Kern	Desert	4,000	2010	Purchased capacity upstream of Reach 17F and Reach 31A
Kern	Coachella	12,000	2010	Purchased capacity upstream of Reach 17F and Reach 31A
Dudley Ridge	Mojave	7,000	2010	Purchased capacity upstream of Reach 8D
Dudley Ridge	AVEK	1,993	2014	Purchased capacity upstream of Reach 8D
Tulare	AVEK	1,451	2014	Purchased capacity upstream of Reach 8D
Dudley Ridge	Mojave	3,000	2015	Purchased capacity upstream of Reach 8D
<i>Subtotal outside of Article 53</i>		<i>159,022</i>		

*Table B-5A-Adj* presents a summary of accounting adjustments that result from water deliveries not originating from the Sacramento-San Joaquin Delta. The methodologies used to calculate various components are based on cumulative charges from the Delta through facilities conveying water to a specific repayment reach. When water is introduced to the SWP downstream of the Delta, contractors require

an adjustment, or credit, for those facilities not used to convey the water.

*Table B-5B* presents a summary of actual and projected annual allocated water quantities for each contractor. The quantities also include amounts of nonproject water and surplus water delivered prior to May 1, 1973, and actual deliveries of Article 21 water in 1994 and thereafter.

Table B-6 summarizes the annual allocated water quantities conveyed or to be conveyed through each aqueduct pumping plant or power plant for each of the following functions:

- *Deliveries–Water Supply.* Water made available to contractors at down-aqueduct delivery structures, including certain hypothetical quantities to facilitate cost allocations, for those years when deliveries are made from net annual storage withdrawals. The net annual amounts of storage withdrawals are hypothetically added to the actual amounts conveyed from the Delta to the reservoirs, since deliveries made from storage withdrawals bear the same variable OMP&R costs per acre-foot as they would if the deliveries were actually conveyed from the Delta in that year. The hypothetical increases in the deliveries made from reservoir storage withdrawals are offset by equal credits to the minimum OMP&R costs of the respective reservoirs. Thus, the variable OMP&R components per acre-foot (Table B-17) may be applied to the total annual quantities delivered either from aqueduct reservoir storage or from the Delta.
- *Initial Fill Water.* Water required for initial filling of down-aqueduct reaches and reservoirs or for repayment of pre-consolidation water used during construction.
- *Deliveries–Recreation.* Water delivered to down-aqueduct recreation developments or used for fish and wildlife enhancement.
- *Operational Losses.* Water lost through evaporation and seepage from all down-aqueduct reaches.
- *Reservoir Storage Changes.* Water placed in down-aqueduct reservoir storage after initial filling of the reservoirs, including projected net annual storage accretions (positive values) and withdrawals (negative values) for all

down-aqueduct reservoirs of the Project Transportation Facilities.

Variable OMP&R costs (Table B-12) that are allocable to storage accretions are assigned to the minimum OMP&R costs of the respective reservoirs. With the exception of Banks Pumping Plant, “Reservoir Storage Changes” also includes SWP water placed into Southern California groundwater storage from 1978 through 1982 (as positive amounts); and water withdrawn from storage and delivered to contractors in 1979, 1982, 1987, 1988, and 1989 (as negative amounts). At Banks Pumping Plant, groundwater additions and withdrawals are included in “Conservation Water.”

Table B-6 also summarizes the following two amounts under the heading *Conservation Water* (Column 25):

- (1) Net annual water amounts stored and projected to be stored in San Luis Reservoir.
- (2) Water lost and projected to be lost through evaporation and seepage from San Luis Reservoir and from the water conservation portion of the California Aqueduct.

“Conservation Water” includes initial fill water, operational losses, and net annual storage changes associated with San Luis Reservoir and the portion of the California Aqueduct that is allocated to conservation. The same allocation procedure outlined previously for Transportation Facilities also applies to water delivered from storage in Conservation Facilities, except that the hypothetical cost increases are added to the variable OMP&R cost to be reimbursed through the Transportation Charge and deducted from the minimum OMP&R costs to be reimbursed through the Delta Water Charge.

San Luis Reservoir is operated to conserve water for future delivery to downstream

contractors. To account for costs associated with reservoir storage, the power and replacement costs of Banks Pumping Plant (a joint Transportation-Conservation Facility) that are allocated to the conveyance of annual conservation water quantities are transferred to the capital costs of San Luis Reservoir (during initial fill) or to the minimum OMP&R costs of San Luis Reservoir (following initial fill).

In years of net storage withdrawal from San Luis Reservoir, a portion of the minimum OMP&R cost of the reservoir is transferred to the variable OMP&R cost of Banks Pumping Plant. That transfer is equal to the variable OMP&R cost per acre-foot of delivery through Banks Pumping Plant for that year, multiplied by the acre-feet of deliveries derived from San Luis Reservoir storage for that year. Table B-6 also includes amounts of nonproject water and surplus water delivered prior to May 1, 1973, and actual deliveries of Article 21 water in 1994 and thereafter.

## Bases for Reimbursable Costs

This section describes the methods used to derive the costs allocated by the procedures outlined in the preceding section. A diagram of the cost derivation process is shown in the upper-left quadrant of Figure B-1.

First, the capital and minimum OMP&R costs of all SWP facilities are allocated among the various project purposes in accordance with the allocation percentages in *Table 2*. Those percentages may be subject to revision in the future.

The redeterminations in this appendix involve only the SWP costs that are allocated to water supply and power generation.

## Capital Costs

Capital costs used in the redeterminations in this appendix reflect prices prevailing on

December 31, 2015; future cost escalation will be reflected in subsequent bulletins.

*Table B-7* presents a reconciliation of estimated total capital costs of each Project Conservation Facility and each Project Transportation Facility. This table shows the relationship of Project Conservation and Transportation costs allocated to contractors (Tables B-8, B-9, B-10, and B-13) to the total SWP capital costs projected by DWR.

*Table B-8* shows costs incurred and projected to be incurred by the State in connection with each contractor's turnouts. Costs incurred by the State for both State-constructed and contractor-constructed delivery structures are paid directly by the contractors for which the structures are built. The State incurs design review and construction inspection costs in connection with contractor-constructed turnouts.

*Table B-9* lists costs and payments for excess capacity built into SWP Transportation Facilities in accordance with amendments to contracts with The Metropolitan Water District of Southern California (Metropolitan), San Gabriel Valley Municipal Water District, and Antelope Valley-East Kern Water Agency, including the following:

- additional costs incurred by the State for requested excess capacity;
- advances by SWP contractors of funds for such costs; and
- credits for advances in excess of costs which were applied to respective contractors' installments of the capital cost component of the Transportation Charge in 1981.

Under Amendment 2 of Metropolitan's contract, 809 cubic feet per second of excess capacity was originally constructed in reaches of the West Branch at Metropolitan's request. That capacity was reclassified as basic capacity of SWP Transportation

**Table 2 Project Purpose Cost Allocation Factors (percentages)<sup>a</sup>**

PROJECT FACILITIES	Water Supply and Power Generation		All Other Purposes (Nonreimbursable)	
	Capital Costs	Minimum OMP&R Costs	Capital Costs	Minimum OMP&R Costs
<b>Project Conservation Facilities</b>				
Frenchman Dam and Lake	21.5	0.0	78.5	100.0
Antelope Dam and Lake	0.0	0.0	100.0	100.0
Grizzly Valley Dam and Lake Davis	1.0	1.8	99.0	98.2
Oroville Division <sup>b</sup>	97.1	99.5	2.9	0.5
California Aqueduct, Delta to Dos Amigos Pumping Plant	96.6	96.7	3.4	3.3
Delta Facilities				
Peripheral Canal Related	86.0	86.0	14.0	14.0
Remaining of Delta Facilities	96.6	96.7	3.4	3.3
<b>Transportation Facilities</b>				
Grizzly Valley Pipeline	100.0	100.0	0.0	0.0
North Bay Aqueduct	100.0	100.0	0.0	0.0
South Bay Aqueduct				
Del Valle Dam and Lake del Valle	25.2	22.0	74.8 <sup>c</sup>	78.0 <sup>d</sup>
Remainder of South Bay Aqueduct	100.0	100.0	0.0	0.0
California Aqueduct				
Delta to Dos Amigos Pumping Plant	96.6	96.6	3.4	3.4
Dos Amigos Pumping Plant to termini (excluding Coastal Branch) <sup>e,f</sup>	94.3 / 99.6	96.9 / 99.6	5.7 / 0.4	3.1 / 0.4
Aqueduct and Plants <sup>e,f</sup>	94.3 / 99.6	96.9 / 99.6	5.7 / 0.4	3.1 / 0.4
Pyramid Dam and Lake <sup>e,f</sup>	94.3 / 96.1	96.9 / 96.1	5.7 / 3.9	3.1 / 3.9
Castaic Dam and Lake <sup>e,f</sup>	94.3 / 91.1	96.9 / 91.1	5.7 / 8.9	3.1 / 8.9
Silverwood Dam and Lake <sup>e,f</sup>	94.3 / 85.3	96.9 / 85.3	5.7 / 14.7	3.1 / 14.7
Perris Dam and Lake <sup>e,f</sup>	94.3 / 67.7	96.9 / 67.7	5.7 / 32.3	3.1 / 32.3
Coastal Branch	100.0	100.0	0.0	0.0

<sup>a</sup> Percentages indicated apply to the majority of the facilities with minor exceptions.

<sup>b</sup> Percentages indicated are applicable to the remaining costs of division after excluding costs allocated to flood control that are reimbursed by the federal government (22 percent of capital costs) and excluding specific power costs of Hyatt and Thermalito powerplants and switchyards.

<sup>c</sup> Percentage indicated consists of 48.0 percent of costs allocated to recreation and 26.8 percent to flood control.

<sup>d</sup> Percentage indicated consists of 44.9 percent of costs allocated to recreation and 33.1 percent to flood control.

<sup>e</sup> Percentage indicated is used for 2012 and previous years.

<sup>f</sup> Percentage indicated is used for 2013 and forward.

Facilities under Amendment 7. Metropolitan paid \$16.3 million as a prepayment of the capital cost component of the Transportation Charge in lieu of advancing funds for the original requested capacity.

Amendment 5 to Metropolitan's contract requires that additional costs for modifications to the Santa Ana Pipeline (required for enlargement of Lake Perris) will be allocated to Metropolitan and returned

to the State through payments of the Transportation Charge. The additional costs to be repaid through Metropolitan's capital cost component for the aqueduct reach from Devil Canyon Powerplant to Barton Road total about \$6.7 million (see Bulletin 132-72, page 98).

Table B-10 presents the actual and projected annual capital costs of each aqueduct reach that will eventually be returned to the

State, with interest, through contractors' payments of the capital cost component of the Transportation Charge and payment of debt service under the Devil Canyon-Castaic contracts.

## Annual Operating Costs

Annual operating costs allocable to water supply and power generation are returned to the State through the minimum OMP&R components of the Delta Water Charge and the Transportation Charge and through a portion of the revenues from energy sales. All reimbursable operating costs of Conservation Facilities are included in the minimum OMP&R component of the Delta Water Charge.

## Transportation and Devil Canyon-Castaic Contract Costs

*Table B-11* shows the amounts of the actual and projected costs to be reimbursed through payments of the minimum OMP&R component of the Transportation Charge and allocated operating costs under the Devil Canyon-Castaic contract. The table includes the following seven types of operating costs incurred annually that do not vary with water quantities delivered to the contractors:

- (1) all direct labor charges for field operation and maintenance personnel, including associated indirect costs;
- (2) a distributed share of general operating costs that cannot be identified solely with one facility or aqueduct reach;
- (3) all of electric power transmission and station service costs up to 2004, and electric power transmission and station service costs for 2005 and after that do not vary with power usage allocable to aqueduct pumping and recovery plants;
- (4) all costs for equipment, materials, and supplies;
- (5) portions of the power and replacement costs of all pumping plants and power plants that are up-aqueduct from Devil Canyon Powerplant and Castaic Powerplant and that are allocable to

the annual conveyance of water lost to evaporation and seepage from respective aqueduct reaches or placed into storage in respective reservoirs of the project transportation facilities (after initial fill);

- (6) credits, which offset those costs in (5) above, for deliveries drawn from reservoir storage; and
- (7) escalation of certain projected operating costs at 1 percent per year for 2019–2035.

*Table B-12* shows the portions of variable OMP&R costs in *Table B-3* that are allocable to the water supply delivery quantities included in *Table B-6* and reimbursed through payments of the variable OMP&R component of the Transportation Charge.

To derive *Table B-12* costs, the following adjustments are made to *Table B-3* costs.

- (1) Part of the variable OMP&R costs of each plant is allocated to recreation. The allocation to recreation is in proportion to the quantity of water conveyed through each plant each year for delivery to on-shore recreational developments. That portion of variable plant costs attributable to the initial fill of aqueduct reaches is allocated to the joint capital costs of respective down-aqueduct reaches and reservoirs.
- (2) That portion of costs attributable to evaporation and seepage is allocated to the joint minimum OMP&R costs of respective down-aqueduct reaches and reservoirs.
- (3) Adjustments are made for additions or withdrawals from storage in aqueduct reservoirs. In years when water is added to storage in aqueduct reservoirs, the cost of conveying this water into storage is charged to the minimum OMP&R costs of the corresponding reservoir. In years when storage in aqueduct reservoirs is decreased for the purpose of making deliveries, a credit



is applied to the minimum OMP&R costs of the reservoir from which the storage is released. This credit is equal to the number of acre-feet of storage reduction times the variable OMP&R unit rate for the year the storage is released. The unit rate is equal to the variable OMP&R unit rate for the year the water is taken from storage.

- (4) That portion of costs attributable to pumping water to replace evaporation and seepage losses and for additions or withdrawals from storage in San Luis Reservoir is charged to the minimum OMP&R component of the Delta Water Rate.

The remaining costs are allocated to transportation water supply and repaid by the contractors.

## Conservation Capital and Operating Costs

*Table B-13* is a summary of actual and projected capital and operating costs of the initial Project Conservation Facilities. These costs are reimbursed through payments by contractors under the Delta Water Charge, Oroville power sales, and Gianelli Pumping-Generating Plant credits. *Table B-13* also shows credits applied to the reimbursable capital costs of the initial Project Conservation Facilities in accordance with negotiated settlements concerning incurred planning costs for the period from 1952 through 1978.

## Project Water Charges

This section describes the redetermination of past and projected components of the Transportation Charge for annual revision of *Tables C through G* of each water supply contract. This section also describes the derivation of the unit Delta Water Rates and the Water System Revenue Bond Surcharge.

A summary of equivalent unit charges for each acre-foot of allocated water service is also included for each contractor and each aqueduct reach. A diagram of all calculations may be found on the lower half of *Figure B-1*.

## Transportation Charges

The accumulation of allocated costs of each aqueduct reach to each contractor is the basis for the Transportation Charge components.

*Table B-14* summarizes each contractor's share of the capital costs of the aqueduct reaches presented in *Table B-10*. Those amounts are determined by applying proportionate-use ratios set forth in *Table B-1* to the costs in *Table B-10*. The resulting allocated costs are set forth in *Table C* of the respective water supply contracts.

Prepayments of the capital cost component, required under Metropolitan's Amendment 7, are included as negative capital costs in *Table B-14* and *Table C* of Metropolitan's Statement of Charges. Solano County Water Agency, Empire West Side Irrigation District, and Castaic Lake Water Agency also prepaid capital costs (see *Table B-14* footnotes). *Table B-14* includes costs of the East Branch Extension to provide water service to San Bernardino Valley Municipal Water District (San Bernardino) and San Geronio Pass Water Agency (San Geronio).

Both *Table B-14* and *Table C* of the six contractors for project water service below Devil Canyon Powerplant and Castaic Powerplant include the capital costs reimbursable under the Devil Canyon-Castaic contract.

*Table B-15* summarizes capital cost components of the Transportation Charge for each contractor for each year of the project repayment period. By the year 2035, the capital cost components shown in

Table B-15 will recover the costs shown in Table B-14, with interest at the Project Interest Rate of 4.610 percent per annum and based on the amortization schedules included in *Table 3*.

Those estimated components, subsequently adjusted for prior overpayments or underpayments, are included in Table D of the water supply contracts. Costs of excess capacity are billed separately and are not included in Table B-15.

Table B-15 includes the debt service payments due from the six contractors down-aqueduct from Devil Canyon Powerplant and Castaic Powerplant, in accordance with terms of the Devil Canyon-Castaic contract.

*Table B-16A* summarizes the minimum OMP&R components of the Transportation Charge for each year of the project repayment period. Those estimated components, subsequently adjusted for prior overpayments or underpayments, are included in Table E of the respective water supply contracts.

The total amounts included in Table B-16A are determined by applying the proportionate-use ratios in Table B-2 to the reach costs in Table B-11.

Table B-16A excludes Off-Aqueduct Power Facility charges, which are included separately in Table B-16B. Both Table B-16A and Table E include the operating costs payable under the Devil Canyon-Castaic contract for the six contractors down-aqueduct from Devil Canyon Powerplant and Castaic Powerplant.

As part of operating agreements with DWR, Kern County Water Agency was billed from 1963 through 1987 for any additional operating costs caused by early installation of units in Las Perillas and Badger Hill pumping plants by Berrenda Mesa Water

**Table 3 Criteria for Amortizing Capital Costs of Transportation Facilities**

Contractor	Year of Initial Payment <sup>a</sup>
Alameda County Flood Control and Water Conservation District, Zone 7	1963 <sup>b</sup>
Alameda County Water District	1963
Antelope Valley-East Kern Water Agency	1963
Castaic Lake Water Agency	1964
City of Yuba City	<sup>c</sup>
Coachella Valley Water District	1964
County of Butte	<sup>c</sup>
County of Kings	1968
Crestline-Lake Arrowhead Water Agency	1964
Desert Water Agency	1963 <sup>d</sup>
Dudley Ridge Water District	1968 <sup>e</sup>
Empire West Side Irrigation District	1968 <sup>e</sup>
Kern County Water Agency	
Agricultural Use	1968 <sup>e</sup>
Municipal and Industrial Use	1968 <sup>e</sup>
Littlerock Creek Irrigation District	1964
The Metropolitan Water District of Southern California	1963
Mojave Water Agency	1964
Napa County Flood Control and Water Conservation District	1966
Oak Flat Water District	1968
Palmdale Water District	1964
Plumas County Flood Control and Water Conservation District	1970
San Bernadino Valley Municipal Water District	1963
San Gabriel Valley Municipal Water District	1963 <sup>d</sup>
San Geronio Pass Water Agency	1963 <sup>d</sup>
San Luis Obispo County Flood Control and Water Conservation District	1964 <sup>f</sup>
Santa Barbara County Flood Control and Water Conservation District	1964
Santa Clara Valley Water District	1963
Solano County Water Agency	1973
Tulare Lake Basin Water Storage District	1968 <sup>e</sup>
Ventura County Watershed Protection District	1964

<sup>a</sup> Allocated capital costs of transportation facilities amortized in equal annual installments unless otherwise noted.

<sup>b</sup> Principal payments on each annual capital cost prior to 1971 delayed until calendar year 1972, except payments for 1963.

<sup>c</sup> For City of Yuba City and County of Butte, payments for Delta Water Charge only.

<sup>d</sup> Payment deferred for 1963 and added to 1964 payment with accrued interest.

<sup>e</sup> For Dudley Ridge Water District, Empire West Side Irrigation District, Kern County Water Agency (agricultural use), Oak Flat Water District, and Tulare Lake Basin Water Storage District, according to Article 45 of the contracts for supply of agricultural water, capital costs of transportation facilities allocated to agricultural water supply are amortized by using an equivalent unit rate per acre-foot applied to the annual allocations (Table B-4) through the project repayment period.

<sup>f</sup> For San Luis Obispo and Santa Barbara, all principal and interest payments for costs of the Coastal Stub were deferred until 1976.

Storage District (see Bulletin 132-71, page 7). Under those agreements, a portion of minimum OMP&R costs of Reach 31A were assigned directly to Kern, as shown in *Table 4*, with the remaining reach costs allocated by application of the proportionate-use ratios. DWR purchased the last unit, Unit No. 6, at Las Perillas and Badger Hill pumping plants in early 1997 to provide

**Table 4 Minimum OMP&R Costs of Reach 31A Assigned Directly to Kern County Water Agency (in dollars)**

Year	Direct Charges
1969	46,511
1970	46,302
1971	140,074
1972	95,017
1973	72,454
1974	100,692
1975	127,456
1976	138,504
1977	120,753
1978	157,652
1979	121,231
1980	150,728
1981	75,866
1982	82,805
1983	90,007
1984	107,468
1985	159,406
1986	137,241
1987	127,073
1988	130,924
1989	128,468
1990	138,234
1991	139,527
1992	185,370
1993	219,334
1994	364,196
1995	272,341
1996	322,123
<b>Total</b>	<b>3,997,767</b>

pumping capacity for deliveries to Coastal Area contractors, which began in 1997.

As a result of the Monterey Amendment, the costs related to this settlement are to be allocated among all SWP contractors in proportion to their maximum Table A amounts. As costs are incurred, related charges will be included in the contractors' annual Statements of Charges as part of the minimum. Between 2002 and 2010, the Monterey Amendment litigation costs recovered from SWP contractors were \$15.8 million.

*Table B-16B* summarizes annual Off-Aqueduct Power Facility charges allocated to each water contractor, adjusted for prior overpayments or underpayments. Those charges are to repay all Off-Aqueduct Power costs, including bond service, deposits for reserves, operation and maintenance costs, fuel costs, taxes, and insurance.

Adopted October 1, 1979, the General Bond Resolution requires that sufficient revenues be collected each year to repay all of those costs. In addition, an amount totaling 25 percent of the annual bond service is collected each year to ensure that sufficient funds are available to cover all annual costs. Any revenues collected and not needed during the year are refunded to the contractors in the next year.

*Table 5* summarizes Off-Aqueduct Power Facility charges and credits related to deliveries for 2015. The ongoing Reid Gardner Powerplant closure costs related to the Reid Gardner Powerplant contract expiration in 2013 are tracked independently from annual Reid Gardner operating costs.

*Table 6* shows projected Off-Aqueduct Power Facility charges and an amount equal to 25 percent of annual bond service for 2016 through 2035. Defeasance of Off-Aqueduct Power facilities bonds occurred in June 2016, so no debt service charges are included in

**Table 5 Summary of 2015 Off-Aqueduct Power Facility Charges and Credits (in dollars)**

<b>Charges by Item</b>	
Reid Gardner Powerplant	1,630,586
Reid Gardner Closure Costs	11,957,444
Bottle Rock Powerplant	4,546,719
South Geysers Powerplant	5,447,854
<i>Subtotal</i>	<i>23,582,603</i>
<b>Credits by Item</b>	
Transmission Services	(72,647)
<b>Net Total Charge</b>	<b>23,509,956</b>

**Table 6 Projected Charges for Off-Aqueduct Power Facilities (in dollars)**

<b>Year</b>	<b>Total Annual Cost</b>	<b>25 Percent Bond Cover</b>
2016	4,648,897	206,321
<b>2017</b>	<b>4,300,000</b>	-
2018	3,300,000	-
2019	200,000	-
2020	200,000	-
2021	200,000	-
2022	200,000	-
2023	200,000	-
2024	200,000	-
2025	200,000	-
2026	200,000	-
2027	200,000	-
2028	200,000	-
2029	200,000	-
2030	200,000	-
2031	200,000	-
2032	200,000	-
2033	200,000	-
2034	200,000	-
2035	200,000	-

future years. Additionally, Reid Gardner, Unit 4 Powerplant remediation costs are projected for 2016, 2017, and 2018 and then only minor operating costs are projected post-2018.

Annual Off-Aqueduct Power Facility charges are allocated among contractors in proportion to the electrical energy required to pump allocated water for the year. The initial allocation for the Statements of Charges is based on estimates of energy to pump requested allocated water deliveries, based on a 60-percent allocation.

An interim adjustment in the allocation of Off-Aqueduct Power costs may be made in May of each year, based on updated cost estimates and April revisions in water delivery schedules. An additional adjustment is made the following year based on actual water deliveries and actual costs for the year.

The energy required to pump each contractor's water is calculated using the kilowatt-hour per acre-foot factors shown in *Table 7* for the pumping plants upstream from the delivery turnouts. The amounts shown include transmission losses.

*Table B-17* presents a summary of actual and projected total variable OMP&R costs for each acre-foot conveyed through each aqueduct pumping plant and power plant for each year of the project. Following are provisions for calculating the variable OMP&R component of the Transportation Charge:

- An annual charge per acre-foot of projected water deliveries to all contractors served from or through each reach is determined so the projected variable OMP&R costs to be incurred for each reach will be returned to the State.



**Table 7 Kilowatt-Hour per Acre-Foot Factors for Allocating Off-Aqueduct Power Facility Costs**

Pumping Plant	kWh per acre-foot <sup>a</sup>	
	At Plant	Cumulative from Delta
Barker Slough	223	223
Cordelia-Benicia	434	657
Cordelia-Vallejo	178	401
Cordelia-Napa	563	786
Banks (Delta)	296	296
South Bay (including Del Valle)	869	1,165
Dos Amigos	138	434
Buena Vista	242	676
Teerink	295	971
Chrisman	639	1,610
Edmonston	2,236	3,846
Pearblossom	703	4,549
Greenspot	871	5,420
Crafton Hills	1,087	6,507
Cherry Valley	224	6,731
Oso	280	4,126
Las Perillas	77	511
Badger Hill	200	711
Devil's Den	705	1,416
Bluestone	705	2,121
Polonio Pass	705	2,826

<sup>a</sup> Includes transmission losses.

- The total annual variable OMP&R component for any contractor for a given reach is obtained by multiplying the unit charge associated with that reach by the quantity of water actually delivered from or through the reach to the contractor.

The data summarized in Table B-17 are derived by dividing the costs shown in Table B-3 by the water quantities shown in Table B-6. However, certain costs included in Table B-3 for extra peaking service, which would otherwise constitute variable OMP&R costs, are assigned directly to contractors requesting this type of service (see Bulletin 132-71, page 21, and Water Service

Contractors Council Memo No. 593, July 10, 1970). Those costs are excluded from the unit charges shown in Table B-17. Peaking charges based on additional capacity ceased in 1983. Since 1984, costs are based on power market energy rates. The amounts of extra peaking charges for additional power costs are shown in *Tables 8 and 9*.

Unit rates shown in Table B-17 constitute the rates for the pumping plants and power plants listed. The cumulative rates constitute the total rates, cumulative from the Sacramento-San Joaquin Delta, and are applicable to deliveries from or downstream of the pumping plants and power plants. Extra peaking service costs are excluded.

*Table B-18* shows the variable OMP&R components of the Transportation Charge for each contractor for each year of the project repayment period. Table B-18 is developed from the costs per acre-foot included in Table B-17 and the delivery quantities for each contractor from each reach as indicated in Table B-5A and Table B-5A-Adj, plus any costs for extra peaking service. Those estimated components, subsequently adjusted for prior overpayments or underpayments, are included in Table F of the respective water supply contracts.

*Table B-19* summarizes the annual Transportation Charges for each contractor (the sum of the corresponding amounts included in Tables B-15, B-16A, B-16B, and B-18). Those estimated payments, subsequently adjusted for prior overpayments or underpayments, are set forth in Table G of the respective water supply contracts.

In accordance with provisions of the Devil Canyon-Castaic contract, Table B-19 and Table G include amounts of debt service and operating cost payments due from the six contractors located down-aqueduct from Devil Canyon and Castaic powerplants.



## Delta Water Charges

*Table B-20A* presents the calculation of the Delta Water Rate for the initial Conservation Facilities applicable in 2017 in accordance with the amended Article 22(e) and 22(g) of all 29 water supply contracts. The Delta Water Rate was calculated at a Project Interest Rate of 4.610 percent, based on Conservation Facility costs shown in *Table B-13*. That Delta Water Rate is used to compute projected Delta Water Charges under Article 53(i) for the contractors who have executed the Monterey Amendment. Included in *Table B-20A* is the Delta Water Rate for the two contractors who have not executed the Monterey Amendment: Plumas County Flood Control and Water Conservation District and Empire West Side Irrigation District.

*Table B-20B* shows each component of the 2017 Delta Water Rate from *Table B-20A*.

*Table B-21* summarizes the annual Delta Water Charge for each contractor. The projected charges in *Table B-21* are developed by multiplying the total rate per acre-foot, as shown in *Table B-20A*, by the amount of allocated water for each contractor, as shown in *Table B-4*.

The projected Delta Water Charges from 2016–2035 include the assumption of escalation of projected operating costs at 1.0 percent per year for 2019–2035.

## Water System Revenue Bond Surcharge

*Table B-22* summarizes the Water System Revenue Bond (WSRB) Surcharge to the Delta Water Charge and the transportation capital cost component for each contractor. The surcharge shown in *Table B-22* includes the financing costs of the WSRB Surcharge, Series B through Series AT. This surcharge is levied according to an amendment to the water supply contracts, which was signed by all of the water supply contractors.

## Total Water Charges

*Table B-23* summarizes the total annual charges to each contractor (the sum of the Transportation Charge in *Table B-19*, the Delta Water Charge in *Table B-21*, and the WSRB Surcharge in *Table B-22*). The charges do not reflect past payments by contractors and are unadjusted for prior overpayments or underpayments.

## Equivalent Total Water Charges

*Table B-24* presents the Transportation Charge and Delta Water Charge in terms of the equivalent unit charge for each acre-foot of allocated water now projected for delivery to the respective contractors.

These equivalent charges would provide the same principal sum at the end of the project repayment period as annual payments to be made as part of the Delta Water Charge and Transportation Charge, plus interest at the Project Interest Rate, if applied to each acre-foot of allocated water delivered to date; all surplus water delivered prior to May 1, 1973; all Article 21 water deliveries in 1994 and thereafter; and all allocated water now projected to be delivered during the remainder of the project repayment period (*Table B-5B*).

The equivalent unit Delta Water Charges included in *Table B-24* are greater than those presented in *Table B-20A* because current projections of allocated water service are less for most contractors than the amounts shown in *Table A*.

## Equivalent Water Costs by Reach

*Table B-25* presents a summary of the equivalent unit transportation cost of conveying allocated water through respective aqueduct reaches of the Project Transportation Facilities.

Those unit costs provide the basis of charges assessed for extra service (such

Table 8 Extra Peaking Charges for Additional Power, by Pumping Plant (in dollars)

Year	Las Perillas													Total
	Cordelia Napa	Cordelia Solano	Barker Slough	South Bay	Banks	Dos Amigos	Badger Hill	Buena Vista	Teerink	Chrisman	Edmonston	Pearlblossom	Oso	
1972	0	0	0	0	0	10,579	24,700	0	0	0	0	0	0	35,279
1973	0	0	0	0	0	0	6,016	0	0	0	0	0	0	6,016
1974	0	0	0	0	0	0	7,140	0	0	0	0	0	0	7,140
1975	0	0	0	0	0	494	6,397	0	0	0	0	0	0	6,891
1976	0	0	0	0	0	0	1,981	0	0	0	0	0	0	1,981
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	45,145	3,680	0	0	0	0	0	0	48,825
1979	0	0	0	0	0	0	3,306	0	0	0	0	0	0	3,306
1980	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	12,126	0	0	0	0	0	0	0	12,126
1982	0	0	0	0	0	89,339	0	0	0	0	0	0	0	89,339
1983	0	0	0	35	7,594	3,534	152	0	0	0	0	0	0	11,315
1984	0	0	0	2,096	84,396	38,607	7,203	11,173	3,823	3,593	0	0	0	150,891
1985	0	0	0	1,480	19,612	8,841	763	4,488	4,412	8,929	28,353	0	0	76,878
1986	0	0	0	0	1,864	863	0	291	354	766	2,683	0	0	6,821
1987	0	0	0	604	17,129	7,838	835	2,295	1,806	3,460	11,058	0	0	45,025
1988	639	39	287	894	43,475	20,082	2,213	5,792	4,367	8,272	25,886	0	0	111,946
1989	2,491	566	1,483	70	40,251	18,642	1,935	3,401	1,531	2,058	3,793	0	0	76,221
1990	45	0	18	343	19,524	9,044	0	150	145	314	643	0	0	30,226
1991	903	0	281	0	21	8	0	15	17	39	139	41	0	1,464
1992	208	117	203	0	7,070	2,502	0	182	190	435	0	0	0	10,907
1993	0	681	889	4,483	123,080	54,741	0	8,898	5,458	10,900	35,068	11,139	0	255,337
1994	0	366	393	679	6,566	2,795	454	1,083	155	357	1,121	0	132	14,101
1995	0	0	0	1,717	24,464	9,422	27	1,865	3,475	782	1,104	400	0	43,256
1996	4	0	1	1,983	10,031	4,976	0	391	432	1,015	3,404	1,160	0	23,397
1997	0	1,780	2,152	3,107	337,357	165,774	1,753	34,604	12,296	15,910	21,028	0	0	595,761
1998	0	0	0	20,966	235,693	106,251	2,354	697	848	1,836	6,426	0	0	375,071
1999	0	0	0	0	63,196	26,235	0	3,394	4,136	8,959	31,350	7,740	0	145,010
2000-2015	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	4,290	3,549	5,707	38,457	1,041,323	637,838	70,909	78,719	43,445	67,625	172,056	20,480	132	2,184,530

**Table 9 Extra Peaking Charges for Additional Power, by Contractor (in dollars)**

Year	Napa	Solano	Alameda- Zone 7	Alameda- County	Santa Clara	Dudley Ridge	Empire	Kern	Kings	Oak Flat	Tulare	AVEK	Castaic Lake	Coachella	Desert	Littlerock	Palmdale	San Gabriel	Total
1972	0	0	0	0	0	0	0	35,269	0	0	10	0	0	0	0	0	0	0	35,279
1973	0	0	0	0	0	0	0	6,016	0	0	0	0	0	0	0	0	0	0	6,016
1974	0	0	0	0	0	0	0	7,140	0	0	0	0	0	0	0	0	0	0	7,140
1975	0	0	0	0	0	0	0	6,891	0	0	0	0	0	0	0	0	0	0	6,891
1976	0	0	0	0	0	0	0	1,981	0	0	0	0	0	0	0	0	0	0	1,981
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	2,035	0	44,484	42	0	0	2,264	0	0	0	0	0	0	48,825
1979	0	0	0	0	0	0	0	2,821	0	0	0	0	485	0	0	0	0	0	3,306
1980	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	11,951	0	0	0	0	0	0	0	175	0	0	12,126
1982	0	0	0	0	0	2,173	0	80,945	0	0	0	4,671	1,128	0	0	0	0	422	89,339
1983	0	0	0	0	48	9,511	0	0	1,365	0	0	0	391	0	0	0	0	0	11,315
1984	0	0	0	0	2,874	0	0	144,021	281	809	0	0	2,906	0	0	0	0	0	150,891
1985	0	0	0	2,029	0	0	64	25,664	0	98	0	48,767	256	0	0	0	0	0	76,878
1986	0	0	0	0	0	0	0	0	0	13	2,194	4,614	0	0	0	0	0	0	6,821
1987	0	0	229	0	599	313	84	24,141	0	95	0	18,207	545	0	0	812	0	0	45,025
1988	892	73	665	561	0	1,853	1,404	58,905	0	72	2,368	44,526	627	0	0	0	0	0	111,946
1989	3,478	1,062	96	0	0	13	403	55,085	0	239	8,278	0	1,043	0	0	1,035	5,489	0	76,221
1990	63	0	470	0	0	0	0	28,587	0	0	0	0	0	0	0	81	1,025	0	30,226
1991	1,184	0	0	0	0	0	0	0	0	0	0	0	0	0	0	280	0	0	1,464
1992	271	257	0	0	0	0	49	10,109	221	0	0	0	0	0	0	0	0	0	10,907
1993	0	1,570	6,122	0	0	0	3,757	97,812	504	0	74,577	0	0	24,983	41,156	0	4,856	0	255,337
1994	0	759	896	0	0	0	7	9,933	0	0	0	0	2,450	0	0	56	0	0	14,101
1995	0	0	2,353	0	0	10,197	0	28,085	310	0	0	0	27	0	0	0	2,284	0	43,256
1996	5	0	81	2,612	0	334	205	4,552	969	0	7,809	0	0	0	0	0	3,598	3,232	23,397
1997	0	3,932	3,999	0	0	6,190	0	546,733	0	40	0	0	0	0	0	0	34,867	0	595,761
1998	0	0	19,666	8,442	0	22,631	1	312,626	0	651	0	0	0	0	0	0	11,054	0	375,071
1999	0	0	0	0	0	0	0	76,425	0	0	6,922	0	0	0	0	0	11,576	50,087	145,010
2000- 2015	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>5,893</b>	<b>7,653</b>	<b>34,577</b>	<b>13,644</b>	<b>3,521</b>	<b>55,250</b>	<b>5,974</b>	<b>1,620,176</b>	<b>3,692</b>	<b>2,017</b>	<b>102,158</b>	<b>123,049</b>	<b>9,858</b>	<b>24,983</b>	<b>41,156</b>	<b>2,439</b>	<b>74,749</b>	<b>53,741</b>	<b>2,184,530</b>

as delivery of allocations down-aqueduct from a contractor's turnout) and for wheeling service to entities other than the SWP contractors.

The cumulative unit conveyance costs indicated for reaches in Table B-25 do not necessarily equal the equivalent unit Transportation Charges to contractors served from such reaches. The unit charges in Table B-24 account for the rate of water demand buildup and cost allocation factors of the individual contractors; however, the unit costs included in Table B-25 reflect the effect of melding the respective buildups and allocation criteria of all contractors whose allocations are conveyed through a given reach. Table B-25 also includes surplus water delivered prior to May 1, 1973, and Article 21 water deliveries in 1994 and thereafter.

### East Branch Enlargement Charges

*Table B-26* reflects DWR's projection of annual capital costs of the East Branch Enlargement for each aqueduct reach. These projections will be redetermined in future bulletins to include the following:

- a reallocation of costs of constructing the present East Branch facilities between Alamo Powerplant and Silverwood Lake;
- a reallocation of costs of Silverwood Lake to reflect additional use as a result of East Branch Enlargement operation;
- a reallocation of costs of San Bernardino Tunnel to reflect redistribution of flow capacities necessary for the East Branch Enlargement facilities; and
- actual enlargement construction costs.

These costs will be recovered with interest from the seven Southern California SWP contractors participating in the enlargement, in accordance with their amended water supply contracts (see *Table 10*).

*Table B-27* lists the projected minimum OMP&R costs for each reach of the enlargement to be repaid by the seven

East Branch Enlargement participating contractors. Currently, this table includes only minimum OMP&R costs attributable to the East Branch Enlargement. In accordance with Article 49(e)(1), the contractors participating in the East Branch Enlargement will also share in the remaining minimum OMP&R costs of the affected reaches, in accordance with a formula developed by DWR in consultation with the affected contractors.

*Table B-28* shows each participating contractor's share of the estimated capital costs of the East Branch Enlargement shown in Table B-26.

*Table B-29* shows the amounts of the annual capital cost components of the East Branch Enlargement Transportation Charge for each participating contractor. This component consists of each contractor's allocated share of debt service on bonds sold to finance the enlargement.

*Table B-30* shows the minimum OMP&R components of the East Branch Enlargement Transportation Charge for each participating contractor for each year of the project repayment period. The amounts shown in Table B-30 will recover the minimum OMP&R costs shown in Table B-27.

*Table B-31* shows the annual East Branch Enlargement Transportation charges for each participating contractor (the sum of the corresponding amounts included in Tables B-29 and B-30).

### East Branch Extension Charges

The East Branch Extension charges recover associated costs for East Branch Extension facilities beginning at Devil Canyon Powerplant Afterbay and extending to the terminus at Noble Creek in the vicinity of Beaumont, Riverside County. These costs, separated into 3 phases: Phase 1 Original, Phase 1 Improvements, and Phase 2, will be recovered from two contractors—San Bernardino and San Geronio—in

**Table 10 Determination of Factors for Distributing Capital and Minimum OMP&R Costs of East Branch Enlargement Facilities among Participating Contractors**

Reach Number	Description
18A	Junction, West Branch, California Aqueduct through Alamo Powerplant
19	Alamo Powerplant to Fairmont
20A	Fairmont through 70th Street West
20B	70th Street West to Palmdale
21	Palmdale to Littlerock Creek
22A	Littlerock Creek to Pearblossom Pumping Plant
22B	Pearblossom Pumping Plant to West Fork Mojave River
23B	West Fork Mojave River to Silverwood Lake (excluding Mojave Siphon Powerplant facilities)
23C	Mojave Siphon Powerplant facilities
24	Cedar Springs Dam and Silverwood Lake
25	Silverwood Lake to South Portal, San Bernardino Tunnel
26A	South Portal, San Bernardino Tunnel through Devil Canyon Powerplant
26B	Devil Canyon Powerplant Bypass

**Share of Enlargement Capacity (cubic feet per second)**

Reach Number	AVEK	Coachella	Desert	Mojave	Palmdale	San Bernardino	Metropolitan	Total
18A		151	13	136	6		1,200	1,506
19		151	13	136	6		1,200	1,506
20A	35	151	13	136	6		1,200	1,541
20B	35	151	13	136	6		1,200	1,541
21	35	151	13	136			1,200	1,535
22A	35	151	13	136			1,200	1,535
22B		151	13	136			1,200	1,500
23B		184	67	212			1,200	1,663
23C		184	67				1,200	1,451
24		190	78				1,200	1,468
25		193	83			63	1,200	1,539
26A		193	83			63	1,200	1,539
26B							300	300

**Factors for Distributing Capital and Minimum OMP&R Costs of East Branch Enlargement Facilities (flow ratios)**

Reach Number	AVEK	Coachella	Desert	Mojave	Palmdale	San Bernardino	Metropolitan	Total
18A	0.00000000	0.10026560	0.00863214	0.09030544	0.00398406	0.00000000	0.79681276	1.00000000
19	0.00000000	0.10026560	0.00863214	0.09030544	0.00398406	0.00000000	0.79681276	1.00000000
20A	0.02271252	0.09798832	0.00843608	0.08825438	0.00389358	0.00000000	0.77871512	1.00000000
20B	0.02271252	0.09798832	0.00843608	0.08825438	0.00389358	0.00000000	0.77871512	1.00000000
21	0.02280130	0.09837134	0.00846906	0.08859935	0.00000000	0.00000000	0.78175895	1.00000000
22A	0.02280130	0.09837134	0.00846906	0.08859935	0.00000000	0.00000000	0.78175895	1.00000000
22B	0.00000000	0.10066667	0.00866667	0.09066667	0.00000000	0.00000000	0.79999999	1.00000000
23B	0.00000000	0.11064342	0.04028863	0.12748046	0.00000000	0.00000000	0.72158749	1.00000000
23C	0.00000000	0.12680910	0.04617505	0.00000000	0.00000000	0.00000000	0.82701585	1.00000000
24	0.00000000	0.12942779	0.05313351	0.00000000	0.00000000	0.00000000	0.81743870	1.00000000
25	0.00000000	0.12540611	0.05393112	0.00000000	0.00000000	0.04093567	0.77972710	1.00000000
26A	0.00000000	0.12540611	0.05393112	0.00000000	0.00000000	0.04093567	0.77972710	1.00000000
26B	0.00000000	0.00000000	0.00000000	0.00000000	0.00000000	0.00000000	1.00000000	1.00000000



accordance with their amended water supply contracts. The factors for distributing minimum costs are shown in *Table 11*. *Table 12* shows the capital factors and the corresponding debt service for each of the phases in 2017.

**Table 11 Factors for Distributing Minimum OMP&R Costs of the East Branch Extension Facilities**

Reach Number	Reach Description	San Bernardino	San Gorgonio	Total
1	Devil Canyon Powerplant to Junction, Foothill Pipeline near Cone Camp Road	0.557330	0.442670	1.000000
2A	Junction Foothill Pipeline near Cone Camp Road to Greenspot Pump Station	0.557330	0.442670	1.000000
2B	Greenspot Pump Station to Morton Canyon Valve Vault	0.777778	0.222222	1.000000
2C	Morton Canyon Valve Vault to Crafton Hills Pump Station	0.777778	0.222222	1.000000
3A	Crafton Hills Pump Station to Carter Street Valve Vault	0.557330	0.442670	1.000000
3B	Carter Street Valve Vault to Garden Air Creek, South of San Bernardino County Line	0.557330	0.442670	1.000000
4A	Garden Air Creek to Cherry Valley Pump Station		1.000000	1.000000
4B	Cherry Valley Pump Station to Terminus at Noble Creek		1.000000	1.000000

**Table 12 East Branch Extension Facilities Debt Service for 2017**

Contractor	Share of Participation (percent)	Total Debt Service Charge (in dollars)
<b>Phase 1 Original</b>		
San Bernardino	45.8417	5,062,124
San Gorgonio	54.1583	5,980,495
<i>Subtotal</i>	100.0000	11,042,619
<b>Phase 1 Improvements</b>		
San Bernardino	63.3410	3,684,787
San Gorgonio	36.6590	2,132,594
<i>Subtotal</i>	100.0000	5,817,381
<b>Phase 2</b>		
San Bernardino	64.4210	8,803,483
San Gorgonio	35.5790	4,862,065
<i>Subtotal</i>	100.0000	13,665,548
<b>Total</b>		30,525,548

## Short-term Agreements

DWR and the water supply contractors execute short-term agreements that affect the contractors' charges.

## Municipal Water Quality Investigations

DWR executed a 5-year agreement in 1997 with 16 municipal and industrial contractors, who agreed to pay for allocated shares of DWR's Municipal Water Quality Investigations costs. Additional amendments were executed in 2002, 2006, 2008, 2010, and 2014 to extend the program. The Municipal Water Quality Investigations charges under this agreement are included in the transportation minimum OMP&R components shown in Table B-16A.

## Feasibility Study

Nine contractors executed a short-term agreement (1997 and 1998) to participate in the feasibility study for the American Basin conjunctive-use program. Feasibility study costs are included in Table B-16A.

## Delta Programs

Contractors have agreed to participate in several Delta improvement programs that started in 2007 and that will possibly extend into the future.

The first agreement pertains to the Bay Delta Conservation Plan (BDCP) agreed to in the Memorandum of Agreement (MOA) for Supplemental Funding for Certain Ecosystem Actions and Support for Implementation of Near-Term Water Supply, Water Quality, Ecosystem, and Levee Actions. The BDCP comprises two elements: fishery costs and consultation costs. These costs were added to the contractors' transportation minimum component for bill years 2007 through 2012.

The second agreement pertains to the non-BDCP costs of the MOA, comprising the Delta Vision and pelagic organism decline research costs. These costs were added to the contractors' conservation minimum component for bill years 2007 and 2008.

The third set of agreements pertains to the Delta Habitat Conservation and Conveyance Program (DHCCP). The agreements are between DWR and 20 participating SWP contractors to provide 50 percent of the funding for the preliminary planning phase of an improved Delta water conveyance facility. (The remaining 50 percent is provided by the Bureau of Reclamation.) This program will assess potential habitat restoration and water conveyance options in the Delta. For bill years 2008 through 2011, nearly \$70 million in charges associated with the DHCCP were billed directly to the 20 participating SWP contractors as

a separate line item in the Statements of Charges and are not reflected in the tables in this appendix.

A fourth set of agreements pertains to both DHCCP and BDCP. For bill years 2012 and 2013, an Agreement for Supplemental Funding for the Costs of Environmental Analysis, Planning and Design of Delta Conservation Measures, Including Delta Conveyance Options, was executed in 2012 between DWR and 16 participating SWP contractors to provide 50 percent of the project funding. In 2012, \$22 million was billed and in 2013, \$28 million was billed directly to the 16 participating contractors as a separate line item in the Statements of Charges.

During 2013, SWP water supply contractors agreed to participate in the 2013 San Joaquin River Flow Augmentation Program. The costs of the \$4 million program were recovered in the 2014 Statements of Charges.

**TABLE B-1 Factors for Distributing Reach Capital Costs Among Contractors<sup>a</sup>**

Sheet 1 of 2

Reach No.	Reach Description	NORTH BAY AREA		SOUTH BAY AREA				Total
		Napa	Solano	Alameda-Zone 7	Alameda County	Santa Clara	Future Contractor South Bay	
1	<b>NORTH BAY AQUEDUCT</b>							
2	Barker Slough through Fairfield/Vacaville Turnout	0.29667896	0.70332104					1.00000000
3A	Fairfield/Vacaville Turnout to Cordelia Forebay	0.38414552	0.61585448					1.00000000
3B	Cordelia Forebay through Benicia and Vallejo Turnouts		1.00000000					1.00000000
3B	Cordelia Forebay through Napa Turnout Reservoir	1.00000000						1.00000000
1	<b>SOUTH BAY AQUEDUCT</b>							
2	Bethany Reservoir through Altamont Turnout			0.22599612	0.20663021	0.49237700	0.07499667	1.00000000
4	Altamont Turnout through Patterson Reservoir			0.22599658	0.20663059	0.49237783	0.07499500	1.00000000
5	Patterson Reservoir to Del Valle Junction			0.19504795	0.21450017	0.51113249	0.07931939	1.00000000
6	Del Valle Junction through Lake del Valle			0.14436367	0.12972254	0.33715573	0.38875806	1.00000000
7	Del Valle Junction through South Livermore Turnout			0.14599918	0.21144710	0.50574745	0.13680627	1.00000000
8	South Livermore Turnout through Vallecitos Turnout				0.25176680	0.60218448	0.14604872	1.00000000
9	Vallecitos Turnout through Alameda-Bayside Turnout				0.27934645	0.72065355		1.00000000
9	Alameda-Bayside Turnout through Santa Clara Terminal Facilities					1.00000000		1.00000000
1	<b>CALIFORNIA AQUEDUCT</b>							
1	Delta through Bethany Reservoir			0.00954737	0.00872917	0.02080118	0.00342507	N/A

Reach No.	Reach Description	CENTRAL COASTAL AREA		SOUTHERN CALIFORNIA AREA				
		San Luis Obispo	Santa Barbara	AVEK	Castaic Lake	Coachella	Crestline	Desert
1	<b>CALIFORNIA AQUEDUCT</b>							
2A	Delta through Bethany Reservoir	0.00533010	0.00983337	0.02939084	0.01285827	0.00528315	0.00133612	0.00871300
2B	Bethany Reservoir to Orestimba Creek	0.00557213	0.01027988	0.03072531	0.01343201	0.00552068	0.00139620	0.00910474
3	Orestimba Creek to O'Neill Forebay	0.00557824	0.01029119	0.03075915	0.01345351	0.00552831	0.00139814	0.00911733
4	O'Neill Forebay to Dos Amigos Pumping Plant	0.00557719	0.01028923	0.03075332	0.01345294	0.00552772	0.00139798	0.00911637
5	Dos Amigos Pumping Plant to Panoche Creek	0.00557607	0.01028717	0.03074719	0.01345233	0.00552710	0.00139784	0.00911536
6	Panoche Creek to Five Points	0.00557467	0.01028462	0.03073954	0.01345157	0.00552633	0.00139763	0.00911409
7	Five Points to Arroyo Pasajero	0.00557257	0.01028074	0.03072799	0.01345042	0.00552517	0.00139733	0.00911216
8C	Arroyo Pasajero to Kettleman City	0.00557189	0.01027949	0.03072428	0.01345006	0.00552480	0.00139723	0.00911154
8D	Kettleman City through Milham Avenue	0.00557103	0.01027792	0.03071961	0.01344960	0.00552432	0.00139712	0.00911076
8D	Milham Avenue through Avenal Gap	0.00568611	0.01049020	0.03135418	0.01373353	0.00563986	0.00142632	0.00930130
9	Avenal Gap through Twisselman Road			0.03426625	0.01356094	0.00616886	0.00156011	0.01017373
10A	Twisselman Road through Lost Hills			0.03481391	0.01377767	0.00626946	0.00158556	0.01033963
11B	Lost Hills to 7th Standard Road			0.03835043	0.01517717	0.00691699	0.00174933	0.01140749
12D	7th Standard Road through Elk Hills Road			0.04031661	0.01595523	0.00727790	0.00184059	0.01200265
12E	Elk Hills Road through Tupman Road			0.04037074	0.01597665	0.00728878	0.00184332	0.01202059
13B	Tupman Road to Buena Vista Pumping Plant			0.04379882	0.01733322	0.00791595	0.00200194	0.01305492
14A	Buena Vista Pumping Plant through Santiago Creek			0.04599268	0.01820137	0.00831952	0.00210399	0.01372049
14B	Santiago Creek through Old River Road			0.04682530	0.01853084	0.00847388	0.00214303	0.01397505
14C	Old River Road to Wheeler Ridge Pumping Plant			0.04825217	0.01909545	0.00873768	0.00220973	0.01441013
15A	Wheeler Ridge Pumping Plant to Chrisman Pumping Plant			0.04905609	0.01941356	0.00888679	0.00224744	0.01465600
16A	Chrisman Pumping Plant to Edmonston Pumping Plant			0.05089794	0.02014241	0.00922722	0.00233351	0.01521742
17E	Edmonston Pumping Plant to Porter Tunnel			0.05329388	0.02109050	0.00967107	0.00244575	0.01594937
17F	Porter Tunnel to Junction, West Branch, California Aqueduct			0.05340725	0.02113537	0.00969176	0.00245098	0.01598349
18A	Junction, West Branch, California Aqueduct through Alamo Powerplant			0.13238112		0.02399391	0.00606795	0.03957043
19	Alamo Powerplant to Fairmont			0.13237766		0.02399451	0.00606811	0.03957141
19C	Buttes Junction through Buttes Reservoir			1.00000000				
20A	Fairmont through 70th Street West			0.06847931		0.02576425	0.00651573	0.04249001
20B	70th Street West to Palmdale			0.02276024		0.02702917	0.00683555	0.04457607
21	Palmdale to Littlerock Creek			0.02318952		0.02754716	0.00696651	0.04543034
22A	Littlerock Creek to Pearblossom Pumping Plant			0.01181870		0.02794143	0.00706621	0.04608043
22B	Pearblossom Pumping Plant to West Fork Mojave River					0.02827552	0.00715074	0.04663153
23	West Fork Mojave River to Silverwood Lake					0.00324449	0.00818122	0.00535117
24	Cedar Springs Dam and Silverwood Lake					0.01024605	0.01251569	0.01690478
25	Silverwood Lake to South Portal San Bernardino Tunnel							
26A	South Portal, San Bernardino Tunnel through Devil Canyon Powerplant							
28G	Devil Canyon Powerplant to Barton Road							
28H	Barton Road to Lake Perris							
28J	Perris Dam and Lake Perris							
29A	Junction, West Branch, California Aqueduct through Oso Pumping Plant				0.03544337			
29F	Oso Pumping Plant through Quail Embankment				0.03544339			
29G	Quail Embankment through Warne Powerplant				0.03544339			
29H	Pyramid Dam and Lake				0.02817144			
29J	Pyramid Lake through Castaic Powerplant				0.03544338			
30	Castaic Dam and Lake				0.02927284			
31A	Avenal Gap to Devil's Den Pumping Plant	0.10560301	0.19482503		0.07364766			
33A	Devil's Den Pumping Plant through Tank 1	0.10101221	0.89898779					
33B	Tank 1 through Chorro Valley Turnout	0.09912818	0.90087182					
34	Chorro Valley Turnout through Lopez Turnout	0.05479573	0.94520427					
35	Lopez Turnout through Guadalupe Turnout		1.00000000					

<sup>a</sup> Proportionate use factors do not reflect permanent water transfers as a result of the Monterey Amendment and after.

TABLE B-1 Factors for Distributing Reach Capital Costs Among Contractors<sup>a</sup>

Sheet 2 of 2

Reach No.	SAN JOAQUIN VALLEY AREA							
	Dudley Ridge	Empire	Future Contractor San Joaquin Valley	Kern		Kings	Oak Flat	Tulare
				Municipal and Industrial	Agricultural			
	CALIFORNIA AQUEDUCT							
1	0.01707770	0.00088678	0.00254693	0.02741768	0.30629913	0.00090695	0.00167121	0.03504975
2A	0.01781031	0.00092482	0.00266258	0.02864263	0.31945188	0.00094747	0.00174288	0.03655331
2B	0.01785838	0.00092731	0.00266550	0.02868743	0.32030556	0.00094896		0.03665201
3	0.01786337	0.00092757	0.00266499	0.02868589	0.32039254	0.00094892		0.03666225
4	0.01786863	0.00092785	0.00266446	0.02868428	0.32048398	0.00094886		0.03667303
5	0.01787517	0.00092819	0.00266380	0.02868227	0.32059816	0.00094879		0.03668649
6	0.01788508	0.00092870	0.00266279	0.02867923	0.32077093	0.00094868		0.03670685
7	0.01788826	0.00092887	0.00266246	0.02867825	0.32082633	0.00094864		0.03671338
8C	0.01789228	0.00092909	0.00266205	0.02867702	0.32089625	0.00094859		0.03672162
8D	0.01828779		0.00271703	0.02928147	0.32798200			0.01820857
9				0.03204523	0.32739538			
10A				0.03257442	0.31658608			
11B				0.03597398	0.24684668			
12D				0.03787171	0.20804762			
12E				0.03793198	0.20695175			
13B				0.01458796	0.16600071			
14A				0.00620338	0.13319181			
14B				0.00632023	0.11741558			
14C				0.00651962	0.09039633			
15A				0.00663252	0.07516317			
16A				0.00688973	0.04028829			
17E				0.00212516				
31A			0.05046240		0.57546190			

Reach No.	SOUTHERN CALIFORNIA AREA (continued)								California Aqueduct Total
	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel	San Gorgonio	Metropolitan	Ventura	
	<b>CALIFORNIA AQUEDUCT</b>								
1	0.00049180	0.01101147	0.00369131	0.02362857	0.00650354	0.00398392	0.43929350	0.00429212	1.00000000
2A	0.00051413	0.01151136	0.00385891	0.02469101	0.00679699	0.00416304	0.45921072	0.00448701	1.00000000
2B	0.00051469	0.01152409	0.00386317	0.02472511	0.00680570	0.00416880	0.45973548	0.00449194	1.00000000
3	0.00051461	0.01152193	0.00386244	0.02472246	0.00680478	0.00416835	0.45965407	0.00449108	1.00000000
4	0.00051451	0.01151965	0.00386167	0.02471968	0.00680380	0.00416787	0.45956848	0.00449019	1.00000000
5	0.00051440	0.01151681	0.00386070	0.02471620	0.00680259	0.00416730	0.45946161	0.00448907	1.00000000
6	0.00051419	0.01151251	0.00385926	0.02471095	0.00680076	0.00416640	0.45929991	0.00448738	1.00000000
7	0.00051413	0.01151113	0.00385879	0.02470927	0.00680016	0.00416612	0.45924807	0.00448685	1.00000000
8C	0.00051405	0.01150938	0.00385821	0.02470716	0.00679941	0.00416576	0.45918261	0.00448616	1.00000000
8D	0.00052466	0.01174718	0.00393793	0.02522383	0.00694100	0.00425288	0.46868533	0.00457883	1.00000000
9	0.00057339	0.01283841	0.00430367	0.02758959	0.00758975	0.00465175	0.51227887	0.00500407	1.00000000
10A	0.00058254	0.01304366	0.00437246	0.02803943	0.00771262	0.00472760	0.52049091	0.00508405	1.00000000
11B	0.00064171	0.01436906	0.00481665	0.03093503	0.00850448	0.00521581	0.57349473	0.00560046	1.00000000
12D	0.00067463	0.01510596	0.00506361	0.03254889	0.00894541	0.00548790	0.60297374	0.00588755	1.00000000
12E	0.00067553	0.01512626	0.00507040	0.03259749	0.00895830	0.00549608	0.60379667	0.00589546	1.00000000
13B	0.00073290	0.01641098	0.00550099	0.03540212	0.00972547	0.00596896	0.65516902	0.00639604	1.00000000
14A	0.00076961	0.01723325	0.00577656	0.03720681	0.01021819	0.00627322	0.68807273	0.00671639	1.00000000
14B	0.00078354	0.01754538	0.00588113	0.03789703	0.01040613	0.00638960	0.70057530	0.00683798	1.00000000
14C	0.00080743	0.01808019	0.00606036	0.03907670	0.01072763	0.00658850	0.72199174	0.00704634	1.00000000
15A	0.00082089	0.01838154	0.00616135	0.03974336	0.01090913	0.00670088	0.73406357	0.00716371	1.00000000
16A	0.00085171	0.01907194	0.00639271	0.04126559	0.01132404	0.00695754	0.76170731	0.00743264	1.00000000
17E	0.00089182	0.01997003	0.00669365	0.04325018	0.01186455	0.00729213	0.79767940	0.00778251	1.00000000
17F	0.00089372	0.02001251	0.00670788	0.04334270	0.01188988	0.00730773	0.79937767	0.00779906	1.00000000
18A	0.00221525	0.04960424	0.01662680	0.10730448	0.02944860	0.01809192	0.57469530		1.00000000
19	0.00221522	0.04960300	0.01662640	0.10730707	0.02944876	0.01809230	0.57469556		1.00000000
19C									1.00000000
20A	0.00237800	0.05324853	0.01784830	0.11522152	0.03161798	0.01942666	0.61700971		1.00000000
20B	0.00249470	0.05586076	0.01872390	0.12087843	0.03316986	0.02038045	0.64729087		1.00000000
21	0.00254199	0.05692053		0.12319480	0.03380324	0.02077093	0.65963498		1.00000000
22A		0.05773082		0.12495766	0.03428605	0.02106816	0.66905054		1.00000000
22B		0.05842136		0.12645207	0.03469614	0.02132008	0.67705256		1.00000000
23				0.14467451	0.03969010	0.02439237	0.77446614		1.00000000
24				0.22243002	0.04339444	0.02843498	0.66607404		1.00000000
25				0.14947726	0.03997502	0.02520426	0.78534346		1.00000000
26A				0.14947726	0.03997502	0.02520426	0.78534346		1.00000000
28G				0.05126137			0.94873863		1.00000000
28H							1.00000000		1.00000000
28J							1.00000000		1.00000000
29A							0.95147783	0.01307880	1.00000000
29F							0.95147785	0.01307876	1.00000000
29G							0.95147785	0.01307876	1.00000000
29H							0.96278381	0.00904475	1.00000000
29J							0.95147787	0.01307875	1.00000000
30							0.96212388	0.00860328	1.00000000
31A									1.00000000
33A									1.00000000
33B									1.00000000
34									1.00000000
35									1.00000000

<sup>a</sup> Proportionate use factors do not reflect permanent water transfers as a result of the Monterey Amendment and after.

TABLE B-2 Factors for Distributing Reach Minimum OMP&R Costs Among Contractors<sup>a</sup>

Sheet 1 of 2

Reach No.	Reach Description	NORTH BAY AREA		SOUTH BAY AREA				Total
		Napa	Solano	Alameda-Zone 7	Alameda County	Santa Clara	Future Contractor South Bay	
NORTH BAY AQUEDUCT								
1	Barker Slough through Fairfield/Vacaville Turnout	0.29251728	0.70748272					1.00000000
2	Fairfield/Vacaville Turnout to Cordelia Forebay	0.42000793	0.57999207					1.00000000
3A	Cordelia Forebay through Benicia and Vallejo Turnouts		1.00000000					1.00000000
3B	Cordelia Forebay through Napa Turnout Reservoir	1.00000000						1.00000000
SOUTH BAY AQUEDUCT								
1	Bethany Reservoir through Altamont Turnout			0.33980110	0.19515838	0.46504052	0.00000000	1.00000000
2	Altamont Turnout through Patterson Reservoir			0.33978741	0.19516252	0.46505007	0.00000000	1.00000000
4	Patterson Reservoir to Del Valle Junction			0.31610985	0.20216089	0.48172926	0.00000000	1.00000000
5	Del Valle Junction through Lake del Valle			0.53312173	0.12972254	0.33715573	0.00000000	1.00000000
6	Del Valle Junction through South Livermore Turnout			0.32478705	0.19906896	0.47614399	0.00000000	1.00000000
7	South Livermore Turnout through Vallecitos Turnout			0.14604872	0.25176680	0.60218448	0.00000000	1.00000000
8	Vallecitos Turnout through Alameda-Bayside Turnout				0.27934645	0.72065355		1.00000000
9	Alameda-Bayside Turnout through Santa Clara Terminal Facilities					1.00000000		1.00000000
CALIFORNIA AQUEDUCT								
1	Delta through Bethany Reservoir				0.00870518	0.02074403		N/A

Reach No.	Reach Description	CENTRAL COASTAL AREA		SOUTHERN CALIFORNIA AREA				
		San Luis Obispo	Santa Barbara	AVEK	Castaic Lake	Coachella	Crestline	Desert
	CALIFORNIA AQUEDUCT							
1	Delta through Bethany Reservoir	0.00531721	0.00980965	0.03130358	0.02543338	0.03261213	0.00133220	0.01285646
2A	Bethany Reservoir to Orestimba Creek	0.00556969	0.01027545	0.03278434	0.02659653	0.03414259	0.00139484	0.01346045
2B	Orestimba Creek to O'Neill Forebay	0.00557578	0.01028673	0.03282389	0.02665383	0.03419149	0.00139677	0.01347932
3	O'Neill Forebay to Dos Amigos Pumping Plant	0.00557472	0.01028476	0.03281870	0.02665705	0.03418834	0.00139663	0.01347795
4	Dos Amigos Pumping Plant to Panoche Creek	0.00557360	0.01028270	0.03281323	0.02666041	0.03418504	0.00139648	0.01347652
5	Panoche Creek to Five Points	0.00557222	0.01028014	0.03280640	0.02666463	0.03418091	0.00139630	0.01347474
6	Five Points to Arroyo Pasajero	0.00557012	0.01027626	0.03279609	0.02667100	0.03417466	0.00139599	0.01347205
7	Arroyo Pasajero to Kettleman City	0.00556944	0.01027501	0.03279278	0.02667304	0.03417265	0.00139589	0.01347118
8C	Kettleman City through Milham Avenue	0.00551362	0.01017203	0.03245613	0.02634257	0.03380450	0.00138102	0.01332696
8D	Milham Avenue through Avenal Gap	0.00562578	0.01037893	0.03311929	0.02690184	0.03450165	0.00140943	0.01360147
9	Avenal Gap through Twisselman Road			0.03490917	0.02761987	0.03509927	0.00151717	0.01432230
10A	Twisselman Road through Lost Hills			0.03544917	0.02807208	0.03564408	0.00154110	0.01454684
11B	Lost Hills to 7th Standard Road			0.03880671	0.03085710	0.03902944	0.00168938	0.01593968
12D	7th Standard Road through Elk Hills Road			0.04066779	0.03241328	0.04090687	0.00177180	0.01671325
12E	Elk Hills Road through Tupman Road			0.04071899	0.03246787	0.04095940	0.00177429	0.01673594
13B	Tupman Road to Buena Vista Pumping Plant			0.04402054	0.03519674	0.04428760	0.00191991	0.01810442
14A	Buena Vista Pumping Plant through Santiago Creek			0.04611560	0.03675967	0.04640153	0.00201279	0.01897599
14B	Santiago Creek through Old River Road			0.04676624	0.03303687	0.04706094	0.00204236	0.01925135
14C	Old River Road to Wheeler Ridge Pumping Plant			0.04794869	0.03181987	0.04825630	0.00209534	0.01974685
15A	Wheeler Ridge Pumping Plant to Chrisman Pumping Plant			0.04864100	0.03227919	0.04895597	0.00212631	0.02003668
16A	Chrisman Pumping Plant to Edmonston Pumping Plant			0.05024161	0.03334119	0.05057226	0.00219758	0.02070455
17E	Edmonston Pumping Plant to Porter Tunnel			0.05223186	0.03466168	0.05258256	0.00228636	0.02153594
17F	Porter Tunnel to Junction, West Branch, California Aqueduct			0.05233552	0.03473046	0.05268698	0.00229092	0.02157880
18A	Junction, West Branch, California Aqueduct through Alamo Powerplant			0.13774725		0.11306511	0.00603056	0.05137695
19	Alamo Powerplant to Fairmont			0.13774370		0.11306344	0.00603069	0.05137766
19C	Buttes Junction through Buttes Reservoir			1.00000000				
20A	Fairmont through 70th Street West			0.06855702		0.12212506	0.00651522	0.05550243
20B	70th Street West to Palmdale			0.02284441		0.12811683	0.00683511	0.05822670
21	Palmdale to Littlerock Creek			0.02327543		0.13055246	0.00696606	0.05933989
22A	Littlerock Creek to Pearblossom Pumping Plant			0.01190663		0.13241285	0.00706574	0.06018798
22B	Pearblossom Pumping Plant to West Fork Mojave River			0.00195128		0.13374659	0.00713697	0.06079440
23	West Fork Mojave River to Silverwood Lake					0.12416451	0.00818135	0.02168414
24	Cedar Springs Dam and Silverwood Lake					0.02651510	0.01251569	0.01910229
25	Silverwood Lake to South Portal San Bernardino Tunnel					0.09751351		0.01317145
26A	South Portal, San Bernardino Tunnel through Devil Canyon Powerplant					0.12013473		0.01622697
28G	Devil Canyon Powerplant to Barton Road					0.30672992		0.04143095
28H	Barton Road to Lake Perris					0.32330286		0.04366951
28J	Perris Dam and Lake Perris					0.32330202		0.04366970
29A	Junction, West Branch, California Aqueduct through Oso Pumping Plant			0.00296720	0.05726734			
29F	Oso Pumping Plant through Quail Embankment			0.00296796	0.05726649			
29G	Quail Embankment through Warne Powerplant				0.05742327			
29H	Pyramid Dam and Lake				0.03349572			
29J	Pyramid Lake through Castaic Powerplant				0.05740996			
30	Castaic Dam and Lake				0.03248607			
31A	Avenal Gap to Devil's Den Pumping Plant	0.10542164	0.19449108		0.07351496	0.05400251		0.01800084
33A	Devil's Den Pumping Plant through Tank 1	0.10101221	0.89898779					
33B	Tank 1 through Chorro Valley Turnout	0.10101221	0.89898779					
34	Chorro Valley Turnout through Lopez Turnout	0.05271277	0.94728723					
35	Lopez Turnout through Guadalupe Turnout		1.00000000					

<sup>a</sup> Proportionate use factors apply to 2017 and reflect permanent capacity water transfers that have been signed as of February 1, 2016.



TABLE B-2 Factors for Distributing Reach Minimum OMP&R Costs Among Contractors<sup>a</sup>

Sheet 2 of 2

Reach No.	SAN JOAQUIN VALLEY AREA										
	Napa	Solano	Alameda-Zone 7	Dudley Ridge	Empire	Future Contractor San Joaquin Valley	Kern		Kings	Oak Flat	Tulare
							Municipal and Industrial	Agricultural			
	CALIFORNIA AQUEDUCT										
1	0.00101482	0.00145895	0.02319903	0.01467673	0.00088461	0.00254076	0.02734568	0.27096833	0.00247145	0.00166714	0.02580275
2A	0.00106145	0.00152591	0.00868253	0.01533481	0.00092428	0.00266141	0.02862314	0.28310687	0.00258398	0.00174185	0.02695973
2B	0.00106360	0.00152905	0.00869823	0.01537617	0.00092676	0.00266432	0.02866783	0.28387747	0.00258988		0.02703241
3	0.00106370	0.00152920	0.00869838	0.01538045	0.00092702	0.00266381	0.02866629	0.28395878	0.00259028		0.02703994
4	0.00106379	0.00152934	0.00869854	0.01538495	0.00092729	0.00266328	0.02866467	0.28404425	0.00259071		0.02704786
5	0.00106390	0.00152952	0.00869876	0.01539058	0.00092763	0.00266262	0.02866263	0.28415100	0.00259125		0.02705775
6	0.00106409	0.00152980	0.00869909	0.01539909	0.00092815	0.00266161	0.02865956	0.28431251	0.00259206		0.02707272
7	0.00106415	0.00152990	0.00869920	0.01540183	0.00092832	0.00266127	0.02865857	0.28436430	0.00259232		0.02707752
8C	0.00105126	0.00151129	0.00859813	0.01519240	0.00091570	0.00263462	0.02834154	0.28048179	0.00255949		0.02670939
8D	0.00107347	0.00154326	0.00877817	0.01552187		0.00268820	0.02892910	0.28657021	0.00165698		0.00825002
9	0.00079148	0.00109219	0.00779740				0.03115978	0.29020213			
10A	0.00080441	0.00110983	0.00792269				0.03165722	0.27906723			
11B	0.00064433	0.00094350	0.00351417				0.03473359	0.21569759			
12D							0.03644652	0.18305822			
12E							0.03650093	0.18194750			
13B							0.01398402	0.14058058			
14A							0.00593078	0.10814827			
14B							0.00602009	0.09952426			
14C							0.00617876	0.07848396			
15A							0.00627144	0.06500426			
16A							0.00648410	0.03392037			
17E							0.00198506				
31A	0.00628695	0.00977801	0.02617705			0.05037550		0.36716813	0.00176551		

Reach No.	SOUTHERN CALIFORNIA AREA (continued)								California Aqueduct Total
	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel	San Geronio	Metropolitan	Ventura	
1	<b>CALIFORNIA AQUEDUCT</b>								
2A	0.00049038	0.02116470	0.00458381	0.02355980	0.00648455	0.00397230	0.41532271	0.00427768	1.00000000
2B	0.00051367	0.02214484	0.00480091	0.02466751	0.00679050	0.00415906	0.43501287	0.00448079	1.00000000
3	0.00051423	0.02218483	0.00480654	0.02470151	0.00679919	0.00416478	0.43550968	0.00448571	1.00000000
4	0.00051414	0.02218522	0.00480573	0.02469885	0.00679827	0.00416433	0.43543260	0.00448486	1.00000000
5	0.00051405	0.02218564	0.00480489	0.02469606	0.00679730	0.00416387	0.43535156	0.00448397	1.00000000
6	0.00051393	0.02218616	0.00480382	0.02469256	0.00679607	0.00416328	0.43525035	0.00448285	1.00000000
7	0.00051372	0.02218693	0.00480221	0.02468729	0.00679422	0.00416240	0.43509723	0.00448115	1.00000000
8C	0.00051366	0.02218719	0.00480171	0.02468559	0.00679362	0.00416212	0.43504813	0.00448061	1.00000000
8D	0.00050851	0.02192962	0.00475278	0.02442260	0.00672277	0.00411777	0.44211780	0.00443571	1.00000000
9	0.00051885	0.02238875	0.00484976	0.02492516	0.00686055	0.00420251	0.45117880	0.00452595	1.00000000
10A	0.00055796	0.02061192	0.00521674	0.02683029	0.00738240	0.00452372	0.48549902	0.00486719	1.00000000
11B	0.00056659	0.02092935	0.00529783	0.02725335	0.00749802	0.00459505	0.49310270	0.00494246	1.00000000
12D	0.00062024	0.02290463	0.00580164	0.02987521	0.00821533	0.00503710	0.54027985	0.00541051	1.00000000
12E	0.00064998	0.02399884	0.00599767	0.03133251	0.00861365	0.00528280	0.56647688	0.00566994	1.00000000
13B	0.00065079	0.02402828	0.00600523	0.03137638	0.00862529	0.00529020	0.56724183	0.00567798	1.00000000
14A	0.00070354	0.02597118	0.00649222	0.03395142	0.00933012	0.00572435	0.61359604	0.00613732	1.00000000
14B	0.00073704	0.02720257	0.00680126	0.03559402	0.00977890	0.00600130	0.64311092	0.00642936	1.00000000
14C	0.00074743	0.02758281	0.00689726	0.03611670	0.00992049	0.00608943	0.65242374	0.00652203	1.00000000
15A	0.00076634	0.02827615	0.00707171	0.03705347	0.01017549	0.00624735	0.66919487	0.00668485	1.00000000
16A	0.00077741	0.02868221	0.00717384	0.03760115	0.01032464	0.00633968	0.67900489	0.00678133	1.00000000
17A	0.00080298	0.02962205	0.00740997	0.03886148	0.01066844	0.00655218	0.70161679	0.00700445	1.00000000
17E	0.00083480	0.03079028	0.00770356	0.04043105	0.01109636	0.00681681	0.72976182	0.00728186	1.00000000
17F	0.00083646	0.03085132	0.00771884	0.04051162	0.01111844	0.00683040	0.73121394	0.00729630	1.00000000
18A	0.00220155	0.04929713	0.01652427	0.10664131	0.02926634	0.01798005	0.46986948		1.00000000
19	0.00220151	0.04929585	0.01652388	0.10664396	0.02926656	0.01798044	0.46987231		1.00000000
19C									1.00000000
20A	0.00237787	0.05324421	0.01784728	0.11521174	0.03161525	0.01942494	0.50757898		1.00000000
20B	0.00249455	0.05585607	0.01872278	0.12086783	0.03316690	0.02037859	0.53249023		1.00000000
21	0.00254183	0.05691567		0.12318381	0.03380017	0.02076901	0.54265567		1.00000000
22A		0.05772584		0.12494639	0.03428290	0.02106619	0.55040548		1.00000000
22B		0.05830722		0.12620561	0.03462835	0.02127845	0.55595113		1.00000000
23				0.14467451	0.03969010	0.02439237	0.63721302		1.00000000
24				0.22243002	0.04339445	0.02843498	0.64760747		1.00000000
25				0.11825184	0.03722720	0.01993915	0.71389685		1.00000000
26A				0.14947726	0.03997501	0.02520426	0.64898177		1.00000000
28G				0.05126136			0.60057777		1.00000000
28H							0.63302763		1.00000000
28J							0.63302828		1.00000000
29A							0.92702291	0.01274255	1.00000000
29F							0.92702302	0.01274253	1.00000000
29G							0.92979606	0.01278067	1.00000000
29H							0.95753173	0.00897255	1.00000000
29J							0.92980918	0.01278086	1.00000000
30							0.95895422	0.00855971	1.00000000
31A		0.09301782							1.00000000
33A									1.00000000
33B									1.00000000
34									1.00000000
35									1.00000000

<sup>a</sup> Proportionate use factors apply to 2017 and reflect permanent capacity water transfers that have been signed as of February 1, 2016.

**TABLE B-3 Power Costs and Credits, Transmission Costs and Annual Replacement Deposits for Each Aqueduct Pumping and Power Recovery Plant<sup>a</sup> (in dollars)**

Sheet 1 of 3

Calendar Year	NORTH BAY AQUEDUCT			SOUTH BAY AQUEDUCT	CALIFORNIA AQUEDUCT			
	Reach 1	Reach 3A	Reach 3B	Reach 1 <sup>c</sup>	Reach 1	Reach 4	Reach 14A	Reach 15A
	Barker Slough Pumping Plant	Cordelia Pumping Plant Solano	Cordelia Pumping Plant Napa <sup>b</sup>	South Bay and Del Valle Pumping Plants	Banks Pumping Plant	Dos Amigos Pumping Plant	Buena Vista Pumping Plant	Teerink Pumping Plant
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
1961	0	0	0	0	0	0	0	0
1962	0	0	0	36,771	0	0	0	0
1963	0	0	0	55,654	0	0	0	0
1964	0	0	0	73,240	0	0	0	0
1965	0	0	0	137,665	0	0	0	0
1966	0	0	0	186,064	0	0	0	0
1967	0	0	0	216,515	15,453	0	0	0
1968	0	0	6,989	336,671	452,630	202,947	0	0
1969	0	0	8,551	257,579	293,741	135,425	0	0
1970	0	0	13,598	396,358	346,215	211,197	1	0
1971	0	0	10,609	381,662	574,015	225,188	115,801	2,564
1972	0	0	14,434	598,702	933,292	492,633	198,914	68,304
1973	0	0	14,449	493,490	688,030	381,232	263,468	236,623
1974	0	0	17,473	565,575	783,562	447,772	315,939	324,966
1975	0	0	14,779	349,758	1,341,019	518,322	508,060	552,952
1976	0	0	20,856	571,361	1,638,453	641,115	712,947	713,875
1977	0	0	22,635	512,996	1,013,307	277,439	265,169	300,985
1978	0	0	21,692	586,355	2,339,502	560,759	689,236	616,104
1979	0	0	16,237	605,136	3,554,256	1,008,564	776,016	749,188
1980	0	0	19,945	523,369	2,083,336	1,129,152	1,051,629	1,047,495
1981	0	0	23,842	567,692	3,952,931	1,939,189	1,336,867	1,319,739
1982	0	0	12,157	605,780	3,082,031	1,363,705	1,200,226	1,213,660
1983	0	0	2,342	82,222	1,001,612	396,086	450,801	432,165
1984	0	0	4,822	271,543	1,856,959	976,773	823,681	770,618
1985	0	0	10,188	451,020	3,186,029	1,621,418	1,409,980	1,411,621
1986	0	0	15,501	807,984	6,601,752	2,627,407	2,405,224	2,432,322
1987	0	0	27,223	886,956	5,820,699	2,555,341	2,295,575	2,286,066
1988	17,813	0	24,020	909,300	6,365,669	2,648,986	2,628,985	2,636,224
1989	29,819	43,846	26,519	1,161,160	9,964,956	4,002,409	4,130,033	4,159,440
1990	52,210	67,109	40,775	1,834,626	10,554,762	4,541,508	5,855,196	6,099,412
1991	10,429	10,118	5,252	378,966	1,994,449	510,781	944,445	1,077,662
1992	13,319	13,070	9,406	311,251	3,385,375	1,235,571	1,366,433	1,441,966
1993	(11,941)	(8,753)	(5,392)	(158,214)	537,591	348,409	(127,617)	(104,923)
1994	46,791	39,624	29,189	799,624	6,013,464	2,450,174	2,778,971	2,823,137
1995	20,014	20,620	11,791	247,645	4,066,595	1,532,502	952,304	877,047
1996	57,320	47,288	23,483	619,160	8,385,766	4,056,188	2,565,655	2,378,677
1997	67,416	52,935	21,955	986,312	7,010,228	2,870,194	2,637,433	2,469,147
1998	(11,427)	(10,141)	(4,879)	(133,721)	204,374	(365,361)	(319,014)	(295,861)
1999	34,881	25,288	11,623	507,549	6,333,906	2,421,869	1,691,167	1,446,775
2000	61,251	42,605	15,645	744,601	8,192,499	3,183,058	3,047,566	3,216,888
2001	376,166	250,964	214,751	4,262,186	27,678,243	10,726,077	15,061,255	15,960,123
2002	192,540	104,564	61,470	2,036,126	17,666,689	7,284,182	8,870,415	9,554,380
2003	198,411	118,387	97,762	2,591,352	24,686,904	9,172,710	10,694,766	11,529,669
2004	262,243	139,241	107,251	2,420,894	22,910,295	9,450,923	12,600,249	13,757,895
2005	291,101	147,895	149,083	2,791,021	33,776,092	12,750,371	11,843,712	12,615,882
2006	240,451	116,406	147,541	2,551,235	24,153,833	10,464,755	11,470,441	12,268,716
2007	461,136	228,029	257,116	4,809,380	23,665,366	11,668,533	17,485,162	18,965,848
2008	430,277	195,656	307,555	3,425,973	14,703,503	6,671,984	11,660,910	13,395,079
2009	221,684	103,270	164,922	2,501,591	13,814,314	4,320,317	7,109,228	7,916,544
2010	265,329	112,283	219,613	2,505,829	27,497,962	9,982,984	11,243,647	11,839,241
2011	276,011	116,076	232,697	3,365,611	40,410,387	15,518,386	14,818,528	15,530,918
2012	277,025	123,844	193,629	3,787,397	24,413,047	12,628,000	14,645,228	14,989,804
2013	446,094	208,054	331,870	5,281,604	23,461,974	9,732,824	13,373,155	13,792,322
2014	388,724	184,702	476,187	4,476,996	18,433,560	4,771,903	8,576,932	8,930,574
2015	390,734	239,088	361,235	5,307,739	16,574,599	6,150,419	10,562,911	11,933,700
2016	548,601	306,673	375,675	5,200,567	46,688,708	12,352,893	17,512,117	18,458,474
2017	<b>629,471</b>	<b>178,375</b>	<b>600,736</b>	<b>4,905,065</b>	<b>43,881,122</b>	<b>16,473,139</b>	<b>20,872,813</b>	<b>21,522,503</b>
2018	640,090	181,385	610,872	5,125,759	43,055,561	16,700,175	20,380,145	20,966,695
2019	573,263	193,348	545,427	5,366,543	48,107,976	17,843,553	21,049,535	21,580,257
2020	585,727	197,552	557,286	5,504,796	35,329,763	18,243,993	21,535,259	22,079,893
2021	576,541	194,453	548,545	5,418,457	42,469,703	17,957,848	21,197,493	21,733,584
2022	583,831	196,912	555,481	5,486,975	39,111,067	18,184,930	21,465,542	22,008,412
2023	580,757	195,876	552,557	5,458,084	38,905,132	18,089,180	21,352,517	21,892,529
2024	583,026	196,641	554,715	5,479,405	38,709,904	18,159,841	21,435,927	21,978,048
2025	586,434	197,790	557,958	5,511,439	32,358,922	18,266,008	21,561,246	22,106,537
2026	575,597	194,135	547,647	5,409,587	45,700,739	17,928,449	21,162,791	21,698,004
2027	579,719	195,525	551,569	5,448,535	38,835,570	18,056,836	21,314,339	21,853,385
2028	581,960	196,281	553,701	5,469,393	38,985,740	18,126,659	21,396,758	21,937,889
2029	583,836	196,914	555,486	5,487,022	38,763,714	18,185,085	21,465,724	22,008,599
2030	586,041	197,658	557,584	5,507,748	33,212,248	18,253,774	21,546,806	22,091,731
2031	586,184	197,706	557,720	5,509,084	36,334,412	18,258,201	21,552,031	22,097,089
2032	576,048	194,287	548,076	5,413,825	47,759,974	17,942,496	21,179,371	21,715,004
2033	588,371	198,444	559,801	5,529,646	27,502,911	18,326,349	21,632,473	22,179,565
2034	579,894	195,585	551,736	5,449,977	42,288,305	18,062,309	21,320,799	21,860,009
2035	576,408	194,409	548,419	5,417,210	46,863,598	17,953,715	21,192,614	21,728,582
<b>TOTAL</b>	<b>16,807,621</b>	<b>6,732,017</b>	<b>14,821,381</b>	<b>178,980,220</b>	<b>1,273,280,293</b>	<b>541,807,754</b>	<b>645,113,929</b>	<b>669,182,323</b>

<sup>a</sup> Starting with 2005, transmission costs that vary and depend on power usage are included, therefore recovered through the variable component.<sup>b</sup> Power costs for the period 1968 through 1987 are for an interim facility.<sup>c</sup> The costs of Del Valle Pumping Plant are combined with those of South Bay Pumping Plant to simplify the cost allocations.

**TABLE B-3 Power Costs and Credits, Transmission Costs and Annual Replacement Deposits for Each Aqueduct Pumping and Power Recovery Plant<sup>a</sup> (in dollars)**

Sheet 2 of 3

Calendar Year	CALIFORNIA AQUEDUCT (continued)							
	Reach 16A	Reach 17E	Reach 18A	Reach 22B	Reach 23	Reach 26A	Reach 2B (EBX)	Reach 3A (EBX)
	Chrisman Pumping Plant	Edmonston Pumping Plant	Alamo Pumping Plant	Pearblossom Pumping Plant	Mojave Siphon Powerplant	Devil Canyon Powerplant	Greenspot Pump Station	Crafton Hills Pump Station
	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]
1961	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0
1972	142,902	542,625	0	3,468	0	(3,024)	0	0
1973	387,198	1,548,428	0	202,289	0	(461,268)	0	0
1974	564,464	2,164,223	0	324,993	0	(546,156)	0	0
1975	1,095,331	4,010,395	0	575,061	0	(1,095,523)	0	0
1976	1,506,985	5,443,936	0	889,544	0	(1,566,056)	0	0
1977	652,643	2,345,033	0	315,128	0	(1,222,866)	0	0
1978	1,132,296	4,180,131	0	1,508,115	0	(3,085,094)	0	0
1979	1,526,850	5,475,688	0	1,838,687	0	(3,466,481)	0	0
1980	2,102,439	7,028,235	0	1,762,063	0	(3,318,152)	0	0
1981	2,838,773	9,351,931	0	2,296,771	0	(3,842,971)	0	0
1982	2,424,920	8,352,207	0	1,498,620	0	(2,736,072)	0	0
1983	793,915	2,375,225	0	397,766	0	(5,478,830)	0	0
1984	1,479,784	4,585,198	0	624,213	0	(7,350,989)	0	0
1985	2,812,461	9,365,591	0	1,226,515	0	(10,748,103)	0	0
1986	4,999,949	16,956,023	(1,013,756)	2,359,599	0	(11,484,996)	0	0
1987	4,586,919	15,121,886	(1,064,827)	1,907,854	0	(11,151,140)	0	0
1988	5,284,130	17,342,811	(744,374)	2,375,784	0	(14,495,967)	0	0
1989	8,772,733	29,455,330	(789,392)	4,235,981	0	(18,688,631)	0	0
1990	13,814,150	49,027,449	(841,172)	6,559,548	0	(21,045,321)	0	0
1991	2,535,180	9,033,684	(269,625)	996,352	0	(4,884,013)	0	0
1992	2,907,026	9,754,469	(975,679)	1,225,121	0	(9,782,946)	0	0
1993	(598,008)	(2,721,158)	(58,116)	(260,035)	0	(7,502,549)	0	0
1994	5,941,789	20,657,617	(60,125)	2,644,592	0	(11,998,949)	0	0
1995	1,752,212	5,829,425	(1,324,810)	1,106,460	0	(9,742,248)	0	0
1996	5,050,986	17,658,964	(2,955,178)	2,833,791	(979,429)	(12,358,465)	0	0
1997	5,545,919	19,859,875	(2,572,220)	3,156,995	(1,748,195)	(13,830,356)	0	0
1998	(664,843)	(2,312,472)	(2,016,390)	(443,482)	(1,253,110)	(10,108,555)	0	0
1999	3,616,732	13,967,075	(2,980,122)	1,837,476	(2,587,958)	(15,232,207)	0	0
2000	7,255,331	26,090,314	(5,123,988)	3,817,684	(4,402,610)	(25,758,437)	0	0
2001	35,512,637	129,642,109	(3,383,762)	18,930,997	(3,714,425)	(20,062,834)	0	0
2002	21,173,346	77,461,814	(5,057,760)	10,849,297	(5,371,837)	(25,292,454)	0	0
2003	25,596,032	94,010,922	(3,408,979)	14,573,122	(6,565,620)	(27,777,638)	0	0
2004	30,537,142	112,157,127	(6,431,864)	17,022,676	(7,858,117)	(32,044,505)	78,555	68,914
2005	27,845,084	97,798,938	(5,880,165)	17,454,941	(6,454,740)	(28,818,797)	69,542	48,909
2006	26,820,813	84,626,897	(4,091,143)	15,795,475	(6,391,206)	(34,897,387)	135,205	148,128
2007	41,386,558	138,617,059	(3,029,048)	19,242,314	(5,896,486)	(28,814,592)	248,626	256,313
2008	26,255,003	82,159,793	(3,426,928)	10,827,189	(3,300,797)	(16,968,293)	242,648	326,570
2009	16,500,988	75,435,159	(3,266,008)	9,230,210	(2,288,833)	(13,842,660)	360,373	391,267
2010	26,190,014	95,975,151	(5,115,083)	16,897,664	(5,653,201)	(24,769,829)	313,542	431,062
2011	33,960,779	118,907,531	(6,536,645)	23,388,410	(7,792,422)	(32,285,174)	372,501	500,578
2012	33,052,074	115,573,786	(2,492,869)	17,437,731	(8,905,115)	(23,525,846)	451,850	551,794
2013	30,134,416	106,092,103	(2,081,221)	12,343,413	(4,915,165)	(14,305,918)	487,724	570,697
2014	19,618,567	67,887,838	(1,786,122)	7,162,418	(1,465,644)	(5,391,598)	316,015	438,715
2015	26,453,951	94,140,819	(2,289,717)	9,195,351	(2,103,231)	(6,675,218)	342,464	457,405
2016	41,795,991	152,354,540	(10,274,609)	26,431,248	(11,357,647)	(22,454,991)	377,640	462,567
2017	<b>49,135,597</b>	<b>180,049,497</b>	<b>(11,603,405)</b>	<b>24,467,615</b>	<b>(14,419,970)</b>	<b>(20,822,068)</b>	<b>476,840</b>	<b>595,092</b>
2018	47,830,901	175,144,689	(12,072,573)	25,989,343	(15,093,100)	(21,811,146)	484,175	604,246
2019	49,160,563	179,855,764	(9,666,198)	22,778,616	(12,708,216)	(18,407,632)	510,297	636,847
2020	50,300,020	184,028,818	(9,695,490)	23,350,642	(12,750,129)	(18,407,632)	521,393	650,693
2021	49,511,097	181,142,449	(9,695,490)	22,984,402	(12,750,129)	(18,407,632)	513,215	640,488
2022	50,137,180	183,433,052	(9,695,490)	23,275,047	(12,750,129)	(18,407,632)	519,705	648,587
2023	49,873,188	182,467,206	(11,056,463)	23,152,495	(12,750,128)	(18,407,632)	516,968	645,172
2024	50,068,008	183,179,974	(11,056,463)	23,242,935	(12,750,128)	(18,407,632)	518,988	647,692
2025	50,360,718	184,250,888	(11,056,463)	23,378,819	(12,750,129)	(18,407,632)	522,022	651,478
2026	49,430,042	180,845,898	(11,056,463)	22,946,774	(12,750,129)	(18,407,632)	512,375	639,439
2027	49,784,015	182,140,951	(11,056,463)	23,111,098	(12,750,129)	(18,407,632)	516,044	644,018
2028	49,976,522	182,845,264	(11,056,463)	23,200,465	(12,750,128)	(18,407,632)	518,039	646,508
2029	50,137,606	183,434,609	(11,056,463)	23,275,244	(12,750,128)	(18,407,632)	519,709	648,592
2030	50,326,988	184,127,485	(11,056,463)	23,363,161	(12,750,128)	(18,407,632)	521,672	651,042
2031	50,339,194	184,172,141	(11,056,463)	23,368,827	(12,750,129)	(18,407,632)	521,799	651,200
2032	49,468,770	180,987,588	(11,056,463)	22,964,753	(12,750,129)	(18,407,632)	512,776	639,940
2033	50,527,082	184,859,553	(11,056,463)	23,456,500	(12,750,129)	(18,407,632)	523,746	653,631
2034	49,799,104	182,196,159	(11,056,463)	23,118,103	(12,750,128)	(18,407,632)	516,200	644,213
2035	49,499,702	181,100,757	(11,056,463)	22,979,112	(12,750,128)	(18,407,632)	513,097	640,340
<b>TOTAL</b>	<b>1,498,760,858</b>	<b>5,415,594,465</b>	<b>(297,504,362)</b>	<b>739,002,909</b>	<b>(347,229,131)</b>	<b>(956,477,057)</b>	<b>13,555,745</b>	<b>16,832,139</b>

<sup>a</sup> Starting with 2005, transmission costs that vary and depend on power usage are included, therefore recovered through the variable component.

**TABLE B-3 Power Costs and Credits, Transmission Costs and Annual Replacement Deposits for Each Aqueduct Pumping and Power Recovery Plant<sup>a</sup> (in dollars)**

Sheet 3 of 3

Calendar Year	CALIFORNIA AQUEDUCT (continued)						Grand Total
	Reach 4B (EBX)	Reach 29A	Reach 29G	Reach 29J	Reach 31A	Reach 33A	
	Cherry Valley Pump Station	Oso Pumping Plant	Warne Powerplant	Castaic Powerplant	Las Perillas and Badger Hill Pumping Plants	Devil's Den, Bluestone, and Polonio Pass Pumping Plants	
	[17]	[18]	[19]	[20]	[21]	[22]	[23]
1961	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	36,771
1963	0	0	0	0	0	0	55,654
1964	0	0	0	0	0	0	73,240
1965	0	0	0	0	0	0	137,665
1966	0	0	0	0	0	0	186,064
1967	0	0	0	0	0	0	231,968
1968	0	0	0	0	118,676	0	1,117,913
1969	0	0	0	0	78,350	0	773,646
1970	0	0	0	0	136,429	0	1,103,798
1971	0	0	0	0	166,296	0	1,476,135
1972	0	79,315	0	(211,144)	212,938	0	3,073,359
1973	0	122,787	0	(1,057,564)	114,897	0	2,934,059
1974	0	157,511	0	(1,547,884)	111,442	0	3,683,880
1975	0	314,636	0	(2,455,461)	88,451	0	5,817,780
1976	0	326,967	0	(2,827,557)	139,279	0	8,211,705
1977	0	75,335	0	(3,734,462)	63,079	0	886,421
1978	0	89,383	0	(1,542,479)	176,153	0	7,272,153
1979	0	102,584	0	(2,776,030)	188,881	0	9,599,576
1980	0	236,768	0	(3,415,486)	168,458	0	10,419,251
1981	0	444,280	0	(2,834,322)	169,177	0	17,563,899
1982	0	539,245	(783,626)	(3,463,971)	168,390	0	13,477,272
1983	0	214,069	(1,488,439)	(6,649,718)	17,920	0	(7,452,864)
1984	0	484,239	(4,088,209)	(4,710,802)	112,679	0	(4,159,491)
1985	0	874,069	(5,930,176)	(15,698,638)	146,843	0	(9,861,182)
1986	0	1,269,590	(5,579,301)	(11,072,448)	297,886	0	11,622,736
1987	0	1,355,533	(6,445,265)	(11,726,458)	245,082	0	6,701,444
1988	0	1,515,349	(7,457,050)	(13,026,992)	214,519	0	6,239,207
1989	0	2,156,915	(8,822,367)	(15,535,849)	282,180	0	24,585,082
1990	0	2,913,030	(11,225,401)	(20,510,539)	416,832	0	48,154,174
1991	0	576,721	(3,882,595)	(6,579,194)	3,610	0	2,462,222
1992	0	829,862	(6,369,339)	(10,976,538)	101,665	0	(5,509,968)
1993	0	70,836	(4,665,393)	(9,531,404)	(111,306)	0	(24,907,973)
1994	0	1,503,796	(7,249,239)	(13,126,331)	206,086	(1,127)	13,499,083
1995	0	247,869	(1,934,202)	(4,049,615)	243,434	0	(142,957)
1996	0	895,929	(4,248,531)	(8,457,232)	296,170	0	15,870,542
1997	0	902,690	(4,824,488)	(8,776,260)	298,483	208,816	14,336,879
1998	0	(67,399)	(1,811,154)	(4,644,120)	(55,491)	(92,902)	(24,405,948)
1999	0	731,865	(5,831,573)	(9,811,777)	166,036	234,077	(3,417,317)
2000	0	1,317,745	(10,161,472)	(17,729,381)	230,343	381,037	(5,579,322)
2001	0	6,502,346	(7,918,467)	(13,370,061)	1,076,567	2,170,015	219,914,887
2002	0	4,246,409	(11,349,183)	(19,513,997)	547,531	1,344,783	94,808,314
2003	0	4,642,103	(10,436,535)	(17,134,431)	637,936	1,538,955	134,765,827
2004	7,290	5,682,375	(12,281,228)	(21,354,179)	675,724	1,804,179	149,713,081
2005	2,544	3,705,184	(7,106,531)	(13,339,416)	858,232	1,749,845	162,298,726
2006	18,268	2,749,517	(7,208,025)	(12,042,760)	864,560	1,537,230	129,478,951
2007	11,163	7,582,778	(11,444,524)	(21,845,299)	1,341,242	2,345,146	217,541,819
2008	7,432	4,769,303	(7,762,363)	(14,997,326)	1,166,751	1,732,340	131,822,259
2009	7,529	4,624,245	(6,997,502)	(15,725,766)	710,827	1,018,536	102,310,234
2010	19,507	3,835,825	(6,643,531)	(11,641,405)	939,644	1,507,260	155,953,509
2011	33,172	3,575,446	(5,996,974)	(10,892,193)	1,151,811	2,176,571	210,832,007
2012	49,815	5,698,695	(8,863,057)	(15,797,149)	1,075,414	2,072,310	187,437,409
2013	69,151	6,825,113	(9,189,037)	(15,851,695)	1,457,638	2,088,482	180,353,599
2014	51,910	4,813,249	(4,376,621)	(7,912,327)	1,670,311	2,535,765	129,802,055
2015	15,029	7,309,133	(6,599,051)	(11,183,098)	1,682,907	1,993,346	164,260,516
2016	83,645	6,112,414	(6,516,031)	(10,450,501)	1,120,409	2,867,075	271,995,458
2017	96,640	9,954,440	(10,351,627)	(17,281,090)	1,128,424	3,682,158	304,171,367
2018	96,927	8,737,353	(9,038,124)	(14,991,580)	1,151,349	3,762,171	298,455,313
2019	100,892	9,717,418	(9,454,247)	(15,262,028)	822,547	5,415,626	318,760,151
2020	101,794	9,928,701	(9,466,665)	(15,262,028)	841,590	5,543,717	313,719,693
2021	100,198	9,772,976	(9,465,833)	(15,262,028)	828,390	5,456,768	315,465,495
2022	101,465	9,896,558	(9,465,188)	(15,262,028)	838,865	5,525,770	316,388,912
2023	100,931	9,844,449	(9,442,478)	(15,262,028)	834,448	5,496,675	313,039,435
2024	101,325	9,882,904	(9,455,444)	(15,262,028)	837,708	5,518,147	314,163,493
2025	101,917	9,940,682	(9,454,612)	(15,262,028)	842,605	5,550,407	309,815,006
2026	100,034	9,756,976	(9,465,833)	(15,262,028)	827,034	5,447,834	316,781,270
2027	100,750	9,826,847	(9,465,833)	(15,262,028)	832,956	5,486,847	312,336,709
2028	101,140	9,864,846	(9,443,310)	(15,262,028)	836,177	5,508,064	313,825,845
2029	101,466	9,896,642	(9,444,196)	(15,262,028)	838,872	5,525,817	314,704,490
2030	101,849	9,934,024	(9,454,612)	(15,262,028)	842,041	5,546,690	310,437,679
2031	101,874	9,936,434	(9,454,612)	(15,262,028)	842,245	5,548,035	313,643,312
2032	100,112	9,764,621	(9,466,665)	(15,262,028)	827,682	5,452,103	319,104,509
2033	102,254	9,973,521	(9,465,188)	(15,262,028)	845,389	5,568,742	306,086,088
2034	100,781	9,829,825	(9,442,478)	(15,262,028)	833,209	5,488,510	315,915,989
2035	100,175	9,770,727	(9,444,196)	(15,262,028)	828,199	5,455,512	318,442,129
<b>TOTAL</b>	<b>2,288,978</b>	<b>289,185,598</b>	<b>(413,627,621)</b>	<b>(743,258,405)</b>	<b>38,671,103</b>	<b>132,191,333</b>	<b>8,734,712,092</b>

<sup>a</sup> Starting with 2005, transmission costs that vary and depend on power usage are included, therefore recovered through the variable component.

## Tables B-4 through B-31

Note: Where applicable, the projected data values shown in this appendix are shaded and the bill year data are in **bold** type.



TABLE B-4 Maximum Contractual Table A Amounts (acre-feet)

Calendar Year	NORTH BAY AREA			SOUTH BAY AREA <sup>a</sup>				CENTRAL COASTAL AREA		
	Napa <sup>b</sup>	Solano	Total	Alameda-Zone 7	Alameda County	Santa Clara	Total	San Luis Obispo	Santa Barbara	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	507	5,248	5,783	11,538	0	0	0
1968	0	0	0	6,900	15,000	88,000	109,900	0	0	0
1969	0	0	0	8,200	15,500	75,000	98,700	0	0	0
1970	0	0	0	10,000	16,200	88,000	114,200	0	0	0
1971	0	0	0	11,200	17,000	88,000	116,200	0	0	0
1972	0	0	0	12,400	17,900	88,000	118,300	0	0	0
1973	0	0	0	13,600	18,800	88,000	120,400	0	0	0
1974	0	0	0	14,800	19,600	88,000	122,400	0	0	0
1975	0	0	0	16,000	20,500	88,000	124,500	0	0	0
1976	0	0	0	17,200	21,300	88,000	126,500	0	0	0
1977	0	0	0	18,400	22,200	88,000	128,600	0	0	0
1978	0	0	0	19,600	23,100	88,000	130,700	0	0	0
1979	0	0	0	20,800	23,900	88,000	132,700	0	0	0
1980	0	500	500	22,000	24,800	88,000	134,800	1,000	946	1,946
1981	0	650	650	23,000	26,000	88,000	137,000	1,000	1,813	2,813
1982	0	800	800	24,000	27,200	88,000	139,200	2,000	3,626	5,626
1983	0	950	950	25,000	28,400	88,000	141,400	3,000	5,439	8,439
1984	0	1,100	1,100	26,000	29,600	88,000	143,600	4,500	8,198	12,698
1985	0	1,250	1,250	27,000	30,800	88,000	145,800	7,500	13,638	21,138
1986	0	1,400	1,400	28,000	32,100	88,000	148,100	10,000	18,210	28,210
1987	0	1,550	1,550	29,000	33,300	88,000	150,300	12,500	22,704	35,204
1988	5,745	9,726	15,471	30,000	34,500	88,000	152,500	15,500	28,222	43,722
1989	6,195	18,420	24,615	31,000	35,700	90,000	156,700	20,000	36,342	56,342
1990	6,940	21,250	28,190	32,000	36,900	92,000	160,900	25,000	45,486	70,486
1991	7,290	22,300	29,590	34,000	38,400	94,000	166,400	25,000	45,486	70,486
1992	7,840	24,170	32,010	36,000	39,900	96,000	171,900	25,000	45,486	70,486
1993	8,490	26,130	34,620	38,000	41,400	98,000	177,400	25,000	45,486	70,486
1994	9,135	28,080	37,215	40,000	42,000	100,000	182,000	25,000	45,486	70,486
1995	9,780	34,250	44,030	42,000	42,000	100,000	184,000	25,000	45,486	70,486
1996	10,425	37,800	48,225	44,000	42,000	100,000	186,000	25,000	45,486	70,486
1997	11,065	38,250	49,315	46,000	42,000	100,000	188,000	6,215	38,986	45,201
1998	11,710	38,710	50,420	46,000	42,000	100,000	188,000	6,215	38,986	45,201
1999	15,850	39,170	55,020	46,000	42,000	100,000	188,000	25,000	45,486	70,486
2000	16,325	39,620	55,945	68,000	42,000	100,000	210,000	25,000	45,486	70,486
2001	20,725	45,836	66,561	78,000	42,000	100,000	220,000	25,000	45,486	70,486
2002	21,100	46,296	67,396	78,000	42,000	100,000	220,000	25,000	45,486	70,486
2003	21,475	46,756	68,231	78,400	42,000	100,000	220,400	25,000	45,486	70,486
2004	21,850	47,206	69,056	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2005	22,225	47,256	69,481	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2006	22,550	47,306	69,856	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2007	22,875	47,356	70,231	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2008	23,200	47,406	70,606	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2009	23,525	47,456	70,981	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2010	29,025	47,506	76,531	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2011	29,025	47,556	76,581	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2012	29,025	47,606	76,631	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2013	29,025	47,656	76,681	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2014	29,025	47,706	76,731	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2015	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2016	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
<b>2017</b>	<b>29,025</b>	<b>47,756</b>	<b>76,781</b>	<b>80,619</b>	<b>42,000</b>	<b>100,000</b>	<b>222,619</b>	<b>25,000</b>	<b>45,486</b>	<b>70,486</b>
2018	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2019	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2020	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2021	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2022	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2023	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2024	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2025	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2026	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2027	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2028	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2029	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2030	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2031	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2032	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2033	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2034	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
2035	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
<b>TOTAL</b>	<b>1,080,965</b>	<b>2,049,856</b>	<b>3,130,821</b>	<b>3,720,815</b>	<b>2,459,248</b>	<b>6,510,783</b>	<b>12,690,846</b>	<b>1,189,430</b>	<b>2,218,494</b>	<b>3,407,924</b>

<sup>a</sup> Table A amounts for the South Bay Area were supplied by non-project water for the period June 1962 through November 1967. Actual delivery quantities of project water are shown for 1967.<sup>b</sup> Napa's Table A quantities exclude amounts during the period 1968 through 1987 that were supplied by non-project water.

TABLE B-4 Maximum Contractual Table A Amounts (acre-feet)

Sheet 2 of 4

Calendar Year	SAN JOAQUIN VALLEY AREA								
	Dudley Ridge	Empire	Kern			Kings	Oak Flat	Tulare	Total
			Municipal and Industrial	Agricultural	Total				
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]
1962	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0
1968	14,300	1,000	0	46,600	46,600	900	2,300	12,250	77,350
1969	14,325	3,000	0	95,700	95,700	1,200	2,500	46,350	163,075
1970	15,700	3,000	28,700	116,400	145,100	1,300	2,600	34,300	202,000
1971	17,900	3,000	35,700	154,600	190,300	1,300	2,800	36,500	251,800
1972	20,000	3,000	39,200	231,500	270,700	1,400	5,366	112,600	413,066
1973	22,000	3,000	43,500	267,000	310,500	1,500	3,100	43,552	383,652
1974	33,390	3,000	48,000	299,000	347,000	1,500	3,471	72,289	460,650
1975	40,555	3,000	52,700	358,120	410,820	1,600	3,576	86,258	545,809
1976	30,921	3,000	56,100	386,050	442,150	1,600	4,039	61,707	543,417
1977	30,400	3,000	60,600	423,000	483,600	1,700	3,700	59,000	581,400
1978	32,500	0	64,100	470,200	534,300	1,900	3,900	63,300	635,900
1979	38,544	3,000	67,600	516,300	583,900	2,000	4,000	71,241	702,685
1980	41,000	3,000	71,100	563,400	634,500	2,200	5,700	71,700	758,100
1981	41,000	3,000	74,800	616,600	691,400	2,300	4,300	76,000	818,000
1982	41,000	3,000	79,600	665,700	745,300	2,500	4,500	80,200	876,500
1983	42,900	3,000	83,500	721,600	805,100	2,800	3,770	9,548	867,118
1984	45,100	3,000	103,600	757,000	860,600	3,100	4,800	62,611	979,211
1985	47,200	3,000	108,900	806,100	915,000	3,400	4,900	45,549	1,019,049
1986	49,300	3,000	113,400	820,246	933,646	3,700	5,100	97,200	1,091,946
1987	51,400	3,000	119,100	904,400	1,023,500	4,000	5,200	101,400	1,188,500
1988	53,500	3,000	123,900	950,700	1,074,600	4,000	5,400	105,600	1,246,100
1989	55,600	3,000	128,200	984,100	1,112,300	4,000	5,600	109,900	1,290,400
1990	28,850	3,000	134,600	1,018,800	1,153,400	4,000	5,700	118,500	1,313,450
1991	53,411	3,000	134,600	1,018,800	1,153,400	4,000	5,700	118,500	1,338,011
1992	57,700	3,000	134,600	1,018,800	1,153,400	4,000	5,700	118,500	1,342,300
1993	57,700	3,000	134,600	1,018,800	1,153,400	4,000	5,700	118,500	1,342,300
1994	57,700	3,000	134,600	1,018,800	1,153,400	4,000	5,700	118,500	1,342,300
1995	57,700	3,000	134,600	1,018,800	1,153,400	4,000	5,700	118,500	1,342,300
1996	53,370	3,000	134,600	982,460	1,117,060	4,000	5,700	118,500	1,301,630
1997	53,370	3,000	134,600	978,130	1,112,730	4,000	5,700	118,500	1,297,300
1998	53,370	3,000	134,600	953,130	1,087,730	4,000	5,700	118,500	1,272,300
1999	53,370	3,000	134,600	953,130	1,087,730	4,000	5,700	118,500	1,272,300
2000	53,370	3,000	134,600	886,130	1,020,730	4,000	5,700	118,500	1,205,300
2001	53,370	3,000	134,600	866,349	1,000,949	4,000	5,700	118,500	1,185,519
2002	57,343	3,000	134,600	866,349	1,000,949	4,000	5,700	111,527	1,182,519
2003	57,343	3,000	134,600	866,349	1,000,949	4,000	5,700	111,127	1,182,119
2004	57,343	3,000	134,600	864,130	998,730	9,000	5,700	96,227	1,170,000
2005	57,343	3,000	134,600	864,130	998,730	9,000	5,700	96,227	1,170,000
2006	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2007	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2008	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2009	57,343	3,000	134,600	864,130	998,730	9,305	5,700	95,922	1,170,000
2010	50,343	3,000	134,600	848,130	982,730	9,305	5,700	88,922	1,140,000
2011	50,343	3,000	134,600	848,130	982,730	9,305	5,700	88,922	1,140,000
2012	50,343	3,000	134,600	848,130	982,730	9,305	5,700	88,922	1,140,000
2013	50,343	3,000	134,600	848,130	982,730	9,305	5,700	88,922	1,140,000
2014	48,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,136,556
2015	45,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,133,556
2016	45,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,133,556
<b>2017</b>	<b>45,350</b>	<b>3,000</b>	<b>134,600</b>	<b>848,130</b>	<b>982,730</b>	<b>9,305</b>	<b>5,700</b>	<b>87,471</b>	<b>1,133,556</b>
2018	45,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,133,556
2019	45,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,133,556
2020	41,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,129,556
2021	41,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,129,556
2022	41,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,129,556
2023	41,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,129,556
2024	41,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,129,556
2025	41,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,129,556
2026	41,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,129,556
2027	41,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,129,556
2028	41,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,129,556
2029	41,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,129,556
2030	41,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,129,556
2031	41,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,129,556
2032	41,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,129,556
2033	41,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,129,556
2034	41,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,129,556
2035	41,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,129,556
<b>TOTAL</b>	<b>3,008,632</b>	<b>199,000</b>	<b>7,693,900</b>	<b>51,855,303</b>	<b>59,549,203</b>	<b>403,050</b>	<b>352,822</b>	<b>5,959,901</b>	<b>69,472,608</b>

TABLE B-4 Maximum Contractual Table A Amounts (acre-feet)

Calendar Year	SOUTHERN CALIFORNIA AREA									
	AVEK	Castaic Lake	Coachella	Crestline	Desert	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel
1962	[20] 0	[21] 0	[22] 0	[23] 0	[24] 0	[25] 0	[26] 0	[27] 0	[28] 0	[29] 0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0
1968	0	3,700	0	0	0	0	0	0	0	0
1969	0	5,000	0	0	0	0	0	0	0	0
1970	0	5,700	0	0	0	0	0	0	0	0
1971	0	6,700	0	0	0	0	0	0	0	0
1972	20,000	8,936	5,200	526	8,000	170	8,400	1,620	1,677	122
1973	25,000	12,400	5,800	870	9,000	290	10,700	2,940	48,000	11,500
1974	30,000	15,400	6,400	1,160	10,000	400	13,100	4,260	50,000	12,300
1975	35,000	18,200	7,000	1,450	11,000	520	15,400	5,580	52,500	13,100
1976	44,000	21,200	7,600	1,740	12,000	640	17,800	6,900	55,000	14,000
1977	50,000	24,100	8,421	2,030	13,000	730	20,200	8,220	57,500	14,800
1978	57,000	24,762	9,242	2,320	14,000	920	0	9,340	60,000	15,700
1979	63,000	28,000	10,063	2,610	15,000	1,040	24,900	10,260	62,500	16,600
1980	69,200	30,400	10,884	2,900	17,000	1,150	27,200	11,180	65,500	17,400
1981	75,000	32,800	12,105	3,190	19,000	1,270	23,100	11,700	68,500	18,300
1982	81,300	34,800	13,326	3,480	21,000	1,380	22,843	12,320	71,500	19,100
1983	87,700	37,300	14,547	3,770	23,000	1,500	34,300	12,940	74,500	19,900
1984	35,000	39,600	15,768	4,060	25,000	1,610	36,700	13,560	78,000	20,700
1985	40,000	41,800	16,989	4,350	27,000	1,730	39,000	14,180	81,500	21,800
1986	42,000	43,600	18,210	4,640	29,000	1,840	41,400	14,800	85,000	23,200
1987	44,000	45,600	19,431	4,930	31,500	1,960	43,700	15,420	89,000	24,600
1988	46,000	48,000	20,652	5,220	34,000	2,070	46,000	16,040	93,000	26,000
1989	125,700	50,100	21,873	5,510	36,500	2,190	48,500	16,660	97,000	27,400
1990	132,100	52,000	23,100	5,800	38,100	2,300	50,800	17,300	101,500	28,800
1991	138,400	54,200	23,100	5,800	38,100	2,300	50,800	17,300	102,600	28,800
1992	138,400	54,200	23,100	5,800	38,100	2,300	50,800	17,300	102,600	28,800
1993	138,400	54,200	23,100	5,800	38,100	2,300	50,800	17,300	102,600	28,800
1994	138,400	54,200	23,100	5,800	38,100	2,300	50,800	17,300	102,600	28,800
1995	138,400	54,200	23,100	5,800	38,100	2,300	50,800	17,300	102,600	28,800
1996	138,400	54,200	23,100	5,800	38,100	2,300	50,800	17,300	102,600	28,800
1997	138,400	54,200	23,100	5,800	38,100	2,300	50,800	17,300	102,600	28,800
1998	138,400	54,200	23,100	5,800	38,100	2,300	75,800	17,300	102,600	28,800
1999	138,400	54,200	23,100	5,800	38,100	2,300	75,800	17,300	102,600	28,800
2000	138,400	95,200	23,100	5,800	38,100	2,300	75,800	21,300	102,600	28,800
2001	138,400	95,200	23,100	5,800	38,100	2,300	75,800	21,300	102,600	28,800
2002	141,400	95,200	23,100	5,800	38,100	2,300	75,800	21,300	102,600	28,800
2003	141,400	95,200	23,100	5,800	38,100	2,300	75,800	21,300	102,600	28,800
2004	141,400	95,200	33,000	5,800	38,100	2,300	75,800	21,300	102,600	28,800
2005	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2006	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2007	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2008	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2009	141,400	95,200	121,100	5,800	50,000	2,300	75,800	21,300	102,600	28,800
2010	141,400	95,200	138,350	5,800	55,750	2,300	82,800	21,300	102,600	28,800
2011	141,400	95,200	138,350	5,800	55,750	2,300	82,800	21,300	102,600	28,800
2012	141,400	95,200	138,350	5,800	55,750	2,300	82,800	21,300	102,600	28,800
2013	141,400	95,200	138,350	5,800	55,750	2,300	82,800	21,300	102,600	28,800
2014	144,844	95,200	138,350	5,800	55,750	2,300	82,800	21,300	102,600	28,800
2015	144,844	95,200	138,350	5,800	55,750	2,300	85,800	21,300	102,600	28,800
2016	144,844	95,200	138,350	5,800	55,750	2,300	85,800	21,300	102,600	28,800
2017	144,844	95,200	138,350	5,800	55,750	2,300	85,800	21,300	102,600	28,800
2018	144,844	95,200	138,350	5,800	55,750	2,300	85,800	21,300	102,600	28,800
2019	144,844	95,200	138,350	5,800	55,750	2,300	85,800	21,300	102,600	28,800
2020	144,844	95,200	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800
2021	144,844	95,200	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800
2022	144,844	95,200	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800
2023	144,844	95,200	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800
2024	144,844	95,200	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800
2025	144,844	95,200	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800
2026	144,844	95,200	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800
2027	144,844	95,200	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800
2028	144,844	95,200	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800
2029	144,844	95,200	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800
2030	144,844	95,200	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800
2031	144,844	95,200	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800
2032	144,844	95,200	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800
2033	144,844	95,200	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800
2034	144,844	95,200	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800
2035	144,844	95,200	138,350	5,800	55,750	2,300	89,800	21,300	102,600	28,800
<b>TOTAL</b>	<b>7,507,768</b>	<b>4,545,098</b>	<b>4,782,511</b>	<b>321,556</b>	<b>2,626,000</b>	<b>127,210</b>	<b>4,069,043</b>	<b>1,127,720</b>	<b>5,909,177</b>	<b>1,641,322</b>

TABLE B-4 Maximum Contractual Table A Amounts (acre-feet)

Sheet 4 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA				South Bay Area Future Contractor	Grand Total
	San Geronio	Metropolitan	Ventura	Total	Yuba City	Butte	Plumas	Total		
	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	11,538
1968	0	0	0	3,700	0	300	250	550	0	191,500
1969	0	0	0	5,000	0	350	270	620	0	267,395
1970	0	0	0	5,700	0	400	300	700	0	322,600
1971	0	0	0	6,700	0	450	440	890	0	375,590
1972	0	154,772	0	209,423	0	500	470	970	0	741,759
1973	0	354,600	0	481,100	0	600	500	1,100	0	986,252
1974	0	454,900	0	597,920	0	700	530	1,230	0	1,182,200
1975	0	555,200	0	714,950	0	1,050	560	1,610	0	1,386,869
1976	0	655,600	0	836,480	0	1,400	590	1,990	0	1,508,387
1977	0	755,900	0	954,901	0	1,800	620	2,420	0	1,667,321
1978	0	856,300	0	1,049,584	0	1,200	650	1,850	0	1,818,034
1979	0	956,600	0	1,190,573	0	1,450	680	2,130	0	2,028,088
1980	6,800	1,057,000	1,000	1,317,614	0	1,100	710	1,810	0	2,214,770
1981	7,800	1,157,300	2,000	1,432,065	0	1,200	740	1,940	0	2,392,468
1982	8,800	1,257,600	3,000	1,550,449	0	1,200	770	1,970	0	2,574,545
1983	9,800	1,358,000	4,000	1,681,257	0	1,200	800	2,000	0	2,701,164
1984	10,800	1,458,300	5,000	1,744,098	1,600	1,200	830	3,630	0	2,884,337
1985	11,800	1,558,700	6,000	1,864,849	1,700	1,200	860	3,760	0	3,055,846
1986	12,900	1,659,300	8,000	1,983,890	2,100	1,200	890	4,190	0	3,257,736
1987	14,000	1,759,800	10,000	2,103,941	2,500	1,200	920	4,620	0	3,484,115
1988	15,100	1,860,400	13,000	2,225,482	2,900	1,200	960	5,060	0	3,688,335
1989	16,200	1,961,000	16,000	2,424,633	3,300	1,200	1,000	5,500	0	3,958,190
1990	17,300	2,011,500	20,000	2,500,600	3,800	1,200	1,040	6,040	0	4,079,666
1991	17,300	2,011,500	20,000	2,510,200	9,600	1,200	1,080	11,880	0	4,126,567
1992	17,300	2,011,500	20,000	2,510,200	9,600	1,200	1,120	11,920	0	4,138,816
1993	17,300	2,011,500	20,000	2,510,200	9,600	1,200	1,160	11,960	0	4,146,966
1994	17,300	2,011,500	20,000	2,510,200	9,600	1,200	1,200	12,000	0	4,154,201
1995	17,300	2,011,500	20,000	2,510,200	9,600	1,200	1,250	12,050	0	4,163,066
1996	0	2,011,500	20,000	2,492,900	9,600	1,200	1,300	12,100	0	4,111,341
1997	0	2,011,500	20,000	2,492,900	9,600	1,200	1,350	12,150	0	4,084,866
1998	0	2,011,500	20,000	2,517,900	9,600	1,200	1,400	12,200	0	4,086,021
1999	2,000	2,011,500	20,000	2,519,900	9,600	2,890	1,450	13,940	0	4,119,646
2000	3,000	2,011,500	20,000	2,565,900	9,600	2,890	1,510	14,000	0	4,121,631
2001	4,000	2,011,500	20,000	2,566,900	9,600	3,500	1,570	14,670	0	4,124,136
2002	4,000	2,011,500	20,000	2,569,900	9,600	3,500	1,630	14,730	0	4,125,031
2003	5,000	2,011,500	20,000	2,570,900	9,600	3,500	1,690	14,790	0	4,126,926
2004	6,000	2,011,500	20,000	2,581,800	9,600	3,500	0	13,100	0	4,127,061
2005	6,500	1,911,500	20,000	2,582,300	9,600	1,200	0	10,800	0	4,125,686
2006	7,000	1,911,500	20,000	2,582,800	9,600	1,200	324	11,124	0	4,126,885
2007	8,650	1,911,500	20,000	2,584,450	9,600	1,200	720	11,520	0	4,129,306
2008	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,020	39,120	0	4,165,931
2009	17,300	1,911,500	20,000	2,593,100	9,600	27,500	2,090	39,190	0	4,166,376
2010	17,300	1,911,500	20,000	2,623,100	9,600	1,731	2,160	13,491	0	4,146,227
2011	17,300	1,911,500	20,000	2,623,100	9,600	2,548	2,240	14,388	0	4,147,174
2012	17,300	1,911,500	20,000	2,623,100	9,600	27,500	2,320	39,420	0	4,172,256
2013	17,300	1,911,500	20,000	2,623,100	9,600	27,500	2,410	39,510	0	4,172,396
2014	17,300	1,911,500	20,000	2,626,544	9,600	27,500	2,500	39,600	0	4,172,536
2015	17,300	1,911,500	20,000	2,629,544	9,600	27,500	2,600	39,700	0	4,172,686
2016	17,300	1,911,500	20,000	2,629,544	9,600	27,500	2,700	39,800	0	4,172,786
2017	17,300	1,911,500	20,000	2,629,544	9,600	27,500	2,700	39,800	0	4,172,786
2018	17,300	1,911,500	20,000	2,629,544	9,600	27,500	2,700	39,800	0	4,172,786
2019	17,300	1,911,500	20,000	2,629,544	9,600	27,500	2,700	39,800	0	4,172,786
2020	17,300	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2021	17,300	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2022	17,300	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2023	17,300	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2024	17,300	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2025	17,300	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2026	17,300	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2027	17,300	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2028	17,300	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2029	17,300	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2030	17,300	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2031	17,300	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2032	17,300	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2033	17,300	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2034	17,300	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
2035	17,300	1,911,500	20,000	2,633,544	9,600	27,500	2,700	39,800	0	4,172,786
<b>TOTAL</b>	<b>748,350</b>	<b>109,260,272</b>	<b>988,000</b>	<b>143,654,027</b>	<b>449,900</b>	<b>775,559</b>	<b>106,474</b>	<b>1,331,933</b>	<b>0</b>	<b>233,688,159</b>

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 1 of 17

Calendar Year	UPPER FEATHER AREA			NORTH BAY AQUEDUCT							
	Butte	Grizzly Valley Pipeline Plumas	Yuba City	Reach 1	Reach 3A		Reach 3A-T		Reach 3B		Total
				Solano	Napa	Solano	Napa	Solano	Napa <sup>a</sup>	Solano	
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
1962	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	1,214	0	1,214
1969	0	0	0	0	0	0	0	0	2,687	0	2,687
1970	0	70	0	0	0	0	0	0	3,618	0	3,618
1971	192	64	0	0	0	0	0	0	2,521	0	2,521
1972	186	505	0	0	0	0	0	0	3,647	0	3,647
1973	53	679	0	0	0	0	0	0	3,792	0	3,792
1974	127	648	0	0	0	0	0	0	4,870	0	4,870
1975	253	405	0	0	0	0	0	0	6,840	0	6,840
1976	527	382	0	0	0	0	0	0	7,122	0	7,122
1977	706	303	0	0	0	0	0	0	8,226	0	8,226
1978	579	278	0	0	0	0	0	0	6,034	0	6,034
1979	302	329	0	0	0	0	0	0	6,561	0	6,561
1980	267	295	0	0	0	0	0	0	6,707	0	6,707
1981	221	355	0	0	0	0	0	0	9,001	0	9,001
1982	334	305	0	0	0	0	0	0	1,213	0	1,213
1983	325	262	0	0	0	0	0	0	2,287	0	2,287
1984	177	272	108	0	0	0	0	0	2,923	0	2,923
1985	308	254	62	0	0	0	0	0	4,039	0	4,039
1986	313	317	328	1,400	0	0	0	0	3,519	0	4,919
1987	459	452	88	1,550	0	0	0	0	7,693	0	9,243
1988	385	523	303	1	0	9,725	0	0	5,392	0	15,118
1989	300	486	403	10	0	17,246	0	0	6,195	0	23,451
1990	380	548	494	3,275	0	15,856	0	0	6,940	0	26,071
1991	328	420	265	3,117	0	3,855	0	0	1,380	0	8,352
1992	117	485	642	5,553	0	9,220	0	0	4,001	0	18,774
1993	256	444	746	14,709	0	14,471	0	0	5,286	0	34,466
1994	329	492	1,035	10,343	0	14,913	0	0	6,792	0	32,048
1995	203	308	910	5,452	0	15,893	0	0	5,182	0	26,527
1996	257	360	820	12,930	0	17,069	0	0	4,893	0	34,892
1997	185	231	1,005	16,029	0	17,501	0	0	4,341	0	37,871
1998	527	0	1,054	11,562	0	18,204	0	0	5,359	0	35,125
1999	286	0	1,096	15,191	0	19,562	0	0	5,304	0	40,057
2000	586	0	901	15,490	0	11,290	0	10,235	4,958	0	41,973
2001	513	0	1,065	14,849	0	11,377	0	8,360	9,345	0	43,931
2002	419	0	1,181	18,841	0	11,130	0	8,589	6,875	0	45,435
2003	551	0	1,324	17,260	0	9,682	9	7,009	7,637	0	41,597
2004	1,440	0	1,434	20,951	0	10,691	135	10,860	7,999	500	51,136
2005	527	0	1,894	18,290	0	10,585	160	8,444	7,509	500	45,488
2006	468	0	5,342	16,573	0	10,865	208	7,578	7,581	500	43,305
2007	956	0	2,327	19,187	0	12,301	180	15,312	10,777	500	58,257
2008	451	243	1,923	21,436	15	11,410	37	7,974	13,240	500	54,612
2009	581	200	2,114	15,004	0	8,651	27	6,795	10,877	500	41,854
2010	807	243	2,331	17,598	0	8,231	70	4,487	12,347	500	43,233
2011	1,092	98	2,297	15,202	0	7,761	39	5,032	11,275	0	39,309
2012	1,374	79	2,695	16,508	0	8,298	47	4,541	9,860	0	39,254
2013	908	366	4,850	16,525	0	10,082	60	9,262	12,478	0	48,407
2014	1,617	251	4,237	7,354	0	6,856	41	5,469	14,123	0	33,843
2015	2,763	730	3,004	8,581	0	6,538	66	8,717	11,133	0	35,035
2016	3,141	625	3,649	13,708	1	9,317	16	8,701	13,231	500	45,474
2017	270	730	5,760	20,762	0	6,708	0	1,185	17,415	0	46,070
2018	270	730	5,760	20,761	0	6,708	0	1,185	17,415	0	46,069
2019	270	730	5,760	20,761	0	6,708	0	1,185	17,415	0	46,069
2020	270	1,619	5,760	20,761	0	6,708	0	1,185	17,415	0	46,069
2021	270	1,619	5,760	20,761	0	6,708	0	1,185	17,415	0	46,069
2022	270	1,619	5,760	20,761	0	6,708	0	1,185	17,415	0	46,069
2023	270	1,619	5,760	20,761	0	6,708	0	1,185	17,415	0	46,069
2024	270	1,619	5,760	20,761	0	6,708	0	1,185	17,415	0	46,069
2025	270	1,619	5,760	20,761	0	6,708	0	1,185	17,415	0	46,069
2026	270	1,619	5,760	20,761	0	6,708	0	1,185	17,415	0	46,069
2027	270	1,619	5,760	20,761	0	6,708	0	1,185	17,415	0	46,069
2028	270	1,619	5,760	20,761	0	6,708	0	1,185	17,415	0	46,069
2029	270	1,619	5,760	20,761	0	6,708	0	1,185	17,415	0	46,069
2030	270	1,619	5,760	20,761	0	6,708	0	1,185	17,415	0	46,069
2031	270	1,619	5,760	20,761	0	6,708	0	1,185	17,415	0	46,069
2032	270	1,619	5,760	20,761	0	6,708	0	1,185	17,415	0	46,069
2033	270	1,619	5,760	20,761	0	6,708	0	1,185	17,415	0	46,069
2034	270	1,619	5,760	20,761	0	6,708	0	1,185	17,415	0	46,069
2035	270	1,619	5,760	20,761	0	6,708	0	1,185	17,415	0	46,069
TOTAL	32,206	41,401	161,367	768,940	16	466,032	1,095	159,880	657,709	4,000	2,057,672

<sup>a</sup> For the period 1968 through 1987, deliveries were non-project water pumped through an interim facility.



TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 2 of 17

Calendar Year	SOUTH BAY AQUEDUCT <sup>b</sup>										
	Reach 1		Reach 2	Reach 4	Reach 5		Reach 6	Reach 7	Reach 8	Reach 9	Total
	Alameda-Zone 7	Alameda County	Alameda-Zone 7	Alameda-Zone 7	Alameda-Zone 7	Alameda County	Alameda-Zone 7	Alameda County	Alameda County	Santa Clara	
	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]
1962	141	8,412	353	0	0	0	0	0	0	0	8,906
1963	814	10,914	917	0	0	0	0	0	0	0	12,645
1964	248	19,238	1,425	0	0	0	0	0	0	0	20,911
1965	637	15,280	1,830	138	0	0	0	1,127	0	15,014	34,026
1966	2,475	0	2,537	499	0	0	0	14,864	0	34,538	54,913
1967	1,527	0	2,391	862	0	0	0	12,882	0	39,101	56,763
1968	1,608	0	3,799	721	5	0	0	24,817	0	70,105	101,055
1969	1,165	0	3,459	1,851	160	0	0	813	0	62,264	69,712
1970	1,345	0	4,558	3,182	164	0	0	0	0	80,311	89,560
1971	546	0	1,908	2,403	160	0	0	5,961	0	87,606	98,584
1972	1,066	0	4,605	2,041	2,777	1,489	0	26,182	0	100,266	138,426
1973	430	0	1,123	1,193	229	0	0	2,521	0	88,582	94,078
1974	177	0	0	975	162	0	0	0	4	88,000	89,318
1975	137	0	1,783	1,864	120	0	714	393	593	88,000	93,604
1976	265	0	7,204	3,384	817	0	5,461	13,774	7,526	88,000	126,431
1977	210	0	4,491	2,213	524	0	5,206	11,284	7,556	76,220	107,704
1978	422	0	2,426	3,754	2,034	0	2,348	854	5,009	95,727	112,574
1979	197	0	4,283	5,567	3,937	0	5,341	3,430	7,444	91,991	122,190
1980	77	0	3,883	6,686	0	1,508	6,144	2,824	6,702	88,000	115,824
1981	1,250	0	4,648	5,273	1,157	5,752	7,262	7,595	8,570	88,000	129,507
1982	473	0	3,043	4,406	630	0	4,571	1,776	4,540	88,000	107,439
1983	179	0	2,712	1,714	50	0	111	0	3,157	86,733	94,656
1984	165	0	4,219	2,219	55	0	126	0	3,338	88,000	98,122
1985	213	0	5,199	2,060	63	0	7,537	11,203	7,813	88,000	122,088
1986	200	0	6,052	2,062	212	0	2,083	5,311	7,068	88,000	110,988
1987	218	0	7,538	2,372	285	0	12,993	15,488	9,902	88,000	136,796
1988	222	0	8,302	4,681	189	0	12,436	24,259	9,205	87,961	147,255
1989	222	0	8,051	6,562	418	0	10,974	17,340	8,702	90,000	142,269
1990	256	0	8,160	8,347	593	0	15,678	22,149	9,554	91,800	156,537
1991	162	0	3,676	3,269	359	0	1,945	9,155	3,493	28,200	50,259
1992	217	0	5,177	2,188	154	0	6,933	12,621	6,532	42,839	76,661
1993	190	0	5,843	8,430	5,964	1,650	13,208	1,792	6,829	62,065	105,971
1994	132	0	4,482	5,427	822	0	9,679	3,379	19,532	57,115	100,568
1995	278	0	6,236	7,195	955	0	15,427	21	17,772	28,756	76,640
1996	277	0	6,151	5,119	388	0	6,968	1,871	11,591	44,850	77,215
1997	138	0	6,647	6,501	1,582	1,323	12,654	1,876	10,864	60,601	102,186
1998	106	0	3,748	2,493	1,277	0	8,347	3,817	11,478	39,610	70,876
1999	148	0	5,048	8,227	1,444	0	13,133	5,326	16,226	52,945	102,497
2000	110	0	7,464	9,761	946	0	16,396	4,498	18,100	78,258	135,533
2001	105	0	7,822	4,879	3,010	0	13,593	0	18,004	47,922	95,335
2002	93	0	7,758	11,619	2,446	0	17,058	5,112	20,616	58,875	123,577
2003	108	0	7,916	11,348	2,887	0	16,684	5,037	12,753	75,981	132,714
2004	72	0	11,754	9,737	3,763	0	21,260	4,968	14,916	59,458	125,928
2005	1,430	0	11,520	10,100	1,826	0	16,597	4,139	10,160	52,364	108,136
2006	830	0	11,546	4,097	2,123	0	19,870	2,708	12,924	64,174	118,272
2007	179	0	10,066	2,563	3,107	0	23,205	8,255	15,107	71,690	134,172
2008	238	0	11,424	2,206	1,899	0	25,363	4,421	18,481	52,530	116,562
2009	211	0	7,054	5,437	1,987	0	16,398	2,551	16,945	66,364	116,947
2010	160	0	7,788	7,528	1,824	0	17,043	330	15,241	45,888	95,802
2011	1,541	0	6,282	6,887	2,173	0	20,098	7	15,203	60,761	112,952
2012	262	0	7,598	9,987	2,972	0	14,112	0	13,331	63,794	112,056
2013	237	0	11,253	9,998	3,171	0	20,197	31	23,609	78,623	147,119
2014	206	0	7,517	4,321	975	0	15,469	8,989	13,669	39,970	91,116
2015	182	0	6,136	3,640	4,594	0	15,532	6,389	14,838	65,773	117,084
2016	228	0	5,926	9,121	3,264	0	19,026	1,221	4,085	67,652	110,523
2017	0	0	9,340	8,520	1,660	0	28,851	0	11,112	60,000	119,483
2018	0	0	5,580	4,910	1,660	0	36,221	0	11,304	62,502	122,177
2019	0	0	5,800	4,910	1,660	0	36,001	0	11,784	60,000	120,155
2020	0	0	6,010	4,910	1,660	0	35,791	0	12,264	60,000	120,635
2021	0	0	6,010	4,910	1,660	0	35,791	0	12,264	60,000	120,635
2022	0	0	6,010	4,910	1,660	0	35,791	0	12,264	60,000	120,635
2023	0	0	6,010	4,910	1,660	0	35,791	0	12,264	60,000	120,635
2024	0	0	6,010	4,910	1,660	0	35,791	0	12,264	60,000	120,635
2025	0	0	6,010	4,910	1,660	0	35,791	0	12,264	60,000	120,635
2026	0	0	6,010	4,910	1,660	0	35,791	0	12,264	60,000	120,635
2027	0	0	6,010	4,910	1,660	0	35,791	0	12,264	60,000	120,635
2028	0	0	6,010	4,910	1,660	0	35,791	0	12,264	60,000	120,635
2029	0	0	6,010	4,910	1,660	0	35,791	0	12,264	60,000	120,635
2030	0	0	6,010	4,910	1,660	0	35,791	0	12,264	60,000	120,635
2031	0	0	6,010	4,910	1,660	0	35,791	0	12,264	60,000	120,635
2032	0	0	6,010	4,910	1,660	0	35,791	0	12,264	60,000	120,635
2033	0	0	6,010	4,910	1,660	0	35,791	0	12,264	60,000	120,635
2034	0	0	6,010	4,910	1,660	0	35,791	0	12,264	60,000	120,635
2035	0	0	6,010	4,910	1,660	0	35,791	0	12,264	60,000	120,635
<b>TOTAL</b>	<b>24,725</b>	<b>53,844</b>	<b>421,611</b>	<b>346,007</b>	<b>102,193</b>	<b>11,722</b>	<b>1,168,909</b>	<b>325,361</b>	<b>699,406</b>	<b>4,687,779</b>	<b>7,841,557</b>

<sup>b</sup> For the period June 1962 through November 1967, deliveries were supplied by non-project water.

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 3 of 17

Calendar Year	CALIFORNIA AQUEDUCT											
	NORTH SAN JOAQUIN DIVISION						SAN LUIS DIVISION					
	Reach 1	Reach 2A					Reach 3		Reach 3A			
	Kern (Agricultural)	Alameda- Zone 7	Kern (Agricultural)	Oak Flat <sup>c</sup>	Santa Clara	Tulare	Dudley Ridge	Metropolitan	Alameda- Zone 7	Alameda County	AVEK	Castaic Lake
	[23]	[24]	[25]	[26]	[27]	[28]	[29]	[30]	[31]	[32]	[33]	[34]
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	3,084	0	0	0	0	0	0	0	0
1969	0	0	0	3,016	0	0	0	0	0	0	0	0
1970	0	0	0	5,911	0	0	0	0	0	0	0	0
1971	0	0	0	7,212	0	0	0	0	0	0	0	0
1972	0	0	0	8,166	0	0	0	0	0	0	0	0
1973	0	0	0	3,214	0	0	0	0	0	0	0	0
1974	0	0	0	3,471	0	0	0	0	0	0	0	0
1975	0	0	0	3,576	0	0	0	0	0	0	0	0
1976	0	0	0	4,112	0	0	0	0	0	0	0	0
1977	0	0	0	1,472	0	0	0	0	0	0	0	0
1978	0	0	0	3,906	0	0	0	0	0	0	0	0
1979	0	0	0	6,149	0	0	0	0	0	0	0	0
1980	0	0	0	5,700	0	0	0	0	0	0	0	0
1981	0	0	0	4,300	0	0	0	0	0	0	0	0
1982	0	0	0	3,838	0	0	0	0	0	0	0	0
1983	0	0	0	3,822	0	0	0	0	0	0	0	0
1984	0	0	0	5,700	0	0	0	0	0	0	0	0
1985	0	0	0	5,433	0	0	0	0	0	0	0	0
1986	0	0	0	5,107	0	0	0	0	0	0	0	0
1987	0	0	0	5,625	0	0	0	0	0	0	0	0
1988	0	0	0	4,412	0	0	0	0	0	0	0	0
1989	0	0	0	6,091	0	300	602	0	0	0	0	0
1990	0	0	0	2,922	200	0	0	0	0	0	0	0
1991	0	0	0	141	0	0	0	0	0	0	0	0
1992	0	0	0	2,239	0	0	0	0	0	0	0	0
1993	0	0	0	2,858	0	0	0	0	0	0	0	0
1994	0	0	0	3,071	0	0	0	0	0	0	0	0
1995	0	0	0	5,169	0	0	0	0	0	0	0	0
1996	0	0	0	4,904	0	0	0	0	0	0	0	0
1997	0	0	0	5,238	0	0	0	11,100	0	0	0	0
1998	0	0	0	4,401	0	0	0	(11,100)	0	0	0	0
1999	0	0	0	4,871	0	0	0	0	0	0	0	0
2000	0	0	0	4,508	0	0	0	0	0	0	0	0
2001	0	0	638	3,592	0	0	0	0	0	0	0	0
2002	0	0	773	4,885	0	0	0	0	0	0	0	0
2003	0	7	917	4,266	0	0	0	0	0	0	0	0
2004	0	38	786	4,629	0	0	0	0	0	0	0	0
2005	0	299	1,046	4,194	0	0	0	0	0	0	0	0
2006	0	321	1,103	4,242	0	0	0	0	0	0	0	0
2007	0	320	1,031	3,567	0	0	0	0	0	0	0	0
2008	8,885	56	1,744	1,985	0	0	0	0	0	0	5,873	0
2009	0	0	1,169	1,993	0	0	0	0	0	0	0	3,300
2010	0	0	1,124	2,906	0	0	0	0	0	0	0	0
2011	0	0	1,112	2,715	0	0	0	0	0	0	0	0
2012	0	0	1,258	3,208	0	0	0	0	0	0	0	0
2013	0	0	1,156	2,820	0	0	0	0	0	0	0	0
2014	0	0	609	1,520	0	0	0	0	5,808	7,408	0	0
2015	0	0	658	1,077	0	0	0	0	2,360	6,032	0	0
2016	0	0	1,167	3,051	0	0	0	0	0	0	0	5,940
2017	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2018	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2019	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2020	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2021	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2022	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2023	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2024	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2025	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2026	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2027	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2028	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2029	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2030	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2031	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2032	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2033	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2034	0	0	1,300	3,420	0	0	0	0	0	0	0	0
2035	0	0	1,300	3,420	0	0	0	0	0	0	0	0
TOTAL	8,885	1,041	40,991	259,269	200	300	602	0	8,168	13,440	5,873	9,240

<sup>c</sup> Includes 425 af of 1988 advance allocation and 141 af of 1992 advance allocation.

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 4 of 17

Calendar Year	CALIFORNIA AQUEDUCT (continued)											
	SAN LUIS DIVISION (continued)											
	Reach 3A (continued)							Reach 4				
	Dudley Ridge	Kern		Metropolitan	Santa Barbara	Santa Clara	Tulare	Castaic Lake	Dudley Ridge	Kern		Tulare
		Municipal and Industrial	Agricultural							Municipal and Industrial	Agricultural	
	[35]	[36]	[37]	[38]	[39]	[40]	[41]	[42]	[43]	[44]	[45]	[46]
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	1,898	0	12,647	0
1990	0	0	0	0	0	0	0	0	0	0	0	1,500
1991	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	14,446	0	3,500	0
1996	0	0	0	0	0	0	0	0	0	1,125	4,162	0
1997	0	0	0	0	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	1,300
2000	0	3,320	68,960	0	0	0	0	0	0	1,517	878	0
2001	0	0	140,242	0	0	30,000	0	0	0	0	0	0
2002	0	6,000	62,024	0	0	0	0	0	0	0	0	0
2003	0	0	151,044	29,596	0	0	0	0	0	0	1,351	0
2004	0	0	44,877	0	0	0	0	0	0	0	0	0
2005	0	0	109,712	50,000	0	8,804	277	0	0	0	7,000	0
2006	0	0	19,575	0	0	0	0	0	0	0	0	0
2007	0	71,567	116,272	0	0	0	0	0	0	0	0	0
2008	0	0	94,562	0	0	0	0	0	0	0	10,721	0
2009	0	0	164,653	52,933	0	9,999	0	0	0	0	0	0
2010	0	0	35,896	120,274	0	9,993	0	0	0	0	0	0
2011	0	0	0	78,324	2,548	1,825	0	0	0	0	0	0
2012	6,068	0	23,401	0	0	0	0	0	0	0	0	0
2013	0	0	64,524	0	0	6,000	0	6,000	0	0	0	0
2014	16,789	0	104,689	15,000	0	27,476	0	0	0	0	0	0
2015	14,460	0	105,537	0	0	17,115	0	0	0	0	3,278	8,166
2016	1,350	0	13,769	31,386	0	6,000	0	0	0	0	1,047	0
2017	0	0	0	0	0	0	0	0	0	0	0	0
2018	0	0	0	0	0	0	0	0	0	0	0	0
2019	0	0	0	0	0	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	38,667	80,887	1,319,737	377,513	2,548	117,212	277	6,000	16,344	2,642	44,584	10,966

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 5 of 17

Calendar Year	CALIFORNIA AQUEDUCT (continued)											
	SAN LUIS DIVISION (continued)								SOUTH SAN JOAQUIN DIVISION			
	Reach 5								Reach 6			
	Castaic Lake	Dudley Ridge	Empire	Kern		Metropolitan	Oak Flat	Tulare	Empire	Kern		Kings
				Municipal and Industrial	Agricultural					Municipal and Industrial	Agricultural	
	[47]	[48]	[49]	[50]	[51]	[52]	[53]	[54]	[55]	[56]	[57]	[58]
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	1,550	0	0	0	0
1989	0	0	0	0	18,831	0	0	0	0	0	8,260	0
1990	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	10,823	0	0	0	0	0	0	0	0	0	0
1993	5,095	27,200	0	0	28,200	0	2,000	1,624	0	0	31,200	0
1994	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	21,776	0	0	0	0	0	3,932	0
1996	0	0	0	1,125	81,507	0	0	4,000	0	0	0	0
1997	0	0	0	9,080	154,940	0	0	3,500	0	0	0	0
1998	0	0	0	0	0	0	0	0	0	20,400	33,340	0
1999	0	0	0	0	0	21,500	0	8,000	0	0	33,776	0
2000	0	0	0	8,130	57,647	0	0	0	0	1,457	35,847	0
2001	0	0	0	0	0	0	0	2,457	0	0	0	0
2002	0	0	0	0	0	0	0	3,000	0	0	0	0
2003	0	0	0	0	0	0	0	3,900	0	0	0	0
2004	0	0	0	0	0	0	0	3,850	0	0	0	3,250
2005	0	0	0	0	0	0	0	1,000	0	0	0	6,954
2006	0	0	0	0	0	0	0	3,000	0	0	0	2,659
2007	0	0	0	0	0	0	0	3,600	0	0	0	3,119
2008	0	0	0	0	0	0	0	1,355	0	0	0	2,159
2009	0	0	870	0	0	0	0	1,490	0	0	0	1,779
2010	0	0	431	0	0	0	0	0	0	0	0	2,477
2011	0	0	0	0	0	0	0	0	400	0	0	2,964
2012	0	0	449	0	0	0	0	2,800	514	0	0	2,706
2013	0	0	692	0	8,393	0	0	5,350	280	0	0	2,666
2014	0	0	303	0	0	0	0	661	38	0	0	1,109
2015	0	0	142	0	1,349	0	0	7,576	120	0	0	391
2016	0	0	0	0	0	0	0	200	0	0	0	4,484
2017	0	0	0	0	0	0	0	0	0	0	0	3,120
2018	0	0	0	0	0	0	0	0	0	0	0	3,120
2019	0	0	0	0	0	0	0	0	0	0	0	3,120
2020	0	0	0	0	0	0	0	0	0	0	0	3,120
2021	0	0	0	0	0	0	0	0	0	0	0	3,120
2022	0	0	0	0	0	0	0	0	0	0	0	3,120
2023	0	0	0	0	0	0	0	0	0	0	0	3,120
2024	0	0	0	0	0	0	0	0	0	0	0	3,120
2025	0	0	0	0	0	0	0	0	0	0	0	3,120
2026	0	0	0	0	0	0	0	0	0	0	0	3,120
2027	0	0	0	0	0	0	0	0	0	0	0	3,120
2028	0	0	0	0	0	0	0	0	0	0	0	3,120
2029	0	0	0	0	0	0	0	0	0	0	0	3,120
2030	0	0	0	0	0	0	0	0	0	0	0	3,120
2031	0	0	0	0	0	0	0	0	0	0	0	3,120
2032	0	0	0	0	0	0	0	0	0	0	0	3,120
2033	0	0	0	0	0	0	0	0	0	0	0	3,120
2034	0	0	0	0	0	0	0	0	0	0	0	3,120
2035	0	0	0	0	0	0	0	0	0	0	0	3,120
TOTAL	5,095	38,023	2,887	18,335	372,643	21,500	2,000	58,913	1,352	21,857	146,355	95,997

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 6 of 17

Calendar Year	CALIFORNIA AQUEDUCT (continued)											
	SOUTH SAN JOAQUIN DIVISION (continued)											
	Reach 6 (continued)		Reach 7							Reach 8C		
	Metropolitan	Tulare	Castaic Lake	Dudley Ridge	Kern		Kings	Metropolitan	Tulare	Dudley Ridge	Empire	Kern
					Municipal and Industrial	Agricultural						Municipal and Industrial)
	[59]	[60]	[61]	[62]	[63]	[64]	[65]	[66]	[67]	[68]	[69]	[70]
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	1,978	0
1969	0	0	0	0	0	0	0	0	0	0	56	0
1970	0	0	0	0	0	0	0	0	0	0	3,942	0
1971	0	0	0	0	0	0	0	0	0	0	5,990	0
1972	0	0	0	0	0	0	0	0	0	0	5,795	0
1973	0	0	0	0	0	0	0	0	0	0	3,000	0
1974	0	0	0	0	0	0	0	0	0	0	3,000	0
1975	0	0	0	0	0	0	0	0	0	0	3,000	0
1976	0	0	0	0	0	0	0	0	0	0	3,000	0
1977	0	0	0	0	0	0	0	0	0	0	738	0
1978	0	0	0	0	0	0	0	0	0	0	454	0
1979	0	0	0	0	0	0	0	0	0	0	1,739	0
1980	0	0	0	0	0	0	0	0	0	0	894	0
1981	0	0	0	0	0	0	0	0	0	0	5,859	0
1982	0	0	0	0	0	0	0	0	0	0	361	0
1983	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	5,197	0
1986	0	0	0	0	0	0	0	0	0	0	1,170	0
1987	0	0	0	0	0	0	0	0	0	0	2,525	0
1988	0	0	0	0	0	0	0	0	0	0	3,475	0
1989	0	0	0	0	0	5,262	0	0	0	2,391	3,000	0
1990	0	0	0	0	0	0	0	0	0	0	1,279	0
1991	0	0	0	0	0	0	0	0	0	0	221	0
1992	0	0	0	0	0	0	0	0	0	280	1,354	0
1993	0	0	0	0	18,157	10,043	0	0	0	0	2,741	0
1994	0	0	2,100	0	0	0	0	0	0	0	1,666	0
1995	0	0	0	0	10,875	20,595	0	0	0	0	1,631	989
1996	0	0	0	0	3,424	69,704	0	0	0	95	1,868	0
1997	0	0	0	0	27,079	32,463	0	0	0	0	0	0
1998	0	3,000	0	200	3,998	62,081	0	0	0	90	542	0
1999	11,000	23,000	0	0	7,923	19,500	0	500	4,470	86	3,176	0
2000	0	3,000	1,200	0	0	45,137	0	20,000	20,500	166	1,799	0
2001	0	600	0	0	0	0	0	0	0	14	1,360	0
2002	0	0	0	0	0	0	0	0	12,067	0	1,405	0
2003	0	0	0	0	0	0	0	0	15,103	0	1,436	0
2004	0	0	0	0	0	0	0	0	0	0	3,562	0
2005	0	0	0	0	0	0	6,904	0	4,000	0	3,834	0
2006	0	0	0	0	0	0	2,500	0	6,000	0	3,282	0
2007	0	0	0	0	0	16,214	0	0	2,545	0	2,084	0
2008	0	0	0	400	0	1,998	1,330	0	1,500	0	947	0
2009	0	2,100	0	1,400	0	0	0	0	600	0	164	0
2010	0	0	0	0	0	0	0	0	3,850	0	2,828	0
2011	0	0	0	0	0	0	0	0	2,500	0	1,515	0
2012	0	500	0	0	0	0	2,000	0	0	0	1,279	0
2013	0	1,159	0	500	0	0	0	0	1,121	0	595	0
2014	0	275	0	0	0	0	0	0	0	0	175	0
2015	0	0	0	850	0	0	0	0	0	0	362	0
2016	0	213	0	0	0	0	0	0	0	0	1,822	0
2017	0	0	0	0	0	0	0	0	0	0	1,800	0
2018	0	0	0	0	0	0	0	0	0	0	1,800	0
2019	0	0	0	0	0	0	0	0	0	0	1,800	0
2020	0	0	0	0	0	0	0	0	0	0	1,800	0
2021	0	0	0	0	0	0	0	0	0	0	1,800	0
2022	0	0	0	0	0	0	0	0	0	0	1,800	0
2023	0	0	0	0	0	0	0	0	0	0	1,800	0
2024	0	0	0	0	0	0	0	0	0	0	1,800	0
2025	0	0	0	0	0	0	0	0	0	0	1,800	0
2026	0	0	0	0	0	0	0	0	0	0	1,800	0
2027	0	0	0	0	0	0	0	0	0	0	1,800	0
2028	0	0	0	0	0	0	0	0	0	0	1,800	0
2029	0	0	0	0	0	0	0	0	0	0	1,800	0
2030	0	0	0	0	0	0	0	0	0	0	1,800	0
2031	0	0	0	0	0	0	0	0	0	0	1,800	0
2032	0	0	0	0	0	0	0	0	0	0	1,800	0
2033	0	0	0	0	0	0	0	0	0	0	1,800	0
2034	0	0	0	0	0	0	0	0	0	0	1,800	0
2035	0	0	0	0	0	0	0	0	0	0	1,800	0
TOTAL	11,000	33,847	3,300	3,350	71,456	282,997	12,734	20,500	74,256	3,122	132,300	989



TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 7 of 17

Calendar Year	CALIFORNIA AQUEDUCT (continued)											
	SOUTH SAN JOAQUIN DIVISION (continued)											
	Reach 8C (continued)			Reach 8D						Reach 9		
	Kern		Tulare	Dudley Ridge	Kern		Kings	San Luis Obispo	Tulare	Dudley Ridge	Kern	
	Agricultural	Kings			Municipal and Industrial	Agricultural					Municipal and Industrial	Agricultural
	[71]	[72]	[73]	[74]	[75]	[76]	[77]	[78]	[79]	[80]	[81]	[82]
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	900	25,100	26,360	0	0	0	0	0	0	0	30,951
1969	0	100	7,081	31,375	0	0	0	0	0	0	0	24,489
1970	0	0	0	40,407	0	0	0	0	3,408	0	0	46,114
1971	0	3,700	80,906	41,053	0	0	0	0	41,579	0	0	58,356
1972	0	1,400	144,843	42,443	0	0	0	0	113,550	0	0	75,464
1973	0	1,500	26,317	22,057	0	1,500	0	0	24,147	0	0	54,583
1974	0	1,500	32,603	33,390	0	0	0	0	39,686	0	0	63,814
1975	0	1,600	41,536	40,555	0	0	0	0	44,722	0	0	50,021
1976	0	1,600	26,595	41,421	0	0	0	0	32,216	0	0	53,465
1977	0	1,530	12,984	11,153	0	0	0	0	5,097	0	0	24,668
1978	0	2,070	3,934	51,747	0	0	0	0	8,119	0	0	72,231
1979	0	2,000	74,758	38,544	0	0	0	0	80,363	0	0	74,524
1980	0	2,200	35,140	41,000	0	0	0	0	40,304	0	0	79,946
1981	0	2,300	50,888	41,000	0	0	0	0	32,550	0	0	76,508
1982	0	1,536	4,405	41,000	0	0	214	0	14,146	0	0	76,877
1983	0	3,550	1,001	42,900	0	0	0	0	5	0	2,217	84,573
1984	0	3,100	3,677	45,100	0	0	0	0	2,066	0	4,100	85,732
1985	0	3,400	68,638	46,251	0	0	0	0	41,153	0	0	67,696
1986	0	3,700	40,017	50,249	0	0	0	0	39,338	0	0	79,943
1987	0	4,000	30,359	46,288	0	0	0	0	62,725	0	0	97,732
1988	0	4,000	46,281	47,994	0	0	0	0	48,035	0	1,100	83,858
1989	0	4,000	63,703	52,158	0	0	0	0	63,947	0	0	91,134
1990	0	2,000	23,504	36,296	0	161	0	0	32,066	0	0	83,108
1991	0	0	1,697	927	0	0	0	0	483	0	13,683	601
1992	0	1,806	15,982	12,667	0	0	0	0	30,746	0	28	40,183
1993	0	4,000	57,112	23,221	0	0	0	0	65,732	197	5,945	53,597
1994	0	2,116	21,510	28,793	0	1,726	0	0	40,852	0	0	44,994
1995	10,527	4,000	40,934	45,240	2,959	27,270	0	0	57,435	0	0	64,076
1996	1,500	4,000	84,130	52,722	0	1,455	0	100	148,745	0	2,236	89,291
1997	1,500	0	9,467	57,496	0	0	0	100	9,402	4,900	0	72,013
1998	1,000	15	8,956	49,435	0	20,000	0	0	8,721	0	0	57,530
1999	400	4,000	90,334	58,290	0	9,000	0	0	162,631	0	0	72,734
2000	400	3,600	63,842	57,920	0	0	0	0	113,952	0	0	73,562
2001	0	1,560	23,300	40,155	0	6,089	0	0	58,369	0	0	54,198
2002	0	2,854	34,009	48,179	0	7,522	0	0	47,426	0	0	60,957
2003	0	3,692	25,317	45,732	0	8,350	0	0	61,521	0	0	54,724
2004	0	5,803	30,546	45,823	0	4,979	0	0	55,625	0	0	54,330
2005	0	4,057	42,450	58,627	0	0	1,891	0	92,552	0	0	53,206
2006	0	1,105	34,367	61,410	0	0	3,266	0	64,840	0	0	56,909
2007	0	657	31,305	39,974	0	7,740	1,921	0	49,633	0	0	66,018
2008	0	240	14,146	18,974	0	21,242	107	0	16,903	0	0	63,315
2009	0	1,612	13,522	12,037	0	19,684	0	0	16,794	5,500	0	64,007
2010	0	26	14,005	17,346	0	14,094	1,900	0	40,609	0	0	76,357
2011	0	2,160	23,814	22,427	0	65	1,194	0	30,827	292	0	78,177
2012	0	2,699	25,847	17,122	0	2,168	0	0	56,570	3,400	0	69,395
2013	0	1,029	16,490	19,605	0	4,239	950	0	24,241	1,941	0	82,005
2014	0	81	2,880	12,960	0	3,554	66	0	5,118	1,000	0	67,754
2015	0	838	977	9,473	0	2,000	0	0	617	1,250	0	64,809
2016	0	1,195	20,313	23,196	0	140	1,209	0	33,781	3,400	0	67,468
2017	0	912	20,993	18,368	0	0	1,368	0	31,490	0	0	61,816
2018	0	912	20,993	23,575	0	0	1,368	0	31,490	0	0	61,816
2019	0	912	20,993	20,571	0	0	1,368	0	31,490	0	0	61,816
2020	0	912	20,993	20,692	0	0	1,368	0	31,490	0	0	61,816
2021	0	912	20,993	20,692	0	0	1,368	0	31,490	0	0	61,816
2022	0	912	20,993	20,692	0	0	1,368	0	31,490	0	0	61,816
2023	0	912	20,993	20,692	0	0	1,368	0	31,490	0	0	61,816
2024	0	912	20,993	20,692	0	0	1,368	0	31,490	0	0	61,816
2025	0	912	20,993	20,692	0	0	1,368	0	31,490	0	0	61,816
2026	0	912	20,993	20,692	0	0	1,368	0	31,490	0	0	61,816
2027	0	912	20,993	20,692	0	0	1,368	0	31,490	0	0	61,816
2028	0	912	20,993	20,692	0	0	1,368	0	31,490	0	0	61,816
2029	0	912	20,993	20,692	0	0	1,368	0	31,490	0	0	61,816
2030	0	912	20,993	20,692	0	0	1,368	0	31,490	0	0	61,816
2031	0	912	20,993	20,692	0	0	1,368	0	31,490	0	0	61,816
2032	0	912	20,993	20,692	0	0	1,368	0	31,490	0	0	61,816
2033	0	912	20,993	20,692	0	0	1,368	0	31,490	0	0	61,816
2034	0	912	20,993	20,692	0	0	1,368	0	31,490	0	0	61,816
2035	0	912	20,993	20,692	0	0	1,368	0	31,490	0	0	61,816
TOTAL	15,327	122,159	1,990,389	2,184,078	2,959	162,978	38,710	200	2,661,657	21,880	29,309	4,312,501

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 8 of 17

Calendar Year	CALIFORNIA AQUEDUCT (continued)											
	SOUTH SAN JOAQUIN DIVISION (continued)											
	Reach 9		Reach 10A								Reach 11B	
	Tulare	Alameda-Zone 7	Alameda County	Castaic Lake	Dudley Ridge	Kern		Metropolitan	San Bernardino	Santa Clara	Tulare	Castaic Lake
						Municipal and Industrial	Agricultural					
	[83]	[84]	[85]	[86]	[87]	[88]	[89]	[90]	[91]	[92]	[93]	[94]
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	2,842	0
1970	1,855	0	0	0	0	0	158	0	0	0	4,315	0
1971	0	0	0	0	0	0	9,973	0	0	0	0	0
1972	0	0	0	0	0	0	5,876	0	0	0	0	0
1973	0	0	0	0	0	0	22,948	0	0	0	0	0
1974	0	0	0	0	0	10,019	22,719	0	0	0	0	0
1975	0	0	0	0	0	2,791	72,121	0	0	0	0	0
1976	0	0	0	0	0	74	50,444	0	0	0	0	0
1977	0	0	0	0	0	201	34,451	0	0	0	0	0
1978	0	0	0	0	0	0	161,889	0	0	0	0	0
1979	0	0	0	0	0	285	153,245	0	0	0	0	0
1980	0	0	0	0	0	3,780	131,836	0	0	0	0	0
1981	0	0	0	0	0	341	133,500	0	0	0	0	0
1982	0	0	0	0	0	4,700	164,832	0	0	0	0	0
1983	0	0	0	0	0	0	146,493	0	0	0	0	0
1984	0	0	0	0	0	6,910	150,302	0	0	0	0	0
1985	0	0	0	0	0	6,495	153,473	0	0	0	0	0
1986	0	0	0	0	0	5,065	198,099	0	0	0	0	0
1987	0	0	0	0	0	900	226,521	0	0	0	0	0
1988	0	0	0	0	0	9,529	212,495	0	0	0	0	0
1989	0	0	0	0	0	21,038	251,979	0	0	0	0	0
1990	0	0	0	0	0	25,189	47,472	0	0	0	0	0
1991	0	0	0	0	0	1,142	6,820	0	0	0	0	0
1992	0	0	0	0	0	3,685	89,390	0	0	0	0	0
1993	0	0	0	0	0	775	233,862	44,496	0	0	0	0
1994	0	0	0	0	0	5,227	126,792	0	0	0	0	0
1995	0	0	0	0	0	366	229,448	50,000	0	0	0	0
1996	0	0	6,200	0	0	6,666	199,854	95,000	0	45,000	0	0
1997	0	0	10,000	0	900	3,577	157,385	125,000	0	35,000	0	0
1998	0	1,970	3,780	0	0	2,603	163,587	39,500	0	23,800	0	0
1999	0	22,910	16,100	0	0	1,657	190,787	75,850	0	30,000	0	0
2000	0	23,940	13,380	0	0	7,672	283,208	0	0	23,730	0	0
2001	0	5,000	0	0	0	160	98,175	0	0	0	0	0
2002	0	14,287	2,083	24,000	0	145	171,498	0	0	3,311	0	0
2003	0	6,500	18,800	0	0	217	174,674	70,940	0	33,000	0	0
2004	0	5,740	8,000	32,522	0	65,751	117,286	0	0	0	0	0
2005	0	0	28,422	0	0	146	232,519	31,210	0	55,448	146	0
2006	0	5,740	27,447	0	5,000	0	237,623	0	0	64,036	0	0
2007	0	717	1,029	0	3,000	0	203,794	0	0	3,692	0	0
2008	0	0	0	0	2,800	1,702	103,176	0	0	4,306	0	0
2009	2,330	0	0	0	2,000	690	95,798	0	0	0	0	0
2010	0	3,000	7,000	0	2,000	14	102,773	74,000	0	51,990	800	0
2011	2,000	3,414	16,020	0	2,908	26	137,476	149,012	0	65,770	500	0
2012	2,000	0	7,500	0	1,660	29	201,876	45,000	2,868	0	0	5,500
2013	0	0	0	0	2,500	2,057	116,190	0	0	0	0	5,500
2014	0	0	0	0	0	0	40,332	0	0	0	0	0
2015	0	0	0	0	0	3,751	49,953	0	0	0	0	0
2016	0	10,491	15,875	0	0	0	120,982	0	0	15,987	0	0
2017	0	0	14,088	0	0	0	141,830	0	0	0	0	0
2018	0	0	13,896	0	0	0	140,140	0	0	0	0	0
2019	0	0	13,416	0	0	0	140,140	0	0	0	0	0
2020	0	0	12,936	0	0	0	140,140	0	0	0	0	0
2021	0	0	12,936	0	0	0	140,140	0	0	0	0	0
2022	0	0	12,936	0	0	0	140,140	0	0	0	0	0
2023	0	0	12,936	0	0	0	140,140	0	0	0	0	0
2024	0	0	12,936	0	0	0	140,140	0	0	0	0	0
2025	0	0	12,936	0	0	0	140,140	0	0	0	0	0
2026	0	0	12,936	0	0	0	140,140	0	0	0	0	0
2027	0	0	12,936	0	0	0	140,140	0	0	0	0	0
2028	0	0	12,936	0	0	0	140,140	0	0	0	0	0
2029	0	0	12,936	0	0	0	140,140	0	0	0	0	0
2030	0	0	12,936	0	0	0	140,140	0	0	0	0	0
2031	0	0	12,936	0	0	0	140,140	0	0	0	0	0
2032	0	0	12,936	0	0	0	140,140	0	0	0	0	0
2033	0	0	12,936	0	0	0	140,140	0	0	0	0	0
2034	0	0	12,936	0	0	0	140,140	0	0	0	0	0
2035	0	0	12,936	0	0	0	140,140	0	0	0	0	0
TOTAL	8,185	103,709	430,012	56,522	22,768	205,375	8,900,434	800,008	2,868	455,070	8,457	11,000

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 9 of 17

Calendar Year	CALIFORNIA AQUEDUCT (continued)										
	SOUTH SAN JOAQUIN DIVISION (continued)										
	Reach 11B (continued)				Reach 12D		Reach 12E				
	Dudley Ridge	Kern		Tulare	Kern		Alameda-Zone 7	Alameda County	Castaic Lake	Dudley Ridge	Kern
		Municipal and Industrial	Agricultural		Municipal and Industrial	Agricultural					Municipal and Industrial
	[95]	[96]	[97]	[98]	[99]	[100]	[101]	[102]	[103]	[104]	[105]
1962	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	24,776	0	0	0	0	0	0	0	0
1969	0	0	64,682	0	0	0	0	0	0	0	0
1970	0	0	72,279	0	0	0	0	0	0	0	0
1971	0	0	63,773	0	0	0	0	0	0	0	0
1972	0	0	72,358	0	0	0	0	0	0	0	0
1973	0	0	67,544	0	0	0	0	0	0	0	0
1974	0	0	87,476	0	0	0	0	0	0	0	2,651
1975	0	0	85,675	0	0	0	0	0	0	0	0
1976	0	0	85,067	0	0	0	0	0	0	0	37,519
1977	0	3,981	29,603	0	0	0	0	0	0	0	20,280
1978	0	0	88,753	0	0	0	0	0	0	0	47,133
1979	0	484	108,379	0	0	0	0	0	0	0	50,740
1980	0	3,112	103,207	0	0	0	0	0	0	0	32,039
1981	0	494	104,395	0	0	0	0	0	0	0	59,917
1982	0	798	99,081	0	0	0	0	0	0	0	36,139
1983	0	2,069	94,117	0	0	0	0	0	0	0	0
1984	0	2,349	124,819	0	0	0	0	0	0	0	63,941
1985	0	10,666	118,646	0	0	0	0	0	0	0	69,839
1986	0	8,673	124,836	0	0	0	0	0	0	0	62,109
1987	0	13,074	111,877	0	0	0	0	0	0	0	95,297
1988	0	13,509	114,031	0	0	0	0	0	0	0	86,390
1989	0	9,986	127,058	0	0	0	0	0	0	0	83,965
1990	0	9,319	104,107	0	0	0	0	0	0	0	82,164
1991	0	6,099	118	0	0	0	0	0	0	0	8,842
1992	0	7,419	35,093	0	0	0	0	0	0	0	47,181
1993	0	2,696	72,645	0	0	0	0	0	0	0	84,822
1994	0	3,506	71,202	0	0	0	0	0	0	0	66,188
1995	0	1,154	97,072	0	0	0	0	0	0	1,000	107,130
1996	0	1,185	96,250	0	0	0	0	0	0	4,131	89,257
1997	0	1,111	104,823	0	0	0	0	0	0	8,012	32,061
1998	0	1,311	72,646	0	0	0	0	0	0	5,925	28,258
1999	0	2,127	92,262	0	0	0	0	0	0	1,321	110,161
2000	1,500	3,793	89,622	0	21	0	0	0	0	953	11,772
2001	0	636	73,105	0	41	0	0	0	0	0	385
2002	0	1,457	91,123	0	760	6	0	0	0	0	0
2003	0	1,379	87,174	0	2,431	152	0	0	0	0	39,479
2004	0	1,299	97,722	0	3,419	768	0	0	0	1,600	52,303
2005	0	824	93,554	0	2,841	644	3,419	1,878	20,000	1,154	43,835
2006	0	0	98,417	0	2,513	1,556	10,000	0	20,000	0	82,207
2007	0	4,030	94,334	0	2,164	2,284	0	0	8,200	0	1,179
2008	0	263	93,417	0	1,514	3,000	0	0	0	0	0
2009	300	127	96,776	0	564	4,274	0	0	0	0	0
2010	5,350	381	92,220	974	1,904	2,206	10,000	0	25,844	0	4,851
2011	0	1,160	105,682	3,500	973	65	10,000	1,960	0	0	26,249
2012	2,000	1,019	94,519	0	3,128	939	20,308	0	6,416	200	19,423
2013	2,500	1,167	110,418	0	3,473	1,531	0	0	0	0	26,652
2014	9,786	0	87,728	0	0	5,225	0	0	0	0	0
2015	8,200	4,553	84,300	0	985	3,486	0	0	0	0	280
2016	3,000	6,000	80,865	0	0	2,297	8,000	0	0	0	54,367
2017	0	7,500	59,915	0	3,900	0	0	0	0	0	54,167
2018	0	7,500	59,915	0	3,900	0	0	0	0	0	54,167
2019	0	7,500	59,915	0	3,900	0	0	0	0	0	54,167
2020	0	7,500	59,915	0	3,900	0	0	0	0	0	54,167
2021	0	7,500	59,915	0	3,900	0	0	0	0	0	54,167
2022	0	7,500	59,915	0	3,900	0	0	0	0	0	54,167
2023	0	7,500	59,915	0	3,900	0	0	0	0	0	54,167
2024	0	7,500	59,915	0	3,900	0	0	0	0	0	54,167
2025	0	7,500	59,915	0	3,900	0	0	0	0	0	54,167
2026	0	7,500	59,915	0	3,900	0	0	0	0	0	54,167
2027	0	7,500	59,915	0	3,900	0	0	0	0	0	54,167
2028	0	7,500	59,915	0	3,900	0	0	0	0	0	54,167
2029	0	7,500	59,915	0	3,900	0	0	0	0	0	54,167
2030	0	7,500	59,915	0	3,900	0	0	0	0	0	54,167
2031	0	7,500	59,915	0	3,900	0	0	0	0	0	54,167
2032	0	7,500	59,915	0	3,900	0	0	0	0	0	54,167
2033	0	7,500	59,915	0	3,900	0	0	0	0	0	54,167
2034	0	7,500	59,915	0	3,900	0	0	0	0	0	54,167
2035	0	7,500	59,915	0	3,900	0	0	0	0	0	54,167
TOTAL	32,636	275,710	5,428,011	4,474	100,831	28,433	61,727	3,838	80,460	24,296	2,796,178

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 10 of 17

Calendar Year	CALIFORNIA AQUEDUCT (continued)										
	SOUTH SAN JOAQUIN DIVISION (continued)										
	Reach 12E (continued)				Reach 13B						
	Kern	Metropolitan	San Bernardino	Santa Clara	Alameda-Zone 7	Alameda County	Dudley Ridge	Kern		Metropolitan	Palmdale
								Municipal and Industrial	Agricultural		
	Agricultural										
1962	[106] 0	[107] 0	[108] 0	[109] 0	[110] 0	[111] 0	[112] 0	[113] 0	[114] 0	[115] 0	[116] 0
1963	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0
1970	9,279	0	0	0	0	0	0	0	4,891	0	0
1971	28,056	0	0	0	0	0	0	0	0	0	0
1972	62,342	0	0	0	0	0	0	0	17,388	0	0
1973	13,082	0	0	0	0	0	0	0	9,297	0	0
1974	4,248	0	0	0	0	0	0	8,038	4,246	0	0
1975	10,787	0	0	0	0	0	0	8,538	7,059	0	0
1976	20,555	0	0	0	0	0	0	5,626	8,855	0	0
1977	1,737	0	0	0	0	0	0	0	5,024	0	0
1978	15,011	0	0	0	0	0	0	21,773	7,601	0	0
1979	61,567	0	0	0	0	0	0	5,663	17,766	0	0
1980	22,252	0	0	0	0	0	0	0	22,515	0	0
1981	58,470	0	0	0	0	0	0	7,844	14,037	0	0
1982	75,587	0	0	0	0	0	0	0	25,553	0	0
1983	10,950	0	0	0	0	0	0	0	3,491	0	0
1984	39,929	0	0	0	0	0	0	12,117	26,178	0	0
1985	84,117	0	0	0	0	0	0	0	67,711	0	0
1986	51,540	0	0	0	0	0	0	0	66,551	0	0
1987	86,223	0	0	0	0	0	0	5,609	40,374	0	0
1988	123,249	0	0	0	0	0	0	9,298	47,167	0	0
1989	146,544	0	0	0	0	0	0	5,504	57,114	0	0
1990	38,973	0	0	0	0	0	0	7,645	20,423	0	0
1991	303	0	0	0	0	0	0	0	0	0	0
1992	57,048	0	0	0	0	0	0	789	17,449	0	0
1993	285,554	5,504	0	0	0	0	0	12,798	88,157	0	0
1994	77,839	0	0	0	0	0	0	2,494	33,148	0	0
1995	181,097	0	0	0	0	0	0	8,751	110,685	0	0
1996	134,138	0	0	0	0	0	0	28,063	64,849	0	0
1997	128,329	1,486	0	0	0	0	0	43,803	49,312	0	0
1998	88,998	24,234	0	0	0	0	0	29,444	40,085	5,500	0
1999	255,343	62,162	0	0	0	0	0	12,969	92,998	0	0
2000	156,215	149,731	0	0	0	0	0	0	102,202	0	0
2001	51,076	0	0	0	0	0	1,733	0	33,925	0	0
2002	135,335	0	0	0	0	0	736	0	71,444	0	0
2003	112,056	45,989	0	0	0	0	350	2,396	124,582	1,865	0
2004	95,893	0	0	0	0	0	1,657	1,922	73,801	0	0
2005	340,281	15,384	0	2,619	2,321	0	14,540	21,781	269,631	192	0
2006	296,230	5,065	0	0	0	0	5,670	11,787	196,116	0	0
2007	87,764	0	0	0	0	0	2,161	0	72,240	0	0
2008	58,983	0	0	0	0	0	0	200	9,785	0	0
2009	82,434	0	0	0	0	0	0	0	12,060	0	0
2010	72,809	134,855	0	0	0	0	304	0	63,966	22,000	0
2011	313,619	109,787	8,066	706	2,331	3,420	34,733	4,896	273,275	25,845	7,000
2012	102,054	92,803	19,066	0	0	0	0	448	70,805	1,950	2,500
2013	60,295	0	0	0	0	0	0	0	14,189	0	0
2014	500	0	0	0	0	0	0	0	2,246	0	0
2015	2,750	0	0	0	0	0	0	0	481	0	0
2016	58,676	18,000	0	0	0	0	0	0	19,000	0	0
2017	64,394	68,964	0	0	0	0	12,000	0	22,200	0	0
2018	66,084	127,949	0	0	0	0	6,793	0	22,200	0	0
2019	66,084	178,205	0	0	0	0	6,793	0	22,200	0	0
2020	66,084	178,205	0	0	0	0	6,672	0	22,200	0	0
2021	66,084	178,205	0	0	0	0	6,672	0	22,200	0	0
2022	66,084	178,205	0	0	0	0	6,672	0	22,200	0	0
2023	66,084	178,205	0	0	0	0	6,672	0	22,200	0	0
2024	66,084	178,205	0	0	0	0	6,672	0	22,200	0	0
2025	66,084	178,205	0	0	0	0	6,672	0	22,200	0	0
2026	66,084	178,205	0	0	0	0	6,672	0	22,200	0	0
2027	66,084	178,205	0	0	0	0	6,672	0	22,200	0	0
2028	66,084	178,205	0	0	0	0	6,672	0	22,200	0	0
2029	66,084	178,205	0	0	0	0	6,672	0	22,200	0	0
2030	66,084	178,205	0	0	0	0	6,672	0	22,200	0	0
2031	66,084	178,205	0	0	0	0	6,672	0	22,200	0	0
2032	66,084	178,205	0	0	0	0	6,672	0	22,200	0	0
2033	66,084	178,205	0	0	0	0	6,672	0	22,200	0	0
2034	66,084	178,205	0	0	0	0	6,672	0	22,200	0	0
2035	66,084	178,205	0	0	0	0	6,672	0	22,200	0	0
TOTAL	5,454,023	3,891,398	27,132	3,325	4,652	3,420	194,222	280,196	2,801,472	57,352	9,500

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 11 of 17

Calendar Year	CALIFORNIA AQUEDUCT (continued)											
	SOUTH SAN JOAQUIN DIVISION (continued)											
	Reach 13B (continued)		Reach 14A		Reach 14B		Reach 14C			Reach 15A		Reach 16A
	Santa Clara	Tulare	Kern		Kern		Kern		Metropolitan	Kern		AVEK
			Municipal and Industrial	Agricultural	Municipal and Industrial	Agricultural	Municipal and Industrial	Agricultural		Municipal and Industrial	Agricultural	
	[117]	[118]	[119]	[120]	[121]	[122]	[123]	[124]	[125]	[126]	[127]	[128]
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	3	0	0	0	0	0	0
1971	0	0	0	23,844	0	49,929	0	24,187	0	0	3,552	0
1972	0	0	0	26,621	0	77,034	0	35,016	0	0	6,064	0
1973	0	0	0	15,328	0	47,040	0	19,043	0	0	19,916	0
1974	0	0	0	7,794	0	32,356	0	12,601	0	0	18,000	0
1975	0	0	0	10,306	0	27,736	0	12,783	0	0	35,420	0
1976	0	0	0	268	0	35,296	0	9,005	0	0	39,551	0
1977	0	0	0	8,299	0	13,539	0	3,757	0	0	6,158	0
1978	0	0	0	34,029	0	72,351	0	24,542	0	0	31,148	0
1979	0	0	3,012	27,356	0	59,413	0	22,372	0	0	38,602	0
1980	0	0	4,312	16,876	0	40,513	0	19,953	0	0	37,817	0
1981	0	0	4,511	13,007	8	42,753	7	18,729	0	0	39,033	0
1982	0	0	3,735	24,240	184	57,739	0	26,479	0	0	47,782	0
1983	0	0	1,168	20,302	0	57,922	0	26,613	0	0	37,426	0
1984	0	0	137	35,369	10	79,179	2	34,996	0	0	49,848	0
1985	0	0	206	33,103	0	72,855	0	31,758	0	0	44,078	0
1986	0	0	180	26,384	0	70,864	0	34,566	0	0	42,461	0
1987	0	0	610	30,098	9	67,710	10	31,019	0	0	34,748	0
1988	0	0	622	32,778	19	75,968	1	37,165	0	16	41,978	0
1989	0	0	721	29,292	7	82,201	5	37,800	0	2	43,239	0
1990	0	0	673	26,800	13	81,076	9	34,174	0	6	36,347	0
1991	0	0	768	0	0	0	0	0	0	0	0	2,000
1992	0	0	673	16,238	464	41,143	0	18,084	0	0	24,243	0
1993	0	0	629	17,832	0	62,493	0	28,103	0	0	27,997	0
1994	0	0	2,513	16,760	3,000	54,011	1,000	22,624	0	0	29,511	0
1995	0	3,500	3	21,234	0	67,391	0	31,285	0	0	26,134	0
1996	0	0	0	26,978	0	85,936	0	38,879	0	0	36,186	0
1997	0	0	0	23,035	0	79,790	0	33,512	0	0	36,281	0
1998	0	0	0	15,706	0	58,132	0	23,097	0	0	28,712	0
1999	0	0	0	21,153	0	67,576	0	31,489	0	0	36,801	0
2000	0	0	0	19,264	0	70,585	0	33,716	0	0	40,063	0
2001	0	0	0	12,452	0	49,602	0	23,557	0	0	31,192	0
2002	0	0	0	11,161	0	52,762	0	27,138	0	0	41,552	0
2003	0	0	0	13,685	0	44,576	0	24,783	12,911	0	36,602	0
2004	0	0	0	13,030	0	52,012	0	30,313	0	0	40,184	0
2005	9,014	0	0	15,663	0	56,739	0	21,979	0	0	39,870	0
2006	0	0	0	17,779	0	65,142	1,413	20,193	5,440	0	46,244	0
2007	0	0	0	21,435	0	67,955	0	24,947	1,881	0	47,390	0
2008	2,324	0	0	20,087	0	63,497	0	27,847	0	0	33,029	0
2009	0	0	0	22,281	0	60,726	0	27,185	0	0	26,007	0
2010	0	10,000	0	21,964	0	58,110	0	25,477	29,818	0	22,045	0
2011	0	0	0	24,131	0	61,859	0	27,061	27,326	0	42,158	0
2012	0	8,000	0	25,982	0	64,489	0	23,446	31,703	0	27,920	0
2013	0	0	0	29,414	0	62,137	0	25,004	6,592	0	28,147	0
2014	0	0	0	28,172	0	50,337	0	20,992	0	0	10,784	0
2015	0	0	0	25,886	0	48,996	0	17,267	0	0	10,202	0
2016	0	0	0	24,106	0	50,210	0	22,403	11	0	22,924	0
2017	0	0	0	17,000	0	42,800	0	20,500	0	0	25,800	0
2018	0	0	0	17,000	0	42,800	0	20,500	0	0	25,800	0
2019	0	0	0	17,000	0	42,800	0	20,500	0	0	25,800	0
2020	0	0	0	17,000	0	42,800	0	20,500	0	0	25,800	0
2021	0	0	0	17,000	0	42,800	0	20,500	0	0	25,800	0
2022	0	0	0	17,000	0	42,800	0	20,500	0	0	25,800	0
2023	0	0	0	17,000	0	42,800	0	20,500	0	0	25,800	0
2024	0	0	0	17,000	0	42,800	0	20,500	0	0	25,800	0
2025	0	0	0	17,000	0	42,800	0	20,500	0	0	25,800	0
2026	0	0	0	17,000	0	42,800	0	20,500	0	0	25,800	0
2027	0	0	0	17,000	0	42,800	0	20,500	0	0	25,800	0
2028	0	0	0	17,000	0	42,800	0	20,500	0	0	25,800	0
2029	0	0	0	17,000	0	42,800	0	20,500	0	0	25,800	0
2030	0	0	0	17,000	0	42,800	0	20,500	0	0	25,800	0
2031	0	0	0	17,000	0	42,800	0	20,500	0	0	25,800	0
2032	0	0	0	17,000	0	42,800	0	20,500	0	0	25,800	0
2033	0	0	0	17,000	0	42,800	0	20,500	0	0	25,800	0
2034	0	0	0	17,000	0	42,800	0	20,500	0	0	25,800	0
2035	0	0	0	17,000	0	42,800	0	20,500	0	0	25,800	0
TOTAL	11,338	21,500	24,473	1,270,522	3,714	3,452,883	2,447	1,536,439	115,682	24	1,935,546	2,000



TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 12 of 17

Calendar Year	CALIFORNIA AQUEDUCT (continued)											
	SOUTH SAN JOAQUIN DIVISION (continued)		TEHACHAPI DIVISION	MOJAVE DIVISION								
	Reach 16A (continued)		Reach 17E	Reach 18A	Reach 19		Reach 20A			Reach 20B		
	Kern		Kern (Municipal and Industrial)									
	Municipal and Industrial	Agricultural										
	[129]	[130]	[131]	[132]	[133]	[134]	[135]	[136]	[137]	[138]	[139]	[140]
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	4,768	0	0	0	0	0	0	0	0	0	0
1973	0	1,961	0	0	0	0	0	0	0	0	0	0
1974	3,000	1,564	0	0	1,223	0	0	0	0	0	0	0
1975	3,200	9,867	0	0	7,622	0	420	0	0	0	0	0
1976	3,500	11,667	0	3,808	23,063	0	471	0	0	416	0	0
1977	3,420	685	0	1,231	8,927	0	773	0	0	271	0	0
1978	7,989	1,655	0	1,321	36,333	0	5,549	0	0	934	0	0
1979	2,813	15,808	0	2,098	49,910	0	7,555	0	0	930	0	0
1980	2,700	16,145	0	2,610	61,534	0	7,605	0	0	655	0	0
1981	2,636	18,156	0	2,340	65,690	0	10,333	0	0	966	0	0
1982	1,921	16,577	0	1,669	41,127	0	7,313	0	0	8	0	0
1983	1,400	17,907	0	43	26,377	0	6,253	0	0	20	0	0
1984	1,338	24,246	0	90	22,462	0	9,558	0	0	2	0	0
1985	1,309	16,820	0	8	23,440	0	11,613	0	1,510	217	0	32
1986	1,213	15,559	0	8	16,898	0	13,808	0	3,041	0	0	45
1987	1,665	10,170	0	0	15,958	0	15,493	0	2,389	151	0	1,624
1988	1,925	8,987	0	0	13,471	0	17,117	0	366	281	0	1,261
1989	2,668	8,649	0	0	18,007	0	23,481	0	381	112	0	7,848
1990	2,819	8,608	0	0	17,281	0	25,843	0	282	84	0	8,292
1991	2,588	343	0	0	728	0	4,282	1,391	84	131	0	3,830
1992	2,087	8,275	0	0	7,238	0	18,518	1,310	185	650	0	3,850
1993	2,494	9,167	0	0	13,340	0	23,662	1,514	164	996	0	7,597
1994	3,011	13,877	0	0	19,122	0	25,250	1,399	299	124	0	8,119
1995	3,188	15,042	0	0	20,222	0	22,385	1,227	328	0	0	6,633
1996	2,573	18,142	0	0	23,919	0	26,979	1,316	354	0	0	11,080
1997	3,997	17,048	0	0	28,834	64	27,999	1,272	313	0	0	11,548
1998	3,751	17,032	0	0	22,466	1,345	25,985	0	195	0	0	8,557
1999	3,316	24,071	0	0	30,944	1,439	32,409	0	377	36	0	12,901
2000	3,015	20,919	0	0	34,786	1,361	37,819	0	0	80	0	9,060
2001	1,894	13,476	0	0	24,370	1,385	33,216	0	0	282	0	10,427
2002	4,227	14,520	0	0	14,297	1,370	36,311	0	0	1,662	0	18,496
2003	1,168	16,799	0	0	12,145	1,285	39,532	0	0	2,289	0	11,547
2004	2,239	19,714	0	0	11,201	1,223	40,408	0	0	1,774	0	12,139
2005	167	18,353	0	11	11,804	1,051	41,496	0	0	1,336	0	11,678
2006	279	22,570	0	0	18,438	1,021	53,878	0	0	1,415	0	12,487
2007	204	26,229	0	0	22,916	1,176	47,639	0	0	1,349	0	19,609
2008	3,834	18,426	0	0	9,096	1,238	33,919	0	0	792	25	14,255
2009	1,531	19,517	0	0	5,717	1,345	35,402	0	0	366	42	15,339
2010	1,033	19,829	0	0	10,825	1,181	43,122	0	0	643	0	10,969
2011	3,808	17,957	0	0	55,707	2,184	35,543	0	0	507	0	9,881
2012	3,453	19,842	0	0	41,053	1,306	33,390	0	0	901	0	16,397
2013	148	21,311	4	16	13,414	1,095	33,507	0	0	693	0	10,567
2014	0	18,673	1	0	621	41	15,761	1,004	0	744	0	8,406
2015	2,407	16,214	0	0	0	0	12,447	1,023	0	447	0	5,836
2016	4,689	15,997	0	0	24,485	0	54,086	1,042	160	2,438	0	13,945
2017	7,083	14,733	0	3,444	14,369	863	63,565	0	0	2,270	0	19,543
2018	7,083	14,733	0	3,444	14,369	863	63,565	0	0	2,270	0	19,543
2019	7,083	14,733	0	3,444	14,369	863	61,499	0	0	2,270	0	19,543
2020	7,083	14,733	0	3,444	14,369	863	61,499	0	0	2,270	0	19,543
2021	7,083	14,733	0	3,444	14,369	863	61,499	0	0	2,270	0	19,543
2022	7,083	14,733	0	3,444	14,369	863	61,499	0	0	2,270	0	19,543
2023	7,083	14,733	0	3,444	14,369	863	61,499	0	0	2,270	0	19,543
2024	7,083	14,733	0	3,444	14,369	863	61,499	0	0	2,270	0	19,543
2025	7,083	14,733	0	3,444	14,369	863	61,499	0	0	2,270	0	19,543
2026	7,083	14,733	0	3,444	14,369	863	61,499	0	0	2,270	0	19,543
2027	7,083	14,733	0	3,444	14,369	863	61,499	0	0	2,270	0	19,543
2028	7,083	14,733	0	3,444	14,369	863	61,499	0	0	2,270	0	19,543
2029	7,083	14,733	0	3,444	14,369	863	61,499	0	0	2,270	0	19,543
2030	7,083	14,733	0	3,444	14,369	863	61,499	0	0	2,270	0	19,543
2031	7,083	14,733	0	3,444	14,369	863	61,499	0	0	2,270	0	19,543
2032	7,083	14,733	0	3,444	14,369	863	61,499	0	0	2,270	0	19,543
2033	7,083	14,733	0	3,444	14,369	863	61,499	0	0	2,270	0	19,543
2034	7,083	14,733	0	3,444	14,369	863	61,499	0	0	2,270	0	19,543
2035	7,083	14,733	0	3,444	14,369	863	61,499	0	0	2,270	0	19,543
TOTAL	241,194	933,069	5	80,689	1,200,022	37,507	2,170,743	12,498	10,428	67,832	67	675,572

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 13 of 17

Calendar Year	CALIFORNIA AQUEDUCT (continued)											
	MOJAVE DIVISION (continued)											
	Reach 21			Reach 22A		Reach 22B					Reach 23	Reach 24
	AVEK	Littlerock	Palmdale	AVEK	Littlerock	AVEK <sup>d</sup>	Coachella <sup>e</sup>	Desert <sup>e</sup>	Metropolitan <sup>e</sup>	Mojave	Mojave	Crestline
	[141]	[142]	[143]	[144]	[145]	[146]	[147]	[148]	[149]	[150]	[151]	[152]
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	338	0	0	0	0	0	0	0	55	0	464
1973	0	290	0	0	0	0	5,800	9,000	(14,800)	0	0	389
1974	0	400	0	0	0	0	6,400	10,000	(16,400)	0	14	627
1975	0	520	0	0	0	0	7,000	11,000	(18,000)	0	0	825
1976	0	589	0	0	0	0	7,600	12,000	(19,600)	0	0	1,002
1977	0	111	0	0	0	0	0	0	0	22	58	1,109
1978	0	208	0	0	0	0	10,084	15,300	(25,384)	0	0	1,209
1979	0	133	0	0	0	0	10,063	15,000	(25,063)	4,000	0	1,260
1980	0	191	0	3	0	0	10,884	17,000	(27,884)	4,000	0	1,239
1981	0	1,270	0	46	0	0	12,105	19,000	(31,105)	4,000	0	1,485
1982	0	0	0	174	0	0	13,326	21,000	(34,326)	10,500	0	1,238
1983	0	38	0	268	0	0	14,547	23,000	(37,547)	0	0	911
1984	0	1	0	550	0	0	15,768	25,000	(40,768)	0	0	1,128
1985	0	0	16	1,786	0	0	16,989	27,000	(43,989)	0	0	1,422
1986	0	163	10	1,735	0	0	18,210	29,000	(47,210)	0	0	1,506
1987	0	1,080	1,366	2,273	5	214	19,431	31,500	(50,931)	17	0	1,849
1988	0	419	143	3,210	0	0	20,652	34,000	(54,652)	9	0	2,006
1989	0	971	780	3,591	0	89	21,873	36,500	(58,373)	0	200	2,170
1990	0	1,747	34	3,988	0	10	23,100	38,100	(61,200)	0	0	1,827
1991	0	522	0	2,427	0	0	6,930	11,430	(18,360)	0	0	849
1992	0	251	0	3,859	0	0	10,427	17,197	(27,624)	42	0	519
1993	0	734	0	5,098	0	0	0	0	0	0	0	439
1994	0	1,098	0	4,657	0	0	0	0	0	14,634	0	785
1995	0	480	0	4,679	0	0	0	0	0	7,495	0	409
1996	0	494	0	5,458	0	0	0	0	0	6,111	0	485
1997	0	444	0	5,549	0	0	0	0	0	9,038	0	651
1998	0	404	0	4,468	0	0	0	0	0	2,580	0	187
1999	0	342	0	5,684	0	0	0	0	0	6,705	0	1,132
2000	5,002	0	0	5,890	0	0	0	0	0	10,019	0	1,194
2001	0	0	0	4,989	0	0	0	0	0	3,048	0	1,057
2002	0	0	0	5,404	0	497	0	0	0	2,976	0	2,189
2003	0	0	0	6,063	0	0	0	0	7,625	13,150	0	1,563
2004	0	0	23	6,095	0	253	0	0	0	11,953	0	2,006
2005	0	0	34	5,184	0	0	0	0	5,942	12,169	0	807
2006	0	0	5	6,653	0	0	0	0	0	32,993	0	641
2007	0	0	25	7,711	0	588	0	0	0	27,684	0	1,768
2008	0	0	0	4,756	0	0	0	0	0	20,479	0	848
2009	0	0	0	4,185	0	0	0	0	0	20,214	0	894
2010	0	0	0	3,899	0	0	0	0	0	27,640	0	357
2011	0	0	0	2,289	0	0	0	0	30,907	2,915	0	474
2012	0	0	0	2,328	0	0	0	0	12,025	9,938	0	624
2013	0	0	0	3,227	0	118	0	0	0	5,888	0	1,368
2014	0	0	0	1,318	0	88	0	0	0	2,536	0	1,233
2015	0	0	0	1,298	0	116	0	0	0	7,807	0	1,253
2016	0	0	0	5,113	0	92	0	0	0	10,817	0	2,019
2017	0	0	0	4,538	0	100	0	0	0	33,065	0	3,480
2018	0	0	0	4,538	0	100	0	0	0	35,515	0	3,480
2019	0	0	0	4,538	0	100	0	0	0	35,515	0	3,480
2020	0	0	0	4,538	0	100	0	0	0	35,515	0	3,480
2021	0	0	0	4,538	0	100	0	0	0	35,515	0	3,480
2022	0	0	0	4,538	0	100	0	0	0	35,515	0	3,480
2023	0	0	0	4,538	0	100	0	0	0	35,515	0	3,480
2024	0	0	0	4,538	0	100	0	0	0	35,515	0	3,480
2025	0	0	0	4,538	0	100	0	0	0	35,515	0	3,480
2026	0	0	0	4,538	0	100	0	0	0	35,515	0	3,480
2027	0	0	0	4,538	0	100	0	0	0	35,515	0	3,480
2028	0	0	0	4,538	0	100	0	0	0	35,515	0	3,480
2029	0	0	0	4,538	0	100	0	0	0	35,515	0	3,480
2030	0	0	0	4,538	0	100	0	0	0	35,515	0	3,480
2031	0	0	0	4,538	0	100	0	0	0	35,515	0	3,480
2032	0	0	0	4,538	0	100	0	0	0	35,515	0	3,480
2033	0	0	0	4,538	0	100	0	0	0	35,515	0	3,480
2034	0	0	0	4,538	0	100	0	0	0	35,515	0	3,480
2035	0	0	0	4,538	0	100	0	0	0	35,515	0	3,480
<b>TOTAL</b>	<b>5,002</b>	<b>13,238</b>	<b>2,436</b>	<b>222,127</b>	<b>5</b>	<b>3,965</b>	<b>251,189</b>	<b>402,027</b>	<b>(596,717)</b>	<b>961,319</b>	<b>272</b>	<b>115,937</b>

<sup>d</sup> 1988 advance allocation.<sup>e</sup> In accordance with the exchange agreement between the noted agencies, Metropolitan assumed responsibility for payment of variable OMP&R costs on the exchange water in reaches beyond Reach 22B, and Desert and Coachella for such costs from the Delta through Reach 22B. The adjustment in deliveries in Reach 22B provides for compliance with provisions for the repayment of costs under the agreement. In 1993 and after, the exchange takes place in Reach 26A.

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 14 of 17

Calendar Year	CALIFORNIA AQUEDUCT (continued)										
	MOJAVE DIVISION (continued)			SANTA ANA DIVISION							
	Reach 24 (continued)			Reach 26A					Reach 28G	Reach 28H	
	Metropolitan <sup>e</sup>	Mojave	San Bernardino	Coachella <sup>a</sup>	Desert <sup>a</sup>	Metropolitan <sup>e</sup>	San Bernardino <sup>f</sup>	San Gabriel	Metropolitan	Coachella	Desert
	[153]	[154]	[155]	[156]	[157]	[158]	[159]	[160]	[161]	[162]	[163]
1962	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	1,275	0	0	0	0
1973	0	0	0	0	0	444	32,426	0	18,942	0	0
1974	0	0	0	0	0	84,981	16,605	612	0	0	0
1975	0	0	0	0	0	169,960	13,865	5,450	0	0	0
1976	0	0	0	0	0	215,312	12,273	6,071	0	0	0
1977	0	0	0	0	0	64,823	24,833	8,996	0	0	0
1978	0	0	0	0	0	297,708	4,055	7,771	0	0	0
1979	0	0	0	0	0	260,903	18	290	0	0	0
1980	0	0	0	0	0	300,345	0	1,085	0	0	0
1981	0	0	0	0	0	395,678	16,021	3,619	0	0	0
1982	0	0	0	0	0	214,566	8,409	12,599	0	0	0
1983	0	0	0	0	0	175,288	5,994	734	0	0	0
1984	0	0	0	0	0	122,311	5,556	7,656	0	0	0
1985	0	0	0	0	0	147,599	7,390	5,028	0	0	0
1986	0	0	0	0	0	215,265	6,421	9,454	0	0	0
1987	0	0	0	0	0	175,012	18,751	10,630	0	0	0
1988	0	0	0	0	0	247,101	21,386	8,948	0	0	0
1989	0	0	0	0	0	326,217	20,782	12,839	0	0	0
1990	0	0	0	0	0	399,387	18,831	16,649	0	0	0
1991	0	2,032	0	0	0	107,182	3,661	5,399	0	0	0
1992	0	9,334	0	0	0	219,524	3,358	7,908	0	0	0
1993	0	10,000	0	23,100	38,100	98,291	4,361	14,397	0	0	0
1994	0	819	0	14,102	23,257	192,979	9,135	15,230	0	0	0
1995	0	0	0	23,100	38,100	107,299	696	12,922	0	0	0
1996	0	0	0	62,219	102,622	73,438	6,064	15,989	0	0	0
1997	0	0	0	58,100	53,100	157,215	9,654	18,175	0	0	0
1998	0	0	0	78,100	58,100	36,770	1,878	9,310	0	6,582	7,708
1999	0	0	0	50,480	58,100	139,752	12,874	21,729	0	0	0
2000	0	0	0	42,323	58,234	326,647	0	15,140	0	0	0
2001	0	0	0	9,100	15,010	284,007	0	2,360	0	0	0
2002	0	0	0	16,755	27,640	301,700	26,399	24,851	0	0	0
2003	17,249	0	0	14,443	23,819	464,719	5,000	21,934	0	0	0
2004	0	0	0	15,465	21,190	428,316	40,000	12,541	0	0	0
2005	14,058	341	0	34,356	49,089	361,976	15,834	13,984	0	0	0
2006	0	0	0	121,100	50,000	404,594	20,000	16,284	0	0	0
2007	0	17,249	710	66,007	27,253	370,971	10,022	4,024	0	7,221	2,981
2008	0	3,679	411	40,171	24,643	210,520	187	7,212	0	6,620	1,785
2009	0	7,488	149	45,074	17,872	138,216	0	11,520	0	948	391
2010	0	9,331	26	53,866	18,398	463,654	20,008	19,180	0	30,415	12,257
2011	14,141	0	31	84,566	34,076	610,454	368	23,591	0	5,713	2,303
2012	2,994	0	0	98,793	33,806	362,047	50,723	22,058	0	16,575	8,266
2013	0	500	0	33,551	17,611	234,576	1,120	9,252	0	28,232	3,180
2014	0	0	202	9,966	3,049	95,402	1,345	1,200	0	1,103	0
2015	0	0	0	26,600	67	110,774	2,100	5,760	0	10,996	9,611
2016	0	0	101	82,742	34,016	475,102	1,024	16,088	0	9,768	0
2017	0	6,000	0	83,010	33,450	320,607	0	17,280	0	0	0
2018	0	6,000	0	83,010	33,450	320,607	0	17,280	0	0	0
2019	0	6,000	0	83,010	33,450	320,607	0	17,280	0	0	0
2020	0	6,000	0	83,010	33,450	320,607	0	17,280	0	0	0
2021	0	6,000	0	83,010	33,450	320,607	0	17,280	0	0	0
2022	0	6,000	0	83,010	33,450	320,607	0	17,280	0	0	0
2023	0	6,000	0	83,010	33,450	320,607	0	17,280	0	0	0
2024	0	6,000	0	83,010	33,450	320,607	0	17,280	0	0	0
2025	0	6,000	0	83,010	33,450	320,607	0	17,280	0	0	0
2026	0	6,000	0	83,010	33,450	320,607	0	17,280	0	0	0
2027	0	6,000	0	83,010	33,450	320,607	0	17,280	0	0	0
2028	0	6,000	0	83,010	33,450	320,607	0	17,280	0	0	0
2029	0	6,000	0	83,010	33,450	320,607	0	17,280	0	0	0
2030	0	6,000	0	83,010	33,450	320,607	0	17,280	0	0	0
2031	0	6,000	0	83,010	33,450	320,607	0	17,280	0	0	0
2032	0	6,000	0	83,010	33,450	320,607	0	17,280	0	0	0
2033	0	6,000	0	83,010	33,450	320,607	0	17,280	0	0	0
2034	0	6,000	0	83,010	33,450	320,607	0	17,280	0	0	0
2035	0	6,000	0	83,010	33,450	320,607	0	17,280	0	0	0
<b>TOTAL</b>	<b>48,442</b>	<b>174,773</b>	<b>1,630</b>	<b>2,681,269</b>	<b>1,462,702</b>	<b>16,687,495</b>	<b>480,702</b>	<b>794,789</b>	<b>18,942</b>	<b>124,173</b>	<b>48,482</b>

<sup>e</sup> In accordance with the exchange agreement between the noted agencies, Metropolitan assumed responsibility for payment of variable OMP&R costs on the exchange water in reaches beyond Reach 22B, and Desert and Coachella for such costs from the Delta through Reach 22B. The adjustment in deliveries in Reach 22B provides for compliance with provisions for the repayment of costs under the agreement. In 1993 and after, the exchange takes place in Reach 26A.

<sup>f</sup> Includes 1,650 acre-feet recaptured from groundwater storage in 1982, 10,000 acre-feet in 1987, and 8,749 acre-feet in 1988. This water was stored under DWR's Ground Water Demonstration Program.

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 15 of 17

Calendar Year	CALIFORNIA AQUEDUCT (continued)										
	SANTA ANA DIVISION (continued)										
	Reach 28H (continued)	Reach 28J			Reach EBX1			Reach EBX2C	Reach EBX3A	Reach EBX4B-G	Reach EBX4B
	Metropolitan	Coachella	Desert	Metropolitan	Coachella	Metropolitan	San Bernardino	San Bernardino	San Bernardino	San Gorgonio	San Gorgonio
	[164]	[165]	[166]	[167]	[168]	[169]	[170]	[171]	[172]	[173]	[174]
1962	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	251	0	0	0	0	0	0	0
1976	55	0	0	2,000	0	0	0	0	0	0	0
1977	43	0	0	2,442	0	0	0	0	0	0	0
1978	48	0	0	64,054	0	0	0	0	0	0	0
1979	1,290	0	0	94,353	0	0	0	0	0	0	0
1980	3,013	0	0	91,532	0	0	0	0	0	0	0
1981	4,365	0	0	149,405	0	0	0	0	0	0	0
1982	3,961	0	0	155,629	0	0	0	0	0	0	0
1983	6,645	0	0	41,616	0	0	0	0	0	0	0
1984	109,743	0	0	5,672	0	0	0	0	0	0	0
1985	182,781	0	0	6,538	0	0	0	0	0	0	0
1986	131,439	0	0	30,071	0	0	0	0	0	0	0
1987	144,743	0	0	26,315	0	0	0	0	0	0	0
1988	199,641	0	0	22,209	0	0	0	0	0	0	0
1989	247,430	0	0	51,462	0	0	0	0	0	0	0
1990	257,796	0	0	36,060	0	0	0	0	0	0	0
1991	38,832	0	0	5,958	0	0	0	0	0	0	0
1992	85,341	0	0	12,223	0	0	0	0	0	0	0
1993	61,841	0	0	4,588	0	0	0	0	0	0	0
1994	134,262	0	0	4,725	0	0	0	0	0	0	0
1995	117,762	0	0	21,099	0	0	0	0	0	0	0
1996	144,906	0	0	12,418	0	0	0	0	0	0	0
1997	107,853	0	0	47,777	0	0	0	0	0	0	0
1998	77,473	1,027	4,839	50,411	0	0	0	0	0	0	0
1999	206,689	0	0	8,163	0	0	0	0	0	0	0
2000	379,713	0	0	7,864	0	5,466	18,399	0	0	0	0
2001	260,984	0	0	33,414	0	0	26,488	0	0	0	0
2002	340,635	0	0	41,552	0	1,427	37,069	0	0	0	0
2003	246,485	0	0	50,776	0	74,496	16,703	1,793	2,617	0	116
2004	357,995	0	0	20,437	0	120,338	13,229	1,430	2,371	0	841
2005	242,245	0	0	114,499	8,163	153,700	12,715	966	2,035	0	692
2006	342,734	0	0	32,242	0	147,432	11,832	885	2,614	3,471	807
2007	271,874	0	0	48,923	0	94,208	38,151	3,130	5,103	3,758	177
2008	175,460	0	0	10,432	0	16,745	25,038	686	8,823	3,863	1,042
2009	126,265	0	0	5,849	0	18,314	25,041	4,090	10,066	4,499	1,898
2010	129,145	1,311	528	65,439	0	0	19,190	617	9,538	2,555	5,685
2011	213,215	0	0	51,638	0	0	19,578	699	9,384	1,213	9,290
2012	86,266	2,219	3,029	36,875	0	0	27,534	3,177	9,604	0	11,010
2013	45,039	4,756	0	40,494	0	0	19,850	3,034	8,081	0	9,445
2014	0	1,801	0	998	0	0	4,610	375	4,424	0	5,044
2015	25,883	0	1,539	977	0	0	15,970	382	5,928	0	3,481
2016	38,920	0	0	58,779	0	0	51,322	278	1,953	0	8,335
2017	138,069	0	0	0	0	0	61,160	0	0	2,200	8,180
2018	71,220	0	0	0	0	0	59,058	0	0	2,300	8,080
2019	71,220	0	0	0	0	0	61,560	0	0	2,400	7,980
2020	71,220	0	0	0	0	0	61,560	0	0	2,500	7,880
2021	71,220	0	0	0	0	0	61,560	0	0	2,500	7,880
2022	71,220	0	0	0	0	0	61,560	0	0	2,500	7,880
2023	71,220	0	0	0	0	0	61,560	0	0	2,500	7,880
2024	71,220	0	0	0	0	0	61,560	0	0	2,500	7,880
2025	71,220	0	0	0	0	0	61,560	0	0	2,500	7,880
2026	71,220	0	0	0	0	0	61,560	0	0	2,500	7,880
2027	71,220	0	0	0	0	0	61,560	0	0	2,500	7,880
2028	71,220	0	0	0	0	0	61,560	0	0	2,500	7,880
2029	71,220	0	0	0	0	0	61,560	0	0	2,500	7,880
2030	71,220	0	0	0	0	0	61,560	0	0	2,500	7,880
2031	71,220	0	0	0	0	0	61,560	0	0	2,500	7,880
2032	71,220	0	0	0	0	0	61,560	0	0	2,500	7,880
2033	71,220	0	0	0	0	0	61,560	0	0	2,500	7,880
2034	71,220	0	0	0	0	0	61,560	0	0	2,500	7,880
2035	71,220	0	0	0	0	0	61,560	0	0	2,500	7,880
TOTAL	6,970,839	11,114	9,935	1,568,159	8,163	632,126	1,549,457	21,542	82,541	66,259	208,183

TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 16 of 17

Calendar Year	CALIFORNIA AQUEDUCT (continued)									
	WEST BRANCH									
	Reach 29F	Reach 29H		Reach 30						
	AVEK	Castaic Lake	Ventura	Castaic Lake	Coachella	Desert	Metropolitan <sup>9</sup>	San Bernardino	Santa Barbara	Ventura
	[175]	[176]	[177]	[178]	[179]	[180]	[181]	[182]	[183]	[184]
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0
1972	53	0	0	0	0	0	71,938	0	0	0
1973	20	0	0	0	0	0	155,297	0	0	0
1974	36	0	0	0	0	0	209,136	0	0	0
1975	26	0	0	0	0	0	374,280	0	0	0
1976	24	0	0	0	0	0	420,684	0	0	0
1977	0	0	0	0	0	0	122,447	0	0	0
1978	0	0	0	0	0	0	171,139	0	0	0
1979	0	0	0	7	0	0	145,591	0	0	0
1980	0	0	0	1,210	0	0	164,721	0	0	0
1981	0	0	0	5,761	0	0	277,503	0	0	0
1982	0	0	0	9,516	0	0	351,362	0	0	0
1983	0	0	0	9,476	0	0	157,519	0	0	0
1984	0	0	0	11,477	0	0	260,624	0	0	0
1985	0	0	0	12,401	0	0	390,696	0	0	0
1986	0	0	0	13,928	0	0	379,275	0	0	0
1987	0	0	0	16,167	0	0	417,285	0	0	0
1988	0	0	0	18,904	0	0	488,265	0	0	0
1989	0	0	0	21,719	0	0	589,962	0	0	0
1990	0	0	4,836	22,139	0	0	764,380	0	0	0
1991	0	0	988	3,846	0	0	257,835	0	1,240	0
1992	0	0	0	14,812	0	0	420,849	0	0	0
1993	6	0	0	13,787	0	0	437,470	0	0	0
1994	0	0	0	14,919	0	0	475,900	0	0	0
1995	0	0	0	17,747	0	0	139,882	0	0	0
1996	0	0	0	18,448	0	0	267,618	0	0	0
1997	11	0	0	22,842	10,240	16,890	271,379	0	0	1,850
1998	7	0	0	19,782	0	0	187,277	0	0	1,850
1999	0	0	0	28,813	0	0	327,001	0	0	1,850
2000	0	0	2,200	31,085	0	0	632,991	0	0	1,850
2001	0	0	0	30,701	0	0	444,764	0	0	1,850
2002	0	0	3,148	42,080	0	0	723,605	8,601	0	1,850
2003	0	6,768	3,150	44,967	0	0	678,964	0	0	1,850
2004	0	0	4,047	47,463	0	0	797,294	0	0	1,203
2005	0	0	0	36,747	0	0	538,839	0	0	1,665
2006	0	0	0	40,017	0	0	574,679	0	0	1,850
2007	0	0	1,890	45,919	0	0	711,831	0	0	1,110
2008	0	0	1,980	42,878	0	0	485,156	0	0	1,818
2009	0	0	3,150	38,784	0	0	589,294	0	0	741
2010	0	0	3,150	31,288	0	0	376,877	0	0	925
2011	0	0	2,520	31,445	0	0	375,921	0	0	1,480
2012	24	0	3,150	36,153	0	0	553,244	0	0	1,203
2013	47	0	2,242	44,126	0	0	565,849	0	0	648
2014	0	0	0	29,448	0	0	275,992	0	0	93
2015	0	0	630	29,189	0	0	435,892	0	0	370
2016	0	0	1,890	30,061	0	0	467,816	0	0	1,110
2017	0	0	1,890	55,120	0	0	597,323	0	0	1,110
2018	0	0	1,890	55,120	0	0	576,868	0	0	1,110
2019	0	0	1,890	55,120	0	0	576,868	0	0	1,110
2020	0	0	1,890	55,120	0	0	576,868	0	0	1,110
2021	0	0	1,890	55,120	0	0	576,868	0	0	1,110
2022	0	0	1,890	55,120	0	0	576,868	0	0	1,110
2023	0	0	1,890	55,120	0	0	576,868	0	0	1,110
2024	0	0	1,890	55,120	0	0	576,868	0	0	1,110
2025	0	0	1,890	55,120	0	0	576,868	0	0	1,110
2026	0	0	1,890	55,120	0	0	576,868	0	0	1,110
2027	0	0	1,890	55,120	0	0	576,868	0	0	1,110
2028	0	0	1,890	55,120	0	0	576,868	0	0	1,110
2029	0	0	1,890	55,120	0	0	576,868	0	0	1,110
2030	0	0	1,890	55,120	0	0	576,868	0	0	1,110
2031	0	0	1,890	55,120	0	0	576,868	0	0	1,110
2032	0	0	1,890	55,120	0	0	576,868	0	0	1,110
2033	0	0	1,890	55,120	0	0	576,868	0	0	1,110
2034	0	0	1,890	55,120	0	0	576,868	0	0	1,110
2035	0	0	1,890	55,120	0	0	576,868	0	0	1,110
TOTAL	254	6,768	74,881	1,977,332	10,240	16,890	28,907,270	8,601	1,240	48,256

<sup>9</sup> Deliveries exclude 6,171 acre-feet of 1982 exchange water.



TABLE B-5A Annual Water Quantities Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)

Sheet 17 of 17

Calendar Year	CALIFORNIA AQUEDUCT (continued)								Total	GRAND TOTAL
	COASTAL BRANCH									
	Reach 31A					Reach 33A				
	AVEK	Castaic Lake	Dudley Ridge	Kern		Kings	San Luis Obispo	Santa Barbara		
				Municipal and Industrial	Agricultural					
1962	[185] 0	[186] 0	[187] 0	[188] 0	[189] 0	[190] 0	[191] 0	[192] 0	[193] 0	[194] 8,906
1963	0	0	0	0	0	0	0	0	0	12,645
1964	0	0	0	0	0	0	0	0	0	20,911
1965	0	0	0	0	0	0	0	0	0	34,026
1966	0	0	0	0	0	0	0	0	0	54,913
1967	0	0	0	0	0	0	0	0	0	56,763
1968	0	7,382	0	0	71,657	0	0	0	192,188	294,457
1969	0	9,970	0	0	52,094	0	0	0	195,705	268,104
1970	0	11,739	0	0	71,910	0	0	0	276,211	369,459
1971	0	12,490	0	0	98,481	0	0	0	553,081	654,442
1972	0	13,905	0	0	107,850	0	0	0	895,006	1,037,770
1973	0	9,418	0	0	69,227	0	0	0	638,930	737,532
1974	0	9,700	0	0	68,474	0	0	0	783,984	878,947
1975	0	10,700	0	0	74,516	0	0	0	1,129,728	1,230,830
1976	0	11,700	0	0	78,358	0	0	0	1,245,662	1,380,124
1977	0	5,075	0	0	35,504	0	0	0	465,442	582,381
1978	0	11,362	0	0	81,242	0	0	0	1,339,268	1,458,733
1979	0	19,138	0	0	104,017	0	0	0	1,537,075	1,666,457
1980	0	13,882	0	0	97,497	0	0	0	1,413,363	1,536,456
1981	0	12,700	0	0	97,054	0	0	0	1,779,479	1,918,563
1982	0	12,700	0	0	83,076	0	0	0	1,641,571	1,750,862
1983	0	12,659	0	0	87,859	0	0	0	1,089,626	1,187,156
1984	0	12,741	0	0	119,098	0	0	0	1,489,814	1,591,416
1985	0	12,099	0	0	110,124	0	0	0	1,863,544	1,990,295
1986	0	13,301	0	0	118,298	0	0	0	1,882,290	1,999,155
1987	0	11,821	0	0	116,259	0	0	0	1,984,570	2,131,608
1988	0	11,534	0	0	109,435	0	0	0	2,221,538	2,385,122
1989	0	14,645	0	0	102,156	0	0	0	2,686,838	2,853,747
1990	0	6,440	0	0	103,362	0	0	0	2,398,121	2,582,151
1991	0	716	0	0	780	0	0	0	489,489	549,113
1992	0	5,887	0	0	73,748	0	0	0	1,374,775	1,471,454
1993	0	4,157	0	0	90,764	0	0	0	2,173,352	2,315,235
1994	0	9,422	0	200	77,536	0	0	0	1,727,504	1,861,976
1995	0	9,486	0	0	85,050	0	0	0	1,926,835	2,031,423
1996	0	14,052	0	0	100,578	0	0	0	2,429,928	2,543,472
1997	0	4,870	0	0	97,020	0	1,099	7,439	2,263,966	2,405,444
1998	0	311	0	0	86,879	0	3,592	18,618	1,657,381	1,764,963
1999	0	4,086	0	0	92,095	0	3,743	20,137	2,755,025	2,898,961
2000	0	8,395	0	0	85,215	0	3,962	22,741	3,390,079	3,569,072
2001	0	1,238	0	0	63,448	0	4,283	18,946	2,034,350	2,175,194
2002	0	2,737	0	0	65,055	0	4,355	27,636	2,738,943	2,909,555
2003	0	4,001	0	0	65,691	0	4,453	26,968	3,151,625	3,327,811
2004	0	3,776	0	0	66,498	0	4,165	29,705	3,050,652	3,230,590
2005	0	2,709	4,684	0	68,190	0	4,251	23,344	3,597,829	3,753,874
2006	0	2,735	0	0	85,214	0	4,209	23,275	3,526,551	3,693,938
2007	0	6,071	0	0	93,954	49	3,776	27,740	3,088,763	3,284,475
2008	0	0	0	17,059	68,385	0	3,402	18,393	1,978,428	2,152,219
2009	0	1	0	0	83,255	0	3,801	15,452	2,065,868	2,227,564
2010	0	768	2,967	0	81,047	276	3,757	17,775	2,690,242	2,832,658
2011	0	1,746	200	0	86,594	238	3,819	21,050	3,513,232	3,668,980
2012	33,511	2,404	0	0	50,050	0	3,944	19,474	2,726,325	2,881,783
2013	0	6,128	0	0	82,887	0	3,681	18,018	2,023,225	2,224,875
2014	0	0	0	0	74,406	0	3,206	16,757	1,111,222	1,242,286
2015	0	0	7,500	0	71,616	0	3,473	11,638	1,339,751	1,498,367
2016	1,489	2,000	0	0	70,395	186	4,032	25,097	2,271,712	2,435,124
2017	0	2,000	0	0	52,810	183	13,056	27,292	2,294,775	2,467,088
2018	0	2,000	0	0	52,810	183	13,125	27,292	2,256,894	2,431,901
2019	0	2,000	0	0	52,810	183	13,161	27,292	2,306,588	2,479,572
2020	0	2,000	0	0	52,810	183	13,237	27,292	2,306,184	2,480,537
2021	0	2,000	0	0	52,810	183	13,237	27,292	2,306,184	2,480,537
2022	0	2,000	0	0	52,810	183	13,237	27,292	2,306,184	2,480,537
2023	0	2,000	0	0	52,810	183	13,237	27,292	2,306,184	2,480,537
2024	0	2,000	0	0	52,810	183	13,237	27,292	2,306,184	2,480,537
2025	0	2,000	0	0	52,810	183	13,237	27,292	2,306,184	2,480,537
2026	0	2,000	0	0	52,810	183	13,237	27,292	2,306,184	2,480,537
2027	0	2,000	0	0	52,810	183	13,237	27,292	2,306,184	2,480,537
2028	0	2,000	0	0	52,810	183	13,237	27,292	2,306,184	2,480,537
2029	0	2,000	0	0	52,810	183	13,237	27,292	2,306,184	2,480,537
2030	0	2,000	0	0	52,810	183	13,237	27,292	2,306,184	2,480,537
2031	0	2,000	0	0	52,810	183	13,237	27,292	2,306,184	2,480,537
2032	0	2,000	0	0	52,810	183	13,237	27,292	2,306,184	2,480,537
2033	0	2,000	0	0	52,810	183	13,237	27,292	2,306,184	2,480,537
2034	0	2,000	0	0	52,810	183	13,237	27,292	2,306,184	2,480,537
2035	0	2,000	0	0	52,810	183	13,237	27,292	2,306,184	2,480,537
TOTAL	35,000	402,797	15,351	17,259	5,027,288	4,226	326,137	928,751	134,557,287	144,691,490

## Tables B-5A-Adj through B-31

Note: Where applicable, the projected data values shown in this appendix are shaded and the bill year data are in **bold** type.

**TABLE B-5A-Adj Annual Water Quantity Adjustments to Water Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)**

Sheet 1 of 5

Calendar Year	CALIFORNIA AQUEDUCT												
	SAN LUIS DIVISION												
	Reach 1		Reach 3A										
	Santa Clara	Alameda-Zone 7	Alameda County	AVEK	Castaic Lake	Crestline	Dudley Ridge	Kern (Agricultural)	Kings	Metropolitan	Mojave	Palmdale	San Bernardino
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]
1962	0	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	(11,135)	0	0	0	0	0
2001	0	0	0	0	0	0	0	(11,487)	0	0	0	0	0
2002	0	0	0	0	0	0	0	(9,332)	0	0	0	0	0
2003	0	0	0	0	0	0	0	(18,428)	0	0	0	0	0
2004	0	0	0	0	0	0	0	(866)	0	0	0	0	0
2005	0	0	0	0	0	0	(576)	(20,082)	0	0	0	0	0
2006	0	0	0	0	0	0	0	(20,239)	0	0	0	0	0
2007	0	0	0	0	0	0	0	(9,867)	0	0	0	0	0
2008	(8,885)	0	0	0	0	0	0	(99,439)	0	0	0	0	0
2009	0	0	0	(5,926)	(38)	(1)	(28)	(88,699)	0	(815)	(5)	(15)	(21)
2010	0	0	0	0	(3,300)	0	0	(87,370)	0	(177,476)	0	0	0
2011	0	0	0	0	0	0	0	(56,909)	0	(106,423)	0	(2,548)	0
2012	0	0	0	0	0	0	(6,068)	(60,762)	0	0	0	0	0
2013	0	0	0	0	0	0	0	(11,846)	0	0	0	0	0
2014	0	0	0	(32)	(34)	(5)	(36)	(114,007)	(2)	(789)	(6)	(14)	(23)
2015	0	(6,264)	(8,763)	0	0	0	(16,796)	(76,139)	0	0	0	0	0
2016	0	0	(1,208)	0	0	0	(503)	(57,875)	0	0	0	0	0
2017	0	0	0	0	0	0	0	0	0	0	0	0	0
2018	0	0	0	0	0	0	0	0	0	0	0	0	0
2019	0	0	0	0	0	0	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	(8,885)	(6,264)	(9,971)	(5,958)	(3,372)	(6)	(24,007)	(754,482)	(2)	(285,503)	(11)	(2,577)	(44)

**TABLE B-5A-Adj Annual Water Quantity Adjustments to Water Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)**

Sheet 2 of 5

Calendar Year	CALIFORNIA AQUEDUCT (continued)												
	SAN LUIS DIVISION (continued)									SOUTH SAN JOAQUIN DIVISION			
	Reach 3A (continued)							Reach 4		Reach 7		REACH 10A	
	San Gabriel	San Geronio	San Luis Obispo	Santa Barbara	Santa Clara	Tulare	Ventura	Kern (Agricultural)	Tulare	Kern (Agricultural)	Tulare	Alameda-Zone 7	Alameda County
	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]	[23]	[24]	[25]	[26]
1962	0	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	(12,806)	0	(24,167)	(2,981)	0	0
2001	0	0	0	0	0	0	0	0	0	0	(25,164)	(1,807)	0
2002	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	(4,000)	0	0	(6,020)	0	0	0	0
2005	0	0	0	0	(20,000)	(277)	0	0	0	0	0	0	0
2006	0	0	0	0	(53,573)	0	0	0	0	0	0	0	0
2007	0	0	0	0	0	0	0	0	0	0	0	0	(5,000)
2008	0	0	0	0	(3,681)	0	0	0	0	0	0	(7,000)	(10,000)
2009	(4)	(4)	(2)	(19)	(1,000)	(49)	(1)	0	0	0	0	0	(3,083)
2010	0	0	0	0	(44,668)	(17,551)	0	0	0	0	0	0	0
2011	0	0	0	0	(51,404)	(11,096)	0	0	0	0	0	0	0
2012	0	0	0	0	0	(9,366)	0	0	0	0	0	0	0
2013	0	0	0	0	0	(6,054)	0	0	0	0	0	(4,000)	(4,000)
2014	(6)	(13)	(134)	(926)	0	(8)	0	0	0	0	0	(8,074)	(13,652)
2015	0	0	(27)	(181)	(21,076)	0	0	0	0	0	0	(11,185)	(14,115)
2016	0	0	0	0	(6,706)	0	0	0	0	0	0	(324)	0
2017	0	0	0	0	0	0	0	0	0	0	0	0	0
2018	0	0	0	0	0	0	0	0	0	0	0	0	0
2019	0	0	0	0	0	0	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL</b>	<b>(10)</b>	<b>(17)</b>	<b>(163)</b>	<b>(1,126)</b>	<b>(202,108)</b>	<b>(48,401)</b>	<b>(1)</b>	<b>(12,806)</b>	<b>(6,020)</b>	<b>(24,167)</b>	<b>(28,145)</b>	<b>(32,390)</b>	<b>(49,850)</b>

**TABLE B-5A-Adj Annual Water Quantity Adjustments to Water Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)**

Sheet 3 of 5

Calendar Year	CALIFORNIA AQUEDUCT (continued)												
	SOUTH SAN JOAQUIN DIVISION (continued)												
	Reach 10A (continued)							Reach 12E					
	Castaic Lake	Coachella	Desert	Kern (Agricultural)	Metropolitan	San Bernardino	Santa Clara	Alameda-Zone 7	AVEK	Castaic Lake	Coachella	Desert	Kern (Agricultural)
	[27]	[28]	[29]	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]
1962	0	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	0	0	0	(1,813)	(31,500)	0	(30,000)	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0	0	0	0	0	(14,638)
2003	0	0	0	0	(10,000)	0	0	0	0	0	0	0	(5,170)
2004	0	0	0	(3)	(93,555)	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	0	0	0	0	0	0	0	0	0	0	0	0	0
2007	0	0	0	(12,469)	(93,986)	0	(20,000)	0	0	(11,000)	0	0	(16,618)
2008	0	0	(4,864)	0	(99,024)	0	(10,000)	0	(8,393)	(11,000)	(3,000)	(3,486)	(103,683)
2009	(4,950)	0	0	(7,733)	(65,499)	0	(27,319)	0	(6,393)	(11,000)	(3,000)	0	(105,145)
2010	0	0	0	(56)	0	0	0	0	0	(2,750)	(8,393)	0	(43,833)
2011	0	0	0	0	0	0	0	0	0	0	0	0	(14,223)
2012	0	0	0	0	0	0	(17,000)	0	0	0	(4,000)	0	(12,815)
2013	0	0	0	(24,626)	(37,544)	0	(27,308)	0	0	0	(16,500)	0	(34,355)
2014	(4,951)	0	0	(7,476)	(30,049)	(694)	(29,134)	(5,901)	0	(13,824)	(5,000)	0	(90,996)
2015	0	0	0	(20,190)	(32,517)	0	(40,572)	(5,029)	0	(13,993)	(9,500)	0	(56,927)
2016	0	0	0	(626)	(12,440)	0	(1,122)	0	0	0	0	0	(36,893)
2017	0	0	0	0	0	0	0	0	0	0	0	0	0
2018	0	0	0	0	0	0	0	0	0	0	0	0	0
2019	0	0	0	0	0	0	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL</b>	<b>(9,901)</b>	<b>0</b>	<b>(4,864)</b>	<b>(74,992)</b>	<b>(506,114)</b>	<b>(694)</b>	<b>(202,455)</b>	<b>(10,930)</b>	<b>(14,786)</b>	<b>(63,567)</b>	<b>(49,393)</b>	<b>(3,486)</b>	<b>(535,296)</b>



**TABLE B-5A-Adj Annual Water Quantity Adjustments to Water Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)**

Sheet 4 of 5

Calendar Year	CALIFORNIA AQUEDUCT (continued)										
	SOUTH SAN JOAQUIN DIVISION (continued)										
	Reach 12E (continued)			Reach 13B							
	Metropolitan	San Bernardino	Santa Clara	Alameda-Zone 7	Alameda County	Dudley Ridge	Kern (Agricultural)	Metropolitan	Palmdale	San Bernardino	Santa Clara
	[40]	[41]	[42]	[43]	[44]	[45]	[46]	[47]	[48]	[49]	[50]
1962	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0	0	0	0
2001	(20,800)	0	0	0	0	0	(132,228)	0	0	0	0
2002	0	0	0	0	0	0	(22,161)	0	0	0	0
2003	(5,073)	0	0	0	0	0	(15,316)	(24,523)	0	0	0
2004	(17,765)	0	0	0	0	0	(43,985)	(4,813)	0	0	0
2005	0	0	0	0	0	0	0	0	0	0	0
2006	0	0	0	0	0	0	0	0	0	0	0
2007	(5,000)	0	0	0	0	0	(257,750)	0	(4,926)	0	0
2008	(8,402)	0	0	0	0	0	(228,579)	(25,721)	0	0	0
2009	(14,516)	0	(6,134)	0	0	0	(186,044)	0	0	0	0
2010	(52,413)	0	0	0	0	0	(59,451)	0	0	0	0
2011	(23,419)	0	0	0	0	0	(29,041)	0	0	0	0
2012	0	0	0	0	0	(6,068)	(103,364)	0	0	0	0
2013	(31,478)	(1,500)	0	0	0	0	(160,286)	(1,033)	0	0	(17,692)
2014	(9,882)	(400)	0	(931)	(1,088)	(16,789)	(161,077)	(17,184)	0	(3,906)	(5,253)
2015	(6,899)	0	(288)	(1,600)	(2,097)	(14,460)	(112,781)	(21,934)	0	0	(4,625)
2016	0	0	0	0	0	(1,350)	(26,683)	0	0	0	0
2017	0	0	0	0	0	0	0	0	0	0	0
2018	0	0	0	0	0	0	0	0	0	0	0
2019	0	0	0	0	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL</b>	<b>(195,647)</b>	<b>(1,900)</b>	<b>(6,422)</b>	<b>(2,531)</b>	<b>(3,185)</b>	<b>(38,667)</b>	<b>(1,538,746)</b>	<b>(95,208)</b>	<b>(4,926)</b>	<b>(3,906)</b>	<b>(27,570)</b>

**TABLE B-5A-Adj Annual Water Quantity Adjustments to Water Delivered from Each Aqueduct Reach to Each Contractor (acre-feet)**

Sheet 5 of 5

Calendar Year	CALIFORNIA AQUEDUCT (continued)											GRAND TOTAL
	SOUTH SAN JOAQUIN DIVISION (continued)						MOJAVE DIVISION				SANTA ANA DIVISION	
	Reach 14B	Reach 14C		Reach 15A	Reach 16A	Reach 19	Reach 22A	Reach 22B		Reach 24	Reach EBX2C	
	Kern (Agricultural)	Kern (Agricultural)	Metropolitan	Kern (Agricultural)	Kern (Agricultural)	AVEK	AVEK	AVEK	Metropolitan	Metropolitan	San Bernardino	
	[51]	[52]	[53]	[54]	[55]	[56]	[57]	[58]	[59]	[60]	[61]	[62]
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0	0	0	0	(51,089)
2001	(396)	(242)	0	0	0	0	0	(152)	0	0	0	(255,589)
2002	0	0	0	0	0	0	0	0	0	0	0	(46,131)
2003	0	0	(12,380)	0	0	0	0	0	0	0	0	(90,890)
2004	0	0	(25,512)	0	0	0	0	0	0	0	(844)	(197,363)
2005	0	0	0	0	0	0	0	0	0	0	(7)	(40,942)
2006	0	0	0	0	0	0	0	0	0	0	(2)	(73,814)
2007	0	0	(24,225)	0	0	0	0	0	(8,751)	(17,249)	0	(486,841)
2008	0	0	(37,602)	0	0	0	0	0	(4,816)	(3,679)	(6)	(681,260)
2009	(1,706)	(5,168)	(54,948)	(2,788)	(444)	0	0	0	0	(7,488)	(11)	(609,996)
2010	(1,867)	(4,761)	(32,758)	(2,913)	0	0	0	0	0	(2,891)	0	(542,451)
2011	0	0	(16,065)	0	0	0	0	0	0	0	0	(311,128)
2012	(73)	(862)	(10,010)	(405)	0	0	0	0	0	0	0	(230,793)
2013	(264)	(4,691)	(33,205)	(406)	0	0	0	0	0	0	0	(416,788)
2014	(6,898)	(10,773)	(47,358)	(5,962)	0	0	(1,046)	0	0	0	0	(614,333)
2015	(10,554)	(11,108)	(70,200)	(5,560)	0	0	(1,516)	0	0	0	0	(596,896)
2016	(4,452)	(4,073)	(29,819)	(2,115)	0	0	(539)	0	0	0	0	(186,728)
2017	0	0	0	0	0	0	0	0	0	0	0	0
2018	0	0	0	0	0	0	0	0	0	0	0	0
2019	0	0	0	0	0	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	(26,210)	(41,678)	(394,082)	(20,149)	(444)	0	(3,101)	(152)	(13,567)	(31,307)	(870)	(5,433,032)

## Tables B-5B through B-31

Note: Where applicable, the projected data values shown in this appendix are shaded and the bill year data are in **bold** type.

TABLE B-5B Annual Water Quantities Delivered to Each Contractor (acre-feet)

Sheet 1 of 4

Calendar Year	NORTH BAY AREA			SOUTH BAY AREA <sup>a</sup>				CENTRAL COASTAL AREA		
	Napa <sup>b</sup>	Solano	Total	Alameda-Zone 7	Alameda County	Santa Clara	Total	San Luis Obispo	Santa Barbara	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1962	0	0	0	494	8,412	0	8,906	0	0	0
1963	0	0	0	1,731	10,914	0	12,645	0	0	0
1964	0	0	0	1,673	19,238	0	20,911	0	0	0
1965	0	0	0	2,605	16,407	15,014	34,026	0	0	0
1966	0	0	0	5,511	14,864	34,538	54,913	0	0	0
1967	0	0	0	4,780	12,882	39,101	56,763	0	0	0
1968	1,214	0	1,214	6,133	24,817	70,105	101,055	0	0	0
1969	2,687	0	2,687	6,635	813	62,264	69,712	0	0	0
1970	3,618	0	3,618	9,249	0	80,311	89,560	0	0	0
1971	2,521	0	2,521	5,017	5,961	87,606	98,584	0	0	0
1972	3,647	0	3,647	10,489	27,671	100,266	138,426	0	0	0
1973	3,792	0	3,792	2,975	2,521	88,582	94,078	0	0	0
1974	4,870	0	4,870	1,314	4	88,000	89,318	0	0	0
1975	6,840	0	6,840	4,618	986	88,000	93,604	0	0	0
1976	7,122	0	7,122	17,131	21,300	88,000	126,431	0	0	0
1977	8,226	0	8,226	12,644	18,840	76,220	107,704	0	0	0
1978	6,034	0	6,034	10,984	5,863	95,727	112,574	0	0	0
1979	6,561	0	6,561	19,325	10,874	91,991	122,190	0	0	0
1980	6,707	0	6,707	16,790	11,034	88,000	115,824	0	0	0
1981	9,001	0	9,001	19,590	21,917	88,000	129,507	0	0	0
1982	1,213	0	1,213	13,123	6,316	88,000	107,439	0	0	0
1983	2,287	0	2,287	4,766	3,157	86,733	94,656	0	0	0
1984	2,923	0	2,923	6,784	3,338	88,000	98,122	0	0	0
1985	4,039	0	4,039	15,072	19,016	88,000	122,088	0	0	0
1986	3,519	1,400	4,919	10,609	12,379	88,000	110,988	0	0	0
1987	7,693	1,550	9,243	23,406	25,390	88,000	136,796	0	0	0
1988	5,392	9,726	15,118	25,830	33,464	87,961	147,255	0	0	0
1989	6,195	17,256	23,451	26,227	26,042	90,000	142,269	0	0	0
1990	6,940	19,131	26,071	33,034	31,703	92,000	156,737	0	0	0
1991	1,380	6,972	8,352	9,411	12,648	28,200	50,259	0	1,240	1,240
1992	4,001	14,773	18,774	14,669	19,153	42,839	76,661	0	0	0
1993	5,286	29,180	34,466	33,635	10,271	62,065	105,971	0	0	0
1994	6,792	25,256	32,048	20,542	22,911	57,115	100,568	0	0	0
1995	5,182	21,345	26,527	30,091	17,793	28,756	76,640	0	0	0
1996	4,893	29,999	34,892	18,903	19,662	89,850	128,415	100	0	100
1997	4,341	33,530	37,871	27,522	24,063	95,601	147,186	1,199	7,439	8,638
1998	5,359	29,766	35,125	17,941	19,075	63,410	100,426	3,592	18,618	22,210
1999	5,304	34,753	40,057	50,910	37,652	82,945	171,507	3,743	20,137	23,880
2000	4,958	37,015	41,973	58,617	35,978	101,988	196,583	3,962	22,741	26,703
2001	9,345	34,586	43,931	34,409	18,004	77,922	130,335	4,283	18,946	23,229
2002	6,875	38,560	45,435	53,261	27,811	62,186	143,258	4,355	27,636	31,991
2003	7,646	33,951	41,597	45,450	36,590	108,981	191,021	4,453	26,968	31,421
2004	8,134	43,002	51,136	52,364	27,884	59,458	139,706	4,165	29,705	33,870
2005	7,669	37,819	45,488	47,512	44,599	128,249	220,360	4,251	23,344	27,595
2006	7,789	35,516	43,305	54,527	43,079	128,210	225,816	4,209	23,275	27,484
2007	10,957	47,300	58,257	40,157	24,391	75,382	139,930	3,776	27,740	31,516
2008	13,292	41,320	54,612	41,186	22,902	59,160	123,248	3,402	18,393	21,795
2009	10,904	30,950	41,854	31,087	19,496	76,363	126,946	3,801	15,452	19,253
2010	12,417	30,816	43,233	47,343	22,571	107,871	177,785	3,757	17,775	21,532
2011	11,314	27,995	39,309	52,726	36,610	129,062	218,398	3,819	23,598	27,417
2012	9,907	29,347	39,254	55,239	20,831	63,794	139,864	3,944	19,474	23,418
2013	12,538	35,869	48,407	44,856	23,640	84,623	153,119	3,681	18,018	21,699
2014	14,164	19,679	33,843	34,296	30,066	67,446	131,808	3,206	16,757	19,963
2015	11,199	23,836	35,035	32,444	27,259	82,888	142,591	3,473	11,638	15,111
2016	13,248	32,226	45,474	56,056	21,181	89,639	166,876	4,032	25,097	29,129
2017	17,415	28,655	46,070	48,371	25,200	62,502	136,073	13,125	27,292	40,417
2018	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,161	27,292	40,453
2019	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,237	27,292	40,529
2020	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,237	27,292	40,529
2021	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,237	27,292	40,529
2022	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,237	27,292	40,529
2023	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,237	27,292	40,529
2024	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,237	27,292	40,529
2025	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,237	27,292	40,529
2026	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,237	27,292	40,529
2027	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,237	27,292	40,529
2028	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,237	27,292	40,529
2029	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,237	27,292	40,529
2030	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,237	27,292	40,529
2031	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,237	27,292	40,529
2032	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,237	27,292	40,529
2033	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,237	27,292	40,529
2034	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,237	27,292	40,529
2035	17,415	28,654	46,069	48,371	25,200	60,000	133,571	13,237	27,292	40,529
<b>TOTAL</b>	<b>658,820</b>	<b>1,398,852</b>	<b>2,057,672</b>	<b>2,242,742</b>	<b>1,541,043</b>	<b>5,274,924</b>	<b>9,058,709</b>	<b>326,337</b>	<b>932,539</b>	<b>1,258,876</b>

<sup>a</sup> For the period June 1962 through November 1967, deliveries were supplied by non-project water.<sup>b</sup> For the period 1968 through 1987, deliveries are non-project water pumped through an interim facility.

TABLE B-5B Annual Water Quantities Delivered to Each Contractor (acre-feet)

Sheet 2 of 4

Calendar Year	SAN JOAQUIN VALLEY AREA								
	Dudley Ridge	Empire	Kern			Kings	Oak Flat	Tulare	Total
			Municipal and Industrial	Agricultural	Total				
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]
1962	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0
1968	26,360	1,978	0	127,384	127,384	900	3,084	25,100	184,806
1969	31,375	56	0	141,265	141,265	100	3,016	9,923	185,735
1970	40,407	3,942	0	204,634	204,634	0	5,911	9,578	264,472
1971	41,053	5,990	0	360,151	360,151	3,700	7,212	122,485	540,591
1972	42,443	5,795	0	490,781	490,781	1,400	8,166	258,393	806,978
1973	22,057	3,000	0	341,469	341,469	1,500	3,214	50,464	421,704
1974	33,390	3,000	23,708	323,292	347,000	1,500	3,471	72,289	460,650
1975	40,555	3,000	14,529	396,291	410,820	1,600	3,576	86,258	545,809
1976	41,421	3,000	46,719	392,531	439,250	1,600	4,112	58,811	548,194
1977	11,153	738	27,882	163,425	191,307	1,530	1,472	18,081	224,281
1978	51,747	454	76,895	590,452	667,347	2,070	3,906	12,053	737,577
1979	38,544	1,739	62,997	683,049	746,046	2,000	6,149	155,121	949,599
1980	41,000	894	45,943	588,557	634,500	2,200	5,700	75,444	759,738
1981	41,000	5,859	75,758	615,642	691,400	2,300	4,300	83,438	828,297
1982	41,000	361	47,477	697,823	745,300	1,750	3,838	18,551	810,800
1983	42,900	0	6,854	587,653	594,507	3,550	3,822	1,006	645,785
1984	45,100	0	90,904	769,696	860,600	3,100	5,700	5,743	920,243
1985	46,251	5,197	88,515	800,381	888,896	3,400	5,433	109,791	1,058,968
1986	50,249	1,170	77,240	829,101	906,341	3,700	5,107	79,355	1,045,922
1987	46,288	2,525	117,174	852,731	969,905	4,000	5,625	93,084	1,121,427
1988	47,994	3,475	122,409	887,111	1,009,520	4,000	4,412	95,866	1,165,267
1989	57,049	3,000	123,896	1,022,166	1,146,062	4,000	6,091	127,950	1,344,152
1990	36,296	1,279	127,837	584,611	712,448	2,000	2,922	57,070	812,015
1991	927	221	33,122	8,965	42,087	0	141	2,180	45,556
1992	23,770	1,354	62,326	420,894	483,220	1,806	2,239	46,728	559,117
1993	50,618	2,741	128,316	1,039,614	1,167,930	4,000	4,858	124,468	1,354,615
1994	28,793	1,666	87,139	570,020	667,159	2,116	3,071	62,362	755,167
1995	60,686	1,631	135,415	1,016,114	1,151,529	4,000	5,169	101,869	1,324,884
1996	56,948	1,868	135,654	1,049,409	1,185,063	4,000	4,904	236,875	1,489,658
1997	71,308	0	120,708	987,451	1,108,159	0	5,238	22,369	1,207,074
1998	55,650	542	89,765	768,825	858,590	15	4,401	20,677	939,875
1999	59,697	3,176	138,153	1,039,985	1,178,138	4,000	4,871	289,735	1,539,617
2000	60,539	1,799	40,697	1,183,440	1,224,137	3,600	4,508	201,294	1,495,877
2001	41,902	1,360	3,116	651,175	654,291	1,560	3,592	84,726	787,431
2002	48,915	1,405	12,589	812,870	825,459	2,854	4,885	96,502	980,020
2003	46,082	1,436	47,070	917,160	964,230	3,692	4,266	105,841	1,125,547
2004	49,080	3,562	126,933	712,193	839,126	9,053	4,629	90,021	995,471
2005	79,005	3,834	69,594	1,328,387	1,397,981	19,806	4,194	140,279	1,645,099
2006	72,080	3,282	98,199	1,164,671	1,262,870	9,530	4,242	108,207	1,460,211
2007	45,135	2,084	79,144	949,601	1,028,745	5,746	3,567	87,083	1,172,360
2008	22,174	947	24,572	702,099	726,671	3,836	1,985	33,904	789,517
2009	21,237	1,034	2,912	779,826	782,738	3,391	1,993	36,836	847,229
2010	27,967	3,259	8,183	689,917	698,100	4,679	2,906	70,238	807,149
2011	60,560	1,915	37,112	1,169,231	1,206,343	6,556	2,715	63,141	1,341,230
2012	30,450	2,242	27,500	778,144	805,644	7,405	3,208	95,717	944,666
2013	27,046	1,567	33,501	711,840	745,341	4,645	2,820	48,361	829,780
2014	40,535	516	1	516,001	516,002	1,256	1,520	8,934	568,763
2015	41,733	624	11,976	508,782	520,758	1,229	1,077	17,336	582,757
2016	30,946	1,822	65,056	571,446	636,502	7,074	3,051	54,507	733,902
2017	30,368	1,800	72,650	525,098	597,748	5,583	3,420	52,483	691,402
2018	30,368	1,800	72,650	525,098	597,748	5,583	3,420	52,483	691,402
2019	27,364	1,800	72,650	525,098	597,748	5,583	3,420	52,483	688,398
2020	27,364	1,800	72,650	525,098	597,748	5,583	3,420	52,483	688,398
2021	27,364	1,800	72,650	525,098	597,748	5,583	3,420	52,483	688,398
2022	27,364	1,800	72,650	525,098	597,748	5,583	3,420	52,483	688,398
2023	27,364	1,800	72,650	525,098	597,748	5,583	3,420	52,483	688,398
2024	27,364	1,800	72,650	525,098	597,748	5,583	3,420	52,483	688,398
2025	27,364	1,800	72,650	525,098	597,748	5,583	3,420	52,483	688,398
2026	27,364	1,800	72,650	525,098	597,748	5,583	3,420	52,483	688,398
2027	27,364	1,800	72,650	525,098	597,748	5,583	3,420	52,483	688,398
2028	27,364	1,800	72,650	525,098	597,748	5,583	3,420	52,483	688,398
2029	27,364	1,800	72,650	525,098	597,748	5,583	3,420	52,483	688,398
2030	27,364	1,800	72,650	525,098	597,748	5,583	3,420	52,483	688,398
2031	27,364	1,800	72,650	525,098	597,748	5,583	3,420	52,483	688,398
2032	27,364	1,800	72,650	525,098	597,748	5,583	3,420	52,483	688,398
2033	27,364	1,800	72,650	525,098	597,748	5,583	3,420	52,483	688,398
2034	27,364	1,800	72,650	525,098	597,748	5,583	3,420	52,483	688,398
2035	27,364	1,800	72,650	525,098	597,748	5,583	3,420	52,483	688,398
<b>TOTAL</b>	<b>2,595,339</b>	<b>136,539</b>	<b>4,175,840</b>	<b>43,475,118</b>	<b>47,650,958</b>	<b>273,826</b>	<b>261,269</b>	<b>4,873,221</b>	<b>55,791,152</b>



TABLE B-5B Annual Water Quantities Delivered to Each Contractor (acre-feet)

Sheet 3 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA									
	AVEK	Castaic Lake <sup>c</sup>	Coachella	Crestline	Desert	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel
	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0
1968	0	7,382	0	0	0	0	0	0	0	0
1969	0	9,970	0	0	0	0	0	0	0	0
1970	0	11,739	0	0	0	0	0	0	0	0
1971	0	12,490	0	0	0	0	0	0	0	0
1972	53	13,905	0	464	0	338	55	0	1,275	0
1973	20	9,418	5,800	389	9,000	290	0	0	32,426	0
1974	1,259	9,700	6,400	627	10,000	400	14	0	16,605	612
1975	8,068	10,700	7,000	825	11,000	520	0	0	13,865	5,450
1976	27,782	11,700	7,600	1,002	12,000	589	0	0	12,273	6,071
1977	11,202	5,075	0	1,109	0	111	80	0	24,833	8,996
1978	44,137	11,362	10,084	1,209	15,300	208	0	0	4,055	7,771
1979	60,493	19,145	10,063	1,260	15,000	133	4,000	0	18	290
1980	72,407	15,092	10,884	1,239	17,000	191	4,000	0	0	1,085
1981	79,375	18,461	12,105	1,485	19,000	1,270	4,000	0	16,021	3,619
1982	50,291	22,216	13,326	1,238	21,000	0	10,500	0	8,409	12,599
1983	32,961	22,135	14,547	911	23,000	38	0	0	5,994	734
1984	32,662	24,218	15,768	1,128	25,000	1	0	0	5,556	7,656
1985	37,064	24,500	16,989	1,422	27,000	0	0	1,558	7,390	5,028
1986	32,449	27,229	18,210	1,506	29,000	163	0	3,096	6,421	9,454
1987	34,089	27,988	19,431	1,849	31,500	1,085	17	5,379	18,751	10,630
1988	34,079	30,438	20,652	2,006	34,000	419	9	1,770	21,386	8,948
1989	45,280	36,364	21,873	2,170	36,500	971	200	9,009	20,782	12,839
1990	47,206	28,579	23,100	1,827	38,100	1,747	0	8,608	18,831	16,649
1991	9,568	4,562	6,930	849	11,430	522	3,423	3,914	3,661	5,399
1992	30,265	20,699	10,427	519	17,197	251	10,686	4,035	3,358	7,908
1993	43,102	23,039	23,100	439	38,100	734	11,514	7,761	4,361	14,397
1994	49,153	26,441	14,102	785	23,257	1,098	16,852	8,418	9,135	15,230
1995	47,286	27,233	23,100	409	38,100	480	8,722	6,961	696	12,922
1996	56,356	32,500	62,219	485	102,622	494	7,427	11,434	6,064	15,989
1997	62,393	27,712	68,340	651	69,990	444	10,374	11,861	9,654	18,175
1998	52,926	20,093	85,709	187	70,647	404	3,925	8,752	1,878	9,310
1999	69,073	32,899	50,480	1,132	58,100	342	8,144	13,278	12,874	21,729
2000	83,577	40,680	42,323	1,194	58,234	0	11,380	9,060	18,399	15,140
2001	62,857	31,939	9,100	1,057	15,010	0	4,433	10,427	26,488	2,360
2002	58,171	68,817	16,755	2,189	27,640	0	4,346	18,496	72,069	24,851
2003	60,029	55,736	14,443	1,563	23,819	0	14,435	11,547	26,113	21,934
2004	59,731	83,761	15,465	2,006	21,190	0	13,176	12,162	57,030	12,541
2005	59,831	59,456	42,519	807	49,089	0	13,561	11,712	31,550	13,984
2006	80,384	62,752	121,100	641	50,000	0	34,014	12,492	35,331	16,284
2007	80,203	60,190	73,228	1,768	30,234	0	46,109	19,634	57,116	4,024
2008	54,436	42,878	46,791	848	26,428	25	25,396	14,255	35,145	7,212
2009	45,670	42,085	46,022	894	18,263	42	29,047	15,339	39,346	11,520
2010	58,489	57,900	85,592	357	31,183	0	38,152	10,969	49,379	19,180
2011	94,046	33,191	90,279	474	36,379	0	5,099	16,881	38,126	23,591
2012	111,207	50,473	117,587	624	45,101	0	11,244	18,897	112,972	22,058
2013	51,022	61,754	66,539	1,368	20,791	0	7,483	10,567	32,085	9,252
2014	18,532	29,448	12,870	1,233	3,049	0	3,581	8,406	10,956	1,200
2015	14,308	29,189	37,596	1,253	11,217	0	8,830	5,836	24,380	5,760
2016	87,703	38,001	92,510	2,019	34,016	0	11,859	14,105	54,678	16,088
2017	88,286	57,120	83,010	3,880	33,450	0	39,928	19,543	61,160	17,280
2018	88,286	57,120	83,010	3,480	33,450	0	39,928	19,543	59,058	17,280
2019	86,220	57,120	83,010	3,480	33,450	0	42,378	19,543	61,560	17,280
2020	86,220	57,120	83,010	3,480	33,450	0	42,378	19,543	61,560	17,280
2021	86,220	57,120	83,010	3,480	33,450	0	42,378	19,543	61,560	17,280
2022	86,220	57,120	83,010	3,480	33,450	0	42,378	19,543	61,560	17,280
2023	86,220	57,120	83,010	3,480	33,450	0	42,378	19,543	61,560	17,280
2024	86,220	57,120	83,010	3,480	33,450	0	42,378	19,543	61,560	17,280
2025	86,220	57,120	83,010	3,480	33,450	0	42,378	19,543	61,560	17,280
2026	86,220	57,120	83,010	3,480	33,450	0	42,378	19,543	61,560	17,280
2027	86,220	57,120	83,010	3,480	33,450	0	42,378	19,543	61,560	17,280
2028	86,220	57,120	83,010	3,480	33,450	0	42,378	19,543	61,560	17,280
2029	86,220	57,120	83,010	3,480	33,450	0	42,378	19,543	61,560	17,280
2030	86,220	57,120	83,010	3,480	33,450	0	42,378	19,543	61,560	17,280
2031	86,220	57,120	83,010	3,480	33,450	0	42,378	19,543	61,560	17,280
2032	86,220	57,120	83,010	3,480	33,450	0	42,378	19,543	61,560	17,280
2033	86,220	57,120	83,010	3,480	33,450	0	42,378	19,543	61,560	17,280
2034	86,220	57,120	83,010	3,480	33,450	0	42,378	19,543	61,560	17,280
2035	86,220	57,120	83,010	3,480	33,450	0	42,378	19,543	61,560	17,280
TOTAL	3,793,507	2,558,514	3,086,148	115,937	1,940,036	13,310	1,186,369	697,936	2,174,473	794,789

<sup>c</sup> Devil's Den Water District merged with Castaic Lake Water Agency effective January 1, 1992.

TABLE B-5B Annual Water Quantities Delivered to Each Contractor (acre-feet)

Sheet 4 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA				South Bay Area Future Contractor	GRAND TOTAL
	San Geronio	Metropolitan	Ventura	Total	Yuba City	Butte	Plumas	Total		
	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]
1962	0	0	0	0	0	0	0	0	0	8,906
1963	0	0	0	0	0	0	0	0	0	12,645
1964	0	0	0	0	0	0	0	0	0	20,911
1965	0	0	0	0	0	0	0	0	0	34,026
1966	0	0	0	0	0	0	0	0	0	54,913
1967	0	0	0	0	0	0	0	0	0	56,763
1968	0	0	0	7,382	0	0	0	0	0	294,457
1969	0	0	0	9,970	0	0	0	0	0	268,104
1970	0	0	0	11,739	0	0	70	70	0	369,459
1971	0	0	0	12,490	0	192	64	256	0	654,442
1972	0	71,938	0	88,028	0	186	505	691	0	1,037,770
1973	0	159,883	0	217,226	0	53	679	732	0	737,532
1974	0	277,717	0	323,334	0	127	648	775	0	878,947
1975	0	526,491	0	583,919	0	253	405	658	0	1,230,830
1976	0	618,451	0	697,468	0	527	382	909	0	1,380,124
1977	0	189,755	0	241,161	0	706	303	1,009	0	582,381
1978	0	507,565	0	601,691	0	579	278	857	0	1,458,733
1979	0	477,074	0	587,476	0	302	329	631	0	1,666,457
1980	0	531,727	0	653,625	0	267	295	562	0	1,536,456
1981	0	795,846	0	951,182	0	221	355	576	0	1,918,563
1982	0	691,192	0	830,771	0	334	305	639	0	1,750,862
1983	0	343,521	0	443,841	0	325	262	587	0	1,187,156
1984	0	457,582	0	569,571	108	177	272	557	0	1,591,416
1985	0	683,625	0	804,576	62	308	254	624	0	1,990,295
1986	0	708,840	0	836,368	328	313	317	958	0	1,999,155
1987	0	712,424	0	863,143	88	459	452	999	0	2,131,608
1988	0	902,564	0	1,056,271	303	385	523	1,211	0	2,385,122
1989	0	1,156,698	0	1,342,686	403	300	486	1,189	0	2,853,747
1990	0	1,396,423	4,836	1,585,906	494	380	548	1,422	0	2,582,151
1991	0	391,447	988	442,693	265	328	420	1,013	0	549,113
1992	0	710,313	0	815,658	642	117	485	1,244	0	1,471,454
1993	0	652,190	0	818,737	746	256	444	1,446	0	2,315,235
1994	0	807,866	0	972,337	1,035	329	492	1,856	0	1,861,976
1995	0	436,042	0	601,951	910	203	308	1,421	0	2,031,423
1996	0	593,380	0	888,970	820	257	360	1,437	0	2,543,472
1997	0	721,810	1,850	1,003,254	1,005	185	231	1,421	0	2,405,444
1998	0	410,065	1,850	665,746	1,054	527	0	1,581	0	1,764,963
1999	0	852,617	1,850	1,122,518	1,096	286	0	1,382	0	2,898,961
2000	0	1,522,412	4,050	1,806,449	901	586	0	1,487	0	3,569,072
2001	0	1,023,169	1,850	1,188,690	1,065	513	0	1,578	0	2,175,194
2002	0	1,408,919	4,998	1,707,251	1,181	419	0	1,600	0	2,909,555
2003	116	1,701,615	5,000	1,936,350	1,324	551	0	1,875	0	3,327,811
2004	841	1,724,380	5,250	2,007,533	1,434	1,440	0	2,874	0	3,230,590
2005	692	1,528,045	1,665	1,812,911	1,894	527	0	2,421	0	3,753,874
2006	4,278	1,512,186	1,850	1,931,312	5,342	468	0	5,810	0	3,693,938
2007	3,935	1,499,688	3,000	1,879,129	2,327	956	0	3,283	0	3,284,475
2008	4,905	898,313	3,798	1,160,430	1,923	451	243	2,617	0	2,152,219
2009	6,397	930,871	3,891	1,189,387	2,114	581	200	2,895	0	2,227,564
2010	8,240	1,416,062	4,075	1,779,578	2,331	807	243	3,381	0	2,832,658
2011	10,503	1,686,570	4,000	2,039,139	2,297	1,092	98	3,487	0	3,668,980
2012	11,010	1,224,907	4,353	1,730,433	2,695	1,374	79	4,148	0	2,881,783
2013	9,445	892,550	2,890	1,165,746	4,850	908	366	6,124	0	2,224,875
2014	5,044	387,392	93	481,804	4,237	1,617	251	6,105	0	1,242,286
2015	3,481	573,526	1,000	716,376	3,004	2,763	730	6,497	0	1,498,367
2016	8,335	1,090,014	3,000	1,452,328	3,649	3,141	625	7,415	0	2,435,124
2017	10,380	1,131,900	3,000	1,548,937	5,760	270	730	6,760	0	2,467,088
2018	10,380	1,096,644	3,000	1,511,179	5,760	270	730	6,760	0	2,431,901
2019	10,380	1,146,900	3,000	1,564,321	5,760	270	730	6,760	0	2,479,572
2020	10,380	1,146,900	3,000	1,564,321	5,760	270	1,619	7,649	0	2,480,537
2021	10,380	1,146,900	3,000	1,564,321	5,760	270	1,619	7,649	0	2,480,537
2022	10,380	1,146,900	3,000	1,564,321	5,760	270	1,619	7,649	0	2,480,537
2023	10,380	1,146,900	3,000	1,564,321	5,760	270	1,619	7,649	0	2,480,537
2024	10,380	1,146,900	3,000	1,564,321	5,760	270	1,619	7,649	0	2,480,537
2025	10,380	1,146,900	3,000	1,564,321	5,760	270	1,619	7,649	0	2,480,537
2026	10,380	1,146,900	3,000	1,564,321	5,760	270	1,619	7,649	0	2,480,537
2027	10,380	1,146,900	3,000	1,564,321	5,760	270	1,619	7,649	0	2,480,537
2028	10,380	1,146,900	3,000	1,564,321	5,760	270	1,619	7,649	0	2,480,537
2029	10,380	1,146,900	3,000	1,564,321	5,760	270	1,619	7,649	0	2,480,537
2030	10,380	1,146,900	3,000	1,564,321	5,760	270	1,619	7,649	0	2,480,537
2031	10,380	1,146,900	3,000	1,564,321	5,760	270	1,619	7,649	0	2,480,537
2032	10,380	1,146,900	3,000	1,564,321	5,760	270	1,619	7,649	0	2,480,537
2033	10,380	1,146,900	3,000	1,564,321	5,760	270	1,619	7,649	0	2,480,537
2034	10,380	1,146,900	3,000	1,564,321	5,760	270	1,619	7,649	0	2,480,537
2035	10,380	1,146,900	3,000	1,564,321	5,760	270	1,619	7,649	0	2,480,537
TOTAL	274,442	59,531,509	123,137	76,290,107	161,367	32,206	41,401	234,974	0	144,691,490

**TABLE B-6 Annual Water Quantities Conveyed through Each Pumping and Power Recovery Plant of Project Transportation Facilities (acre-feet)**

Sheet 1 of 10

Calendar Year	NORTH BAY AQUEDUCT											
	Barker Slough Pumping Plant				Cordelia Pumping Plant Solano				Cordelia Pumping Plant Napa			
	Initial Fill Water	Operational Losses	Water Supply Delivery	Total	Initial Fill Water	Operational Losses	Water Supply Delivery	Total	Initial Fill Water	Operational Losses	Water Supply Delivery <sup>a</sup>	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
1961	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	24	(10)	1,214	1,228
1969	0	0	0	0	0	0	0	0	0	2	2,687	2,689
1970	0	0	0	0	0	0	0	0	0	18	3,618	3,636
1971	0	0	0	0	0	0	0	0	0	4	2,521	2,525
1972	0	0	0	0	0	0	0	0	0	(10)	3,647	3,637
1973	0	0	0	0	0	0	0	0	0	1	3,792	3,793
1974	0	0	0	0	0	0	0	0	0	10	4,870	4,880
1975	0	0	0	0	0	0	0	0	0	10	6,840	6,850
1976	0	0	0	0	0	0	0	0	0	4	7,122	7,126
1977	0	0	0	0	0	0	0	0	0	2	8,226	8,228
1978	0	0	0	0	0	0	0	0	0	(6)	6,034	6,028
1979	0	0	0	0	0	0	0	0	0	1	6,561	6,562
1980	0	0	0	0	0	0	0	0	0	(3)	6,707	6,704
1981	0	0	0	0	0	0	0	0	0	8	9,001	9,009
1982	0	0	0	0	0	0	0	0	0	(8)	1,213	1,205
1983	0	0	0	0	0	0	0	0	0	(12)	2,287	2,275
1984	0	0	0	0	0	0	0	0	0	(15)	2,923	2,908
1985	0	0	0	0	0	0	0	0	0	13	4,039	4,052
1986	0	0	0	0	0	0	0	0	0	(4)	3,519	3,515
1987	0	0	0	0	0	0	0	0	0	0	7,693	7,693
1988	1	283	15,118	15,402	0	0	9,725	9,725	1	(1)	5,392	5,392
1989	0	758	23,451	24,209	0	0	17,246	17,246	0	(4)	6,195	6,191
1990	0	3	26,071	26,074	0	(634)	15,856	15,222	0	3	6,940	6,943
1991	0	667	8,352	9,019	0	124	3,855	3,979	0	198	1,380	1,578
1992	0	1,643	18,774	20,417	0	0	9,220	9,220	0	0	4,001	4,001
1993	0	1,153	34,466	35,619	0	0	14,471	14,471	0	0	5,286	5,286
1994	0	780	32,048	32,828	0	(6)	14,913	14,907	0	0	6,792	6,792
1995	0	908	26,527	27,435	0	0	15,893	15,893	0	0	5,182	5,182
1996	0	1,354	34,892	36,246	0	0	17,069	17,069	0	0	4,893	4,893
1997	0	1,422	37,871	39,293	0	0	17,501	17,501	0	0	4,341	4,341
1998	0	1,343	35,125	36,468	0	0	18,204	18,204	0	0	5,359	5,359
1999	0	2,522	40,057	42,579	0	0	19,562	19,562	0	0	5,304	5,304
2000	0	1,853	41,973	43,826	0	4	21,525	21,529	0	180	4,958	5,138
2001	0	1,760	43,931	45,691	0	0	19,737	19,737	0	0	9,345	9,345
2002	0	496	45,435	45,931	0	0	19,719	19,719	0	0	6,875	6,875
2003	0	3,991	41,597	45,588	0	0	16,700	16,700	0	0	7,637	7,637
2004	0	2,181	51,136	53,317	0	0	21,686	21,686	0	0	8,499	8,499
2005	0	935	45,488	46,423	0	0	19,189	19,189	0	0	8,009	8,009
2006	0	1,005	43,305	44,310	0	0	18,651	18,651	0	0	8,081	8,081
2007	0	1,189	58,257	59,446	0	0	27,793	27,793	0	0	11,277	11,277
2008	0	845	54,612	55,457	0	0	19,436	19,436	0	255	13,740	13,995
2009	0	537	41,854	42,391	0	0	15,473	15,473	0	130	11,377	11,507
2010	0	809	43,233	44,042	0	0	12,788	12,788	0	254	12,847	13,101
2011	0	803	39,309	40,112	0	0	12,832	12,832	0	213	11,275	11,488
2012	0	686	39,254	39,940	0	0	12,886	12,886	0	196	9,860	10,056
2013	0	1,150	48,407	49,557	0	0	19,404	19,404	0	350	12,478	12,828
2014	0	2,597	33,843	36,440	0	0	12,366	12,366	0	970	14,123	15,093
2015	0	144	35,035	35,179	0	0	15,321	15,321	0	76	11,133	11,209
2016	0	51	45,474	45,525	0	0	18,035	18,035	0	5	13,731	13,736
2017	0	51	46,070	46,121	0	0	7,893	7,893	0	5	17,415	17,420
2018	0	51	46,069	46,120	0	0	7,893	7,893	0	5	17,415	17,420
2019	0	51	46,069	46,120	0	0	7,893	7,893	0	5	17,415	17,420
2020	0	51	46,069	46,120	0	0	7,893	7,893	0	5	17,415	17,420
2021	0	51	46,069	46,120	0	0	7,893	7,893	0	5	17,415	17,420
2022	0	51	46,069	46,120	0	0	7,893	7,893	0	5	17,415	17,420
2023	0	51	46,069	46,120	0	0	7,893	7,893	0	5	17,415	17,420
2024	0	51	46,069	46,120	0	0	7,893	7,893	0	5	17,415	17,420
2025	0	51	46,069	46,120	0	0	7,893	7,893	0	5	17,415	17,420
2026	0	51	46,069	46,120	0	0	7,893	7,893	0	5	17,415	17,420
2027	0	51	46,069	46,120	0	0	7,893	7,893	0	5	17,415	17,420
2028	0	51	46,069	46,120	0	0	7,893	7,893	0	5	17,415	17,420
2029	0	51	46,069	46,120	0	0	7,893	7,893	0	5	17,415	17,420
2030	0	51	46,069	46,120	0	0	7,893	7,893	0	5	17,415	17,420
2031	0	51	46,069	46,120	0	0	7,893	7,893	0	5	17,415	17,420
2032	0	51	46,069	46,120	0	0	7,893	7,893	0	5	17,415	17,420
2033	0	51	46,069	46,120	0	0	7,893	7,893	0	5	17,415	17,420
2034	0	51	46,069	46,120	0	0	7,893	7,893	0	5	17,415	17,420
2035	0	51	46,069	46,120	0	0	7,893	7,893	0	5	17,415	17,420

<sup>a</sup> For the period 1968 through 1987, deliveries are non-SWP water pumped through an interim facility.

**TABLE B-6 Annual Water Quantities Conveyed through Each Pumping and Power Recovery Plant of Project Transportation Facilities (acre-feet)**

Sheet 2 of 10

Calendar Year	SOUTH BAY AQUEDUCT						CALIFORNIA AQUEDUCT								
	South Bay Pumping Plant						NORTH SAN JOAQUIN DIVISION								
							Banks Pumping Plant								
	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Deliveries		Total	Transportation Water						Conservation Water	Total	
				Water Supply <sup>b</sup>	Recreation		Initial Fill Water	Operational Losses	Reservoir Storage Changes	Deliveries		Total			
	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]	[23]	[24]	[25]	[26]	
1961	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1962	9	272	0	8,906	0	9,187	0	0	0	0	0	0	0	0	
1963	71	185	0	12,645	0	12,901	0	0	0	0	0	0	0	0	
1964	171	152	0	20,911	0	21,234	0	0	0	0	0	0	0	0	
1965	93	729	0	34,026	0	34,848	0	0	0	0	0	0	0	0	
1966	0	1,746	0	54,913	0	56,659	0	0	0	0	0	0	0	0	
1967	0	1,677	0	56,763	0	58,440	5,746	1,183	0	11,538	0	18,467	2,957	21,424	
1968	0	1,847	0	101,055	0	102,902	11,079	74,464	0	293,243	0	378,786	531,275	910,061	
1969	3,449	2,668	0	69,712	0	75,829	7,336	44,287	0	265,417	0	317,040	531,185	848,225	
1970	16,279	1,086	(5,355)	89,560	0	101,570	23,947	20,767	(5,355)	365,771	0	405,130	(12,995)	392,135	
1971	0	1,815	8,854	98,584	0	109,253	23,207	(10,754)	8,854	651,665	8	672,980	7,708	680,688	
1972	0	3,557	2,273	138,426	0	144,256	145,066	9,057	(4,285)	1,033,432	6,489	1,189,759	48,300	1,238,059	
1973	0	(33)	(1,510)	94,078	0	92,535	214,941	(4,951)	2,902	733,008	1,155	947,055	55,846	1,002,901	
1974	0	1,287	(10,056)	89,318	0	80,549	247,894	(11,526)	(32,510)	873,302	2,118	1,079,278	54,683	1,133,961	
1975	0	320	8,550	93,604	0	102,474	110,149	(8,092)	16,101	1,223,332	3,377	1,344,867	(102,625)	1,242,242	
1976	0	2,431	1,391	126,431	141	130,394	67,834	5,443	(244,124)	1,372,093	1,745	1,202,991	(442,348)	760,643	
1977	0	2,866	2,685	107,704	112	113,367	0	39,897	(157,543)	573,146	1,111	456,611	(13,507)	443,104	
1978	0	2,165	(11,249)	112,574	126	103,616	67,457	(36,898)	35,129	1,451,842	1,177	1,518,707	752,075	2,270,782	
1979	0	2,401	1,069	122,190	89	125,749	17,397	60,958	(32,307)	1,659,265	1,398	1,706,711	(112,053)	1,594,658	
1980	0	1,758	(6,563)	115,824	123	111,142	3,159	58,484	(275,538)	1,529,187	2,131	1,317,423	186,601	1,504,024	
1981	0	2,627	13,742	129,507	121	145,997	46,060	85,350	40,536	1,908,986	4,974	2,085,906	(931,878)	1,154,028	
1982	0	2,344	(23,928)	107,439	129	85,984	5,979	61,556	99,897	1,743,145	4,646	1,915,223	347,983	2,263,206	
1983	0	2,151	(22,886)	94,656	132	74,053	6,071	47,022	(310,477)	1,184,282	7,853	934,751	835,771	1,770,522	
1984	0	2,088	8,442	98,122	158	108,810	38,649	97,143	(108,548)	1,587,936	5,874	1,621,054	21,875	1,642,929	
1985	0	2,817	(1,607)	122,088	152	123,450	0	110,469	137,783	1,985,632	5,452	2,239,336	(110,569)	2,128,767	
1986	0	2,299	(1,850)	110,988	130	111,567	0	90,799	20,177	1,993,278	3,865	2,108,119	200,298	2,308,417	
1987	0	2,625	(584)	136,796	137	138,974	0	91,427	(23,116)	2,121,366	7,672	2,197,349	(458,725)	1,738,624	
1988	0	2,884	(698)	147,255	142	149,583	0	107,249	(35,484)	2,368,793	4,889	2,445,447	(303,583)	2,141,864	
1989	0	2,673	3,296	142,269	152	148,390	0	117,603	(38,058)	2,829,107	8,135	2,916,787	421,131	3,337,918	
1990	0	894	1,982	156,537	168	159,581	0	99,059	(290,965)	2,554,658	9,262	2,372,014	(374,027)	1,997,987	
1991	0	2,637	(4,532)	50,259	150	48,514	0	80,106	(79,038)	539,748	4,879	545,695	554,904	1,100,599	
1992	0	2,881	756	76,661	147	80,445	0	91,391	(218,170)	1,451,436	2,605	1,327,262	61,343	1,388,605	
1993	0	1,940	(20,051)	105,971	143	88,003	0	149,372	(273,789)	2,279,323	2,609	2,157,515	849,249	3,006,764	
1994	0	1,981	1,714	100,568	168	104,431	0	148,712	(120,985)	1,828,072	3,803	1,859,602	(324,640)	1,534,962	
1995	0	1,188	(12,333)	76,640	146	65,641	0	173,074	(397,605)	2,003,475	2,575	1,781,519	293,159	2,074,678	
1996	0	981	(1,990)	77,215	150	76,356	0	123,502	78,123	2,507,143	3,902	2,712,670	288,576	3,001,246	
1997	0	1,575	5,016	102,186	155	108,932	527	135,106	(98,334)	2,366,152	2,594	2,406,045	(50,000)	2,356,045	
1998	0	1,551	3,595	70,876	114	76,136	0	91,319	(346,039)	1,728,257	2,107	1,475,644	120,886	1,596,530	
1999	0	2,166	12,313	100,497	139	115,115	0	135,809	(17,569)	2,855,522	4,301	2,978,063	(307,839)	2,670,224	
2000	0	2,346	(20,958)	135,533	145	117,066	0	115,895	(13,232)	3,474,523	5,182	3,582,368	(15,487)	3,566,881	
2001	0	2,784	1,301	95,335	196	99,616	0	222,144	(17,529)	1,874,096	1,978	2,080,689	86,928	2,167,617	
2002	0	2,534	(13,938)	123,577	146	112,319	0	225,032	36,404	2,816,389	4,672	3,082,497	(151,719)	2,930,778	
2003	0	2,920	(1,399)	132,714	131	134,366	0	329,699	(49,580)	3,193,449	11,362	3,484,930	225,348	3,710,278	
2004	0	2,982	(7,240)	125,928	150	121,820	0	83,788	(4,079)	2,979,217	1,337	3,060,263	103,811	3,164,074	
2005	0	2,823	(3,565)	108,136	154	107,548	0	151,931	(163,243)	3,665,023	1,270	3,654,981	535,754	4,190,735	
2006	0	2,989	(9,645)	118,272	169	111,785	0	67,040	(129,767)	3,571,009	1,208	3,509,490	43,481	3,552,971	
2007	0	2,840	14,928	134,172	146	152,086	0	73,956	133,124	2,736,094	830	2,944,004	(398,297)	2,545,707	
2008	0	2,215	880	116,562	166	119,823	0	130,066	(3,350)	1,413,730	1,082	1,541,528	(397,949)	1,143,579	
2009	0	1,999	(1,134)	116,947	108	117,920	0	111,805	(1,860)	1,572,819	2,023	1,684,787	928,666	2,613,453	
2010	0	1,717	3,436	95,802	117	101,072	0	203,757	51,667	2,243,593	1,163	2,500,180	37,606	2,537,786	
2011	0	1,534	(2,332)	112,952	122	112,276	0	314,282	(21,148)	3,315,056	1,588	3,609,778	165,312	3,775,090	
2012	0	2,025	5,931	112,056	150	120,162	0	143,580	20,504	2,607,588	1,606	2,773,278	(473,745)	2,299,533	
2013	0	2,753	(5,596)	147,119	137	144,413	0	173,145	(6,654)	1,753,556	1,641	1,921,688	(123,957)	1,797,731	
2014	0	3,285	4,951	91,116	46	99,398	0	114,127	36,033	588,005	650	738,815	301,102	1,039,917	
2015	0	2,727	(8,482)	117,084	43	111,372	0	109,951	(7,686)	859,939	690	962,894	(140,538)	822,356	
2016	0	2,686	9,000	110,523	400	122,609	0	120,595	97,393	2,195,507	8,660	2,422,155	76,703	2,498,858	
2017	0	2,401	0	119,483	400	122,284	0	121,618	83,000	2,414,258	8,660	2,627,536	225,962	2,853,498	
2018	0	2,308	0	122,177	400	124,885	0	121,576	38,000	2,379,071	8,660	2,547,307	129,783	2,677,090	
2019	0	3,351	0	120,155	400	123,906	0	128,613	50,179	2,426,743	8,660	2,614,195	77,224	2,691,419	
2020	0	3,351	0	120,635	400	124,386	0	128,690	(366)	2,426,819	8,660	2,563,803	(8,687)	2,555,116	
2021	0	3,351	0	120,635	400	124,386	0	128,769	10,725	2,426,819	8,660	2,574,973	(1,095)	2,573,878	
2022	0	3,351	0	120,635	400	124,386	0	128,846	(3,483)	2,426,819	8,660	2,560,842	(185,907)	2,374,935	
2023	0	3,351	0	120,635	400	124,386	0	128,818	(18,971)	2,426,819	8,660	2,545,326	115,791	2,661,117	
2024	0	3,351	0	120,635	400	124,386	0	128,625	11,289	2,426,819	8,660	2,575,393	79,858	2,655,251	
2025	0	3,351	0	120,635	400	124,386	0								

**TABLE B-6 Annual Water Quantities Conveyed through Each Pumping and Power Recovery Plant of Project Transportation Facilities (acre-feet)**

Sheet 3 of 10

Calendar Year	CALIFORNIA AQUEDUCT (continued)											
	SAN LUIS DIVISION						SOUTH SAN JOAQUIN DIVISION					
	Dos Amigos Pumping Plant						Buena Vista Pumping Plant					
	Initial Fill	Operational Losses	Reservoir Storage Changes	Deliveries		Total	Initial Fill	Operational Losses	Reservoir Storage Changes	Deliveries		Total
				Water Supply	Recreation					Water Supply	Recreation	
	[27]	[28]	[29]	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]
1961	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	11,079	25,126	0	189,104	0	225,309	0	0	0	0	0	0
1969	3,887	9,922	0	192,689	0	206,498	0	0	0	0	0	0
1970	7,668	1,901	0	270,300	0	279,869	4,779	1,012	0	3	0	5,794
1971	23,207	(12,030)	0	545,869	0	557,046	7,853	8,399	0	101,512	0	117,764
1972	145,066	(6,635)	(6,558)	886,840	6,481	1,025,194	100,274	20,044	(6,558)	223,626	6,481	343,867
1973	214,941	(6,778)	1,329	635,716	1,147	846,355	204,638	35,695	1,329	311,096	1,147	553,905
1974	247,894	(16,765)	(15,295)	780,513	2,108	998,455	237,554	19,672	(15,295)	388,949	2,108	632,988
1975	110,149	(12,144)	(693)	1,126,152	3,358	1,226,822	103,352	26,342	(693)	672,531	3,358	804,890
1976	67,834	(456)	(152,171)	1,241,550	1,581	1,158,338	61,122	29,428	(152,171)	785,055	1,581	725,015
1977	0	26,359	(116,219)	463,970	737	374,847	0	25,173	(116,219)	271,944	560	181,458
1978	67,457	1,905	79,308	1,335,362	680	1,484,712	65,027	17,751	121,904	762,043	674	967,399
1979	17,397	33,884	(51,299)	1,530,926	685	1,531,593	12,302	46,157	(51,299)	737,714	502	745,376
1980	3,159	34,391	(272,825)	1,407,663	1,514	1,173,902	0	49,025	(134,009)	778,059	1,262	694,337
1981	46,060	36,962	23,359	1,775,179	4,348	1,885,908	0	38,942	23,359	1,077,322	4,112	1,143,735
1982	5,979	57,146	116,086	1,631,868	4,205	1,815,284	0	29,059	117,174	990,863	4,045	1,141,141
1983	6,071	63,583	(101,155)	1,085,804	7,475	1,061,778	0	40,205	(101,155)	593,920	7,291	540,261
1984	38,649	109,263	(112,744)	1,484,114	5,391	1,524,673	0	38,487	(114,984)	781,955	5,244	710,702
1985	0	86,772	138,898	1,858,111	4,936	2,088,717	0	42,838	139,689	992,606	4,804	1,179,937
1986	0	51,963	19,989	1,877,183	3,426	1,952,561	0	36,751	37,546	1,014,294	3,285	1,091,876
1987	0	64,827	(25,707)	1,978,945	7,121	2,025,186	0	30,495	(25,522)	1,027,361	6,937	1,039,271
1988	0	72,679	(34,592)	2,217,126	4,490	2,259,703	0	38,804	(29,747)	1,244,196	4,360	1,257,613
1989	0	90,090	(29,411)	2,679,845	7,652	2,748,176	0	29,594	(60,826)	1,532,625	7,490	1,508,883
1990	0	115,074	(11,323)	2,394,999	8,922	2,507,672	0	46,865	(15,092)	1,769,991	8,879	1,810,643
1991	0	92,227	9,325	489,348	4,605	595,505	0	39,274	96,506	446,916	4,560	587,256
1992	0	118,796	(225,603)	1,372,536	2,079	1,267,808	0	28,138	(98,271)	920,978	1,995	852,840
1993	0	136,432	(220,537)	2,170,494	1,864	2,088,253	0	14,186	(128,363)	908,200	1,676	795,699
1994	0	152,414	(78,957)	1,724,433	3,098	1,800,988	0	35,083	(88,211)	1,107,122	2,918	1,056,912
1995	0	137,937	(12,473)	1,921,666	1,711	2,048,841	0	33,963	(16,431)	706,742	1,669	725,943
1996	0	45,591	14,927	2,425,024	2,998	2,488,540	0	31,304	15,438	988,612	2,928	1,038,282
1997	527	107,033	(66,814)	2,247,628	2,090	2,290,464	0	42,670	40,852	1,054,461	2,076	1,140,059
1998	0	95,185	(338,076)	1,664,080	1,589	1,422,778	0	41,910	(106,487)	753,731	1,585	690,739
1999	0	95,262	(2,778)	2,750,154	3,285	2,845,923	0	48,502	(2,807)	1,131,826	3,279	1,180,800
2000	0	134,231	7,726	3,273,337	4,222	3,419,516	0	37,514	7,726	1,814,685	4,216	1,864,141
2001	0	150,830	(18,830)	1,615,776	1,218	1,748,994	0	31,361	(18,830)	1,318,835	1,211	1,332,577
2002	0	92,905	50,342	2,628,462	3,968	2,775,677	0	41,565	50,342	1,831,874	3,961	1,927,742
2003	0	85,360	(48,181)	2,893,333	10,656	2,941,168	0	43,352	(48,181)	1,909,192	10,645	1,915,008
2004	0	25,865	3,161	2,807,825	652	2,837,503	0	41,551	3,161	2,102,371	649	2,147,732
2005	0	62,569	(159,678)	3,423,490	581	3,326,962	0	35,019	(159,678)	1,846,180	559	1,722,080
2006	0	(12,341)	(120,122)	3,501,308	504	3,369,349	0	30,271	(120,122)	2,077,130	504	1,987,783
2007	0	47,736	118,196	2,419,032	312	2,585,276	0	43,400	118,196	2,002,793	305	2,164,694
2008	0	103,375	(4,230)	1,296,068	361	1,395,574	0	39,056	(4,230)	1,275,174	327	1,310,327
2009	0	76,206	(726)	1,318,452	1,367	1,395,299	0	32,900	(726)	1,217,847	1,295	1,251,316
2010	0	76,447	48,231	2,307,963	636	2,433,277	0	43,377	48,231	1,505,105	603	1,597,316
2011	0	66,937	(18,816)	3,343,960	870	3,392,951	0	39,914	(18,816)	1,820,268	742	1,842,108
2012	0	113,586	14,573	2,537,793	942	2,666,894	0	95,029	14,573	1,672,197	938	1,782,737
2013	0	174,857	(1,058)	1,549,837	836	1,724,472	0	105,771	(1,058)	1,275,717	795	1,381,225
2014	0	105,741	31,082	433,625	214	570,662	0	72,181	31,082	523,726	172	627,161
2015	0	103,380	796	724,862	155	829,193	0	46,903	796	738,410	151	786,260
2016	0	63,199	88,393	2,088,613	7,210	2,247,415	0	33,737	88,393	1,492,844	7,010	1,621,984
2017	0	<b>64,552</b>	<b>83,000</b>	<b>2,290,055</b>	<b>7,210</b>	<b>2,444,817</b>	0	<b>35,090</b>	<b>83,000</b>	<b>1,605,889</b>	<b>7,010</b>	<b>1,730,989</b>
2018	0	64,990	38,000	2,252,174	7,210	2,362,374	0	35,528	38,000	1,509,146	7,010	1,589,684
2019	0	70,564	50,179	2,301,868	7,210	2,429,821	0	41,102	50,179	1,512,032	7,010	1,610,323
2020	0	70,628	(366)	2,301,464	7,210	2,378,936	0	41,166	(366)	1,512,032	7,010	1,559,842
2021	0	70,711	10,725	2,301,464	7,210	2,390,110	0	41,249	10,725	1,512,032	7,010	1,571,016
2022	0	70,705	(3,483)	2,301,464	7,210	2,375,896	0	41,243	(3,483)	1,512,032	7,010	1,556,802
2023	0	70,696	(18,971)	2,301,464	7,210	2,360,399	0	41,234	(18,971)	1,512,032	7,010	1,541,305
2024	0	70,575	11,289	2,301,464	7,210	2,390,538	0	41,113	11,289	1,512,032	7,010	1,571,444
2025	0	70,638	(12,518)	2,301,464	7,210	2,366,794	0	41,176	(12,518)	1,512,032	7,010	1,547,700
2026	0	70,650	24,308	2,301,464	7,210	2,403,632	0	41,188	24,308	1,512,032	7,010	1,584,538
2027	0	70,563	(17,799)	2,301,464	7,210	2,361,438	0	41,101	(17,799)	1,512,032	7,010	1,542,344
2028	0	70,703	12,291	2,301,464	7,210	2,391,668	0	41,241	12,291	1,512,032	7,010	1,572,574
2029	0	70,630	(9,046)	2,301,464	7,210	2,370,258	0	41,168	(9,046)	1,512,032	7,010	1,551,164
2030	0	70,694	20,756	2,301,464	7,210	2,400,124	0	41,232	20,756	1,512,032	7,010	1,581,030
2031	0	70,566	(97,726)	2,301,464	7,210	2,281,514	0	41,104	(97,726)	1,512,032	7,010	1,462,420
2032	0	70,168	84,999	2,301,464	7,210	2,463,841	0	40,706	84,999	1,512,032	7,010	1,644,747
2033	0	70,373	(94,652)	2,301,464	7,210	2,284,395	0	40,911	(94,652)	1,512,032	7,010	1,465,301
2034	0	69,865	69,593	2,301,464	7,210	2,448,132	0	40,403	69,593	1,512,032	7,010	1,629,038
2035	0	69,205	(242,659)	2,301,464	7,210	2,135,220	0	39,743	(242,659)	1,512,032	7,010	1,316,126



**TABLE B-6 Annual Water Quantities Conveyed through Each Pumping and Power Recovery Plant of Project Transportation Facilities (acre-feet)**

Sheet 4 of 10

Calendar Year	CALIFORNIA AQUEDUCT (continued)											
	SOUTH SAN JOAQUIN DIVISION (continued)											
	Teerink Pumping Plant						Chrisman Pumping Plant					
	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Deliveries		Total	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Deliveries		Total
				Water Supply	Recreation					Water Supply	Recreation	
1961	[39] 0	[40] 0	[41] 0	[42] 0	[43] 0	[44] 0	[45] 0	[46] 0	[47] 0	[48] 0	[49] 0	[50] 0
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0
1970	198	2	0	0	0	200	0	0	0	0	0	0
1971	7,533	(112)	0	3,552	0	10,973	7,366	(159)	0	0	0	7,207
1972	100,274	12,765	(6,558)	84,955	6,481	197,917	100,274	13,160	(6,558)	78,891	6,481	192,248
1973	204,638	21,543	1,329	229,685	1,147	458,342	204,638	32,414	1,329	209,769	1,147	449,297
1974	237,554	11,843	(15,295)	336,198	2,108	572,408	237,554	17,655	(15,295)	318,198	2,108	560,220
1975	103,352	19,763	(693)	621,706	3,358	747,486	103,352	25,326	(693)	586,286	3,358	717,629
1976	61,122	18,552	(152,171)	740,486	1,581	669,570	61,122	21,468	(152,171)	700,935	1,581	632,935
1977	0	16,415	(116,219)	246,349	560	147,105	0	15,698	(116,219)	240,191	560	140,230
1978	65,027	28,820	121,904	631,121	674	847,546	65,027	26,705	121,904	599,973	674	814,283
1979	12,302	50,663	(51,299)	625,561	502	637,729	12,302	50,580	(51,299)	586,959	502	599,044
1980	0	48,825	(134,009)	696,405	1,262	612,483	0	58,085	(134,009)	658,588	1,262	583,926
1981	0	51,600	23,359	998,307	4,112	1,077,378	0	48,844	23,359	959,274	4,112	1,035,589
1982	0	44,353	117,332	878,486	4,045	1,044,216	0	33,541	117,277	830,704	4,045	985,567
1983	0	43,961	(101,155)	487,915	7,291	438,012	0	34,698	(101,155)	450,489	7,291	391,323
1984	0	45,999	(115,088)	632,262	5,244	568,417	0	33,132	(115,092)	582,414	5,244	505,698
1985	0	50,106	139,973	854,684	4,804	1,049,567	0	54,831	139,954	810,606	4,804	1,010,195
1986	0	38,747	37,546	882,300	3,285	961,878	0	41,421	37,546	839,839	3,285	922,091
1987	0	47,815	(25,522)	897,905	6,937	927,135	0	33,195	(25,522)	863,157	6,937	877,767
1988	0	53,815	(29,747)	1,097,643	4,360	1,126,071	0	39,775	(29,747)	1,055,649	4,360	1,070,037
1989	0	49,088	(60,826)	1,382,599	7,490	1,378,351	0	42,307	(60,826)	1,339,358	7,490	1,328,329
1990	0	66,868	(15,092)	1,627,246	8,879	1,687,901	0	56,663	(15,092)	1,590,893	8,879	1,641,343
1991	0	40,564	105,176	446,148	4,560	596,448	0	34,016	105,176	446,148	4,560	589,900
1992	0	31,820	(92,123)	844,376	1,995	786,068	0	34,477	(92,123)	820,133	1,995	764,482
1993	0	27,158	(127,738)	799,143	1,676	700,239	0	28,614	(127,738)	771,146	1,676	673,698
1994	0	50,802	(88,211)	1,007,214	2,918	972,723	0	57,203	(88,211)	977,703	2,918	949,613
1995	0	48,705	(16,431)	586,829	1,669	620,772	0	36,309	(16,431)	560,695	1,669	582,242
1996	0	58,437	15,438	836,819	2,928	913,622	0	43,710	15,438	800,633	2,928	862,709
1997	0	73,656	40,852	918,124	2,076	1,034,708	0	62,275	40,852	881,843	2,076	987,046
1998	0	61,137	(106,487)	656,796	1,585	613,031	0	47,523	(106,487)	628,084	1,585	570,705
1999	0	77,334	(2,807)	1,011,608	3,279	1,089,414	0	55,514	(2,807)	974,807	3,279	1,030,793
2000	0	87,084	7,726	1,691,120	4,216	1,790,146	0	49,690	7,726	1,651,057	4,216	1,712,689
2001	0	71,588	(18,830)	1,233,862	1,211	1,287,831	0	54,742	(18,830)	1,202,670	1,211	1,239,793
2002	0	108,309	50,342	1,740,813	3,961	1,903,425	0	69,443	50,342	1,699,261	3,961	1,823,007
2003	0	106,973	(48,181)	1,825,617	10,645	1,895,054	0	57,291	(48,181)	1,789,015	10,645	1,808,770
2004	0	122,559	3,161	2,032,528	649	2,158,897	0	60,847	3,161	1,992,344	649	2,057,001
2005	0	99,523	(159,678)	1,751,799	559	1,692,203	0	53,502	(159,678)	1,711,929	559	1,606,312
2006	0	128,022	(120,122)	1,967,163	504	1,975,567	0	46,463	(120,122)	1,920,919	504	1,847,764
2007	0	139,502	118,196	1,910,800	305	2,168,803	0	59,454	118,196	1,863,410	305	2,041,365
2008	0	97,209	(4,230)	1,201,345	327	1,294,651	0	51,709	(4,230)	1,168,316	327	1,216,122
2009	0	88,574	(726)	1,169,477	1,295	1,258,620	0	43,229	(726)	1,146,258	1,295	1,190,056
2010	0	92,345	48,231	1,409,122	603	1,550,301	0	59,808	48,231	1,389,990	603	1,498,632
2011	0	114,286	(18,816)	1,695,956	742	1,792,168	0	67,210	(18,816)	1,653,798	742	1,702,934
2012	0	114,502	14,573	1,537,522	938	1,667,535	0	70,999	14,573	1,510,007	938	1,596,517
2013	0	116,975	(1,058)	1,190,730	795	1,307,442	0	69,572	(1,058)	1,162,989	795	1,232,298
2014	0	70,655	31,082	489,254	172	591,163	0	52,458	31,082	484,432	172	568,144
2015	0	67,819	796	738,123	151	806,889	0	56,466	796	733,481	151	790,894
2016	0	30,107	88,393	1,434,458	7,010	1,559,968	0	29,857	88,393	1,413,649	7,010	1,538,909
2017	0	31,460	83,000	1,525,589	7,010	1,647,059	0	31,210	83,000	1,499,789	7,010	1,621,009
2018	0	31,898	38,000	1,428,846	7,010	1,505,754	0	31,648	38,000	1,403,046	7,010	1,479,704
2019	0	37,472	50,179	1,431,732	7,010	1,526,393	0	37,222	50,179	1,405,932	7,010	1,500,343
2020	0	37,536	(366)	1,431,732	7,010	1,475,912	0	37,286	(366)	1,405,932	7,010	1,449,862
2021	0	37,619	10,725	1,431,732	7,010	1,487,086	0	37,369	10,725	1,405,932	7,010	1,461,036
2022	0	37,613	(3,483)	1,431,732	7,010	1,472,872	0	37,363	(3,483)	1,405,932	7,010	1,446,822
2023	0	37,604	(18,971)	1,431,732	7,010	1,457,375	0	37,354	(18,971)	1,405,932	7,010	1,431,325
2024	0	37,483	11,289	1,431,732	7,010	1,487,514	0	37,233	11,289	1,405,932	7,010	1,461,464
2025	0	37,546	(12,518)	1,431,732	7,010	1,463,770	0	37,296	(12,518)	1,405,932	7,010	1,437,720
2026	0	37,558	24,308	1,431,732	7,010	1,500,608	0	37,308	24,308	1,405,932	7,010	1,474,558
2027	0	37,471	(17,799)	1,431,732	7,010	1,458,414	0	37,221	(17,799)	1,405,932	7,010	1,432,364
2028	0	37,611	12,291	1,431,732	7,010	1,488,644	0	37,361	12,291	1,405,932	7,010	1,462,594
2029	0	37,538	(9,046)	1,431,732	7,010	1,467,234	0	37,288	(9,046)	1,405,932	7,010	1,441,184
2030	0	37,602	20,756	1,431,732	7,010	1,497,100	0	37,352	20,756	1,405,932	7,010	1,471,050
2031	0	37,474	(97,726)	1,431,732	7,010	1,378,490	0	37,224	(97,726)	1,405,932	7,010	1,352,440
2032	0	37,076	84,999	1,431,732	7,010	1,560,817	0	36,826	84,999	1,405,932	7,010	1,534,767
2033	0	37,281	(94,652)	1,431,732	7,010	1,381,371	0	37,031	(94,652)	1,405,932	7,010	1,355,321
2034	0	36,773	69,593	1,431,732	7,010	1,545,108	0	36,523	69,593	1,405,932	7,010	1,519,058
2035	0	36,113	(242,659)	1,431,732	7,010	1,232,196	0	35,863	(242,659)	1,405,932	7,010	1,206,146

**TABLE B-6 Annual Water Quantities Conveyed through Each Pumping and Power Recovery Plant of Project Transportation Facilities (acre-feet)**

Calendar Year	CALIFORNIA AQUEDUCT (continued)											
	TEHACHAPI DIVISION						MOJAVE DIVISION					
	Edmonston Pumping Plant						Alamo Pumping Plant					
	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Deliveries		Total	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Deliveries		Total
				Water Supply	Recreation					Water Supply	Recreation	
	[51]	[52]	[53]	[54]	[55]	[56]	[57]	[58]	[59]	[60]	[61]	[62]
1961	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0
1971	5,446	8	0	0	0	5,454	0	0	0	0	0	0
1972	100,274	16,067	(6,558)	74,123	6,481	190,387	0	0	0	0	0	0
1973	204,638	34,051	1,329	207,808	1,147	448,973	0	0	0	0	0	0
1974	237,554	18,181	(15,295)	313,634	2,108	556,182	0	0	0	0	0	0
1975	103,352	20,183	(693)	573,219	3,358	699,419	0	0	0	0	0	0
1976	61,122	21,096	(152,171)	685,768	1,581	617,396	0	0	0	0	0	0
1977	0	18,424	(116,219)	236,086	560	138,851	0	0	0	0	0	0
1978	65,027	20,887	121,904	590,329	674	798,821	0	0	0	0	0	0
1979	12,302	46,332	(51,299)	568,338	502	576,175	0	0	0	0	0	0
1980	0	52,967	(134,009)	639,743	1,262	559,963	0	0	0	0	0	0
1981	0	40,602	23,359	938,482	4,112	1,006,555	0	0	0	0	0	0
1982	0	37,244	117,296	812,206	4,045	970,791	0	0	0	0	0	0
1983	0	40,690	(101,155)	431,182	7,291	378,008	0	0	0	0	0	0
1984	0	42,112	(115,214)	556,830	5,244	488,972	0	0	0	0	0	0
1985	0	45,265	139,988	792,477	4,804	982,534	0	0	0	0	0	0
1986	0	36,918	37,546	823,067	3,285	900,816	0	14,735	12,258	429,864	1,508	458,365
1987	0	29,580	(25,522)	851,322	6,937	862,317	0	11,665	(15,270)	417,870	1,239	415,504
1988	0	42,017	(29,747)	1,044,737	4,360	1,061,367	0	21,696	1,101	537,568	971	561,336
1989	0	32,270	(60,826)	1,328,041	7,490	1,306,975	0	4,686	(20,363)	716,360	1,407	702,090
1990	0	42,198	(15,092)	1,579,466	8,879	1,615,451	0	8,898	(5,916)	788,111	1,388	792,481
1991	0	33,999	105,176	441,217	4,560	584,952	0	17,908	34,422	177,308	394	230,032
1992	0	23,121	(92,123)	809,771	1,995	742,764	0	14,873	(17,115)	374,110	423	372,291
1993	0	11,946	(127,738)	759,485	1,676	645,369	0	9,304	(3,455)	308,222	443	314,514
1994	0	40,808	(88,211)	960,815	2,918	916,330	0	21,837	3,395	469,996	430	495,658
1995	0	36,001	(16,431)	542,465	1,669	563,704	0	14,139	(30,761)	384,836	427	368,641
1996	0	37,357	15,438	779,918	2,928	835,641	0	7,247	(11,410)	493,852	565	490,254
1997	0	51,475	40,852	860,798	2,076	955,201	0	20,725	38,960	537,586	507	597,778
1998	0	48,601	(106,487)	607,301	1,585	551,000	0	21,456	16,361	398,385	363	436,565
1999	0	52,726	(2,807)	947,420	3,279	1,000,618	0	26,644	(8,486)	589,756	396	608,310
2000	0	43,072	7,726	1,627,123	4,216	1,682,137	0	8,983	(10,472)	958,997	449	957,957
2001	0	39,544	(18,830)	1,187,300	1,211	1,209,225	0	14,526	3,478	709,985	452	728,441
2002	0	60,037	50,342	1,680,514	3,961	1,794,854	0	15,190	8,398	901,230	490	925,308
2003	0	53,320	(48,181)	1,771,048	10,645	1,786,832	0	13,676	(20,787)	1,035,349	355	1,028,593
2004	0	57,962	3,161	1,970,391	649	2,032,163	0	15,581	17,207	1,120,384	171	1,153,343
2005	0	40,949	(159,678)	1,693,409	559	1,575,239	0	2,561	(50,014)	1,116,158	84	1,068,789
2006	0	52,291	(120,122)	1,898,070	504	1,830,743	0	13,170	8,653	1,281,524	98	1,303,445
2007	0	65,423	118,196	1,836,977	305	2,020,901	0	17,957	(5,091)	1,076,227	103	1,089,196
2008	0	50,959	(4,230)	1,146,056	327	1,193,112	0	14,592	5,383	614,224	80	634,279
2009	0	59,186	(726)	1,125,654	1,295	1,185,409	0	25,599	(5,619)	493,685	1,100	514,765
2010	0	61,816	48,231	1,369,128	603	1,479,778	0	33,660	6,964	956,888	363	997,875
2011	0	64,370	(18,816)	1,632,033	742	1,678,329	0	34,783	(1,405)	1,220,667	500	1,254,545
2012	0	65,684	14,573	1,486,712	938	1,567,907	0	22,523	(229)	892,938	550	915,782
2013	0	69,789	(1,058)	1,141,530	795	1,211,056	0	20,563	3,278	528,614	501	552,956
2014	0	43,179	31,082	465,759	172	540,192	0	16,120	41,923	160,225	81	218,349
2015	0	43,312	796	714,860	151	759,119	0	10,834	(7,803)	248,779	71	251,881
2016	0	28,307	88,393	1,392,963	7,010	1,516,673	0	17,263	6,393	892,086	1,630	917,372
2017	0	29,660	83,000	1,477,973	7,010	1,597,643	0	17,245	10,000	822,530	1,630	851,405
2018	0	30,098	38,000	1,381,230	7,010	1,456,338	0	18,043	38,000	746,242	1,630	803,915
2019	0	35,672	50,179	1,384,116	7,010	1,476,977	0	20,924	31,508	749,128	1,630	803,190
2020	0	35,736	(366)	1,384,116	7,010	1,426,496	0	20,947	(3,398)	749,128	1,630	768,307
2021	0	35,819	10,725	1,384,116	7,010	1,437,670	0	20,946	(1,117)	749,128	1,630	770,587
2022	0	35,813	(3,483)	1,384,116	7,010	1,423,456	0	20,940	(3,434)	749,128	1,630	768,264
2023	0	35,804	(18,971)	1,384,116	7,010	1,407,959	0	20,939	(18,638)	749,128	1,630	753,059
2024	0	35,683	11,289	1,384,116	7,010	1,438,098	0	20,881	21,309	749,128	1,630	792,948
2025	0	35,746	(12,518)	1,384,116	7,010	1,414,354	0	20,965	(11,624)	749,128	1,630	760,099
2026	0	35,758	24,308	1,384,116	7,010	1,451,192	0	20,930	13,030	749,128	1,630	784,718
2027	0	35,671	(17,799)	1,384,116	7,010	1,408,998	0	20,861	(6,161)	749,128	1,630	765,458
2028	0	35,811	12,291	1,384,116	7,010	1,439,228	0	20,961	4,006	749,128	1,630	775,725
2029	0	35,738	(9,046)	1,384,116	7,010	1,417,818	0	20,955	(913)	749,128	1,630	770,800
2030	0	35,802	20,756	1,384,116	7,010	1,447,684	0	20,930	8,528	749,128	1,630	780,216
2031	0	35,674	(97,726)	1,384,116	7,010	1,329,074	0	20,956	(31,057)	749,128	1,630	740,657
2032	0	35,276	84,999	1,384,116	7,010	1,511,401	0	20,865	43,953	749,128	1,630	815,576
2033	0	35,481	(94,652)	1,384,116	7,010	1,331,955	0	20,854	(37,929)	749,128	1,630	733,683
2034	0	34,973	69,593	1,384,116	7,010	1,495,692	0	20,769	28,588	749,128	1,630	800,115
2035	0	34,313	(242,659)	1,384,116	7,010	1,182,780	0	20,892	(49,219)	749,128	1,630	722,431

**TABLE B-6 Annual Water Quantities Conveyed through Each Pumping and Power Recovery Plant of Project Transportation Facilities (acre-feet)**

Sheet 6 of 10

Calendar Year	CALIFORNIA AQUEDUCT (continued)											
	MOJAVE DIVISION (continued)											
	Pearblossom Pumping Plant						Mojave Siphon Powerplant					
	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Deliveries		Total	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Deliveries		Total
				Water Supply	Recreation					Water Supply	Recreation	
	[63]	[64]	[65]	[66]	[67]	[68]	[69]	[70]	[71]	[72]	[73]	[74]
1961	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0
1971	21	0	0	0	0	21	0	0	0	0	0	0
1972	35,243	5,282	(153)	1,794	0	42,166	0	0	0	0	0	0
1973	80,177	21,522	(2,700)	52,201	72	151,272	0	0	0	0	0	0
1974	76,694	10,847	(11,149)	102,839	44	179,275	0	0	0	0	0	0
1975	10,000	2,364	(8,397)	190,351	70	194,388	0	0	0	0	0	0
1976	4,168	7,040	(16,055)	236,713	152	232,018	0	0	0	0	0	0
1977	0	11,398	(17,534)	102,326	580	96,770	0	0	0	0	0	0
1978	19,922	5,696	69,130	374,845	498	470,091	0	0	0	0	0	0
1979	12,302	6,836	(32,518)	362,114	502	349,236	0	0	0	0	0	0
1980	0	16,200	6,159	401,214	781	424,354	0	0	0	0	0	0
1981	0	4,992	(36,278)	574,573	933	544,220	0	0	0	0	0	0
1982	0	5,251	55,232	401,037	1,919	463,439	0	0	0	0	0	0
1983	0	11,745	(26,847)	231,188	1,180	217,266	0	0	0	0	0	0
1984	0	18,228	23,230	252,066	1,494	295,018	0	0	0	0	0	0
1985	0	25,292	(2,815)	350,758	1,076	374,311	0	0	0	0	0	0
1986	0	30,876	12,258	394,156	1,508	438,798	0	0	0	0	0	0
1987	0	27,552	(15,270)	377,531	1,239	391,052	0	0	0	0	0	0
1988	0	32,209	1,101	501,300	971	535,581	0	1,977	1,101	501,291	971	505,340
1989	0	31,500	(20,363)	661,189	1,407	673,733	0	29,110	(20,363)	661,100	1,407	671,254
1990	0	32,672	(5,916)	730,560	1,388	758,704	0	23,692	(5,916)	730,550	1,388	749,714
1991	0	15,209	34,774	163,913	394	214,290	0	(543)	34,774	163,913	394	198,538
1992	0	13,989	(17,451)	338,249	423	335,210	0	(13,193)	(17,451)	338,207	423	307,986
1993	0	9,779	(3,455)	255,117	443	261,884	0	(11,922)	(3,455)	255,117	443	240,183
1994	0	150	3,395	409,928	430	413,903	0	1,601	3,395	395,294	430	400,720
1995	0	6,820	(29,282)	328,882	427	306,847	0	10,458	(29,282)	321,387	427	302,990
1996	0	9,514	(11,410)	424,252	565	422,921	0	(5,577)	(11,410)	418,141	565	401,719
1997	0	(1,124)	38,960	461,563	507	499,906	0	5,171	38,960	452,525	507	497,163
1998	0	(2,087)	16,361	334,965	363	349,602	0	11,496	16,361	332,385	363	360,605
1999	0	(1,154)	(8,486)	505,624	396	496,380	0	11,065	(8,486)	498,919	396	501,894
2000	0	(23,296)	(10,472)	864,999	449	831,680	0	4,896	(10,472)	854,980	449	849,853
2001	0	(9,304)	3,478	635,316	452	629,942	0	7,403	3,478	632,420	452	643,753
2002	0	3,810	8,398	823,690	490	836,388	0	9,300	8,398	820,217	490	838,405
2003	0	2,814	(20,787)	962,488	355	944,870	0	(6,586)	(20,787)	941,713	355	914,695
2004	0	(15,558)	17,207	1,047,521	171	1,049,341	0	5,034	17,207	1,035,315	171	1,057,727
2005	0	(18,967)	(50,014)	1,043,564	84	974,667	0	827	(50,014)	1,025,453	84	976,350
2006	0	(21,986)	8,653	1,187,627	98	1,174,392	0	(845)	8,653	1,154,634	98	1,162,540
2007	0	(13,055)	(5,091)	975,802	103	957,759	0	3,060	(5,091)	956,281	103	954,353
2008	0	723	5,383	550,143	80	556,329	0	8,380	5,383	534,480	80	548,323
2009	0	3,807	(5,619)	431,289	1,100	430,577	0	10,520	(5,619)	411,075	1,100	417,076
2010	0	3,489	6,964	886,249	363	897,065	0	11,912	6,964	858,609	363	877,848
2011	0	7,953	(1,405)	1,114,556	500	1,121,604	0	13,506	(1,405)	1,080,734	500	1,093,335
2012	0	3,499	(229)	797,563	550	801,383	0	3,492	(229)	775,600	550	779,413
2013	0	6,273	3,278	466,095	501	476,147	0	12,172	3,278	460,089	501	476,040
2014	0	11,143	41,923	133,376	81	186,523	0	13,671	41,923	130,752	81	186,427
2015	0	7,067	(7,803)	229,244	71	228,579	0	9,953	(7,803)	221,321	71	223,542
2016	0	11,913	6,393	791,356	1,430	811,092	0	8,443	6,393	780,447	1,430	796,713
2017	0	<b>11,895</b>	<b>10,000</b>	<b>713,938</b>	<b>1,430</b>	<b>737,263</b>	0	<b>8,425</b>	<b>10,000</b>	<b>680,773</b>	<b>1,430</b>	<b>700,628</b>
2018	0	12,693	38,000	637,650	1,430	689,773	0	9,223	38,000	604,485	1,430	653,138
2019	0	15,574	31,508	642,602	1,430	691,114	0	12,104	31,508	606,987	1,430	652,029
2020	0	15,597	(3,398)	642,602	1,430	656,231	0	12,127	(3,398)	606,987	1,430	617,146
2021	0	15,596	(1,117)	642,602	1,430	658,511	0	12,126	(1,117)	606,987	1,430	619,426
2022	0	15,590	(3,434)	642,602	1,430	656,188	0	12,120	(3,434)	606,987	1,430	617,103
2023	0	15,589	(18,638)	642,602	1,430	640,983	0	12,119	(18,638)	606,987	1,430	601,898
2024	0	15,531	21,309	642,602	1,430	680,872	0	12,061	21,309	606,987	1,430	641,787
2025	0	15,615	(11,624)	642,602	1,430	648,023	0	12,145	(11,624)	606,987	1,430	608,938
2026	0	15,580	13,030	642,602	1,430	672,642	0	12,110	13,030	606,987	1,430	633,557
2027	0	15,511	(6,161)	642,602	1,430	653,382	0	12,041	(6,161)	606,987	1,430	614,297
2028	0	15,611	4,006	642,602	1,430	663,649	0	12,141	4,006	606,987	1,430	624,564
2029	0	15,605	(913)	642,602	1,430	658,724	0	12,135	(913)	606,987	1,430	619,639
2030	0	15,580	8,528	642,602	1,430	668,140	0	12,110	8,528	606,987	1,430	629,055
2031	0	15,606	(31,057)	642,602	1,430	628,581	0	12,136	(31,057)	606,987	1,430	589,496
2032	0	15,515	43,953	642,602	1,430	703,500	0	12,045	43,953	606,987	1,430	664,415
2033	0	15,504	(37,929)	642,602	1,430	621,607	0	12,034	(37,929)	606,987	1,430	582,522
2034	0	15,419	28,588	642,602	1,430	688,039	0	11,949	28,588	606,987	1,430	648,954
2035	0	15,542	(49,219)	642,602	1,430	610,355	0	12,072	(49,219)	606,987	1,430	571,270

**TABLE B-6 Annual Water Quantities Conveyed through Each Pumping and Power Recovery Plant of Project Transportation Facilities (acre-feet)**

Sheet 7 of 10

Calendar Year	CALIFORNIA AQUEDUCT (continued)									
	SANTA ANA DIVISION									
	Devil Canyon Powerplant						Greenspot Pump Station			
	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Deliveries		Total	Initial Fill Water	Operational Losses	Water Supply Delivery	Total
				Water Supply	Recreation					
	[75]	[76]	[77]	[78]	[79]	[80]	[81]	[82]	[83]	[84]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0
1972	37	0	0	1,275	0	1,312	0	0	0	0
1973	40,848	14,745	0	51,812	0	107,405	0	0	0	0
1974	74,666	8,367	(4,925)	102,198	0	180,306	0	0	0	0
1975	10,000	1,995	(6,719)	189,526	0	194,802	0	0	0	0
1976	4,168	5,180	(9,182)	235,711	23	235,900	0	0	0	0
1977	0	8,082	(5,235)	101,137	469	104,453	0	0	0	0
1978	14,820	3,754	21,686	373,636	481	414,377	0	0	0	0
1979	12,302	5,620	(27,107)	356,854	485	348,154	0	0	0	0
1980	0	9,468	12,714	395,975	742	418,899	0	0	0	0
1981	0	8,401	(23,448)	569,088	807	554,848	0	0	0	0
1982	0	6,012	44,469	399,799	1,798	452,078	0	0	0	0
1983	0	8,597	5,188	230,277	1,078	245,140	0	0	0	0
1984	0	12,861	(850)	250,938	1,414	264,363	0	0	0	0
1985	0	14,325	(8,791)	349,336	956	355,826	0	0	0	0
1986	0	9,486	8,339	392,650	1,378	411,853	0	0	0	0
1987	0	7,923	(11,335)	375,451	1,118	373,157	0	0	0	0
1988	0	11,090	2,238	499,285	861	513,474	0	0	0	0
1989	0	13,116	(5,487)	658,730	1,301	667,660	0	0	0	0
1990	0	13,439	(4,622)	728,723	1,281	738,821	0	0	0	0
1991	0	10,836	18,308	161,032	340	190,516	0	0	0	0
1992	0	9,157	(9,084)	328,354	371	328,798	0	0	0	0
1993	0	5,602	5,593	244,678	364	256,237	0	0	0	0
1994	0	10,915	(11,045)	393,690	357	393,917	0	0	0	0
1995	0	11,268	2,331	320,978	358	334,935	0	0	0	0
1996	0	9,496	13,015	417,656	494	440,661	0	0	0	0
1997	0	8,087	(19,685)	451,874	416	440,692	0	0	0	0
1998	0	6,700	16,643	332,198	310	355,851	0	0	0	0
1999	0	9,784	(4,177)	497,787	341	503,735	0	0	0	0
2000	0	7,407	(11,040)	853,786	375	850,528	0	0	0	0
2001	0	9,324	8,183	631,363	374	649,244	0	0	0	0
2002	0	10,315	9,682	818,028	413	838,438	0	0	0	0
2003	0	9,198	(18,298)	922,901	260	914,061	0	0	4,526	4,526
2004	0	11,166	15,150	1,033,309	85	1,059,710	0	0	3,798	3,798
2005	0	4,500	(63,441)	1,010,247	0	951,306	0	0	3,686	3,686
2006	0	8,208	7,571	1,153,993	0	1,169,772	0	0	7,775	7,775
2007	0	8,216	(5,872)	953,803	0	956,147	0	0	12,168	12,168
2008	0	10,599	7,759	533,221	0	551,579	0	0	14,408	14,408
2009	0	10,035	(5,600)	410,032	1,025	415,492	0	0	20,542	20,542
2010	0	6,275	5,344	851,786	307	863,712	0	0	18,395	18,395
2011	0	7,359	2,371	1,066,088	417	1,076,235	0	0	20,586	20,586
2012	0	(1,942)	(2,225)	771,982	459	768,274	0	0	23,791	23,791
2013	0	3,306	3,042	458,221	416	464,985	0	0	20,560	20,560
2014	0	9,919	42,495	129,317	27	181,758	0	0	9,843	9,843
2015	0	8,923	(4,305)	220,068	35	224,721	0	0	9,791	9,791
2016	0	5,241	393	778,327	1,250	785,211	0	0	10,566	10,566
2017	0	<b>5,544</b>	<b>10,000</b>	<b>670,893</b>	<b>1,250</b>	<b>687,687</b>	0	0	<b>10,380</b>	<b>10,380</b>
2018	0	6,465	38,000	595,005	1,250	640,720	0	0	10,380	10,380
2019	0	8,492	17,408	597,507	1,250	624,657	0	0	10,380	10,380
2020	0	8,483	(17,305)	597,507	1,250	589,935	0	0	10,380	10,380
2021	0	8,486	(398)	597,507	1,250	606,845	0	0	10,380	10,380
2022	0	8,486	13,735	597,507	1,250	620,978	0	0	10,380	10,380
2023	0	8,482	(8,417)	597,507	1,250	598,822	0	0	10,380	10,380
2024	0	8,462	689	597,507	1,250	607,908	0	0	10,380	10,380
2025	0	8,489	4,591	597,507	1,250	611,837	0	0	10,380	10,380
2026	0	8,475	(3,819)	597,507	1,250	603,413	0	0	10,380	10,380
2027	0	8,479	745	597,507	1,250	607,981	0	0	10,380	10,380
2028	0	8,481	(5,355)	597,507	1,250	601,883	0	0	10,380	10,380
2029	0	8,481	2,909	597,507	1,250	610,147	0	0	10,380	10,380
2030	0	8,480	296	597,507	1,250	607,533	0	0	10,380	10,380
2031	0	8,475	(1,976)	597,507	1,250	605,256	0	0	10,380	10,380
2032	0	8,449	18,821	597,507	1,250	626,027	0	0	10,380	10,380
2033	0	8,449	(23,419)	597,507	1,250	583,787	0	0	10,380	10,380
2034	0	8,443	21,651	597,507	1,250	628,851	0	0	10,380	10,380
2035	0	8,451	(31,434)	597,507	1,250	575,774	0	0	10,380	10,380

**TABLE B-6 Annual Water Quantities Conveyed through Each Pumping and Power Recovery Plant of Project Transportation Facilities (acre-feet)**

Sheet 8 of 10

Calendar Year	CALIFORNIA AQUEDUCT (continued)													
	SANTA ANA DIVISION (continued)								WEST BRANCH					
	Crafton Hills Pump Station				Cherry Valley Pump Station				Oso Pumping Plant					
	Initial Fill Water	Operational Losses	Water Supply Delivery	Total	Initial Fill Water	Operational Losses	Water Supply Delivery	Total	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Deliveries		Total
												Water Supply	Recreation	
	[85]	[86]	[87]	[88]	[89]	[90]	[91]	[92]	[93]	[94]	[95]	[96]	[97]	[98]
1961	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	2,444	133	0	0	0	2,577
1972	0	0	0	0	0	0	0	0	63,883	6,557	(6,405)	71,991	6,481	142,507
1973	0	0	0	0	0	0	0	0	124,461	16,995	4,029	155,317	1,075	301,877
1974	0	0	0	0	0	0	0	0	160,860	12,702	(4,146)	209,172	2,064	380,652
1975	0	0	0	0	0	0	0	0	93,352	23,008	7,704	374,306	3,288	501,658
1976	0	0	0	0	0	0	0	0	56,954	15,845	(136,116)	420,708	1,429	358,820
1977	0	0	0	0	0	0	0	0	0	4,407	(98,685)	122,447	(20)	28,149
1978	0	0	0	0	0	0	0	0	45,105	9,061	52,774	171,139	176	278,255
1979	0	0	0	0	0	0	0	0	0	25,355	(18,781)	145,598	0	152,172
1980	0	0	0	0	0	0	0	0	0	24,576	(140,168)	165,931	481	50,820
1981	0	0	0	0	0	0	0	0	0	15,254	59,637	283,264	3,179	361,334
1982	0	0	0	0	0	0	0	0	0	23,824	61,685	360,878	2,126	448,513
1983	0	0	0	0	0	0	0	0	0	23,601	(74,308)	166,995	6,111	122,399
1984	0	0	0	0	0	0	0	0	0	12,461	(138,146)	272,101	3,750	150,166
1985	0	0	0	0	0	0	0	0	0	28,257	142,219	403,097	3,728	577,301
1986	0	0	0	0	0	0	0	0	0	22,387	25,288	393,203	1,777	442,655
1987	0	0	0	0	0	0	0	0	0	18,164	(10,252)	433,452	5,698	447,062
1988	0	0	0	0	0	0	0	0	0	20,461	(30,848)	507,169	3,389	500,171
1989	0	0	0	0	0	0	0	0	0	27,914	(40,463)	611,681	6,083	605,215
1990	0	0	0	0	0	0	0	0	0	33,666	(9,176)	791,355	7,491	823,336
1991	0	0	0	0	0	0	0	0	0	16,460	70,754	263,909	4,166	355,289
1992	0	0	0	0	0	0	0	0	0	8,238	(75,008)	435,661	1,572	370,463
1993	0	0	0	0	0	0	0	0	0	2,674	(124,283)	451,263	1,233	330,887
1994	0	0	0	0	0	0	0	0	0	18,688	(91,606)	490,819	2,488	420,389
1995	0	0	0	0	0	0	0	0	0	21,775	14,330	157,629	1,242	194,976
1996	0	0	0	0	0	0	0	0	0	30,121	26,848	286,066	2,363	345,398
1997	0	0	0	0	0	0	0	0	0	30,468	1,892	323,212	1,569	357,141
1998	0	0	0	0	0	0	0	0	0	26,851	(122,848)	208,916	1,222	114,141
1999	0	0	0	0	0	0	0	0	0	25,690	5,679	357,664	2,883	391,916
2000	0	0	0	0	0	0	0	0	0	33,658	18,198	668,126	3,767	723,749
2001	0	0	0	0	0	0	0	0	0	24,551	(22,308)	477,315	759	480,317
2002	0	0	0	0	0	0	0	0	0	44,692	41,944	779,284	3,471	869,391
2003	0	0	2,733	2,733	0	0	116	116	0	39,495	(27,394)	735,699	10,290	758,090
2004	0	0	3,212	3,212	0	0	841	841	0	41,947	(14,046)	850,007	478	878,386
2005	0	0	2,727	2,727	0	0	692	692	0	38,154	(109,664)	577,251	475	506,216
2006	0	0	6,892	6,892	0	0	807	807	0	38,534	(128,775)	616,546	406	526,711
2007	0	0	9,038	9,038	0	0	177	177	0	46,921	123,287	760,750	202	931,160
2008	0	0	13,728	13,728	0	0	1,042	1,042	0	36,204	(9,613)	531,832	247	558,670
2009	0	0	16,463	16,463	0	0	1,898	1,898	0	33,295	4,893	631,969	195	670,352
2010	0	0	17,778	17,778	0	0	5,685	5,685	0	27,788	41,267	412,240	240	481,535
2011	0	0	19,887	19,887	0	0	9,290	9,290	0	29,227	(17,411)	411,366	242	423,424
2012	0	0	20,614	20,614	0	0	11,010	11,010	0	42,913	14,802	593,774	388	651,877
2013	0	0	17,526	17,526	0	0	9,445	9,445	0	49,029	(4,336)	612,912	294	657,899
2014	0	0	9,468	9,468	0	0	5,044	5,044	0	27,005	(10,841)	305,533	91	321,788
2015	0	0	9,409	9,409	0	0	3,481	3,481	0	32,430	8,599	466,081	80	507,190
2016	0	0	10,288	10,288	0	0	8,335	8,335	0	10,994	82,000	500,877	5,380	599,251
2017	0	0	10,380	10,380	0	0	8,180	8,180	0	12,365	73,000	655,443	5,380	746,188
2018	0	0	10,380	10,380	0	0	8,080	8,080	0	12,005	0	634,988	5,380	652,373
2019	0	0	10,380	10,380	0	0	7,980	7,980	0	14,698	18,671	634,988	5,380	673,737
2020	0	0	10,380	10,380	0	0	7,880	7,880	0	14,739	3,032	634,988	5,380	658,139
2021	0	0	10,380	10,380	0	0	7,880	7,880	0	14,823	11,842	634,988	5,380	667,033
2022	0	0	10,380	10,380	0	0	7,880	7,880	0	14,823	(49)	634,988	5,380	655,142
2023	0	0	10,380	10,380	0	0	7,880	7,880	0	14,815	(333)	634,988	5,380	654,850
2024	0	0	10,380	10,380	0	0	7,880	7,880	0	14,752	(10,020)	634,988	5,380	645,100
2025	0	0	10,380	10,380	0	0	7,880	7,880	0	14,731	(894)	634,988	5,380	654,205
2026	0	0	10,380	10,380	0	0	7,880	7,880	0	14,778	11,278	634,988	5,380	666,424
2027	0	0	10,380	10,380	0	0	7,880	7,880	0	14,760	(11,638)	634,988	5,380	643,490
2028	0	0	10,380	10,380	0	0	7,880	7,880	0	14,800	8,285	634,988	5,380	663,453
2029	0	0	10,380	10,380	0	0	7,880	7,880	0	14,733	(8,133)	634,988	5,380	646,968
2030	0	0	10,380	10,380	0	0	7,880	7,880	0	14,822	12,228	634,988	5,380	667,418
2031	0	0	10,380	10,380	0	0	7,880	7,880	0	14,668	(66,669)	634,988	5,380	588,367
2032	0	0	10,380	10,380	0	0	7,880	7,880	0	14,361	41,046	634,988	5,380	695,775
2033	0	0	10,380	10,380	0	0	7,880	7,880	0	14,577	(56,723)	634,988	5,380	598,222
2034	0	0	10,380	10,380	0	0	7,880	7,880	0	14,154	41,005	634,988	5,380	695,527
2035	0	0	10,380	10,380	0	0	7,880	7,880	0	13,371	(193,440)	634,988	5,380	460,299



**TABLE B-6 Annual Water Quantities Conveyed through Each Pumping and Power Recovery Plant of Project Transportation Facilities (acre-feet)**

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Calendar Year	CALIFORNIA AQUEDUCT (continued)											
	WEST BRANCH (continued)											
	Warne Powerplant						Castaic Powerplant					
	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Deliveries		Total	Initial Fill Water	Operational Losses	Reservoir Storage Changes	Deliveries		Total
				Water Supply	Recreation					Water Supply	Recreation	
	[99]	[100]	[101]	[102]	[103]	[104]	[105]	[106]	[107]	[108]	[109]	[110]
1961	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	57,364	1,788	(6,162)	71,938	6,481	131,409
1973	0	0	0	0	0	0	37,198	6,430	4,542	155,297	1,075	204,542
1974	0	0	0	0	0	0	82,364	1,772	(950)	209,136	541	292,863
1975	0	0	0	0	0	0	90,460	5,002	(1,534)	374,280	1,563	469,771
1976	0	0	0	0	0	0	55,990	(7,695)	(132,036)	420,684	1,429	338,372
1977	0	0	0	0	0	0	0	(1,485)	(102,532)	122,447	(20)	18,410
1978	0	0	0	0	0	0	45,105	(2,264)	129,523	171,139	176	343,679
1979	0	0	0	0	0	0	0	(2,339)	(20,400)	145,598	0	122,859
1980	0	0	0	0	0	0	0	991	(118,026)	165,931	481	49,377
1981	0	0	0	0	0	0	0	(44,416)	47,244	283,264	2,704	288,796
1982	0	24,468	61,169	360,878	2,126	448,641	0	(60,135)	59,069	360,878	1,187	360,999
1983	0	20,780	(74,308)	166,995	6,111	119,578	0	(33,418)	(46,904)	166,995	2,618	89,291
1984	0	13,572	(139,219)	275,212	2,208	151,773	0	(29,618)	(139,545)	275,212	2,201	108,250
1985	0	29,286	141,492	403,097	874	574,749	0	(4,622)	135,007	403,097	844	534,326
1986	0	21,579	25,288	393,203	1,777	441,847	0	(6,664)	21,520	393,203	623	408,682
1987	0	20,885	(10,252)	433,452	5,698	449,783	0	(519)	(6,241)	433,452	2,734	429,426
1988	0	23,253	(31,453)	507,169	3,389	502,358	0	12,650	(28,498)	507,169	1,359	492,680
1989	0	27,131	(40,463)	611,681	6,083	604,432	0	634	(40,154)	611,681	3,161	575,322
1990	0	34,208	(9,176)	791,355	7,491	823,878	0	(14,012)	(15,101)	786,519	3,419	760,825
1991	0	16,908	70,754	263,909	4,166	355,737	0	(871)	89,637	262,921	2,283	353,970
1992	0	9,638	(75,008)	435,661	1,572	371,863	0	(609)	(71,795)	435,661	1,543	364,800
1993	0	1,922	(124,283)	451,257	1,233	330,129	0	21,959	(77,428)	451,257	1,211	396,999
1994	0	23,151	(91,606)	490,819	2,488	424,852	0	5,205	(95,738)	490,819	2,465	402,751
1995	0	15,860	14,330	157,629	1,242	189,061	0	20,400	75,863	157,629	1,223	255,115
1996	0	21,191	26,848	286,066	2,363	336,468	0	(5,621)	19,088	286,066	2,362	301,895
1997	0	23,437	1,892	323,201	1,569	350,099	0	11,119	(1,802)	323,201	1,566	334,084
1998	0	26,864	(122,848)	208,909	1,222	114,147	0	24,544	(57,726)	208,909	1,222	176,949
1999	0	21,822	8,120	357,664	2,883	390,489	0	(3,670)	6,280	357,664	2,865	363,139
2000	0	27,237	18,198	668,126	3,767	717,328	0	(19,645)	9,320	665,926	1,556	657,157
2001	0	17,404	(22,308)	477,315	759	473,170	0	(5,949)	(16,588)	477,315	746	455,524
2002	0	35,058	41,944	779,284	3,471	859,757	0	10,071	35,623	776,136	305	822,135
2003	0	28,167	(27,394)	735,699	10,290	746,762	0	9,075	(17,034)	725,781	356	718,178
2004	0	31,034	(14,046)	850,007	478	867,473	0	9,120	(11,440)	845,960	456	844,096
2005	0	29,111	(109,664)	577,251	475	497,173	0	21,155	(61,490)	577,251	472	537,388
2006	0	23,453	(128,775)	616,546	406	511,630	0	4,173	(121,607)	616,546	396	499,508
2007	0	29,978	123,287	760,750	202	914,217	0	(1,664)	117,880	758,860	196	875,272
2008	0	36,744	(9,613)	531,832	247	559,210	0	498	(14,279)	529,852	211	516,282
2009	0	30,564	4,893	631,969	195	667,621	0	(2,825)	9,194	628,819	164	635,352
2010	0	26,930	41,267	412,240	240	480,677	0	(4,135)	40,284	409,090	207	445,446
2011	0	29,363	(17,411)	411,366	242	423,560	0	(9,084)	(22,531)	408,846	221	377,452
2012	0	28,769	14,802	593,750	388	637,709	0	10,210	16,335	590,600	375	617,520
2013	0	30,918	(4,336)	612,865	294	639,741	0	13,114	(3,811)	610,623	196	620,122
2014	0	17,555	(10,841)	305,533	91	312,338	0	4,742	(11,327)	305,533	47	298,995
2015	0	22,165	8,599	466,081	80	496,925	0	4,268	9,481	465,451	63	479,263
2016	0	9,084	82,000	500,877	5,380	597,341	0	4,700	82,000	498,987	2,330	588,017
2017	0	10,455	73,000	655,443	5,380	744,278	0	6,575	73,000	653,553	2,330	735,458
2018	0	10,095	0	634,988	5,380	650,463	0	6,377	0	633,098	2,330	641,805
2019	0	12,788	18,671	634,988	5,380	671,827	0	6,503	18,671	633,098	2,330	660,602
2020	0	12,829	3,032	634,988	5,380	656,229	0	6,544	3,032	633,098	2,330	645,004
2021	0	12,913	11,842	634,988	5,380	665,123	0	6,628	11,842	633,098	2,330	653,898
2022	0	12,913	(49)	634,988	5,380	653,232	0	6,628	(49)	633,098	2,330	642,007
2023	0	12,905	(333)	634,988	5,380	652,940	0	6,620	(333)	633,098	2,330	641,715
2024	0	12,842	(10,020)	634,988	5,380	643,190	0	6,557	(10,020)	633,098	2,330	631,965
2025	0	12,821	(894)	634,988	5,380	652,295	0	6,536	(894)	633,098	2,330	641,070
2026	0	12,868	11,278	634,988	5,380	664,514	0	6,583	11,278	633,098	2,330	653,289
2027	0	12,850	(11,638)	634,988	5,380	641,580	0	6,565	(11,638)	633,098	2,330	630,355
2028	0	12,890	8,285	634,988	5,380	661,543	0	6,605	8,285	633,098	2,330	650,318
2029	0	12,823	(8,133)	634,988	5,380	645,058	0	6,538	(8,133)	633,098	2,330	633,833
2030	0	12,912	12,228	634,988	5,380	665,508	0	6,627	12,228	633,098	2,330	654,283
2031	0	12,758	(66,669)	634,988	5,380	586,457	0	6,473	(66,669)	633,098	2,330	575,232
2032	0	12,451	41,046	634,988	5,380	693,865	0	6,166	41,046	633,098	2,330	682,640
2033	0	12,667	(56,723)	634,988	5,380	596,312	0	6,382	(56,723)	633,098	2,330	585,087
2034	0	12,244	41,005	634,988	5,380	693,617	0	5,959	41,005	633,098	2,330	682,392
2035	0	11,461	(193,440)	634,988	5,380	458,389	0	5,176	(193,440)	633,098	2,330	447,164

**TABLE B-6 Annual Water Quantities Conveyed through Each Pumping and Power Recovery Plant of Project Transportation Facilities (acre-feet)**

Sheet 10 of 10

Calendar Year	CALIFORNIA AQUEDUCT (continued)							
	COASTAL BRANCH							
	Las Perillas and Badger Hill Pumping Plants				Devil's Den, Bluestone, and Polonio Pass Pumping Plants			
	Initial Fill Water	Operational Losses	Water Supply Delivery	Total	Initial Fill Water	Operational Losses	Water Supply Delivery	Total
	[111]	[112]	[113]	[114]	[115]	[116]	[117]	[118]
1961	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0
1968	210	873	79,039	80,122	0	0	0	0
1969	0	1,042	62,064	63,106	0	0	0	0
1970	0	638	83,649	84,287	0	0	0	0
1971	0	3,455	110,971	114,426	0	0	0	0
1972	0	1,745	121,755	123,500	0	0	0	0
1973	0	5,479	78,645	84,124	0	0	0	0
1974	0	7,344	78,174	85,518	0	0	0	0
1975	0	5,819	85,216	91,035	0	0	0	0
1976	0	6,562	90,058	96,620	0	0	0	0
1977	0	5,777	40,579	46,356	0	0	0	0
1978	0	9,085	92,604	101,689	0	0	0	0
1979	0	10,896	123,155	134,051	0	0	0	0
1980	0	9,449	111,379	120,828	0	0	0	0
1981	0	13,232	109,754	122,986	0	0	0	0
1982	0	7,984	95,776	103,760	0	0	0	0
1983	0	5,710	100,518	106,228	0	0	0	0
1984	0	5,740	126,387	132,127	0	0	0	0
1985	0	7,563	120,823	128,386	0	0	0	0
1986	0	8,719	131,599	140,318	0	0	0	0
1987	0	11,363	128,080	139,443	0	0	0	0
1988	0	12,831	120,969	133,800	0	0	0	0
1989	0	11,454	116,801	128,255	0	0	0	0
1990	0	13,022	109,802	122,824	0	0	0	0
1991	0	5,802	1,496	7,298	0	0	0	0
1992	0	7,893	79,635	87,528	0	0	0	0
1993	0	9,282	94,921	104,203	0	0	0	0
1994	0	8,515	87,158	95,673	0	0	0	0
1995	0	6,986	94,536	101,522	0	0	0	0
1996	0	9,663	114,630	124,293	0	0	0	0
1997	527	8,343	110,428	119,298	527	0	8,538	9,065
1998	0	8,415	109,400	117,815	0	0	22,210	22,210
1999	0	2,453	120,061	122,514	0	303	23,880	24,183
2000	0	(429)	120,313	119,884	0	0	26,703	26,703
2001	0	(742)	87,915	87,173	0	0	23,229	23,229
2002	0	638	99,783	100,421	0	(151)	31,991	31,840
2003	0	161	101,113	101,274	0	284	31,421	31,705
2004	0	492	104,144	104,636	0	480	33,870	34,350
2005	0	1,484	103,178	104,662	0	573	27,595	28,168
2006	0	1,994	115,433	117,427	0	2,034	27,484	29,518
2007	0	3,355	131,590	134,945	0	293	31,516	31,809
2008	0	3,696	107,239	110,935	0	(30)	21,795	21,765
2009	0	2,242	102,509	104,751	0	(3,078)	19,253	16,175
2010	0	4,050	106,590	110,640	0	272	21,532	21,804
2011	0	3,994	113,647	117,641	0	533	24,869	25,402
2012	0	7,411	109,383	116,794	0	589	23,418	24,007
2013	0	7,637	110,714	118,351	0	295	21,699	21,994
2014	0	6,636	94,369	101,005	0	4,018	19,963	23,981
2015	0	5,458	94,227	99,685	0	378	15,111	15,489
2016	0	802	103,199	104,001	0	212	29,129	29,341
2017	0	802	95,341	96,143	0	212	40,348	40,560
2018	0	802	95,410	96,212	0	212	40,417	40,629
2019	0	802	95,446	96,248	0	212	40,453	40,665
2020	0	802	95,522	96,324	0	212	40,529	40,741
2021	0	802	95,522	96,324	0	212	40,529	40,741
2022	0	802	95,522	96,324	0	212	40,529	40,741
2023	0	802	95,522	96,324	0	212	40,529	40,741
2024	0	802	95,522	96,324	0	212	40,529	40,741
2025	0	802	95,522	96,324	0	212	40,529	40,741
2026	0	802	95,522	96,324	0	212	40,529	40,741
2027	0	802	95,522	96,324	0	212	40,529	40,741
2028	0	802	95,522	96,324	0	212	40,529	40,741
2029	0	802	95,522	96,324	0	212	40,529	40,741
2030	0	802	95,522	96,324	0	212	40,529	40,741
2031	0	802	95,522	96,324	0	212	40,529	40,741
2032	0	802	95,522	96,324	0	212	40,529	40,741
2033	0	802	95,522	96,324	0	212	40,529	40,741
2034	0	802	95,522	96,324	0	212	40,529	40,741
2035	0	802	95,522	96,324	0	212	40,529	40,741

**TABLE B-7 Reconciliation of Capital Costs Allocated to Water Supply and Power Generation (in thousands of dollars)**

Item	Project Costs Allocated to Water Supply and Power Generation							Capital Costs Allocated to Other Purposes	Total State Water Project Capital Cost
	Miscellaneous Income Credited to Construction <sup>a</sup>	Allowance for Future Price Escalation <sup>b</sup>	Costs of Construction of Delivery Structures <sup>c</sup>	Costs of Requested Excess Capacity and Future Enlargement <sup>d</sup>	Capital Cost Component of Delta Water Charge <sup>e</sup>	Capital Cost Component of Transportation Water Charge <sup>f</sup>	Water Supply and Power Total		
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
<b>CONSERVATION FACILITIES</b>									
Upper Feather Division									
Frenchman Dam and Lake	180	0	0	0	602	0	782	2,876	3,658
Grizzly Valley Dam and Lake Davis	65	0	0	0	55	0	120	8,953	9,073
Antelope Dam and Lake	1	0	0	0	0	0	1	5,864	5,865
Abbey Bridge Dam and Reservoir	0	0	0	0	0	0	0	520	520
Dixie Refuge Dam and Reservoir	0	0	0	0	0	0	0	236	236
<b>Total, Upper Feather Division</b>	<b>246</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>657</b>	<b>0</b>	<b>903</b>	<b>18,449</b>	<b>19,352</b>
Oroville Division									
Multipurpose Facilities	3,152	0	0	0	776,437	0	779,589	99,522	879,111
Specific Power Facilities	230	0	0	0	214,682	0	214,912	(876)	214,037
<b>Total, Oroville Division</b>	<b>3,382</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>991,119</b>	<b>0</b>	<b>994,501</b>	<b>98,646</b>	<b>1,093,148</b>
California Aqueduct									
North San Joaquin Division	1,210	0	0	0	105,794	0	107,004	3,820	110,824
San Luis Division	13,152	0	0	0	162,632	0	175,784	5,701	181,484
<b>Total, California Aqueduct</b>	<b>14,362</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>268,426</b>	<b>0</b>	<b>282,788</b>	<b>9,521</b>	<b>292,309</b>
Delta Facilities	314,899	0	0	0	649,755	0	687,066	31,944	719,009
Planning and Preoperation	5,302	0	0	0	101,240	0	106,542	0	106,542
<b>TOTAL, CONSERVATION FACILITIES</b>	<b>338,191</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2,011,197</b>	<b>0</b>	<b>2,071,800</b>	<b>158,560</b>	<b>2,230,360</b>
<b>TRANSPORTATION FACILITIES</b>									
Upper Feather Division									
Grizzly Valley Pipeline	0	0	315	0	0	567	881	0	881
North Bay Aqueduct	266	0	676	0	0	121,758	122,700	0	122,700
South Bay Aqueduct	1,791	0	3,655	0	0	383,410	388,856	23,726	412,582
California Aqueduct									
North San Joaquin Division	2,462	0	108	0	0	233,864	236,434	8,503	244,936
San Luis Division	9,201	0	0	0	0	175,334	184,535	8,805	193,340
South San Joaquin Division	386	0	4,800	13,152	0	341,825	360,162	17,845	378,008
Tehachapi Division	27	0	0	5,230	0	381,875	387,132	20,888	408,019
Mojave Division	918	0	2,153	0	0	348,766	351,837	40,084	391,922
Santa Ana Division	1,184	0	6,060	5,331	0	366,341	378,915	71,761	450,676
West Branch	37,592	0	455	37	0	521,827	559,912	34,302	594,214
Coastal Branch	(279)	0	216	0	0	511,864	511,802	0	511,802
<b>Total, California Aqueduct</b>	<b>51,491</b>	<b>0</b>	<b>13,792</b>	<b>23,750</b>	<b>0</b>	<b>2,881,695</b>	<b>2,970,729</b>	<b>202,188</b>	<b>3,172,917</b>
<b>TOTAL, TRANSPORTATION FACILITIES</b>	<b>53,548</b>	<b>0</b>	<b>18,438</b>	<b>23,750</b>	<b>0</b>	<b>3,387,430</b>	<b>3,483,166</b>	<b>225,914</b>	<b>3,709,080</b>
East Branch Enlargement	0	0	0	0	0	462,031	462,031	0	462,031
East Branch Extension	0	0	0	0	0	410,580	410,580	0	410,580
Coastal Power Allocation	0	0	0	0	0	30,708	30,708	0	30,708
San Joaquin Drainage Facilities	0	0	0	0	0	0	0	105,037	105,037
Off-Aqueduct									
Power Generation Facilities	0	0	0	0	0	602,174	602,174	0	602,174
Small Hydro									
Power Generation Facilities	0	0	0	0	14,095	85,971	100,066	0	100,066
Land Purchase—Kern Water Bank	0	0	0	0	34,686	0	34,686	0	34,686
Unassigned/Miscellaneous	0	0	0	0	0	0	0	21,250	21,250
Davis-Grunsky	0	0	0	0	0	0	0	130,000	130,000
<b>TOTAL THROUGH 2025</b>	<b>391,739</b>	<b>0</b>	<b>18,438</b>	<b>23,750</b>	<b>2,059,978</b>	<b>4,978,894</b>	<b>7,195,210</b>	<b>640,761</b>	<b>7,835,971</b>

<sup>a</sup> Miscellaneous project receipts that are applied for accounting purposes to reduce the capital costs of the particular facilities.<sup>b</sup> These allowances are included for planning the future financial program, but not for determining current water charges.<sup>c</sup> See Table B-8.<sup>d</sup> See Table B-9.<sup>e</sup> See Table B-13.<sup>f</sup> See Table B-10. Mojave Division total reduced by \$85,971,000 for costs included in "Small Hydro Power Generation Facilities" line.

**TABLE B-8 SWP Capital Costs of Requested Delivery Structures (in dollars)**

Project Service Area and Water Supply Contractors	Calendar Year Capital Costs <sup>a</sup>						
	1952-2013	2014	2015	2016	2017	2018	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
<b>FEATHER RIVER AREA</b>							
County of Butte	261,979	0	0	0	0	0	261,979
Plumas County Flood Control and Water Conservation District	8,723	0	0	0	0	0	8,723
Thermalito Irrigation District <sup>b</sup>	43,939	0	0	0	0	0	43,939
<i>Subtotal</i>	<i>314,641</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>314,641</i>
<b>NORTH BAY AREA</b>							
Napa County Flood Control and Water Conservation District	13,590	0	0	0	0	0	13,590
Solano County Water Agency	662,113	0	0	0	0	0	662,113
<i>Subtotal</i>	<i>675,703</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>675,703</i>
<b>SOUTH BAY AREA</b>							
Alameda County Flood Control and Water Conservation District, Zone 7	1,882,673	5,216	23,461	13,000	0	0	1,924,350
Alameda County Water District	630,576	0		0	0	0	630,576
Santa Clara Valley Water District	21,500	1,215	10,816	0	0	0	33,531
San Francisco Water Department <sup>b</sup>	1,066,680	0	0	0	0	0	1,066,680
<i>Subtotal</i>	<i>3,601,429</i>	<i>6,431</i>	<i>34,277</i>	<i>13,000</i>	<i>0</i>	<i>0</i>	<i>3,655,137</i>
<b>CENTRAL COASTAL AREA</b>							
San Luis Obispo County Flood Control and Water Conservation District	26,204	204	15,010	20,000	0	0	61,418
Santa Barbara County Flood Control and Water Conservation District	67,058	0	0	0	0	0	67,058
<i>Subtotal</i>	<i>93,262</i>	<i>204</i>	<i>15,010</i>	<i>20,000</i>	<i>0</i>	<i>0</i>	<i>128,476</i>
<b>SAN JOAQUIN VALLEY AREA</b>							
Castaic Lake Water Agency	82,567	0	0	0	0	0	82,567
County of Kings	17,210	16,731	1,450	10,000	30,000	0	75,391
Dudley Ridge Water District <sup>c</sup>	304,541	19,171	2,235	15,000	15,000	0	355,947
Empire West Side Irrigation District	6,358	0	0	0	0	0	6,358
Green Valley Water District <sup>b</sup>	5,292	0	0	0	0	0	5,292
Kern County Water Agency	3,990,419	22,998	15,999	20,000	35,000	0	4,084,416
Oak Flat Water District	97,643	0	0	0	0	0	97,643
Tracy Golf and Country Club <sup>b</sup>	6,932	0	0	0	0	0	6,932
Tulare Lake Basin Water Storage District	277,483	0	0	0	0	0	277,483
Veterans Administration Cemetery <sup>b</sup>	3,342	0	0	0	0	0	3,342
<i>Subtotal</i>	<i>4,791,787</i>	<i>58,900</i>	<i>19,684</i>	<i>45,000</i>	<i>80,000</i>	<i>0</i>	<i>4,995,371</i>
<b>SOUTHERN CALIFORNIA AREA</b>							
Antelope Valley-East Kern Water Agency	1,095,918	118,410	289,003	120,000	100,000	0	1,723,331
Castaic Lake Water Agency	375,593	0	0	0	0	0	375,593
Coachella Valley Water District	14,206	0	0	0	0	0	14,206
Crestline-Lake Arrowhead Water Agency	25,298	0	0	0	0	0	25,298
Desert Water Agency	23,438	0	0	0	0	0	23,438
Littlerock Creek Irrigation District	23,732	0	0	0	0	0	23,732
Mojave Water Agency	309,042	12	0	0	0	0	309,054
Palmdale Water District	34,173	0	0	0	0	0	34,173
San Bernardino Valley Municipal Water District	960,685	0	0	0	0	0	960,685
San Gabriel Valley Municipal Water District	131,052	0	0	0	0	0	131,052
San Geronio Pass Water Agency	119,654	3,063	2,768	10,000	15,000	0	150,485
The Metropolitan Water District of Southern California	4,817,609	1	0	0	0	0	4,817,610
Ventura County Flood Control District	79,699	0	0	0	0	0	79,699
<i>Subtotal</i>	<i>8,010,099</i>	<i>121,486</i>	<i>291,771</i>	<i>130,000</i>	<i>115,000</i>	<i>0</i>	<i>8,668,356</i>
<b>TOTAL</b>	<b>17,486,921</b>	<b>187,021</b>	<b>360,742</b>	<b>208,000</b>	<b>195,000</b>	<b>0</b>	<b>18,437,684</b>

<sup>a</sup> Approximate only, not to be construed as invoice amounts.<sup>b</sup> Not a SWP water supply contractor.<sup>c</sup> 2014 and the majority of 2015 costs were from proposed reverse flow program; to be split among Dudley Ridge, Kern, and four Kern member units.

Table B-9 Capital Costs of Requested Excess Peaking Capacity (in dollars unless otherwise indicated)

Sheet 1 of 2

Calendar Year	Total Advance Payments and Credits for Excess Capacity	Total Incremental Costs for Excess Capacity	Overpayment (+) or Underpayment (-) <sup>a</sup>	Annual Surplus Money Investment Fund Interest Rate <sup>b</sup>		Net Over- or Underpayment With Interest <sup>c</sup>
				January–June	July–December	
	[1]	[2]	[3]	[4]	[5]	[6]
<b>THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA</b>						
1965	0	158,000	(158,000)	3.968%	4.184%	(163,412)
1966	8,056,000	435,800	7,620,200	4.540%	5.057%	7,701,103
1967	9,094,963	1,878,270	7,216,693	4.815%	4.744%	15,524,533
1968	1,523,252	2,887,351	(1,364,099)	5.330%	5.540%	14,959,187
1969	8,310,651	3,059,310	5,251,341	5.946%	6.389%	21,369,973
1970	3,426,736	2,397,102	1,029,634	7.071%	7.125%	23,986,083
1971	1,086,045	1,146,648	(60,603)	5.154%	5.580%	25,238,017
1972	(4,244,807)	487,394	(4,732,201)	4.477%	4.977%	21,532,965
1973	(15,913,829)	25,041	(15,938,870)	6.023%	8.717%	6,014,116
1974	0	37,775	(37,775)	9.222%	10.351%	6,576,393
1975	0	2,085	(2,085)	7.089%	6.791%	7,038,515
1976	0	0	0	6.048%	6.021%	7,469,662
1977	0	0	0	5.788%	6.182%	7,923,403
1978	0	0	0	7.171%	8.096%	8,539,736
1979	0	0	0	8.979%	9.671%	9,354,605
1980	0	0	0	11.500%	11.500%	10,461,314
<b>Total</b>	<b>11,339,011</b>	<b>12,514,776</b>	<b>(1,175,765)</b>	—	—	<b>10,461,314</b>
<b>SAN GABRIEL VALLEY MUNICIPAL WATER DISTRICT</b>						
1967	0	25,730	(25,730)	4.815%	4.744%	(26,611)
1968	184,422	44,053	140,369	5.330%	5.540%	117,587
1969	49,052	38,075	10,977	5.946%	6.389%	136,751
1970	44,911	17,959	26,952	7.071%	7.125%	175,186
1971	61,588	5,900	55,688	5.154%	5.580%	242,927
1972	(20,263)	6,835	(27,098)	4.477%	4.977%	226,230
1973	(180,465)	0	(180,465)	6.023%	8.717%	49,198
1974	0	0	0	9.222%	10.351%	54,130
1975	0	0	0	7.089%	6.791%	57,952
1976	0	0	0	6.048%	6.021%	61,501
1977	0	0	0	5.788%	6.182%	65,237
1978	0	0	0	7.171%	8.096%	70,312
1979	0	0	0	8.979%	9.671%	77,021
1980	0	0	0	11.500%	11.500%	86,133
<b>Total</b>	<b>139,245</b>	<b>138,552</b>	<b>693</b>	—	—	<b>86,133</b>
<b>ANTELOPE VALLEY-EAST KERN WATER AGENCY</b>						
1968	85,495	1,645	83,850	5.330%	5.540%	86,962
1969	52,625	6,326	46,299	5.946%	6.389%	140,964
1970	101,648	15,076	86,572	7.071%	7.125%	243,222
1971	34,062	11,748	22,314	5.154%	5.580%	279,673
1972	(12,794)	2,018	(14,812)	4.477%	4.977%	277,552
1973	(205,354)	308	(205,662)	6.023%	8.717%	77,288
1974	0	96	(96)	9.222%	10.351%	84,933
1975	0	0	0	7.089%	6.791%	90,929
1976	0	190	(190)	6.048%	6.021%	96,300
1977	0	0	0	5.788%	6.182%	102,150
1978	0	0	0	7.171%	8.096%	110,096
1979	0	0	0	8.979%	9.671%	120,601
1980	0	0	0	11.500%	11.500%	134,869
<b>Total</b>	<b>55,682</b>	<b>37,407</b>	<b>18,275</b>	—	—	<b>134,869</b>

<sup>a</sup> Overpayment or underpayment for each calendar year—column [1] minus column [2].<sup>b</sup> Interest rates shown are annual rates. Interest is credited daily at applicable rates on funds deposited in the State's Surplus Money Investment Fund.<sup>c</sup> Amounts shown are end-of-year balances. Interest on overpayments is credited at applicable Surplus Money Investment Fund interest rates shown in columns [4] and [5]. Interest on underpayments is charged at the 1980 Project Interest Rate of 4.584 percent.



Table B-9 Capital Costs of Requested Excess Peaking Capacity (in dollars)

Sheet 2 of 2

Reach Number	ANNUAL REQUIRED ADVANCE OF FUNDS													Reach Total
	Incremental Costs and Advance Payments by Calendar Year													
	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1981	
	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]
THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA														
Incremental Costs														
8C		1,000	1,000											2,000
8D		43,500	43,500											87,000
9		27,000	27,000	13,500										67,500
10A		29,700	29,700	14,800										74,200
11B	10,100	18,300	18,300	9,200										55,900
12D	1,800		19,300	25,800	12,900									59,800
12E	1,800		12,400	18,800	10,800									43,800
13B			12,600	37,800	31,600									82,000
14A	2,500	500	11,100	80,216	107,504	124,069	37,519	6,413	381	87				370,289
14B	1,200	1,800		19,100	19,100	12,800								54,000
14C	1,800	900		13,500	13,500	9,000								38,700
15A	700		14,000	66,947	133,357	128,099	54,821	5,327	946	2,076				406,273
16A	700		18,900	137,894	182,000	211,608	133,927	26,203	5,767	6,156				723,155
17E		51,500	444,600	537,247	860,024	998,985	699,281	193,286	17,947	29,456	2,085			3,834,411
17F	109,100	261,600	261,600	261,600	261,600	239,500								1,395,000
25			964,270	1,650,947	1,426,925	673,041	221,100	256,165						5,192,448
28J		304,612	13,706	296,668	65,966	230,169	1,209,586	2,017,134	235,900	4,900				4,378,641
Total	129,700	740,412	1,891,976	3,184,019	3,125,276	2,627,271	2,356,234	2,504,528	260,941	42,675	2,085			16,865,117
Current Adjustments														
8C through 25	1. Advance Payments Applied to Incremental Costs Amendment 2 <sup>d</sup>													
	0	8,056,000	9,094,963	1,523,252	8,310,651	3,426,736	1,086,045	(4,244,807)	(14,381,396)				(356,668)	12,514,776
	2. Interest Credits-Amendment 2 <sup>e</sup>													
								(1,532,433)					(10,104,646)	(11,637,079)
	3. Advance Payments Applied to Incremental Costs Amendment 5 <sup>f</sup>													
	0	1,240,000	1,483,180	2,469,325	(927,035)	1,729,160	3,215,258	2,967,475	1,690,000	(9,488,722)				4,378,641
	4. Interest Credits-Amendment 5 <sup>g</sup>													
										(2,721,803)				(2,721,803)
28J	5. Net Required Advance of Funds													
	0	9,296,000	10,578,143	3,992,577	7,383,616	5,155,896	4,301,303	(1,277,332)	(14,233,829)	(12,210,525)			<sup>h</sup> (10,461,314)	2,524,535
	SAN GABRIEL VALLEY MUNICIPAL WATER DISTRICT													
	Incremental Costs													
	25			25,730	44,053	38,075	17,959	5,900	6,835					138,552
				25,730	44,053	38,075	17,959	5,900	6,835					138,552
	Current Adjustments													
	1. Advance Payments Applied to Incremental Costs <sup>d</sup>													
	0	184,422	49,052	44,911	61,588	(20,263)	(174,133)						(7,025)	138,552
	2. Interest Credit													
								(6,332)					<sup>h</sup> (79,108)	(85,440)
	3. Net Required Advance of Funds													
	0	184,422	49,052	44,911	61,588	(20,263)	(180,465)						(86,133)	53,112
ANTELOPE VALLEY-EAST KERN WATER AGENCY														
Incremental Costs														
29A				1,645	6,326	13,376	10,048	2,018	308	96		190		34,007
29F						1,700	1,700							3,400
				1,645	6,326	15,076	11,748	2,018	308	96		190		37,407
Current Adjustments														
	1. Advance Payments Applied to Incremental Costs <sup>d</sup>													
		85,495	52,625	101,648	34,062	(12,794)	(189,120)		0		0		(34,509)	37,407
	2. Interest Credit													
								(16,234)					(100,360)	(116,594)
	3. Net Required Advance of Funds													
		85,495	52,625	101,648	34,062	(12,794)	(205,354)		0		0		(134,869)	(79,187)

<sup>d</sup> Actual payments are shown for 1965 through 1976 with 1981 adjusted to reflect overpayments and underpayments without interest for prior years.<sup>e</sup> Interest for overpayments and underpayments under provisions of Amendment 2 of the contract.<sup>f</sup> Actual payments are shown for 1965 through 1973 with 1974 adjusted to reflect overpayments and underpayments without interest for prior years.<sup>g</sup> Interest for overpayments and underpayments under provisions of Amendment 5 of the contract.<sup>h</sup> Amounts in excess of incremental costs, under the provisions of the contract, reduce the Transportation Charge capital cost component of the agency's Statement of Charges for January 1981.

**TABLE B-10 Capital Costs of Each Aqueduct Reach to be Reimbursed through Capital Cost Component of Transportation Charge (in dollars)**

Sheet 1 of 8

Calendar Year	UPPER FEATHER DIVISION	NORTH BAY AQUEDUCT					SOUTH BAY AQUEDUCT			
		Reach 1	Reach 2	Reach 3A	Reach 3B	Total	Reach 1	Reach 2	Reach 4	Reach 5
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1952	0	0	0	0	0	0	97	34	30	57
1953	0	0	0	0	0	0	477	166	144	297
1954	0	0	0	0	0	0	1,466	508	437	959
1955	0	0	0	0	0	0	1,944	674	560	1,266
1956	0	0	0	0	0	0	18,789	6,515	5,090	12,545
1957	0	13,290	3,391	0	9,953	26,634	45,090	15,639	12,285	33,218
1958	2	19,202	5,011	0	25,798	50,011	195,985	80,961	7,714	21,930
1959	14	7,517	2,118	0	17,653	27,288	496,140	148,516	24,945	17,118
1960	28	8,797	4,292	0	4,838	17,927	1,130,378	67,351	71,779	68,028
1961	10	1,551	10,318	0	2,526	14,395	3,273,247	180,596	307,885	74,398
1962	32	217	(1,751)	0	414	(1,120)	1,548,884	203,535	695,446	35,102
1963	51	2,510	(1,063)	0	983	2,430	480,716	69,182	2,284,291	206,587
1964	7,791	39,879	12,046	0	21,934	73,859	2,549,118	15,903	181,900	264,410
1965	3,139	72,793	17,900	0	170,361	261,054	807,505	153,454	85,425	447,830
1966	(48)	59,615	12,972	0	438,949	511,536	898,074	149,529	142,096	1,690,200
1967	47	47,257	11,597	0	1,551,023	1,609,877	607,614	50,423	293,304	3,496,284
1968	51,573	70,586	19,560	0	831,158	921,304	965,119	19,543	89,300	2,931,101
1969	234,232	63,650	23,628	0	46,428	133,706	455,173	9,618	3,860	896,727
1970	16,227	59,090	42,733	0	9,415	111,238	52,481	3,380	10,517	154,358
1971	27,204	20,819	31,516	0	8,480	60,815	24,505	4,645	5,035	20,395
1972	9	15,538	12,952	0	10,058	38,548	26,918	825	2,945	26,090
1973	25	18,488	29,018	0	39,878	87,384	24,468	4,010	6,016	12,708
1974	45	67,352	29,978	0	134,332	231,662	17,108	1,192	1,765	65,587
1975	21	62,855	73,112	0	45,091	181,058	57,619	561	1,165	7,291
1976	51	52,419	75,611	218	13,168	141,416	104,242	2,846	8,915	12,701
1977	28	53,274	65,662	2,240	23,138	144,314	176,062	3,625	3,225	16,158
1978	38	61,936	57,158	2,955	28,987	151,036	264,581	4,494	3,668	14,028
1979	23	316,620	91,367	3,953	62,240	474,180	111,106	17,151	8,515	31,725
1980	26	422,804	111,600	19,910	96,125	650,439	368,942	17,708	8,249	38,045
1981	34	430,992	147,295	(10,752)	43,157	610,692	(145,428)	3,600	6,533	12,448
1982	11	934,812	357,720	(7,165)	134,408	1,419,775	(44,778)	18,971	7,451	37,824
1983	19	1,091,091	1,076,627	2,628	517,615	2,687,961	429,225	73,925	38,185	72,415
1984	26	1,875,968	2,317,661	3,290	1,068,363	5,265,282	506,951	36,354	9,610	92,846
1985	29	2,248,491	7,849,886	27,815	3,416,370	13,542,562	34,103	2,822	5,034	27,138
1986	31	16,420,238	10,020,277	1,309,599	1,819,349	29,569,463	85,732	14,715	17,144	13,982
1987	32	11,873,826	7,214,307	1,628,932	1,670,596	22,387,661	126,377	15,693	27,881	32,931
1988	55	3,287,756	1,648,431	1,015,971	686,821	6,638,979	290,505	36,744	51,786	25,078
1989	44	1,056,583	950,985	224,567	374,886	2,607,021	130,609	16,848	35,518	12,582
1990	63	493,522	537,881	145,694	71,938	1,249,035	275,732	32,387	99,251	40,263
1991	54	76,599	17,130	24,846	70,542	189,117	1,153,109	26,900	53,613	21,889
1992	42	56,492	6,525	18,333	37,778	119,128	401,906	53,036	61,799	51,386
1993	30	104,317	24,579	40,129	82,032	251,057	313,476	55,679	79,149	39,293
1994	14	68,065	13,463	27,107	45,909	154,544	(211,712)	29,017	362,585	36,350
1995	3	26,002	5,920	7,337	20,617	59,876	265,751	42,516	48,189	21,436
1996	0	14,790	3,334	6,614	14,606	39,344	139,573	13,049	25,751	10,677
1997	3	67,264	35,545	38,585	(13,571)	127,823	203,476	31,135	36,986	16,906
1998	7	15,410	6,392	6,797	10,396	38,995	67,974	6,120	14,731	4,616
1999	2	71,950	35,515	33,879	32,613	173,957	162,161	25,329	35,716	24,347
2000	24	29,992	8,327	11,710	4,156	54,185	100,654	15,688	24,144	19,652
2001	20	10,597	3,904	3,892	1,954	20,347	436,756	4,272	118,836	4,207
2002	14	27,018	18,971	15,254	4,614	65,857	3,068,535	5,648	329,244	64,425
2003	0	14,733	9,243	4,658	46,313	74,947	4,465,569	200,125	199,457	360,387
2004	0	23,929	2,214	2,341	145,290	173,774	1,257,335	120,340	131,702	99,547
2005	0	89,369	216	9	33,947	123,541	1,224,486	119,298	260,893	(81)
2006	5	28,222	237	90	879,428	907,978	1,234,636	68,374	259,542	523
2007	0	61,330	1	0	3,219,041	3,280,372	3,406,319	15,183	70,776	1,884
2008	4	75,107	6,065	5,318	7,878,424	7,964,914	6,248,064	35,890	169,891	5,098
2009	13	26,653	348	0	1,188,748	1,215,749	10,200,692	1,397,392	1,835,005	1,984
2010	0	4,735	(10)	(1)	395,362	400,086	7,061,416	104,212	468,330	14,866,013
2011	1	57,126	34	0	175,933	233,093	10,255,066	1,863,345	4,089,231	3,416,729
2012	0	585,216	3	15,163	311,585	911,967	7,800,110	1,379,855	3,102,674	104,555
2013	0	870,300	27	67,533	394,181	1,332,041	2,392,878	1,228,777	1,071,752	328,413
2014	0	781,566	3	109,243	355,488	1,246,300	(122,873)	(1,111,982)	(319,804)	127,441
2015	0	263,623	2	81,486	109,403	454,515	1,779,537	117,701	716,517	127,700
2016	0	93,968	4,506	50,292	32,460	181,226	200,594	156,508	198,553	46,005
2017	0	<b>35,812</b>	<b>572</b>	<b>25,101</b>	<b>10,195</b>	<b>71,680</b>	<b>35,832</b>	<b>131</b>	<b>176</b>	<b>23,884</b>
2018	0	198,951	105,367	96,168	20,797	421,283	1,548,287	49,862	67,616	454,214
2019	0	211,487	6,469	5,779	1,230	224,965	26,427	128,462	9,207	230,235
2020	0	0	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0
<b>TOTAL</b>	<b>341,149</b>	<b>45,261,962</b>	<b>33,176,697</b>	<b>5,067,519</b>	<b>28,905,904</b>	<b>112,412,082</b>	<b>81,508,910</b>	<b>7,666,506</b>	<b>18,087,160</b>	<b>31,474,364</b>

**TABLE B-10 Capital Costs of Each Aqueduct Reach to be Reimbursed through Capital Cost Component of Transportation Charge (in dollars)**

Sheet 2 of 8

Calendar Year	SOUTH BAY AQUEDUCT (continued)					CALIFORNIA AQUEDUCT			
						NORTH SAN JOAQUIN DIVISION			
	Reach 6	Reach 7	Reach 8	Reach 9	Total	Reach 1	Reach 2A	Reach 2B	Subtotal
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]
1952	8	66	72	132	496	4,012	3,279	1,499	8,790
1953	38	327	336	640	2,425	10,559	8,589	3,964	23,112
1954	123	1,005	1,003	1,954	7,455	13,796	11,163	5,179	30,138
1955	160	1,293	1,149	2,454	9,500	7,370	5,952	2,760	16,082
1956	1,559	11,959	11,043	28,372	95,872	9,880	5,020	2,398	17,298
1957	3,659	28,675	27,385	563,114	729,065	11,953	5,456	2,612	20,021
1958	2,243	17,872	17,385	560,904	904,994	18,585	17,191	7,994	43,770
1959	357	3,200	3,568	149,874	843,718	123,170	100,306	45,510	268,986
1960	1,102	2,944	4,498	359,749	1,705,829	191,408	102,136	48,968	342,512
1961	4,726	18,325	22,765	(1,367)	3,880,575	153,765	195,947	42,843	392,555
1962	17,295	160,939	178,242	209,042	3,048,485	612,258	491,225	168,218	1,271,701
1963	265,414	1,250,386	939,832	129,902	5,626,310	1,993,284	1,525,734	684,095	4,203,113
1964	100,603	1,716,371	2,327,770	2,947,522	10,103,597	4,674,280	2,369,858	700,074	7,744,212
1965	42,345	368,476	637,266	1,921,844	4,464,145	5,877,189	6,873,699	2,975,719	15,726,607
1966	17,663	34,915	140,350	777,887	3,850,714	8,553,362	14,112,820	5,677,099	28,343,281
1967	(41,567)	137,856	147,183	379,764	5,070,861	9,678,607	10,672,113	6,646,739	26,997,459
1968	84,553	2,130	68,057	253,152	4,412,955	6,392,664	891,681	1,303,186	8,587,531
1969	4,279	11,572	162,300	32,000	1,575,529	3,542,767	792,259	443,924	4,778,950
1970	2,487	6,820	20,086	(15,718)	234,411	2,236,607	149,692	115,578	2,501,877
1971	4,350	6,923	17,750	39,084	122,687	98,138	215,512	69,410	383,060
1972	1,084	203	4,800	32,199	95,064	159,608	43,721	7,744	211,073
1973	288	989	7,449	9,693	65,621	105,581	25,496	22,418	153,495
1974	527	6,020	30,628	11,433	134,260	177,700	16,627	45,707	240,034
1975	126	679	1,086	3,464	71,991	239,144	14,680	169,676	423,500
1976	701	3,529	8,362	26,186	167,482	641,860	45,533	65,943	753,336
1977	270	1,310	8,651	24,938	234,239	274,381	20,283	22,568	317,232
1978	231	1,204	1,631	17,123	306,960	801,265	36,221	9,714	847,200
1979	1,367	1,721	2,134	7,322	181,041	1,051,792	59,695	26,106	1,137,593
1980	1,321	1,718	2,182	7,102	445,267	4,173,603	96,760	38,789	4,309,152
1981	308	1,462	1,398	5,077	(114,602)	(502,921)	1,487,516	38,451	1,023,046
1982	716	1,561	1,746	6,074	29,565	700,738	46,501	22,308	769,547
1983	407	5,721	8,143	23,367	651,388	706,104	84,435	211,619	1,002,158
1984	269	1,853	1,667	13,301	662,851	1,559,539	41,352	48,478	1,649,369
1985	402	1,657	2,129	6,750	80,035	677,955	24,812	19,404	722,171
1986	1,119	2,744	3,313	12,234	150,983	398,788	63,830	35,420	498,038
1987	1,496	3,081	3,560	21,842	232,861	799,672	88,945	41,659	930,276
1988	5,706	6,689	7,603	33,728	457,839	2,898,156	(128,051)	(56,448)	2,713,657
1989	2,641	3,878	4,755	14,489	221,320	6,898,872	346,589	173,993	7,419,454
1990	5,092	19,899	36,584	87,796	597,004	13,483,785	112,002	2,446,232	16,042,019
1991	1,942	5,059	7,357	31,682	1,301,551	13,914,632	133,121	114,981	14,162,734
1992	1,184	2,042	2,250	35,464	609,067	6,260,482	241,456	239,437	6,741,375
1993	3,618	6,028	8,873	42,200	548,316	2,542,869	257,330	200,072	3,000,271
1994	2,897	4,781	5,346	89,991	319,255	1,145,666	148,396	88,357	1,382,419
1995	11,556	3,635	14,769	24,750	432,602	1,462,211	217,940	131,995	1,812,146
1996	3,092	2,271	2,699	12,522	209,634	874,227	74,153	41,215	989,595
1997	1,454	4,141	3,655	20,589	318,342	2,064,446	146,851	84,303	2,295,600
1998	363	1,134	(6,005)	5,776	94,709	729,475	33,695	16,670	779,840
1999	1,533	3,304	12,727	31,634	296,751	2,208,776	88,951	90,639	2,388,366
2000	2,406	4,944	5,331	10,755	183,575	(706,517)	57,503	40,185	(608,829)
2001	91,721	68,849	404,226	1,190,653	2,319,521	371,407	91,792	8,926	472,124
2002	229,409	453,259	1,107,580	2,977,939	8,236,039	833,187	44,543	22,639	900,369
2003	67,216	509,964	477,926	1,409,228	7,689,872	228,767	22,779	13,565	265,112
2004	3,193	3,100	39,326	3,276,907	4,931,451	892,456	15,333	77,640	985,430
2005	5,341	5,271	4,848	731,512	2,351,567	294,112	40,135	98,505	432,751
2006	1,286	1,342	1,352	15,393	1,582,447	422,511	15,048	177,980	615,539
2007	7,470	7,471	7,471	10,731	3,527,304	490,384	58,152	121,987	670,522
2008	8,415	8,730	8,932	12,419	6,497,439	1,202,812	39,742	85,604	1,328,158
2009	3,054	3,271	3,369	4,804	13,449,571	555,295	41,137	30,031	626,464
2010	734	731	730	1,045	22,503,210	181,448	8,328	2,386	192,162
2011	6,514	7,668	6,484	9,188	19,654,224	813,697	51,659	3,983	869,339
2012	51,903	117,364	68,876	393,352	13,018,689	1,570,134	226,476	75,111	1,871,721
2013	130,731	137,199	384,922	875,282	6,549,953	6,957,464	800,204	237,566	7,995,234
2014	102,374	121,005	107,609	207,301	(888,929)	5,789,004	3,238,636	167,361	9,195,000
2015	26,053	37,802	38,192	62,844	2,906,347	5,857,589	930,778	373,501	7,161,867
2016	6,311	6,525	6,425	10,060	630,981	5,621,086	575,134	2,899,639	9,095,859
2017	32	40	45	51	60,191	7,104,765	733,943	137,201	7,975,909
2018	12,083	15,083	17,126	19,946	2,184,217	5,304,235	1,466,819	14,184	6,785,238
2019	1,203	1,430	1,281	3,124	401,369	2,570,357	756,964	9,902	3,337,223
2020	0	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0
<b>TOTAL</b>	<b>1,320,557</b>	<b>5,391,413</b>	<b>7,609,582</b>	<b>20,221,567</b>	<b>173,280,058</b>	<b>157,006,252</b>	<b>51,633,575</b>	<b>27,943,116</b>	<b>236,582,942</b>

**TABLE B-10 Capital Costs of Each Aqueduct Reach to be Reimbursed through Capital Cost Component of Transportation Charge (in dollars)**

Sheet 3 of 8

Calendar Year	CALIFORNIA AQUEDUCT (continued)									
	SAN LUIS DIVISION						SOUTH SAN JOAQUIN DIVISION			
	Reach 3	Reach 4	Reach 5	Reach 6	Reach 7	Subtotal	Reach 8C	Reach 8D	Reach 9	Reach 10A
	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]
1952	2,492	3,549	3,987	1,010	1,390	12,428	13	727	1,109	695
1953	6,999	10,144	10,986	2,834	3,869	34,832	45	2,671	4,185	2,569
1954	8,704	12,545	13,693	3,520	4,766	43,228	50	2,719	4,026	2,821
1955	4,273	6,055	6,813	1,728	2,325	21,194	19	888	1,100	1,097
1956	3,295	5,600	5,857	1,445	3,556	19,753	98	3,850	4,376	4,428
1957	3,543	6,115	6,357	1,565	3,998	21,578	234	10,604	13,209	13,269
1958	11,927	19,393	22,037	5,509	7,512	66,378	375	19,033	25,073	25,086
1959	21,979	37,358	39,689	9,813	19,679	128,518	436	20,578	25,697	25,787
1960	207,025	45,419	41,044	12,074	37,633	343,195	1,673	44,565	25,290	47,492
1961	184,443	292,639	170,559	38,338	70,068	756,047	3,949	75,726	30,852	68,505
1962	495,836	549,984	252,698	22,397	26,967	1,347,882	6,131	159,481	62,375	57,705
1963	2,772,189	2,034,351	2,498,712	66,353	30,647	7,402,252	5,861	161,252	81,343	52,585
1964	4,348,311	4,932,301	1,053,227	161,422	251,461	10,746,722	4,014	90,622	117,907	124,014
1965	3,860,997	5,688,252	2,869,931	1,072,111	667,768	14,159,059	15,049	491,042	564,036	622,257
1966	2,312,372	8,527,843	5,765,798	4,230,221	7,708,334	28,544,568	201,274	5,197,322	2,539,278	2,800,056
1967	(44,527)	2,062,305	6,942,522	222,885	6,675,398	15,858,583	212,285	4,982,844	3,363,650	3,652,342
1968	119,884	395,689	973,956	179,917	461,031	2,130,477	64,234	611,192	940,074	1,025,969
1969	(6,065)	126,946	98,492	107,486	160,668	487,527	58,960	116,146	85,130	145,111
1970	32,387	(20,243)	105,385	(827,457)	1,215,966	506,038	23,011	106,810	84,116	74,366
1971	99,945	230,624	305,227	26,995	341,010	1,003,801	8,813	33,099	23,088	15,595
1972	15,990	90,852	17,053	14,621	281,343	419,859	10,818	13,349	16,603	19,736
1973	6,753	103,707	41,549	13,810	41,427	207,246	5,145	11,089	13,249	14,283
1974	6,618	117,165	55,978	16,199	71,796	267,756	5,434	24,433	16,567	22,111
1975	18,921	107,275	23,671	8,797	152,574	311,238	5,424	15,960	12,966	15,865
1976	17,485	79,554	13,041	5,138	41,687	156,905	19,931	76,280	62,164	76,202
1977	35,707	84,669	9,412	4,028	9,655	143,471	21,096	70,005	97,952	75,628
1978	8,539	428,395	7,006	3,536	6,994	454,470	7,584	40,453	17,395	48,754
1979	(35,394)	543,225	19,463	9,485	(242,253)	294,526	10,474	6,181	6,227	241
1980	66,622	3,450,695	191,307	75,209	185,384	3,969,217	2,158	17,492	17,706	18,165
1981	28,491	(2,244,127)	(44,017)	(15,456)	918,984	(1,356,125)	1,151	9,642	9,541	10,309
1982	100,629	(1,616,569)	20,184	10,359	3,525,738	2,040,341	2,469	8,283	6,956	8,237
1983	75,639	33,881	11,785	6,638	1,811,638	1,939,581	7,955	13,782	11,090	14,488
1984	31,748	87,083	26,712	12,754	3,053,662	3,211,959	26,489	9,959	6,268	7,533
1985	53,251	56,732	13,685	6,934	582,910	713,512	7,220	9,762	7,688	9,215
1986	73,979	201,509	50,668	19,223	1,282,469	1,627,848	8,902	25,011	20,503	22,335
1987	(7,829)	116,268	40,009	15,946	518,349	682,743	12,744	18,927	56,042	16,704
1988	(149,385)	224,154	(406,398)	(137,353)	923,622	454,640	9,833	(119,741)	(60,639)	(159,357)
1989	39,652	594,894	232,852	80,090	575,855	1,523,343	5,279	91,501	278,061	70,153
1990	39,270	259,895	79,589	29,606	461,219	869,579	5,814	41,345	2,016,434	34,841
1991	4,916,134	397,959	98,847	35,860	511,519	5,960,319	4,588	43,140	41,348	36,888
1992	(757,001)	545,729	211,854	74,544	396,398	471,524	3,546	103,695	109,225	103,321
1993	110,233	724,929	186,271	70,815	720,283	1,812,531	15,016	101,634	90,929	90,291
1994	1,151,976	288,018	63,862	27,812	710,770	2,242,438	6,770	42,455	40,696	65,737
1995	285,776	441,479	130,761	58,640	1,914,186	2,830,842	12,548	49,963	43,251	435,909
1996	31,942	(110,471)	34,529	12,219	588,712	556,931	6,444	29,863	27,050	253,433
1997	73,224	513,793	(277,781)	42,881	5,016,215	5,368,332	11,497	49,111	43,799	73,458
1998	19,692	304,115	34,319	16,542	2,819,556	3,194,224	2,562	11,115	8,955	14,618
1999	18,187	158,902	100,061	41,691	1,901,382	2,220,222	5,706	25,179	23,510	47,359
2000	101,618	373,699	78,036	36,186	1,139,073	1,728,613	3,922	23,591	29,281	43,459
2001	(10,513)	(47,112)	519,031	(3,546)	61,595	519,455	2,280	17,030	21,196	42,731
2002	12,237	24,434	6,079,343	3,454	(1,812,639)	4,306,829	3,627	44,010	20,221	87,805
2003	8,864	79,647	(5,377,004)	7,923	6,118,421	837,852	2,130	18,793	16,716	22,946
2004	(16,126)	(14,365)	(50,563)	(2,487)	147,468	63,927	22,520	5,980	3,879	5,493
2005	261	11,360	129,470	3,529	2,533,886	2,678,506	26,301	11,593	6,323	7,316
2006	1,421	27,658	(10,639)	1,444	(28,549)	(8,664)	6,106	2,942	1,621	1,872
2007	2	87,855	39,476	7,718	34,608	169,659	13,352	21,920	11,909	13,807
2008	14,780	16,097	46,719	13,920	2,107,019	2,198,535	9,017	13,020	7,277	8,919
2009	934	216,920	45,727	5,164	(43,789)	224,956	2,380	16,160	8,894	10,504
2010	(16)	1,560,454	130,995	655	(355,859)	1,336,229	(1)	1,824	989	1,148
2011	7,073	644,241	481,776	1,325	78,355	1,212,771	3	6,385	1,768	14,006
2012	44,540	213,896	2,999	29,658	170,358	461,451	1,139	114,545	36,447	73,710
2013	810,117	299,508	906,259	120,865	215,316	2,352,064	42,393	383,194	323,185	342,033
2014	843,003	317,107	461,093	67,178	207,794	1,896,174	20,475	181,707	136,459	158,996
2015	(624,058)	145,421	228,663	15,444	153,006	(81,523)	45,988	140,973	95,175	122,837
2016	248,879	3,350,250	2,784,418	121,708	551,346	7,056,601	91,311	422,628	209,782	402,801
2017	176,001	7,197,061	1,946,640	184,593	2,340,382	11,844,677	82,770	327,598	1,167,528	424,335
2018	78,295	5,800,148	1,375,418	133,210	188,747	7,575,818	0	7,328	0	616,221
2019	42,007	2,101,728	540,675	28,007	23,656	2,736,073	577	7,405	4,801	319,380
2020	0	0	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0
<b>TOTAL</b>	<b>22,462,178</b>	<b>53,356,588</b>	<b>32,531,774</b>	<b>6,676,682</b>	<b>60,306,313</b>	<b>175,333,534</b>	<b>1,227,412</b>	<b>14,739,666</b>	<b>13,140,902</b>	<b>12,928,526</b>

**TABLE B-10 Capital Costs of Each Aqueduct Reach to be Reimbursed through Capital Cost Component of Transportation Charge (in dollars)**

Sheet 4 of 8

Calendar Year	CALIFORNIA AQUEDUCT (continued)									
	SOUTH SAN JOAQUIN DIVISION (continued)									
	Reach 11B	Reach 12D	Reach 12E	Reach 13B	Reach 14A	Reach 14B	Reach 14C	Reach 15A	Reach 16A	Subtotal
	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]
1952	1,279	1,980	995	1,663	794	212	212	1,911	4,440	16,030
1953	4,790	7,480	3,745	6,236	2,599	733	741	7,016	16,513	59,323
1954	4,855	7,565	3,792	6,319	2,880	810	817	7,073	16,601	60,328
1955	1,557	2,404	1,211	2,025	1,183	325	327	2,253	5,223	19,612
1956	6,223	9,233	4,737	8,054	7,026	1,638	1,584	9,939	21,754	82,940
1957	18,772	29,082	14,615	24,411	15,651	3,834	3,864	26,871	62,657	237,073
1958	48,191	78,564	39,087	61,715	33,726	12,330	11,813	49,499	133,083	537,575
1959	67,246	107,781	53,836	86,478	64,824	22,102	21,828	70,838	205,748	773,179
1960	66,317	77,936	39,867	63,517	84,363	23,260	22,305	73,305	204,788	774,678
1961	46,073	88,274	51,457	28,015	242,753	91,290	65,565	150,205	206,305	1,148,969
1962	56,056	69,189	44,851	49,179	208,180	61,489	47,608	133,653	171,396	1,127,293
1963	91,914	173,985	86,405	67,733	425,626	104,436	77,970	102,072	481,941	1,913,123
1964	333,621	291,013	174,469	86,271	1,093,795	684,005	485,033	571,173	1,778,952	5,834,889
1965	1,053,029	1,524,848	1,044,851	196,487	3,385,205	1,655,024	1,436,258	476,830	1,268,176	13,733,092
1966	3,709,779	673,429	466,228	418,141	4,916,319	974,862	724,354	1,829,852	2,896,274	27,347,168
1967	4,636,627	1,881,333	1,244,265	1,238,428	2,788,299	525,653	400,183	1,721,304	3,442,021	30,089,234
1968	1,323,302	4,726,074	3,145,775	8,343,706	10,210,266	1,330,361	1,405,117	7,522,015	7,578,498	48,226,583
1969	229,185	706,272	529,080	3,704,065	15,112,041	1,223,457	1,134,395	9,523,012	13,136,056	45,702,910
1970	85,151	70,725	72,798	320,797	11,031,255	987,213	738,955	8,836,897	13,890,751	36,322,845
1971	45,006	43,988	42,624	339,078	2,925,191	193,255	36,514	3,275,227	7,903,937	14,885,415
1972	32,657	43,939	24,748	81,937	1,388,348	101,784	20,165	1,003,380	3,025,555	5,783,019
1973	16,448	9,980	16,320	25,090	680,834	19,584	13,469	798,805	1,472,313	3,096,609
1974	14,951	19,555	32,240	29,582	524,504	30,735	16,333	778,696	1,031,843	2,546,984
1975	13,479	10,793	13,678	25,827	269,197	25,164	21,048	370,265	489,545	1,289,211
1976	54,217	37,464	59,842	105,332	507,513	59,753	42,776	434,574	618,049	2,154,103
1977	52,919	22,826	54,444	81,293	301,515	49,972	30,152	235,514	580,209	1,673,525
1978	16,469	(2,816)	27,331	43,126	348,674	(653)	1,500	297,817	582,775	1,428,409
1979	6,906	13,401	14,229	25,411	293,786	9,846	7,856	245,590	542,554	1,182,702
1980	18,813	15,608	27,498	34,190	1,676,267	29,169	23,023	1,719,775	3,772,498	7,372,362
1981	14,885	26,473	20,972	25,515	(1,076,221)	27,551	33,674	(1,142,721)	(2,527,211)	(4,566,440)
1982	6,608	7,680	8,346	16,339	(745,914)	9,886	29,393	(804,147)	(1,850,736)	(3,296,600)
1983	9,792	14,174	13,050	35,872	419,650	17,389	24,933	115,983	166,232	864,390
1984	27,613	87,907	49,271	22,732	54,590	75,453	63,060	63,537	119,387	613,799
1985	6,949	5,263	8,013	8,875	(49,408)	9,523	5,867	54,782	82,117	165,866
1986	16,664	16,014	25,031	20,483	140,642	25,960	13,913	154,089	186,348	675,895
1987	13,512	12,369	20,023	15,435	101,453	20,411	8,581	227,047	194,936	718,184
1988	(73,648)	(151,040)	(51,401)	(120,104)	161,077	(75,276)	(75,307)	144,369	262,334	(308,900)
1989	65,216	63,382	120,925	73,037	2,778,880	119,559	36,660	2,952,046	5,955,356	12,610,055
1990	29,230	27,269	49,082	34,048	715,031	44,187	14,537	440,017	640,283	4,092,118
1991	32,195	30,146	55,119	34,144	423,235	50,345	12,116	353,596	774,129	1,890,989
1992	99,765	98,178	192,455	97,638	991,603	185,311	9,210	387,615	731,512	3,113,074
1993	70,131	63,247	118,440	80,530	687,462	109,792	38,960	942,211	857,038	3,265,681
1994	29,221	26,997	50,234	35,154	400,534	44,481	17,426	324,942	853,328	1,937,975
1995	32,487	25,516	49,885	41,733	524,524	48,740	29,125	450,952	628,941	2,373,574
1996	19,489	15,020	30,202	29,333	403,125	26,945	16,405	253,622	388,064	1,498,995
1997	30,890	25,368	48,767	40,900	451,910	47,815	29,878	809,848	481,458	2,144,699
1998	7,107	5,773	10,697	9,676	288,667	10,799	6,819	119,562	440,746	937,096
1999	17,022	13,362	34,410	31,539	260,623	24,634	14,826	264,538	361,516	1,124,225
2000	21,186	32,480	40,180	25,119	168,825	15,243	11,006	151,512	372,997	938,802
2001	14,471	22,325	34,995	8,027	71,645	4,537	3,988	66,918	167,694	477,837
2002	19,626	7,157	78,600	47,505	276,160	22,632	34,980	164,596	286,748	1,093,668
2003	9,280	8,935	18,115	15,308	136,433	6,671	9,686	110,492	159,978	535,484
2004	3,291	4,188	7,001	5,787	52,563	5,588	1,490	50,520	322,068	490,368
2005	6,332	12,579	6,307	6,354	21,617	12,567	44	9,079	43,887	170,299
2006	1,680	3,146	1,618	1,736	5,936	3,109	108	2,695	11,294	43,863
2007	11,909	23,818	11,909	11,910	40,392	23,818	1	16,745	82,675	284,166
2008	6,999	12,960	8,044	8,187	35,363	13,537	568	22,711	63,596	210,197
2009	8,926	16,976	9,236	9,565	35,656	17,158	450	18,753	67,633	222,291
2010	985	1,985	990	981	3,325	1,988	(7)	1,362	6,865	22,435
2011	1,782	3,513	1,767	1,796	40,475	3,504	26	13,750	134,357	223,131
2012	33,065	62,348	34,901	34,973	393,561	64,937	3,511	494,940	686,555	2,034,633
2013	196,084	263,911	240,567	240,749	1,246,859	349,608	127,458	1,544,197	1,678,853	6,979,091
2014	98,155	149,649	112,143	112,254	867,288	175,751	46,203	632,842	1,189,256	3,881,178
2015	80,659	97,498	100,853	108,237	819,453	119,113	58,327	664,725	820,322	3,274,158
2016	137,263	691,256	300,700	653,250	1,148,537	518,366	113,544	869,378	1,591,803	7,150,619
2017	88,172	1,159,310	123,762	480,491	921,558	377,241	90,109	758,082	1,653,348	7,654,304
2018	0	5,400,095	0	0	3,430,464	0	0	1,851,138	3,709,585	15,014,831
2019	3,265	1,905	9,543	10,021	2,039,503	5,576	2,466	1,010,033	1,977,319	5,391,794
2020	0	0	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0
<b>TOTAL</b>	<b>13,254,091</b>	<b>19,131,038</b>	<b>9,329,769</b>	<b>17,819,236</b>	<b>77,229,696</b>	<b>10,786,090</b>	<b>7,625,800</b>	<b>54,841,716</b>	<b>89,313,065</b>	<b>341,367,007</b>



**TABLE B-10 Capital Costs of Each Aqueduct Reach to be Reimbursed through Capital Cost Component of Transportation Charge (in dollars)**

Sheet 5 of 8

Calendar Year	CALIFORNIA AQUEDUCT (continued)									
	TEHACHAPI DIVISION			MOJAVE DIVISION						
	Reach 17E	Reach 17F	Subtotal	Reach 18A	Reach 19	Reach 19C	Reach 20A	Reach 20B	Reach 21	Reach 22A
	[40]	[41]	[42]	[43]	[44]	[45]	[46]	[47]	[48]	[49]
1952	9,703	4,072	13,775	4,090	1,520	0	2,561	892	5,788	35
1953	31,337	13,284	44,621	12,610	4,685	0	7,246	3,402	17,846	71
1954	46,243	20,010	66,253	16,642	6,184	0	9,506	4,548	23,558	369
1955	25,880	11,362	37,242	5,612	2,086	0	2,529	2,213	7,947	178
1956	47,487	17,609	65,096	6,038	2,244	0	2,440	2,655	8,542	216
1957	119,673	49,130	168,803	22,348	8,304	0	9,035	9,826	31,616	800
1958	164,056	72,091	236,147	37,917	14,166	123	15,391	16,752	53,569	1,397
1959	151,389	57,883	209,272	38,620	23,450	1,102	23,605	18,604	56,724	1,844
1960	203,222	45,323	248,545	21,356	26,093	5,318	40,523	37,179	43,893	11,029
1961	387,819	85,558	473,377	35,664	32,281	2,262	34,918	37,102	21,532	14,517
1962	353,119	82,610	435,729	68,508	266,284	1,841	10,323	10,730	8,197	4,186
1963	1,191,633	124,757	1,316,390	37,379	435,881	4,137	39,706	40,865	26,670	17,081
1964	1,866,000	775,005	2,641,005	95,693	706,369	8,564	43,342	71,116	33,912	22,793
1965	2,574,824	2,284,869	4,859,693	121,060	716,092	9,156	108,519	343,506	91,095	65,689
1966	5,537,412	9,323,517	14,860,929	366,116	1,644,699	13,373	159,282	1,311,628	160,388	178,538
1967	26,239,390	12,398,708	38,638,098	1,312,022	903,880	24,103	645,078	1,718,942	498,257	367,961
1968	33,363,479	7,416,464	40,779,943	136,804	7,109,653	71,388	1,889,601	2,291,691	1,141,929	1,145,768
1969	40,368,425	6,883,206	47,251,631	213,805	2,465,641	7,423	5,939,151	5,626,284	2,358,737	1,515,147
1970	35,446,706	6,786,231	42,232,937	2,211,077	1,210,665	6,217	3,652,478	5,304,372	3,232,911	2,081,810
1971	20,141,395	6,835,303	26,976,698	1,496,843	284,738	6,994	1,074,759	1,091,123	825,070	432,464
1972	10,002,935	34,791	10,037,726	129,417	409,903	3,620	471,963	635,507	484,772	324,865
1973	3,090,140	36,207	3,126,347	23,931	75,638	2,539	88,416	83,840	63,774	36,179
1974	4,798,348	152,494	4,950,842	28,399	205,581	2,703	138,673	118,639	103,545	54,198
1975	2,144,178	411,404	2,555,582	44,774	70,652	5,066	68,157	169,294	167,240	19,453
1976	1,124,357	174,629	1,298,986	121,043	84,593	6,786	59,967	102,909	44,896	24,732
1977	655,047	31,512	686,559	261,400	133,767	7,521	117,878	120,160	71,389	49,445
1978	1,900,843	27,956	1,928,799	553,014	57,150	5,872	51,615	68,838	32,855	18,183
1979	2,099,385	61,381	2,160,766	626,615	339,536	10,831	37,085	36,225	18,948	10,675
1980	17,433,610	6,046	17,439,656	1,130,429	1,073,430	3,604	308,188	284,545	133,526	121,171
1981	(3,848,206)	6,908	(3,841,298)	1,218,824	845,702	4,498	48,625	32,214	13,223	6,466
1982	11,370,112	6,054	11,376,166	6,968,683	746,900	3,920	33,869	77,988	13,158	14,459
1983	8,862,914	8,269	8,871,183	10,909,386	64,660	2,596	40,793	58,714	25,900	10,363
1984	3,227,937	31,701	3,259,638	8,340,371	309,491	3,124	17,505	35,378	845,423	6,052
1985	1,926,289	10,460	1,936,749	5,264,156	227,986	3,885	68,422	(232,549)	(481,017)	1,945,477
1986	1,381,955	33,788	1,415,743	2,049,111	2,069,663	4,261	2,331,707	(2,046,222)	(1,334,975)	3,260,280
1987	671,183	13,807	684,990	1,347,722	(6,453)	4,684	562,540	(344,829)	55,519	64,264
1988	1,408,760	(49,734)	1,359,026	847,954	(104,961)	13,409	(159,892)	(147,290)	(70,564)	351,489
1989	504,715	64,660	569,375	376,980	207,150	50,953	31,173	60,657	30,217	534,658
1990	783,219	25,218	808,437	202,065	(402,573)	61,192	(637,062)	(403,413)	(635,623)	(97,841)
1991	691,578	33,405	724,983	273,021	22,218	81,545	(188,732)	(18,809)	(147,369)	(17,234)
1992	741,986	24,369	766,355	620,962	384,568	86,644	225,398	338,098	(263,897)	75,210
1993	1,223,402	35,370	1,258,772	1,131,166	248,287	72,746	110,869	180,598	133,941	49,144
1994	806,213	16,681	822,894	998,126	164,096	60,147	51,340	114,273	65,260	26,546
1995	1,538,497	19,443	1,557,940	390,433	157,481	45,990	92,925	121,499	66,503	30,918
1996	2,571,039	10,797	2,581,836	91,593	69,281	22,188	35,656	48,699	44,953	17,787
1997	1,009,249	18,265	1,027,514	135,402	92,607	13,590	65,433	39,973	55,881	27,865
1998	925,574	6,843	932,417	47,486	36,170	4,164	29,900	27,626	20,285	12,816
1999	662,144	12,166	674,310	113,232	49,150	5,329	171,935	58,392	37,660	17,874
2000	408,352	14,333	422,685	120,267	90,145	936	83,478	75,230	44,857	20,181
2001	266,815	10,891	277,706	65,580	186,973	2,223	343,775	121,907	77,799	54,526
2002	247,986	9,586	257,572	35,787	(139,334)	1,374	(111,675)	(82,663)	(7,369)	(43,431)
2003	189,022	12,339	201,361	84,434	(19,049)	0	(11,367)	(7,564)	(3,238)	(3,009)
2004	372,622	4,637	377,259	19,723	17,430	0	18,763	12,619	13,744	5,414
2005	2,264,602	6,587	2,271,188	27,020	18,910	0	25,134	18,874	25,074	6,335
2006	5,855,349	2,353	5,857,702	7,062	4,978	0	6,373	4,511	5,983	1,500
2007	3,829,554	11,915	3,841,469	49,382	35,729	0	47,637	35,725	47,634	11,908
2008	640,715	7,591	648,306	20,474	19,644	0	28,901	19,526	25,456	6,477
2009	9,987,899	10,348	9,998,247	23,685	25,891	0	33,870	24,745	32,909	8,241
2010	11,126,864	940	11,127,803	25,049	2,960	0	3,965	2,992	3,992	997
2011	4,980,685	1,943	4,982,629	4,594	5,331	0	7,045	5,220	6,951	1,739
2012	875,243	32,877	908,120	95,936	114,523	0	152,679	114,484	152,651	38,158
2013	704,335	156,471	860,806	234,199	314,887	0	419,827	314,845	419,785	104,949
2014	3,010,683	79,990	3,090,674	1,077,259	203,219	0	270,945	203,188	270,922	67,726
2015	9,052,794	37,215	9,090,009	678,421	91,309	0	1,520,944	91,309	121,745	30,436
2016	5,005,509	48,665	5,054,174	80,972	52,468	0	70,385	52,503	69,933	17,494
2017	<b>6,799,918</b>	<b>4,198</b>	<b>6,804,116</b>	<b>168,157</b>	<b>268,272</b>	<b>0</b>	<b>357,696</b>	<b>268,272</b>	<b>357,696</b>	<b>89,424</b>
2018	7,163,698	0	7,163,698	184,711	325,905	0	558,224	335,969	427,179	109,904
2019	5,975,009	0	5,975,009	231,728	15,093	0	130,055	24,038	13,581	6,159
2020	0	0	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0
<b>TOTAL</b>	<b>326,734,248</b>	<b>55,004,762</b>	<b>381,739,010</b>	<b>53,740,340</b>	<b>25,131,870</b>	<b>759,941</b>	<b>21,940,993</b>	<b>19,200,113</b>	<b>10,350,885</b>	<b>13,392,516</b>

**TABLE B-10 Capital Costs of Each Aqueduct Reach to be Reimbursed through Capital Cost Component of Transportation Charge (in dollars)**

Sheet 6 of 8

Calendar Year	CALIFORNIA AQUEDUCT (continued)									
	MOJAVE DIVISION (continued)				SANTA ANA DIVISION					
	Reach 22B	Reach 23	Reach 24	Subtotal	Reach 25	Reach 26A	Reach 28G <sup>a</sup>	Reach 28H	Reach 28J	Subtotal
	[50]	[51]	[52]	[53]	[54]	[55]	[56]	[57]	[58]	[59]
1952	2,013	2,074	2,413	21,386	3,334	5,599	4,785	4,055	3,020	20,793
1953	5,752	6,886	7,438	65,936	10,275	17,264	15,580	11,511	9,476	64,106
1954	8,560	7,849	9,820	87,036	13,566	22,790	18,015	18,100	12,160	84,631
1955	2,754	2,725	3,313	29,357	4,575	7,687	6,052	6,081	4,151	28,546
1956	2,905	2,961	3,561	31,562	4,917	8,264	6,496	6,525	4,480	30,682
1957	10,757	10,962	13,177	116,825	18,205	30,586	24,044	24,156	16,585	113,576
1958	18,717	18,578	22,627	199,237	31,001	52,019	40,844	41,033	28,470	193,367
1959	25,421	20,372	45,646	255,388	39,325	58,137	45,746	45,946	44,331	233,485
1960	136,751	17,152	109,816	449,110	65,655	93,700	59,102	58,548	118,969	395,974
1961	215,859	9,546	373,473	777,154	26,979	56,734	32,226	34,382	674,787	825,108
1962	164,168	4,336	279,421	817,994	9,964	36,235	21,383	20,530	47,484	135,596
1963	237,695	7,228	358,503	1,205,145	31,013	112,271	43,884	41,698	1,506,440	1,735,306
1964	262,996	6,863	244,003	1,495,651	69,669	202,642	89,710	45,762	98,569	506,352
1965	827,655	11,836	621,566	2,916,174	279,237	206,356	96,956	76,899	146,095	805,543
1966	1,746,245	31,078	1,018,628	6,629,975	415,066	364,004	170,878	308,756	589,107	1,847,811
1967	3,146,128	62,135	2,331,106	11,009,612	3,184,296	638,539	233,968	283,126	987,832	5,327,761
1968	4,588,850	102,207	2,600,293	21,078,184	8,264,126	1,268,194	871,337	266,295	780,587	11,450,539
1969	7,750,478	260,659	11,131,406	37,268,731	6,807,783	1,768,456	1,117,873	1,444,654	756,442	11,895,208
1970	23,451,612	1,240,798	16,885,193	59,277,133	2,169,051	7,229,429	1,843,621	1,013,468	2,829,523	15,085,092
1971	16,772,680	1,922,115	5,385,721	29,292,507	1,135,248	9,811,736	16,095,702	6,401,303	12,111,623	45,555,612
1972	3,788,894	48,049	788,479	7,085,469	1,095,740	5,528,987	1,537,880	11,960,791	21,542,747	41,666,145
1973	1,623,274	24,333	4,225,877	6,247,801	136,994	1,810,729	209,664	247,769	3,673,344	6,078,500
1974	5,699,605	130,567	766,562	7,248,472	68,180	1,922,999	162,178	101,638	1,980,991	4,235,986
1975	4,793,580	19,467	373,783	5,731,466	166,653	3,787,797	157,365	124,399	1,626,274	5,862,488
1976	3,103,916	84,188	204,705	3,837,735	475,176	1,494,750	178,287	118,748	1,497,465	3,764,426
1977	1,654,122	60,112	232,230	2,708,024	76,255	776,085	127,106	89,036	323,091	1,391,573
1978	677,448	36,484	210,198	1,711,657	57,463	131,076	147,112	153,867	347,482	837,000
1979	560,506	103,634	103,615	1,754,670	29,960	80,482	29,723	19,225	225,947	385,337
1980	2,239,224	60,229	559,963	5,914,309	31,462	181,638	137,833	154,821	1,077,900	1,583,654
1981	(774,614)	138,917	203,941	1,737,796	5,864	69,031	28,815	22,654	61,349	187,713
1982	432,274	346,905	79,819	8,717,975	9,224	159,280	16,069	58,900	55,841	299,314
1983	451,428	2,029,405	58,989	13,652,234	4,304	528,764	18,213	89,581	(264,804)	376,058
1984	(83,811)	1,290,740	34,764	10,799,037	3,850	270,455	14,462	12,259	49,547	505,573
1985	608,583	966,160	51,634	8,422,737	5,555	62,571	17,816	11,481	54,070	151,493
1986	1,097,122	230,510	51,994	7,713,451	9,927	114,561	31,564	25,037	86,794	267,883
1987	3,631,282	146,850	91,223	5,552,802	4,908	27,208	17,141	8,005	45,528	102,790
1988	552,546	558,557	197,761	2,039,009	7,358	161,957	41,892	21,113	90,784	323,104
1989	4,161,037	1,496,776	433,072	7,382,673	8,092	(2,297,399)	28,708	12,619	51,556	(2,196,424)
1990	8,794,258	1,394,698	344,367	8,620,068	176,854	(1,657,576)	27,478	12,817	55,408	(1,385,019)
1991	7,985,326	3,624,824	139,105	11,753,895	202,286	(1,316,160)	142,139	15,524	62,794	(893,417)
1992	4,849,560	8,364,426	127,829	14,808,798	333,934	(1,878,502)	34,185	13,422	69,479	(1,427,482)
1993	2,094,764	15,390,366	159,211	19,571,092	1,506,787	3,979,221	44,300	27,047	162,854	5,720,209
1994	933,021	8,082,401	81,869	10,577,079	2,104,588	2,493,097	16,351	11,673	54,581	4,680,290
1995	1,096,953	5,924,175	123,653	8,050,530	3,310,564	500,791	35,402	28,202	164,254	4,039,213
1996	1,736,686	2,181,669	96,339	4,344,851	19,019,751	(100,474)	76,723	73,629	344,747	19,414,376
1997	809,666	(342,563)	102,390	1,000,244	7,645,602	(662,524)	50,662	20,720	268,293	7,322,753
1998	273,139	3,392,776	36,135	3,880,497	993,619	1,613,505	10,268	8,970	479,138	3,105,500
1999	1,006,721	2,208,657	123,472	3,792,421	224,119	843,638	84,683	45,293	324,223	1,521,955
2000	724,837	1,251,684	83,871	2,495,486	129,156	1,285,637	64,095	41,331	114,224	1,634,443
2001	550,843	342,964	26,780	1,773,369	73,031	447,282	20,193	13,635	88,656	642,797
2002	270,386	269,139	71,793	264,008	54,815	1,753,554	53,787	12,619	196,949	2,071,724
2003	382,025	146,659	30,255	599,147	86,731	350,997	1,096,665	2,482,179	179,466	4,196,038
2004	262,810	48,570	12,285	411,358	13,577	275,709	1,736,308	856,587	24,559	2,906,739
2005	62,967	104,838	144,149	433,303	16,962	120,279	2,049,655	410,021	270,894	2,867,810
2006	15,163	294,318	577,859	917,747	21,932	16,665	2,302,259	406,071	2,544,382	5,291,309
2007	151,063	919,040	69,935	1,368,052	12,905	55,918	(246)	1,099,958	3,664,344	4,832,879
2008	346,638	3,113,899	2,019,852	5,600,869	2,481	82,555	835,530	899,508	682,829	2,502,902
2009	940,452	448,164	1,834,401	3,372,357	2,972	260,999	4,202,648	976,867	2,819,145	8,262,631
2010	2,207,142	26,737	1,373,264	3,647,098	(3)	119,968	43,408	930,165	3,865,738	4,959,276
2011	5,924,635	6,288	99,900	6,061,703	11	35,412	1,173,995	577	1,955,691	3,165,686
2012	10,149,651	95,175	28,760	10,942,016	8,715	477,006	2,750,751	214,702	2,760,048	6,211,222
2013	6,331,413	334,524	74,035	8,548,463	36,624	1,113,282	3,313,512	1,342,565	6,139,955	11,945,937
2014	2,576,361	184,199	28,491	4,882,309	15,952	2,420,588	79,084	64,672	3,933,527	6,513,824
2015	1,890,516	120,714	15,294	4,560,688	10,156	3,069,709	19,721	20,406	20,412,533	23,532,526
2016	506,452	1,575,567	12,648	2,438,422	11,340	1,799,535	11,667	22,681	31,053,422	32,898,645
2017	<b>1,071,939</b>	<b>1,841,209</b>	<b>74,052</b>	<b>4,496,717</b>	<b>766,417</b>	<b>3,852,864</b>	<b>86,466</b>	<b>735,050</b>	<b>19,327,280</b>	<b>24,768,077</b>
2018	2,038,964	550,950	142,540	4,674,346	534,182	5,059,005	160,274	2,465,034	12,885,912	21,104,407
2019	966,163	103,569	48,307	1,538,693	0	2,764,690	0	5,772,375	6,059,228	14,596,293
2020	0	0	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0
<b>TOTAL</b>	<b>160,544,927</b>	<b>73,426,880</b>	<b>58,218,575</b>	<b>436,707,041</b>	<b>62,096,311</b>	<b>65,978,283</b>	<b>44,261,992</b>	<b>42,409,069</b>	<b>174,260,587</b>	<b>389,006,243</b>

<sup>a</sup> Includes excess capacity costs (not shown in Table B-9) allocated to Metropolitan in the following years and repaid under Article 24(c) of its contract: 1970 - \$362,000; 1971 - \$6,198,000; 1972 - \$139,000.

**TABLE B-10 Capital Costs of Each Aqueduct Reach to be Reimbursed through Capital Cost Component of Transportation Charge (in dollars)**

Sheet 7 of 8

Calendar Year	CALIFORNIA AQUEDUCT (continued)									
	WEST BRANCH							COASTAL BRANCH		
	Reach 29A	Reach 29F	Reach 29G	Reach 29H	Reach 29J	Reach 30	Subtotal	Reach 31A	Reach 33A	Reach 33B
	[60]	[61]	[62]	[63]	[64]	[65]	[66]	[67]	[68]	[69]
1952	2,924	136	175	459	553	1,408	5,655	0	0	0
1953	9,093	344	237	1,754	1,683	4,346	17,457	0	0	0
1954	7,389	1,201	2,229	2,350	4,162	5,743	23,074	0	0	0
1955	1,019	585	1,086	1,147	2,029	1,943	7,809	0	0	0
1956	490	698	1,297	1,366	2,420	2,077	8,348	0	0	0
1957	1,809	2,583	4,792	5,057	8,952	7,684	30,877	0	0	0
1958	3,256	4,516	8,714	8,878	15,847	13,931	55,142	0	0	0
1959	7,953	9,150	19,414	18,243	35,583	44,384	134,727	28,046	49,114	0
1960	21,753	14,990	34,447	29,764	69,752	84,703	255,409	34,404	70,450	0
1961	22,442	12,775	21,559	20,086	39,761	123,330	239,953	13,801	17,868	0
1962	40,237	28,729	86,938	58,215	108,962	348,366	671,447	10,121	7,798	0
1963	91,959	69,162	163,347	110,015	211,592	521,491	1,167,566	20,470	14,299	0
1964	150,670	66,420	207,977	143,340	291,404	1,372,464	2,232,275	315,418	26,963	0
1965	361,811	77,914	403,115	127,430	589,638	3,383,950	4,943,858	747,023	36,178	0
1966	489,512	203,497	1,233,640	348,918	3,231,797	9,364,753	14,872,117	2,258,915	35,864	0
1967	1,589,715	882,096	1,117,243	891,607	31,088,491	17,618,827	53,187,979	6,310,419	38,331	0
1968	3,899,363	300,921	396,190	1,104,832	36,157,768	15,736,691	57,595,765	2,707,580	30,784	0
1969	6,592,580	336,480	693,348	1,184,454	9,655,871	16,228,175	34,690,908	423,797	26,549	0
1970	7,986,733	6,089,401	2,624,747	3,002,968	8,463,475	22,330,328	50,497,652	269,194	24,368	0
1971	4,247,037	3,768,699	1,120,231	8,244,651	5,844,024	16,890,503	40,115,145	164,446	32,230	0
1972	1,871,831	426,932	985,512	18,787,722	(23,015,734)	3,818,001	2,874,264	131,332	17,601	0
1973	775,824	168,064	399,856	9,408,706	1,821,206	13,426,222	25,999,878	182,493	16,154	0
1974	560,657	168,878	169,717	3,901,261	(3,454,239)	2,988,318	4,334,592	190,866	18,799	0
1975	353,670	421,176	925,693	664,113	609,891	1,808,235	4,782,778	64,582	36,012	0
1976	396,809	650,417	1,274,484	706,244	650,209	1,253,067	4,931,230	198,266	68,898	0
1977	390,637	3,018,637	2,152,961	196,012	1,135,148	345,023	7,238,418	918,473	81,305	0
1978	1,427,190	2,219,135	6,694,615	57,817	149,932	763,445	11,312,134	52,994	83,300	0
1979	940,013	2,168,382	19,813,742	597,858	331,313	282,145	24,133,453	38,182	108,951	0
1980	1,276,793	4,108,143	24,537,814	550,337	204,751	2,055,206	32,733,044	189,070	376,036	0
1981	(711,751)	2,699,873	19,806,531	94,944	28,852	275,460	22,193,909	19,897	(157,537)	0
1982	(465,217)	351,251	17,964,617	215,678	42,587	351,376	18,460,292	(16,381)	(96,449)	0
1983	100,394	180,971	6,751,649	220,029	24,295	566,545	7,843,883	85,496	67,106	0
1984	71,759	68,930	2,870,259	335,942	17,285	1,118,954	4,483,129	28,568	54,074	0
1985	142,244	25,386	2,126,670	102,366	21,971	284,243	2,702,880	36,834	54,314	0
1986	133,914	62,294	274,660	141,894	36,149	213,353	862,264	82,358	223,134	0
1987	13,936	453,949	711,773	192,511	27,931	158,313	1,558,413	53,817	1,061,939	0
1988	427,544	118,010	1,660,959	203,130	95,930	222,068	2,727,641	183,853	1,141,272	0
1989	207,067	430,662	584,186	241,811	97,472	148,674	1,709,872	84,678	893,765	0
1990	197,428	355,480	386,882	813,211	54,269	119,438	1,926,708	133,868	1,100,167	0
1991	219,321	344,386	453,336	1,132,520	55,176	229,315	2,434,054	164,610	1,635,283	0
1992	541,026	295,312	464,421	4,402,524	47,182	206,495	5,956,960	183,240	1,220,510	1,495,646
1993	464,987	320,182	643,189	3,361,457	74,198	296,349	5,160,362	344,928	5,274,657	5,052,431
1994	203,666	231,527	362,717	306,148	33,758	168,426	1,306,242	282,150	15,905,886	21,341,196
1995	344,358	392,647	536,253	468,656	34,007	304,983	2,080,904	1,196,326	45,172,271	62,947,362
1996	150,901	161,394	427,223	203,201	15,357	98,522	1,056,598	948,730	42,987,442	54,300,990
1997	298,002	71,310	432,940	276,180	50,095	233,956	1,362,483	562,583	11,209,633	13,893,576
1998	346,973	21,003	2,028,979	181,951	49,377	67,874	2,696,157	248,671	2,355,322	4,159,441
1999	296,520	37,641	1,080,682	125,373	51,213	118,013	1,709,442	288,236	2,906,010	4,398,935
2000	212,174	33,747	238,676	116,588	13,241	187,926	802,352	132,435	228,901	2,965,936
2001	43,281	6,448	104,127	110,850	10,737	23,847	299,290	103,281	(7,057)	568,968
2002	171,190	30,767	252,912	60,146	7,881	62,684	585,581	98,021	147,827	105,972
2003	50,519	9,141	103,160	57,712	51,000	34,282	305,814	42,075	43,753	31,706
2004	47,768	6,780	27,718	107,695	215,925	16,535	422,421	26,667	13,644	21,479
2005	273,482	12,706	54,409	6,642	52,413	594,136	993,789	29,337	(261,476)	38,618
2006	660,664	3,017	115,825	1,557	2,299,565	164,739	3,245,367	7,046	6,303	37,583
2007	107,460	23,817	1,958,512	269,569	347	31,047	2,390,752	37,460	32,702	42,774
2008	2,090,139	13,683	103,704	1,001,788	2,089	60,186	3,271,589	41,227	34,997	10,865
2009	1,931,429	16,719	22,988	1,463,563	631	47,211	3,482,539	19,458	17,409	2,357
2010	864,340	1,994	24,691	231,970	(12)	17,025	1,140,007	633,621	3,158	0
2011	426,185	3,483	3,892	40,732	41	3,525	477,858	894,066	39,656	0
2012	615,441	76,325	91,531	55,362	18,910	79,163	936,732	337,039	271,933	0
2013	182,443	231,925	230,217	172,032	51,955	257,967	1,126,538	840,207	1,113,962	0
2014	300,223	264,332	332,855	96,090	39,531	1,677,183	2,710,215	1,315,805	1,321,585	0
2015	154,771	112,785	1,070,833	48,982	27,813	3,377,755	4,792,939	812,625	1,255,677	0
2016	196,852	1,706,010	159,211	375,351	28,519	3,124,623	5,590,566	3,953,756	1,735,542	0
2017	<b>176,526</b>	<b>990,494</b>	<b>1,336,936</b>	<b>1,820,869</b>	<b>98,586</b>	<b>2,221,794</b>	<b>6,645,205</b>	<b>1,946,582</b>	<b>880,140</b>	<b>0</b>
2018	330,428	205,949	586,965	867,556	104,196	4,476,833	6,571,927	1,241,221	1,242,580	0
2019	330,330	16,841	2,114,192	593,692	17,879	3,555,614	6,628,548	624,445	624,445	0
2020	0	0	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0
<b>TOTAL</b>	<b>45,669,886</b>	<b>35,609,232</b>	<b>133,596,398</b>	<b>70,693,877</b>	<b>78,154,592</b>	<b>156,021,191</b>	<b>519,745,176</b>	<b>33,318,730</b>	<b>142,972,331</b>	<b>171,415,834</b>

**TABLE B-10 Capital Costs of Each Aqueduct Reach to be Reimbursed through Capital Cost Component of Transportation Charge (in dollars)**

Sheet 8 of 8

Calendar Year	CALIFORNIA AQUEDUCT (continued)						GRAND TOTAL
	COASTAL BRANCH (continued)					Total	
	Reach 34	Reach 35	Reach 37	Reach 38	Subtotal		
	[70]	[71]	[72]	[73]	[74]	[75]	[76]
1952	0	0	0	0	0	98,857	99,353
1953	0	0	0	0	0	309,387	311,812
1954	0	0	0	0	0	394,688	402,143
1955	0	0	0	0	0	159,842	169,342
1956	0	0	0	0	0	255,679	351,551
1957	0	0	0	0	0	708,753	1,464,452
1958	0	0	0	0	0	1,331,616	2,286,623
1959	7,441	8,236	0	0	92,837	2,096,392	2,967,412
1960	8,507	14,265	0	0	127,626	2,937,049	4,660,833
1961	1,501	3,931	0	0	37,101	4,650,264	8,545,244
1962	524	1,689	0	0	20,132	5,827,774	8,875,171
1963	880	2,943	0	0	38,592	18,981,487	24,610,278
1964	1,687	5,639	0	0	349,707	31,550,813	41,736,060
1965	2,118	7,060	0	0	792,379	57,936,405	62,664,743
1966	1,736	5,764	0	0	2,302,279	124,748,128	129,110,330
1967	1,891	6,213	0	0	6,356,854	187,465,580	194,146,365
1968	1,324	4,369	0	0	2,744,057	192,593,079	197,978,911
1969	907	2,905	0	0	454,158	182,530,023	184,473,490
1970	851	2,787	0	0	297,200	206,720,774	207,082,650
1971	1,315	3,804	0	0	201,795	158,414,033	158,624,739
1972	522	1,660	0	0	151,115	68,228,670	68,362,291
1973	542	1,758	0	0	200,947	45,110,823	45,263,853
1974	463	1,405	0	0	211,533	24,036,199	24,402,166
1975	2,255	6,656	0	0	109,505	21,065,768	21,318,838
1976	5,088	14,988	0	0	287,240	17,183,961	17,492,910
1977	1,834	5,387	0	0	1,006,999	15,165,801	15,544,382
1978	1,302	3,852	0	0	141,448	18,661,117	19,119,151
1979	1,505	4,433	0	0	153,071	31,202,118	31,857,362
1980	1,152	3,449	0	0	569,707	73,891,101	74,986,833
1981	1,427	4,261	0	0	(131,952)	15,246,649	15,742,773
1982	588	1,787	0	0	(110,455)	38,256,580	39,705,931
1983	794	2,398	0	0	155,794	34,705,281	38,044,649
1984	986	2,959	0	0	86,587	24,454,091	30,382,250
1985	2,111	6,263	0	0	99,522	14,914,930	28,537,556
1986	17,458	51,279	0	0	374,229	13,435,351	43,155,828
1987	92,506	272,968	0	0	1,481,230	11,711,428	34,331,982
1988	99,456	293,612	0	0	1,718,193	11,026,370	18,123,243
1989	77,283	228,038	0	0	1,283,764	30,302,112	33,130,497
1990	103,785	277,889	0	0	1,615,709	32,589,619	34,435,721
1991	123,603	363,889	0	0	2,287,385	38,320,942	39,811,664
1992	566,230	240,553	102,051	74,162	3,882,392	34,312,996	35,041,233
1993	1,345,211	688,935	268,937	358,367	13,333,466	53,122,384	53,921,787
1994	8,915,445	2,363,238	678,753	1,315,559	50,802,227	73,751,564	74,225,377
1995	23,975,738	20,849,939	7,029,108	7,117,197	168,287,941	191,033,090	191,525,571
1996	26,475,298	18,790,572	7,213,823	6,616,310	157,333,165	187,776,347	188,025,325
1997	10,456,863	4,149,105	545,378	798,606	41,615,744	62,137,369	62,583,537
1998	3,368,320	952,615	192,567	280,779	11,557,715	27,083,446	27,217,157
1999	2,616,574	356,318	36,680	51,648	10,654,402	24,085,343	24,556,053
2000	2,746,120	17,830	0	0	6,091,222	13,504,773	13,742,557
2001	3,960	(1,112)	0	0	668,039	5,130,617	7,470,505
2002	77,266	13,119	0	0	442,204	9,921,954	18,223,863
2003	25,734	6,272	0	0	149,540	7,090,347	14,855,165
2004	3,142	1,942	0	0	66,873	5,724,375	10,829,600
2005	526	327	0	0	(192,669)	9,654,977	12,130,085
2006	4	18,012	0	0	68,949	16,031,812	18,522,243
2007	0	152	0	0	113,088	13,670,587	20,478,263
2008	24	14,163	0	0	101,277	15,861,831	30,324,188
2009	43	44,176	0	0	83,443	26,272,929	40,938,263
2010	(1)	(1,210)	0	0	635,568	23,060,578	45,963,874
2011	4	4,284	0	0	938,010	17,931,126	37,818,444
2012	96	1,455	0	0	610,523	23,976,419	37,907,075
2013	209	1,590	0	0	1,955,967	41,764,102	49,646,096
2014	114	1,113	0	0	2,638,616	34,807,990	35,165,362
2015	1,286	0	0	0	2,069,588	54,400,252	57,761,115
2016	3,878	0	0	0	5,693,176	74,978,062	75,790,269
2017	104	0	0	0	2,826,826	73,015,831	73,147,702
2018	0	0	0	0	2,483,801	71,374,066	73,979,566
2019	0	0	0	0	1,248,890	41,452,523	42,078,857
2020	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0
TOTAL	81,147,529	50,131,923	16,067,297	16,612,628	511,666,272	2,992,147,224	3,278,180,514

**TABLE B-11 Minimum OMP&R Costs of Each Aqueduct Reach to be Reimbursed through Minimum OMP&R Component of Transportation Charge (in dollars)**

Sheet 1 of 9

Calendar Year	UPPER FEATHER DIVISION	NORTH BAY AQUEDUCT					SOUTH BAY AQUEDUCT			
		Reach 1	Reach 2	Reach 3A	Reach 3B	Total	Reach 1	Reach 2	Reach 4	Reach 5
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	37,396	5,522	0	0
1963	0	0	0	0	0	0	147,719	20,639	0	0
1964	0	0	0	0	0	0	149,750	15,574	19,405	0
1965	0	0	0	0	0	0	259,939	45,718	46,485	0
1966	0	0	0	0	0	0	270,890	23,799	63,921	0
1967	0	0	0	0	0	0	438,050	32,798	108,127	0
1968	0	0	0	0	130	130	410,919	44,277	66,973	706
1969	0	0	0	0	80,875	80,875	487,377	48,339	75,644	706
1970	0	0	0	0	94,872	94,872	381,734	44,852	64,833	71,376
1971	54	0	0	0	45,579	45,579	357,850	25,666	50,344	38,735
1972	40	0	0	0	37,895	37,895	347,941	30,606	56,800	100,106
1973	1	0	0	0	32,993	32,993	386,897	36,172	58,288	28,810
1974	143	0	0	0	46,498	46,498	456,381	57,081	83,120	61,623
1975	1,069	0	0	0	37,707	37,707	624,989	46,111	81,361	36,682
1976	139	0	0	0	60,786	60,786	614,362	47,862	123,838	91,096
1977	892	0	0	0	78,400	78,400	511,065	48,926	104,280	102,083
1978	39	0	0	0	56,318	56,318	671,195	125,224	176,855	50,289
1979	3,235	0	0	0	73,852	73,852	650,826	76,849	212,826	91,380
1980	416	0	0	0	81,769	81,769	1,128,840	212,974	242,118	110,786
1981	3,847	0	0	0	101,340	101,340	884,763	130,126	167,118	204,772
1982	11,075	0	0	0	191,987	191,987	1,156,605	141,718	249,447	96,020
1983	1,928	0	0	0	80,215	80,215	1,258,144	84,360	373,875	152,255
1984	3,765	0	0	0	139,121	139,121	1,998,984	113,797	340,344	34,461
1985	2,888	0	0	0	259,515	259,515	2,044,121	207,478	427,930	247,308
1986	2,787	0	0	0	229,508	229,508	1,834,838	285,908	305,149	159,054
1987	2,388	0	0	0	310,683	310,683	2,118,974	163,714	400,547	283,067
1988	545	0	(94)	0	330,156	330,062	2,068,655	186,275	299,934	370,212
1989	1,800	473,408	178,069	237,480	373,427	1,262,384	2,164,688	163,481	320,734	497,038
1990	788	556,610	244,897	123,144	427,257	1,351,908	2,233,036	251,434	355,022	571,415
1991	3,654	651,307	302,327	205,516	428,470	1,587,620	1,806,699	152,509	95,745	93,986
1992	647	443,912	189,330	265,462	280,505	1,179,209	2,064,907	405,932	409,435	363,964
1993	3,630	435,240	294,416	213,267	289,206	1,232,129	3,925,050	621,712	480,832	399,558
1994	2,279	430,112	198,322	206,594	365,646	1,200,674	4,673,275	302,115	404,709	408,066
1995	2,906	428,313	282,898	151,703	295,326	1,158,240	3,849,620	316,905	566,447	330,706
1996	8,007	796,526	272,743	240,106	260,001	1,569,376	3,526,989	254,075	664,485	493,300
1997	7,449	504,476	210,763	213,211	315,374	1,243,824	3,010,809	189,269	591,540	230,371
1998	798	404,834	227,562	204,821	251,154	1,088,371	2,965,219	426,872	532,042	303,263
1999	416	678,159	332,340	298,066	289,895	1,598,459	3,748,823	478,982	437,660	463,868
2000	505	919,679	254,626	657,967	414,264	2,246,536	3,810,111	541,675	440,808	550,541
2001	314	1,072,446	231,959	455,772	181,372	1,941,549	2,907,483	272,673	289,919	390,950
2002	3,627	1,586,250	415,744	410,985	398,645	2,811,624	3,853,092	341,500	466,141	537,905
2003	393	1,776,863	546,644	567,701	354,209	3,245,417	2,347,693	365,741	575,370	963,068
2004	455	1,601,564	636,208	738,083	818,164	3,794,019	3,338,897	510,169	746,539	698,050
2005	452	1,059,791	322,691	767,313	412,453	2,562,248	3,309,594	262,581	427,595	807,600
2006	3,899	780,037	229,313	602,270	430,027	2,041,646	3,469,851	376,927	752,147	587,680
2007	(8)	1,081,328	233,393	467,032	275,816	2,057,569	5,012,579	690,060	587,379	789,216
2008	3,578	822,561	218,282	524,737	600,368	2,165,948	5,191,152	674,547	739,593	920,312
2009	88	1,224,100	274,814	618,045	550,745	2,667,705	3,988,958	671,161	701,725	1,354,606
2010	25	2,676,286	112,906	1,103,248	276,198	4,168,638	4,462,007	579,469	803,235	718,991
2011	63	2,637,729	584,885	1,237,150	415,201	4,874,964	5,107,370	830,971	858,788	501,594
2012	(24)	2,606,317	143,492	1,448,182	1,123,880	5,321,871	5,277,809	1,107,820	742,533	830,281
2013	277	3,312,169	133,031	474,666	369,782	4,289,649	6,079,677	1,205,562	650,830	1,099,343
2014	111	4,104,427	176,973	616,666	552,426	5,450,493	7,418,110	632,701	641,034	1,318,890
2015	114	2,893,292	252,069	1,230,053	1,088,021	5,463,435	8,540,606	662,653	630,093	857,266
2016	111	3,735,827	207,056	1,055,657	1,082,388	6,080,928	9,530,570	717,679	725,386	1,768,833
2017	111	4,362,459	252,147	1,291,807	1,325,272	7,231,685	10,293,334	816,292	809,586	1,489,355
2018	111	3,967,043	250,623	1,287,429	1,321,939	6,827,034	12,717,965	805,363	798,630	1,590,106
2019	112	4,061,994	238,975	1,223,747	1,255,632	6,780,348	10,955,763	787,576	785,646	1,632,259
2020	113	4,102,614	241,365	1,235,985	1,268,188	6,848,152	11,065,320	795,451	793,503	1,648,582
2021	114	4,143,640	243,778	1,248,345	1,280,870	6,916,633	11,175,973	803,406	801,438	1,665,068
2022	116	4,185,076	246,216	1,260,828	1,293,679	6,985,799	11,287,733	811,440	809,452	1,681,718
2023	117	4,226,927	248,678	1,273,437	1,306,615	7,055,657	11,400,611	819,554	817,546	1,698,535
2024	118	4,269,196	251,165	1,286,171	1,319,682	7,126,214	11,514,617	827,750	825,722	1,715,521
2025	119	4,311,888	253,677	1,299,033	1,332,878	7,197,476	11,629,763	836,027	833,979	1,732,676
2026	120	4,355,007	256,213	1,312,023	1,346,207	7,269,450	11,746,060	844,388	842,319	1,750,003
2027	122	4,398,557	258,776	1,325,143	1,359,669	7,342,145	11,863,521	852,832	850,742	1,767,503
2028	123	4,442,543	261,363	1,338,395	1,373,266	7,415,567	11,982,156	861,360	859,250	1,785,178
2029	124	4,486,968	263,977	1,351,779	1,386,999	7,489,723	12,101,978	869,973	867,842	1,803,030
2030	125	4,531,838	266,617	1,365,296	1,400,869	7,564,620	12,222,998	878,673	876,520	1,821,060
2031	126	4,577,156	269,283	1,378,949	1,414,877	7,640,265	12,345,228	887,460	885,286	1,839,270
2032	128	4,622,928	271,976	1,392,739	1,429,026	7,716,669	12,468,680	896,335	894,138	1,857,663
2033	129	4,669,157	274,696	1,406,666	1,443,316	7,793,835	12,593,367	905,298	903,080	1,876,240
2034	130	4,715,849	277,442	1,420,733	1,457,749	7,871,773	12,719,300	914,351	912,111	1,895,002
2035	132	4,763,007	280,217	1,434,940	1,472,327	7,950,491	12,846,493	923,494	921,232	1,913,952
<b>TOTAL</b>	<b>83,894</b>	<b>122,887,411</b>	<b>12,614,845</b>	<b>40,468,342</b>	<b>41,079,478</b>	<b>217,050,075</b>	<b>364,244,738</b>	<b>32,446,563</b>	<b>35,925,348</b>	<b>54,344,909</b>



**TABLE B-11 Minimum OMP&R Costs of Each Aqueduct Reach to be Reimbursed through Minimum OMP&R Component of Transportation Charge (in dollars)**

Sheet 2 of 9

Calendar Year	SOUTH BAY AQUEDUCT (continued)					CALIFORNIA AQUEDUCT			
						NORTH SAN JOAQUIN DIVISION			
	Reach 6	Reach 7	Reach 8	Reach 9	Total	Reach 1	Reach 2A	Reach 2B	Subtotal
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]
1961	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	42,918	0	0	0	0
1963	0	0	0	0	168,358	0	0	0	0
1964	0	0	0	0	184,729	0	0	0	0
1965	2,634	6,490	4,704	12,904	378,874	0	0	0	0
1966	4,707	10,328	9,233	25,519	408,397	0	0	0	0
1967	2,712	7,659	10,812	34,347	634,505	0	0	0	0
1968	3,109	7,960	10,166	40,372	584,482	1,001,998	228,359	103,116	1,333,473
1969	3,944	5,975	8,795	38,566	669,346	933,116	301,596	188,194	1,422,906
1970	2,464	(1,991)	6,870	28,210	598,348	971,602	306,198	151,539	1,429,339
1971	3,116	9,394	9,895	31,068	526,068	1,103,021	254,786	113,694	1,471,501
1972	5,125	10,247	12,054	44,699	607,578	1,107,855	230,906	110,109	1,448,870
1973	4,178	7,500	4,890	43,816	570,551	1,150,864	221,445	100,221	1,472,530
1974	7,812	7,564	5,523	48,054	727,158	1,272,034	231,383	117,156	1,620,573
1975	18,120	14,683	18,325	68,377	908,648	1,434,736	455,110	201,075	2,090,921
1976	10,873	5,557	19,920	49,921	963,429	1,519,801	217,348	453,400	2,190,549
1977	(240)	2,228	8,391	89,579	866,312	1,913,643	292,380	196,564	2,402,587
1978	(1,404)	16,766	(5,313)	104,078	1,137,690	1,860,456	306,503	188,214	2,355,173
1979	1,269	29,294	7,351	106,835	1,176,630	1,848,109	231,339	145,205	2,224,653
1980	3,621	24,270	17,404	110,852	1,850,865	2,365,292	472,660	247,608	3,085,560
1981	4,038	20,109	17,586	98,143	1,526,655	2,649,730	435,226	154,191	3,239,147
1982	2,236	22,870	21,919	202,590	1,893,405	3,192,710	599,793	244,664	4,037,167
1983	(2,047)	48,781	45,573	216,434	2,177,375	4,244,937	802,908	273,081	5,320,926
1984	4,449	44,017	23,563	455,054	3,014,669	4,373,157	808,917	290,728	5,472,802
1985	13,097	74,565	57,920	238,067	3,310,486	4,717,323	629,825	189,199	5,536,347
1986	11,614	31,084	46,864	363,350	3,037,861	5,217,491	929,919	359,365	6,506,775
1987	15,273	25,182	37,949	416,375	3,461,081	5,292,200	958,927	362,065	6,613,192
1988	30,207	41,047	49,156	335,408	3,380,894	5,329,317	822,300	360,336	6,511,953
1989	9,740	54,881	114,203	179,323	3,504,088	5,753,966	851,745	907,609	7,513,320
1990	31,161	69,416	119,309	247,781	3,878,574	6,788,986	1,066,314	883,822	8,739,122
1991	22,434	(18,690)	99,577	262,052	2,514,312	6,796,247	1,067,078	585,008	8,448,333
1992	26,787	332,012	98,670	186,640	3,888,347	9,415,121	1,419,603	673,833	11,508,557
1993	24,845	181,592	94,169	316,045	6,043,803	10,274,070	1,371,074	900,996	12,546,140
1994	28,383	90,791	80,942	416,061	6,404,342	8,451,199	1,325,511	802,217	10,578,927
1995	29,298	64,012	80,278	373,657	5,610,923	10,406,784	2,386,507	959,685	13,752,976
1996	(1,020)	60,610	11,672	312,097	5,322,208	10,246,985	2,604,651	628,177	13,479,813
1997	18,428	95,321	15,691	335,566	4,486,995	10,429,338	1,098,381	2,084,859	13,612,578
1998	26,323	54,255	611,290	658,090	5,777,354	11,409,135	1,449,411	5,364,368	18,222,914
1999	50,555	36,519	430,229	2,035,938	7,682,573	11,604,989	1,444,270	1,338,751	14,388,009
2000	135,659	87,477	185,352	640,387	6,392,010	12,608,781	893,969	641,868	14,144,617
2001	112,959	188,988	197,681	1,047,994	5,408,647	17,552,867	1,388,491	756,266	19,697,624
2002	143,673	171,046	500,788	2,780,034	8,794,180	14,389,040	859,538	618,090	15,866,667
2003	77,999	97,782	247,719	987,204	5,662,577	16,518,162	1,742,623	753,303	19,014,088
2004	156,564	179,006	205,095	453,634	6,287,953	13,885,710	1,209,768	678,337	15,773,814
2005	143,052	202,176	135,131	223,699	5,511,428	12,444,177	1,941,010	872,985	15,258,172
2006	143,824	119,903	73,947	376,646	5,900,924	13,714,452	1,912,078	1,248,347	16,874,876
2007	78,501	115,030	67,507	242,111	7,582,385	11,969,643	1,699,879	626,384	14,295,906
2008	170,307	155,609	232,191	234,883	8,318,594	15,507,243	1,444,449	802,326	17,754,019
2009	84,133	140,725	113,617	616,936	7,671,860	13,690,186	1,056,971	855,488	15,602,646
2010	52,534	575,109	24,031	454,850	7,670,226	12,753,967	2,062,618	1,416,588	16,233,173
2011	82,590	77,284	58,732	472,947	7,990,276	16,652,633	2,812,144	1,444,687	20,909,465
2012	55,686	132,731	61,561	2,492,483	10,700,905	15,602,498	1,324,371	1,308,624	18,235,493
2013	81,564	174,382	98,067	1,165,316	10,554,741	16,956,601	1,840,446	2,477,620	21,274,667
2014	188,016	171,874	58,769	2,061,674	12,491,067	23,790,397	2,788,820	2,015,701	28,594,917
2015	122,039	194,215	143,600	3,152,008	14,302,479	24,926,649	1,648,818	1,919,733	28,495,200
2016	173,138	203,619	310,919	8,834,445	22,264,589	28,278,887	2,443,227	1,938,195	32,660,309
2017	<b>193,705</b>	<b>227,668</b>	<b>268,877</b>	<b>6,059,026</b>	<b>20,157,843</b>	<b>33,554,425</b>	<b>2,708,001</b>	<b>2,152,716</b>	<b>38,415,142</b>
2018	192,563	226,178	94,593	1,443,966	17,869,364	34,141,292	2,664,637	2,113,969	38,919,898
2019	188,334	221,346	227,044	5,500,271	20,298,239	32,311,450	2,631,341	2,088,976	37,031,767
2020	190,217	223,560	229,315	5,555,273	20,501,221	32,634,564	2,657,655	2,109,866	37,402,085
2021	192,119	225,795	231,608	5,610,826	20,706,233	32,960,910	2,684,231	2,130,965	37,776,106
2022	194,040	228,053	233,924	5,666,934	20,913,294	33,290,519	2,711,074	2,152,274	38,153,867
2023	195,981	230,334	236,263	5,723,604	21,122,428	33,623,424	2,738,184	2,173,797	38,535,405
2024	197,940	232,637	238,626	5,780,840	21,333,653	33,959,658	2,765,566	2,195,535	38,920,759
2025	199,920	234,964	241,012	5,838,648	21,546,989	34,299,255	2,793,222	2,217,491	39,309,968
2026	201,919	237,313	243,422	5,897,034	21,762,458	34,642,248	2,821,154	2,239,665	39,703,067
2027	203,938	239,686	245,857	5,956,005	21,980,084	34,988,670	2,849,366	2,262,062	40,100,098
2028	205,978	242,083	248,315	6,015,565	22,199,885	35,338,557	2,877,859	2,284,683	40,501,099
2029	208,037	244,504	250,798	6,075,721	22,421,883	35,691,942	2,906,638	2,307,530	40,906,110
2030	210,118	246,949	253,306	6,136,478	22,646,102	36,048,862	2,935,704	2,330,605	41,315,171
2031	212,219	249,419	255,839	6,197,843	22,872,564	36,409,350	2,965,061	2,353,911	41,728,322
2032	214,341	251,913	258,398	6,259,821	23,101,289	36,773,444	2,994,712	2,377,450	42,145,606
2033	216,485	254,432	260,982	6,322,419	23,332,303	37,141,178	3,024,659	2,401,225	42,567,062
2034	218,649	256,976	263,591	6,385,643	23,565,623	37,512,590	3,054,906	2,425,237	42,992,733
2035	220,836	259,546	266,227	6,449,500	23,801,280	37,887,716	3,085,455	2,449,489	43,422,660
<b>TOTAL</b>	<b>6,277,420</b>	<b>9,012,610</b>	<b>9,468,283</b>	<b>143,638,535</b>	<b>655,358,406</b>	<b>1,099,528,159</b>	<b>108,761,018</b>	<b>82,821,035</b>	<b>1,291,110,213</b>

**TABLE B-11 Minimum OMP&R Costs of Each Aqueduct Reach to be Reimbursed through Minimum OMP&R Component of Transportation Charge (in dollars)**

Sheet 3 of 9

Calendar Year	CALIFORNIA AQUEDUCT (continued)									
	SAN LUIS DIVISION						SOUTH SAN JOAQUIN DIVISION			
	Reach 3	Reach 4	Reach 5	Reach 6	Reach 7	Subtotal	Reach 8C	Reach 8D	Reach 9	Reach 10A
	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0
1968	120,038	428,308	130,105	44,591	104,033	827,075	0	0	0	0
1969	90,033	460,907	184,467	35,696	235,322	1,006,425	22,013	134,760	86,103	83,706
1970	89,547	484,300	226,002	66,070	192,582	1,058,501	26,207	156,981	128,273	118,046
1971	99,917	541,574	175,592	64,193	158,170	1,039,446	32,312	190,753	118,372	129,811
1972	116,708	647,979	174,519	73,670	154,783	1,167,659	35,031	187,242	130,396	117,625
1973	116,791	611,705	158,145	58,344	153,955	1,098,940	51,150	225,747	127,530	117,706
1974	120,309	671,455	150,835	63,905	150,230	1,156,734	34,752	199,127	131,298	141,658
1975	133,593	839,285	178,974	81,478	157,586	1,390,916	78,523	250,377	159,006	207,908
1976	54,938	883,956	220,832	90,305	174,835	1,424,866	39,348	133,933	123,424	139,134
1977	73,331	1,114,465	270,734	98,132	196,311	1,752,973	38,086	121,348	178,078	194,086
1978	45,867	898,992	203,261	106,938	203,079	1,458,137	45,552	178,805	129,928	168,634
1979	223,973	842,508	144,055	99,670	180,734	1,490,940	69,973	150,679	129,756	175,107
1980	243,507	1,176,463	222,942	127,625	281,860	2,052,397	57,726	274,848	185,155	284,207
1981	265,766	1,065,358	193,048	90,533	1,612,157	3,226,862	80,121	198,256	144,187	199,927
1982	279,250	1,241,285	209,371	114,421	1,433,180	3,277,507	59,424	269,086	233,494	264,947
1983	214,468	1,949,017	339,809	131,377	2,143,678	4,778,349	49,448	383,476	223,078	308,801
1984	241,273	2,233,969	335,166	163,858	2,111,386	5,085,652	42,062	458,489	300,924	396,448
1985	322,068	2,882,583	360,431	176,577	1,603,532	5,345,191	58,820	495,500	213,368	298,337
1986	416,027	2,996,792	472,551	252,188	601,250	4,738,808	90,730	478,786	596,800	422,493
1987	362,738	3,104,592	424,107	236,349	439,232	4,567,018	113,962	412,042	446,067	488,226
1988	365,209	2,954,186	456,864	231,754	639,242	4,647,255	96,728	379,073	417,991	532,489
1989	263,171	3,182,472	393,589	332,986	633,419	4,805,637	83,282	389,698	400,853	733,030
1990	397,353	4,011,110	579,073	464,639	729,132	6,181,307	111,019	436,849	515,611	651,465
1991	256,473	4,388,184	543,760	728,156	765,765	6,682,338	104,414	496,794	465,940	716,328
1992	302,021	3,792,401	795,587	363,134	815,590	6,068,733	118,315	511,982	417,871	574,145
1993	439,725	4,337,616	1,008,394	551,849	734,796	7,072,380	230,338	745,885	490,159	723,450
1994	282,579	4,376,461	816,129	396,768	492,860	6,364,797	125,398	602,404	572,557	703,493
1995	107,995	5,026,076	1,066,971	440,006	1,356,668	7,997,716	185,681	7,997,716	432,072	881,902
1996	1,003,229	4,738,221	931,944	683,323	1,034,376	8,391,093	112,062	416,294	472,350	984,784
1997	859,665	5,761,996	924,289	254,934	646,209	8,447,093	128,190	449,316	728,436	1,864,113
1998	690,845	5,520,206	1,242,589	534,931	654,538	8,643,109	115,748	457,845	429,433	1,011,284
1999	601,726	5,793,961	1,220,810	540,364	679,483	8,836,344	107,647	426,289	440,869	1,161,363
2000	708,169	5,826,574	1,028,776	525,073	871,710	8,960,301	103,853	463,578	509,758	919,469
2001	(581,175)	7,166,334	850,243	372,180	677,562	8,485,144	58,377	554,983	604,713	872,227
2002	1,074,504	5,158,919	663,420	249,525	731,359	7,877,727	54,621	729,627	416,211	1,308,245
2003	1,034,027	6,035,460	744,338	301,781	617,433	8,733,040	62,401	676,858	646,001	819,171
2004	619,278	6,865,921	679,631	337,749	578,358	9,080,937	35,363	474,032	334,335	604,690
2005	553,163	5,984,035	984,716	401,930	799,290	8,723,134	28,347	403,804	296,577	898,100
2006	(88,420)	6,126,305	1,583,392	632,718	896,513	9,150,507	46,470	530,528	789,865	480,754
2007	1,134,200	7,672,694	1,960,080	686,349	933,964	12,387,287	242,446	855,398	535,678	632,751
2008	881,252	10,607,394	2,142,634	658,371	963,220	15,252,871	71,530	455,135	657,221	942,082
2009	959,839	8,156,620	1,219,003	505,401	1,137,623	11,978,486	36,452	762,901	473,869	926,070
2010	957,367	9,472,901	1,599,039	567,698	1,308,120	13,905,125	67,258	743,999	550,142	726,994
2011	1,230,248	7,617,811	2,856,384	601,015	1,659,616	13,965,074	12,993	601,287	796,103	1,165,011
2012	1,670,712	10,840,403	2,393,275	635,916	1,228,086	16,768,391	36,160	661,338	806,876	813,710
2013	1,848,948	11,472,141	2,834,618	1,348,079	3,254,456	20,758,242	39,807	602,550	617,626	1,023,482
2014	1,375,711	11,781,292	2,598,056	802,158	1,318,030	17,875,247	3,986	1,146,644	254,127	1,985,121
2015	1,168,352	11,861,195	2,413,481	855,789	2,062,856	18,361,672	6,335	563,501	261,272	1,452,032
2016	1,461,189	11,986,860	2,294,822	801,782	1,522,865	18,067,518	7,371	825,578	229,499	1,677,228
2017	<b>1,635,143</b>	<b>13,031,123</b>	<b>2,630,456</b>	<b>888,853</b>	<b>1,675,133</b>	<b>19,860,708</b>	<b>8,022</b>	<b>906,224</b>	<b>249,215</b>	<b>1,845,746</b>
2018	1,604,223	13,844,970	2,907,437	874,374	1,645,927	20,876,931	7,686	900,240	247,841	1,832,879
2019	1,582,520	13,083,861	2,637,014	863,553	1,630,788	19,797,736	7,770	886,121	244,607	1,803,137
2020	1,598,345	13,214,699	2,663,384	872,189	1,647,096	19,995,713	7,847	894,982	247,053	1,821,168
2021	1,614,329	13,346,846	2,690,018	880,910	1,663,567	20,195,670	7,926	903,932	249,524	1,839,380
2022	1,630,472	13,480,315	2,716,918	889,720	1,680,202	20,397,627	8,005	912,971	252,019	1,857,774
2023	1,646,777	13,615,118	2,744,088	898,617	1,697,004	20,601,604	8,085	922,101	254,539	1,876,352
2024	1,663,245	13,751,269	2,771,528	907,603	1,713,974	20,807,619	8,166	931,322	257,084	1,895,115
2025	1,679,877	13,888,782	2,799,244	916,679	1,731,114	21,015,696	8,248	940,635	259,655	1,914,066
2026	1,696,676	14,027,670	2,827,236	925,846	1,748,425	21,225,853	8,330	950,041	262,252	1,933,207
2027	1,713,643	14,167,946	2,855,508	935,104	1,765,910	21,438,111	8,414	959,542	264,874	1,952,539
2028	1,730,779	14,309,626	2,884,064	944,455	1,783,569	21,652,493	8,498	969,137	267,523	1,972,064
2029	1,748,087	14,452,722	2,912,904	953,900	1,801,404	21,869,017	8,583	978,829	270,198	1,991,785
2030	1,765,568	14,597,249	2,942,033	963,439	1,819,418	22,087,707	8,668	988,617	272,900	2,011,703
2031	1,783,223	14,743,222	2,971,454	973,073	1,837,613	22,308,585	8,755	998,503	275,629	2,031,820
2032	1,801,056	14,890,654	3,001,168	982,804	1,855,989	22,531,671	8,843	1,008,488	278,386	2,052,138
2033	1,819,066	15,039,560	3,031,180	992,632	1,874,549	22,756,987	8,931	1,018,573	281,169	2,072,659
2034	1,837,257	15,189,956	3,061,492	1,002,558	1,893,294	22,984,557	9,020	1,028,759	283,981	2,093,386
2035	1,855,629	15,341,856	3,092,107	1,012,584	1,912,227	23,214,403	9,111	1,039,046	286,821	2,114,320
<b>TOTAL</b>	<b>57,613,411</b>	<b>491,608,686</b>	<b>97,740,084</b>	<b>35,661,171</b>	<b>75,408,238</b>	<b>758,031,590</b>	<b>3,616,739</b>	<b>40,077,752</b>	<b>23,354,523</b>	<b>68,953,026</b>

**TABLE B-11 Minimum OMP&R Costs of Each Aqueduct Reach to be Reimbursed through Minimum OMP&R Component of Transportation Charge (in dollars)**

Sheet 4 of 9

Calendar Year	CALIFORNIA AQUEDUCT (continued)									
	SOUTH SAN JOAQUIN DIVISION (continued)									
	Reach 11B	Reach 12D	Reach 12E	Reach 13B	Reach 14A	Reach 14B	Reach 14C	Reach 15A	Reach 16A	Subtotal
	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0
1969	59,077	0	0	0	0	0	0	0	0	385,659
1970	85,758	94,171	123,374	152,424	0	0	0	0	0	885,234
1971	80,282	95,075	91,389	167,142	691,791	151,979	111,623	529,723	10,291	2,400,543
1972	84,287	98,647	115,592	146,096	877,535	124,831	101,479	609,058	1,106,884	3,734,703
1973	92,257	74,238	114,843	221,385	961,855	120,106	99,429	692,748	1,243,941	4,142,935
1974	98,103	74,914	193,523	141,540	898,272	143,866	115,649	853,098	1,343,972	4,369,772
1975	124,105	61,799	117,194	108,154	1,156,757	180,614	119,889	988,045	1,537,862	5,090,233
1976	69,715	33,655	147,908	134,063	1,124,051	177,086	114,133	1,037,799	1,727,428	5,001,677
1977	108,644	91,547	175,039	137,975	1,397,006	203,837	119,467	1,339,196	1,961,081	6,065,390
1978	106,702	72,585	170,578	151,120	1,254,043	139,662	132,224	1,265,813	1,922,950	5,738,596
1979	85,942	56,331	174,147	150,029	1,490,461	201,935	260,981	1,216,126	1,798,566	5,960,033
1980	120,896	123,120	167,249	164,749	1,988,619	189,132	238,607	1,437,614	2,231,456	7,463,378
1981	76,965	33,322	113,202	171,669	1,741,488	163,934	161,182	1,799,832	2,762,773	7,646,858
1982	158,178	142,631	224,170	224,051	1,793,867	195,086	15,768	1,933,859	2,961,383	8,475,944
1983	136,350	124,724	203,733	217,324	2,421,794	199,708	181,879	2,550,842	4,302,165	11,303,322
1984	163,331	108,212	188,724	245,764	3,312,127	329,490	204,332	3,215,901	5,077,824	14,043,628
1985	198,368	154,995	194,327	360,308	3,463,178	237,127	180,068	3,427,049	5,683,454	14,964,899
1986	248,170	242,660	346,410	349,369	3,781,427	320,984	360,156	3,574,451	5,780,666	16,593,102
1987	334,059	325,697	469,378	322,824	3,731,912	463,757	238,813	4,080,465	5,636,043	17,063,245
1988	290,881	220,658	374,653	318,253	3,451,893	411,110	313,806	3,746,920	5,150,238	15,704,693
1989	268,025	207,487	595,433	380,883	3,512,884	333,996	220,978	3,751,081	5,458,633	16,336,263
1990	363,652	225,171	480,738	677,729	4,021,727	439,953	212,851	4,381,643	6,440,643	18,959,051
1991	328,683	269,873	371,312	433,313	4,309,082	424,704	273,169	4,566,702	5,805,189	18,565,503
1992	334,579	270,768	409,314	423,717	4,734,368	729,211	571,412	4,270,793	6,471,964	19,838,439
1993	413,722	278,375	496,851	594,201	5,182,830	664,063	423,780	5,266,124	7,583,165	23,092,943
1994	346,600	239,873	482,301	445,909	4,012,614	414,899	254,393	3,727,019	7,142,378	19,069,838
1995	405,045	242,253	622,654	507,102	4,607,154	309,283	315,905	3,973,757	6,540,575	19,680,665
1996	367,570	238,622	519,560	604,736	4,892,967	214,773	187,784	4,331,630	7,065,052	20,408,184
1997	309,696	254,080	516,115	429,771	5,094,202	261,221	275,610	4,011,366	7,387,904	21,710,020
1998	295,927	170,556	384,226	484,072	4,752,549	309,440	248,178	4,694,822	7,530,927	20,885,077
1999	395,036	195,417	423,158	542,097	5,103,420	342,515	221,942	4,894,215	8,835,442	23,089,410
2000	404,362	327,150	648,418	562,412	5,945,146	344,498	142,466	5,359,955	12,461,593	28,192,658
2001	416,395	897,047	522,093	661,972	4,692,342	(139,041)	(98,322)	6,011,908	15,791,557	30,846,252
2002	380,417	296,724	958,343	860,305	5,941,368	31,540	251,192	5,589,160	11,451,910	28,269,664
2003	340,029	236,373	691,470	614,014	6,164,414	(137,592)	18,098	6,989,790	11,502,383	28,623,409
2004	245,166	176,282	624,735	585,768	7,239,478	(138,773)	(165,021)	8,910,178	14,633,593	33,559,826
2005	211,328	118,730	849,764	466,735	6,234,813	(183,109)	(192,435)	5,882,666	13,847,844	28,863,166
2006	188,866	52,813	762,428	499,485	5,083,876	(181,776)	(182,478)	8,375,589	13,735,578	30,181,999
2007	258,809	292,673	551,452	551,241	6,675,167	(434,035)	(342,673)	10,901,936	8,478,396	29,199,239
2008	426,215	237,474	422,241	719,977	11,073,392	(266,060)	(206,483)	13,007,213	10,907,808	38,447,745
2009	410,501	210,761	617,913	547,520	7,830,639	581,148	(49,310)	8,769,515	13,408,814	34,526,793
2010	447,372	114,405	424,310	704,712	7,799,349	(173,823)	(67,392)	6,623,155	9,524,487	27,484,968
2011	623,899	313,489	875,232	1,586,259	8,809,103	(231,506)	(41,917)	6,239,408	15,913,157	36,662,518
2012	793,290	280,317	1,047,947	3,225,501	11,205,763	394,747	450,640	8,830,991	12,805,126	41,352,406
2013	488,570	459,096	908,878	835,436	11,814,134	279,726	167,099	9,575,603	14,554,021	41,384,028
2014	114,415	75,228	565,140	336,771	15,188,195	208,189	330,856	10,418,109	16,031,466	46,658,246
2015	688,341	296,151	641,512	859,451	11,133,640	119,822	218,661	11,945,683	16,392,990	44,579,392
2016	374,197	149,056	571,929	538,637	14,105,103	254,358	381,822	9,905,215	12,398,885	41,418,878
2017	408,959	159,814	626,765	590,364	15,989,459	276,070	415,050	12,107,122	13,767,055	47,349,865
2018	408,411	160,495	625,264	586,516	14,871,228	274,403	418,217	11,625,419	14,947,487	46,906,086
2019	401,161	158,019	614,066	577,558	15,138,483	270,960	409,080	11,324,711	13,841,520	45,677,193
2020	405,172	159,600	620,207	583,333	15,289,867	273,670	413,171	11,437,958	13,979,936	46,133,964
2021	409,224	161,196	626,409	589,166	15,442,766	276,406	417,302	11,552,338	14,119,735	46,595,304
2022	413,316	162,807	632,673	595,058	15,597,194	279,170	421,475	11,667,861	14,260,932	47,061,255
2023	417,450	164,436	639,000	601,009	15,753,166	281,962	425,690	11,784,540	14,403,542	47,531,872
2024	421,624	166,080	645,390	607,019	15,910,697	284,782	429,947	11,902,385	14,547,577	48,007,188
2025	425,840	167,741	651,844	613,089	16,069,804	287,630	434,247	12,021,409	14,693,053	48,487,261
2026	430,099	169,418	658,362	619,220	16,230,502	290,506	438,589	12,141,623	14,839,983	48,972,132
2027	434,400	171,112	664,946	625,412	16,392,807	293,411	442,975	12,263,039	14,988,383	49,461,854
2028	438,744	172,823	671,595	631,666	16,556,735	296,345	447,405	12,385,670	15,138,267	49,956,472
2029	443,131	174,552	678,311	637,983	16,722,303	299,308	451,879	12,509,526	15,289,650	50,456,038
2030	447,562	176,297	685,094	644,363	16,889,526	302,301	456,398	12,634,622	15,442,546	50,960,597
2031	452,038	178,060	691,945	650,806	17,058,421	305,325	460,962	12,760,968	15,596,972	51,470,204
2032	456,558	179,841	698,865	657,314	17,229,005	308,378	465,571	12,888,577	15,752,941	51,984,905
2033	461,124	181,639	705,853	663,888	17,401,295	311,462	470,227	13,017,463	15,910,471	52,504,754
2034	465,735	183,456	712,912	670,526	17,575,308	314,576	474,929	13,147,638	16,069,576	53,029,802
2035	470,393	185,290	720,041	677,232	17,751,061	317,722	479,678	13,279,114	16,230,271	53,560,100
TOTAL	21,573,719	12,587,901	33,260,440	35,385,486	542,567,425	14,271,002	15,263,082	457,955,749	636,160,355	1,905,027,200

**TABLE B-11 Minimum OMP&R Costs of Each Aqueduct Reach to be Reimbursed through Minimum OMP&R Component of Transportation Charge (in dollars)**

Sheet 5 of 9

Calendar Year	CALIFORNIA AQUEDUCT (continued)								
	TEHACHAPI DIVISION			MOJAVE DIVISION					
	Reach 17E	Reach 17F	Subtotal	Reach 18A	Reach 19	Reach 20A	Reach 20B	Reach 21	Reach 22A
	[40]	[41]	[42]	[43]	[44]	[45]	[46]	[47]	[48]
1961	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0
1971	3,471	0	3,471	0	0	0	0	0	0
1972	1,424,782	28,127	1,452,909	36,699	135,675	130,711	120,271	75,768	80,436
1973	1,777,260	49,949	1,827,209	36,207	146,739	161,838	148,631	60,641	66,539
1974	2,298,091	16,259	2,314,350	30,525	90,404	115,571	88,200	65,007	77,667
1975	2,403,430	35,193	2,438,623	40,588	122,584	137,684	118,898	135,462	77,825
1976	2,776,194	126,653	2,902,847	118,610	201,215	182,927	151,555	106,314	131,007
1977	3,845,464	83,936	3,929,400	93,565	226,906	180,884	112,589	98,577	86,279
1978	2,954,313	42,637	2,996,950	91,815	200,759	215,673	120,584	109,271	71,763
1979	3,539,402	45,997	3,585,399	99,670	307,386	261,205	194,104	203,078	121,586
1980	4,749,245	54,806	4,804,051	116,487	446,175	290,719	237,250	156,794	117,274
1981	5,485,957	64,886	5,550,843	316,590	585,003	325,112	292,081	181,062	119,602
1982	6,349,080	55,997	6,405,077	447,739	638,615	275,763	330,502	186,109	125,429
1983	14,153,033	96,397	14,249,430	345,229	564,698	368,139	326,767	219,943	140,523
1984	18,448,383	77,201	18,525,584	267,497	563,588	413,443	329,933	266,919	146,866
1985	18,134,698	137,928	18,272,626	298,932	475,028	450,444	388,327	799,514	125,780
1986	19,297,129	109,938	19,407,067	703,413	350,906	347,690	315,566	242,158	178,847
1987	17,398,908	98,355	17,497,263	1,261,056	558,996	818,475	357,971	298,190	236,263
1988	17,697,838	138,405	17,836,243	1,242,139	560,911	585,014	400,005	331,099	149,876
1989	17,641,151	88,488	17,729,639	1,049,615	283,065	366,590	345,614	194,047	138,825
1990	19,995,760	99,868	20,095,628	1,298,537	229,083	469,502	202,412	273,748	49,174
1991	19,903,346	131,558	20,034,904	1,432,360	665,443	1,025,089	516,257	478,555	231,223
1992	18,194,788	279,610	18,474,398	1,167,898	738,238	666,181	696,623	585,072	168,251
1993	19,051,939	199,640	19,251,579	1,868,745	606,763	1,232,409	818,675	509,309	207,818
1994	17,354,702	204,963	17,559,665	1,699,479	763,493	1,145,700	957,350	873,215	241,679
1995	19,360,033	191,516	19,551,549	1,284,146	614,314	1,941,939	2,411,412	355,198	179,930
1996	19,041,451	237,846	19,279,297	1,163,708	576,674	1,335,804	1,713,145	790,618	136,397
1997	19,724,881	176,120	19,901,001	1,330,450	730,628	1,401,562	2,043,179	640,177	189,241
1998	23,227,152	182,754	23,409,906	1,513,656	309,052	7,568,901	508,030	297,621	115,100
1999	19,935,886	160,568	20,096,454	3,153,935	732,113	5,398,788	1,667,027	1,395,062	188,629
2000	23,226,081	243,938	23,470,019	1,868,145	727,509	1,371,226	1,426,706	967,602	162,166
2001	24,048,075	618,800	24,666,875	2,441,832	2,559,238	1,850,191	1,534,046	1,075,394	479,665
2002	20,727,872	472,355	21,200,227	1,398,680	800,777	757,179	584,201	1,156,428	282,340
2003	20,832,780	283,162	21,115,942	3,732,995	677,629	710,160	624,723	469,296	279,974
2004	26,586,558	245,747	26,832,306	1,821,260	1,373,456	1,320,755	1,043,387	1,053,643	412,752
2005	16,373,205	1,498,514	17,871,718	2,840,486	1,501,877	1,540,619	879,549	677,058	353,179
2006	14,670,515	266,057	14,936,572	4,449,702	1,303,886	1,193,604	2,914,336	958,902	754,968
2007	15,871,071	347,913	16,218,984	5,893,334	1,629,072	1,794,553	1,821,245	829,221	654,462
2008	23,109,411	319,178	23,428,589	2,246,772	1,362,637	1,251,216	824,345	497,380	704,285
2009	23,067,138	155,874	23,223,012	2,530,319	1,537,178	1,338,895	1,165,997	776,728	537,958
2010	14,067,369	265,687	14,333,057	3,393,552	1,619,063	2,625,090	1,740,261	792,598	701,196
2011	18,685,334	142,015	18,827,348	2,549,346	1,775,618	2,319,037	2,218,994	625,535	580,615
2012	21,008,891	220,193	21,229,084	5,054,306	1,462,607	1,601,347	2,700,410	1,804,711	652,283
2013	33,828,004	265,732	34,093,736	5,868,227	1,678,553	1,304,759	3,052,637	1,415,631	532,979
2014	38,296,710	224,743	38,521,453	4,001,952	2,661,670	1,379,980	2,971,265	630,562	764,712
2015	27,088,951	146,355	27,235,307	4,684,007	2,079,809	2,850,085	865,084	2,594,986	1,107,739
2016	30,834,000	205,974	31,039,974	4,836,958	2,668,672	2,348,147	1,168,168	1,077,924	659,698
2017	<b>33,129,641</b>	<b>214,074</b>	<b>33,343,715</b>	<b>5,034,328</b>	<b>2,733,060</b>	<b>2,406,053</b>	<b>1,182,929</b>	<b>1,097,364</b>	<b>664,663</b>
2018	31,305,908	2,271,125	33,577,033	5,146,068	2,688,430	2,362,006	1,170,629	1,077,279	653,903
2019	32,074,081	906,028	32,980,109	5,055,843	2,723,688	2,395,790	1,185,648	1,095,031	666,015
2020	32,394,822	915,088	33,309,910	5,106,401	2,750,925	2,419,747	1,197,504	1,105,981	672,676
2021	32,718,770	924,239	33,643,009	5,157,465	2,778,434	2,443,945	1,209,479	1,117,041	679,402
2022	33,045,958	933,482	33,979,440	5,209,040	2,806,218	2,468,384	1,221,574	1,128,211	686,196
2023	33,376,418	942,816	34,319,234	5,261,130	2,834,281	2,493,068	1,233,790	1,139,493	693,058
2024	33,710,182	952,245	34,662,427	5,313,741	2,862,623	2,517,999	1,246,128	1,150,888	699,989
2025	34,047,284	961,767	35,009,051	5,366,879	2,891,250	2,543,179	1,258,589	1,162,397	706,989
2026	34,387,757	971,385	35,359,142	5,420,548	2,920,162	2,568,611	1,271,175	1,174,021	714,059
2027	34,731,634	981,099	35,712,733	5,474,753	2,949,364	2,594,297	1,283,886	1,185,761	721,199
2028	35,078,950	990,909	36,069,859	5,529,501	2,978,857	2,620,240	1,296,725	1,197,619	728,411
2029	35,429,740	1,000,819	36,430,559	5,584,796	3,008,646	2,646,442	1,309,693	1,209,595	735,695
2030	35,784,037	1,010,827	36,794,864	5,640,644	3,038,732	2,672,907	1,322,789	1,221,691	743,052
2031	36,141,878	1,020,935	37,162,813	5,697,050	3,069,120	2,699,636	1,336,017	1,233,908	750,483
2032	36,503,297	1,031,144	37,534,441	5,754,020	3,099,811	2,726,632	1,349,378	1,246,247	757,988
2033	36,868,330	1,041,456	37,909,786	5,811,561	3,130,809	2,753,898	1,362,871	1,258,710	765,568
2034	37,237,013	1,051,870	38,288,883	5,869,676	3,162,117	2,781,437	1,376,500	1,271,297	773,223
2035	37,609,383	1,062,389	38,671,772	5,928,373	3,193,738	2,809,252	1,390,265	1,284,010	780,956
<b>TOTAL</b>	<b>1,404,064,815</b>	<b>28,321,529</b>	<b>1,432,386,343</b>	<b>185,482,981</b>	<b>95,463,973</b>	<b>104,294,125</b>	<b>67,653,882</b>	<b>49,688,848</b>	<b>27,114,325</b>

**TABLE B-11 Minimum OMP&R Costs of Each Aqueduct Reach to be Reimbursed through Minimum OMP&R Component of Transportation Charge (in dollars)**

Sheet 6 of 9

Calendar Year	CALIFORNIA AQUEDUCT (continued)										
	MOJAVE DIVISION (continued)					SANTA ANA DIVISION					
	Reach 22B	Reach 23	Reach 24	Subtotal		Reach 25	Reach 26A	Reach 28G	Reach 28H	Reach 28J	Subtotal
	[49]	[50]	[51]	[52]		[53]	[54]	[55]	[56]	[57]	[58]
1961	0	0	0	0		0	0	0	0	0	0
1962	0	0	0	0		0	0	0	0	0	0
1963	0	0	0	0		0	0	0	0	0	0
1964	0	0	0	0		0	0	0	0	0	0
1965	0	0	0	0		0	0	0	0	0	0
1966	0	0	0	0		0	0	0	0	0	0
1967	0	0	0	0		0	0	0	0	0	0
1968	0	0	0	0		0	0	0	0	0	0
1969	0	0	0	0		0	0	0	0	0	0
1970	0	0	0	0		0	0	0	0	0	0
1971	0	0	0	0		0	0	0	0	0	0
1972	1,036,831	51,520	362,153	2,030,064		26	578	109	30	0	743
1973	1,283,816	65,475	353,262	2,323,148		20,541	679,328	136,352	79	0	836,300
1974	1,477,946	96,340	334,302	2,375,962		24,380	799,400	155,262	34,693	854,637	1,868,372
1975	1,630,554	111,141	419,450	2,794,186		29,337	885,021	110,729	69,082	723,814	1,817,983
1976	1,598,071	107,787	304,638	2,902,124		51,356	1,103,139	138,575	100,400	635,853	2,029,323
1977	1,882,080	71,228	48,359	2,800,647		62,584	1,412,740	127,543	92,647	825,880	2,521,394
1978	2,211,965	72,179	637,401	3,731,410		67,186	1,159,950	166,919	68,363	835,082	2,297,500
1979	2,104,832	76,960	202,566	3,571,387		84,462	1,235,189	142,586	92,812	265,525	1,820,574
1980	2,670,387	147,009	688,605	4,870,700		72,651	1,532,535	158,340	129,897	1,120,131	3,013,554
1981	3,030,407	134,895	47,750	5,032,502		35,662	1,575,444	160,053	111,722	333,550	2,216,431
1982	3,248,883	299,712	623,755	6,176,507		26,852	1,822,250	205,350	135,463	1,518,759	3,708,674
1983	3,899,769	223,626	384,292	6,472,986		19,017	1,663,599	244,720	124,651	412,806	2,464,793
1984	4,783,997	59,337	1,104,149	7,935,729		11,319	2,325,661	240,496	190,924	769,068	3,537,468
1985	5,330,501	261,135	811,346	8,941,007		17,764	2,707,662	451,600	182,242	871,492	4,230,760
1986	6,190,812	156,053	515,945	9,001,390		31,012	2,768,728	439,048	256,526	982,332	4,477,646
1987	5,731,239	151,796	732,607	10,146,593		19,362	2,847,390	278,094	218,717	1,118,529	4,482,092
1988	6,910,472	253,833	970,052	11,403,401		36,576	3,087,873	271,868	200,811	1,176,659	4,773,787
1989	5,963,386	349,544	1,242,144	9,932,830		30,881	3,190,809	230,953	281,861	1,130,035	4,864,539
1990	6,905,442	436,785	1,891,053	11,755,736		25,518	3,330,913	437,812	308,144	1,538,449	5,640,836
1991	7,488,366	263,723	1,561,051	13,662,067		32,172	3,847,589	843,388	632,912	1,630,321	6,986,382
1992	7,076,997	317,042	622,116	12,038,418		55,819	4,043,878	281,864	5,636,464	1,102,519	11,120,544
1993	7,765,751	359,632	1,708,915	15,078,017		72,464	5,638,325	382,195	570,563	994,721	7,658,268
1994	7,691,548	1,220,795	1,245,936	15,839,195		105,373	5,139,991	617,136	415,603	1,022,412	7,300,515
1995	6,994,639	842,041	746,371	15,369,990		96,781	4,357,648	1,308,828	704,154	894,338	7,361,749
1996	8,590,347	889,842	(78,782)	15,117,753		156,395	4,051,744	1,001,063	1,041,697	1,316,493	7,567,392
1997	8,138,580	1,586,227	3,355,446	19,415,490		177,217	4,585,198	493,841	949,188	953,590	7,159,034
1998	8,887,728	1,924,868	1,134,837	22,259,793		142,703	4,856,225	379,997	991,426	(67,444)	6,302,907
1999	9,516,356	2,034,226	1,222,891	25,309,026		190,302	6,039,135	503,433	1,970,921	1,084,943	9,788,735
2000	9,556,103	1,711,058	1,516,573	19,307,088		353,556	4,201,190	842,570	1,003,213	1,120,734	7,521,262
2001	7,652,968	1,891,843	12,799	19,497,975		296,461	2,417,502	1,667,660	810,577	5,739,153	10,931,354
2002	11,246,808	1,693,570	934,841	18,854,823		509,111	3,398,149	1,250,266	422,611	2,236,460	7,816,597
2003	13,351,358	2,095,918	(453,629)	21,488,425		368,521	3,728,906	545,107	375,520	1,281,666	6,299,722
2004	10,504,893	2,128,188	1,088,145	20,746,480		427,774	5,436,548	1,238,040	439,722	3,569,898	11,111,982
2005	7,608,361	2,414,926	2,241,009	20,057,064		452,675	5,608,440	1,518,256	683,607	(1,905,129)	6,357,849
2006	10,098,886	1,919,091	568,759	24,162,134		293,908	5,197,631	634,186	316,935	5,184,271	11,626,932
2007	10,008,621	2,951,769	651,749	26,234,026		229,797	8,066,110	822,916	704,840	3,274,316	13,097,980
2008	14,593,176	2,387,828	994,755	24,862,395		307,325	6,579,986	801,539	772,346	4,546,566	13,007,763
2009	12,215,276	3,461,716	1,505,075	25,069,142		504,670	7,181,446	623,720	672,441	2,745,997	11,728,274
2010	12,778,606	3,245,549	2,773,872	29,669,788		610,161	6,555,228	475,716	424,243	3,582,180	11,647,528
2011	13,501,681	4,111,682	3,061,369	30,743,878		435,864	5,580,016	878,382	567,478	4,853,781	12,315,520
2012	13,565,808	2,841,988	4,693,221	34,376,682		245,876	6,395,064	1,704,208	545,922	3,968,805	12,859,875
2013	14,711,098	3,546,462	3,640,725	35,751,072		444,336	7,997,122	850,408	723,742	2,262,056	12,277,664
2014	18,266,063	4,407,799	2,923,227	38,007,231		321,796	9,265,546	1,195,014	337,187	9,656,256	20,775,799
2015	19,470,668	4,574,534	2,788,399	41,015,311		179,011	12,000,606	829,035	500,506	2,185,546	15,694,705
2016	20,250,606	5,018,044	5,000,473	43,028,690		257,560	10,805,264	1,051,274	435,754	3,179,339	15,729,191
2017	<b>23,685,221</b>	<b>5,213,511</b>	<b>4,171,880</b>	<b>46,189,009</b>		<b>639,846</b>	<b>12,255,029</b>	<b>1,207,113</b>	<b>493,890</b>	<b>5,152,073</b>	<b>19,747,951</b>
2018	21,849,024	5,203,282	4,850,130	45,000,751		1,082,537	12,189,352	1,176,700	483,869	10,242,983	25,175,441
2019	22,147,567	5,196,395	4,720,903	45,186,880		666,581	11,867,380	1,156,479	475,883	6,253,380	20,419,703
2020	22,369,042	5,248,359	4,768,112	45,638,747		673,247	11,986,054	1,168,044	480,642	6,315,913	20,623,900
2021	22,592,733	5,300,842	4,815,793	46,095,134		679,979	12,105,915	1,179,724	485,448	6,379,073	20,830,139
2022	22,818,660	5,353,851	4,863,951	46,556,085		686,779	12,226,974	1,191,522	490,303	6,442,863	21,038,441
2023	23,046,847	5,407,389	4,912,590	47,021,646		693,647	12,349,243	1,203,437	495,206	6,507,292	21,248,825
2024	23,277,315	5,461,463	4,961,716	47,491,862		700,583	12,472,736	1,215,471	500,158	6,572,365	21,461,313
2025	23,510,088	5,516,078	5,011,333	47,966,782		707,589	12,597,463	1,227,626	505,159	6,638,089	21,675,926
2026	23,745,189	5,571,239	5,061,447	48,446,451		714,665	12,723,438	1,239,902	510,211	6,704,469	21,892,685
2027	23,982,641	5,626,951	5,112,061	48,930,913		721,812	12,850,672	1,252,301	515,313	6,771,514	22,111,612
2028	24,222,468	5,683,221	5,163,182	49,420,224		729,030	12,979,179	1,264,824	520,466	6,839,229	22,332,728
2029	24,464,692	5,740,053	5,214,814	49,914,426		736,320	13,108,971	1,277,473	525,671	6,907,622	22,556,057
2030	24,709,339	5,797,453	5,266,962	50,413,569		743,683	13,240,061	1,290,247	530,928	6,976,698	22,781,617
2031	24,956,433	5,855,428	5,319,631	50,917,706		751,120	13,372,461	1,303,150	536,237	7,046,465	23,009,433
2032	25,205,997	5,913,982	5,372,828	51,426,883		758,631	13,506,186	1,316,181	541,599	7,116,929	23,239,526
2033	25,458,057	5,973,122	5,426,556	51,941,152		766,218	13,641,248	1,329,343	547,015	7,188,099	23,471,923
2034	25,712,637	6,032,853	5,480,821	52,460,561		773,880	13,777,660	1,342,636	552,485	7,259,980	23,706,641
2035	25,969,764	6,093,182	5,535,630	52,985,170		781,619	13,915,437	1,356,063	558,010	7,332,579	23,943,708
<b>TOTAL</b>	<b>813,146,397</b>	<b>169,155,370</b>	<b>153,164,312</b>	<b>1,665,164,213</b>		<b>21,941,881</b>	<b>430,268,154</b>	<b>50,534,687</b>	<b>34,997,130</b>	<b>212,174,006</b>	<b>749,915,859</b>



**TABLE B-11 Minimum OMP&R Costs of Each Aqueduct Reach to be Reimbursed through Minimum OMP&R Component of Transportation Charge (in dollars)**

Sheet 7 of 9

Calendar Year	CALIFORNIA AQUEDUCT (continued)									
	SANTA ANA DIVISION - EAST BRANCH EXTENSION									
	Reach 1	Reach 2A	Reach 2B	Reach 2C	Reach 2D	Reach 3A	Reach 3B	Reach 4A	Reach 4B	Subtotal
	[59]	[60]	[61]	[62]	[63]	[64]	[65]	[66]	[67]	[68]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0	0	0
2003	1,022	84,351	375,153	2,329	0	627,038	360	93,305	33,614	1,217,171
2004	10,740	40,841	509,089	2,340	0	276,019	337	13,434	71,444	924,242
2005	9,849	15,079	526,273	4,153	0	496,547	9,036	27,330	216,418	1,304,685
2006	10,208	10,233	535,408	9,252	57,222	398,825	1,267	14,835	70,564	1,107,813
2007	27,119	9,819	657,783	5,082	124,796	616,238	58,536	39,166	138,296	1,676,836
2008	76,886	34,526	847,770	1,323	208,729	1,316,836	92,649	76,305	230,399	2,885,423
2009	79,262	17,694	995,567	911	220,884	1,004,939	24,654	139,677	229,081	2,712,670
2010	53,803	3,532	812,550	15,916	256,844	1,263,890	9,501	165,322	356,984	2,938,342
2011	21,463	5,389	701,037	4,454	111,270	1,082,991	11,005	75,379	543,209	2,556,199
2012	5,714	15,628	750,672	15,710	167,228	1,591,638	26,683	18,408	198,024	2,789,705
2013	1,099	6,045	597,222	183,482	221,805	1,498,333	4,349	6,272	178,225	2,696,832
2014	8,302	9,525	802,623	105,209	149,466	1,825,021	3,996	2,447	326,592	3,233,181
2015	(140)	7,978	826,907	11,362	79,024	1,485,418	106,157	19,865	379,551	2,916,122
2016	4,281	7,921	572,391	59,259	159,773	1,712,220	53,936	11,272	475,688	3,056,741
2017	<b>6,044</b>	<b>9,264</b>	<b>1,119,425</b>	<b>83,575</b>	<b>175,960</b>	<b>2,514,708</b>	<b>79,694</b>	<b>15,890</b>	<b>616,004</b>	<b>4,620,564</b>
2018	5,402	9,395	800,458	74,736	160,201	2,095,036	70,794	14,206	574,233	3,804,461
2019	5,295	8,949	839,065	73,248	166,964	2,128,394	68,823	13,927	560,861	3,865,526
2020	5,348	9,038	847,456	73,981	168,634	2,149,678	69,511	14,067	566,470	3,904,183
2021	5,401	9,129	855,931	74,721	170,320	2,171,175	70,206	14,207	572,135	3,943,225
2022	5,455	9,220	864,490	75,468	172,024	2,192,887	70,908	14,349	577,856	3,982,657
2023	5,510	9,312	873,135	76,222	173,744	2,214,816	71,617	14,493	583,635	4,022,484
2024	5,565	9,405	881,866	76,985	175,481	2,236,964	72,333	14,638	589,471	4,062,708
2025	5,621	9,499	890,685	77,754	177,236	2,259,333	73,057	14,784	595,366	4,103,335
2026	5,677	9,594	899,592	78,532	179,009	2,281,927	73,787	14,932	601,319	4,144,369
2027	5,733	9,690	908,588	79,317	180,799	2,304,746	74,525	15,081	607,333	4,185,812
2028	5,791	9,787	917,673	80,111	182,607	2,327,793	75,270	15,232	613,406	4,227,670
2029	5,849	9,885	926,850	80,912	184,433	2,351,071	76,023	15,384	619,540	4,269,947
2030	5,907	9,984	936,119	81,721	186,277	2,374,582	76,783	15,538	625,735	4,312,646
2031	5,966	10,084	945,480	82,538	188,140	2,398,328	77,551	15,694	631,993	4,355,774
2032	6,026	10,185	954,935	83,363	190,021	2,422,311	78,327	15,851	638,313	4,399,332
2033	6,086	10,286	964,484	84,197	191,921	2,446,534	79,110	16,009	644,696	4,443,323
2034	6,147	10,389	974,129	85,039	193,841	2,471,000	79,901	16,169	651,143	4,487,758
2035	6,209	10,493	983,870	85,889	195,779	2,495,710	80,700	16,331	657,654	4,532,635
<b>TOTAL</b>	<b>418,640</b>	<b>452,148</b>	<b>26,894,676</b>	<b>1,929,091</b>	<b>5,170,432</b>	<b>59,032,947</b>	<b>1,821,385</b>	<b>989,798</b>	<b>14,975,252</b>	<b>111,684,370</b>

**TABLE B-11 Minimum OMP&R Costs of Each Aqueduct Reach to be Reimbursed through Minimum OMP&R Component of Transportation Charge (in dollars)**

Sheet 8 of 9

Calendar Year	CALIFORNIA AQUEDUCT (continued)						
	WEST BRANCH						
	Reach 29A	Reach 29F	Reach 29G	Reach 29H	Reach 29J	Reach 30	Subtotal
	[69]	[70]	[71]	[72]	[73]	[74]	[75]
1961	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0
1972	719,255	159,249	199,145	234,196	88,198	420,789	1,820,832
1973	779,949	339,363	122,664	264,850	119,743	621,431	2,248,000
1974	883,312	158,366	112,458	350,160	(4,525)	723,949	2,223,720
1975	1,049,990	176,676	194,724	801,457	75,870	841,991	3,140,708
1976	1,220,429	215,588	202,591	624,614	98,268	(650,944)	1,710,546
1977	1,268,813	116,939	218,129	684,679	184	634,581	2,923,325
1978	1,174,708	342,479	267,308	415,641	17,764	3,088,954	5,306,854
1979	1,366,942	285,575	284,188	972,584	29,850	958,068	3,897,207
1980	1,698,215	224,472	455,619	874,259	288,303	222,549	3,763,417
1981	1,783,405	123,264	615,047	2,305,110	8,794	1,093,897	5,929,517
1982	1,919,979	190,500	702,265	2,208,264	414,230	978,624	6,413,862
1983	2,739,814	149,333	888,475	745,939	579,882	3,698,681	8,802,124
1984	3,463,038	81,260	2,358,495	537,207	719,282	755,136	7,914,418
1985	3,866,946	295,836	3,047,591	975,729	614,735	1,753,355	10,554,192
1986	3,791,427	457,604	2,893,171	1,480,015	1,032,216	1,338,657	10,993,090
1987	3,423,494	213,106	2,933,342	944,604	459,398	1,406,519	9,380,463
1988	3,447,403	255,113	3,017,463	883,714	446,468	1,452,589	9,502,750
1989	4,025,641	405,583	2,738,143	1,398,165	865,738	1,505,029	10,938,299
1990	4,088,481	383,655	3,232,445	3,153,869	777,713	847,500	12,483,663
1991	3,862,056	304,143	3,550,063	639,527	763,037	1,191,090	10,309,916
1992	4,286,050	327,802	3,892,480	1,014,551	872,953	2,259,032	12,652,868
1993	3,969,075	343,304	4,515,385	1,670,952	852,208	1,157,876	12,508,800
1994	3,649,861	293,376	3,359,381	1,879,417	872,624	1,674,576	11,729,235
1995	4,137,046	883,315	4,750,275	1,588,080	754,904	(421,879)	11,691,741
1996	4,511,858	966,044	3,593,671	4,208,195	877,111	1,574,098	15,730,977
1997	4,543,506	1,030,809	2,429,066	3,755,901	1,597,361	1,521,491	14,878,134
1998	4,871,761	464,376	3,473,405	2,398,630	1,996,114	1,291,185	14,495,471
1999	4,859,457	4,249,651	4,989,423	1,764,943	1,005,565	1,911,025	18,780,064
2000	5,444,691	774,398	4,265,267	2,284,579	170,222	1,536,126	14,475,283
2001	5,907,227	1,543,146	5,135,332	4,420,653	240,595	(980,772)	16,266,181
2002	5,322,904	1,489,898	4,065,555	4,477,490	(53,068)	3,471,144	18,773,924
2003	4,454,348	1,314,746	3,721,548	3,350,981	(628,046)	951,438	13,165,016
2004	8,912,025	1,374,456	3,481,196	5,116,356	(616,073)	1,506,926	19,774,885
2005	5,758,956	2,597,096	7,383,506	(596,347)	2,649,206	(1,245,748)	16,546,669
2006	6,911,944	2,288,053	5,092,673	3,553,035	(573,856)	(4,269,390)	13,002,460
2007	5,696,261	2,717,724	10,411,695	7,817,696	358,723	12,030,517	39,032,616
2008	8,251,259	826,055	16,167,768	7,403,865	(108,940)	423,365	32,963,372
2009	7,845,579	885,234	8,628,704	5,631,532	242,713	2,819,511	26,053,273
2010	10,044,990	794,487	8,884,396	6,261,330	434,116	5,354,068	31,773,387
2011	6,957,766	937,807	9,611,877	8,050,024	49,269	(254,496)	25,352,248
2012	7,469,442	2,896,857	9,420,124	6,177,066	109,979	6,527,159	32,600,628
2013	8,908,504	3,791,701	12,367,640	7,266,853	406,492	3,722,179	36,463,369
2014	10,960,305	3,105,173	7,417,392	7,330,754	402,036	5,457,532	34,673,193
2015	9,389,581	3,629,618	7,617,836	8,728,237	299,124	6,391,330	36,055,726
2016	10,649,346	1,895,719	7,304,887	6,884,574	665,334	20,974,332	48,374,192
2017	<b>11,876,289</b>	<b>2,505,391</b>	<b>8,186,404</b>	<b>8,075,808</b>	<b>1,253,010</b>	<b>20,467,653</b>	<b>52,364,555</b>
2018	14,541,621	2,537,998	8,277,639	7,785,870	748,013	10,080,445	43,971,586
2019	12,479,309	2,336,166	8,002,207	7,657,905	897,674	17,345,885	48,719,146
2020	12,604,103	2,359,528	8,082,229	7,734,484	906,650	17,519,344	49,206,338
2021	12,730,144	2,383,123	8,163,051	7,811,829	915,717	17,694,537	49,698,401
2022	12,857,445	2,406,954	8,244,682	7,889,947	924,874	17,871,483	50,195,385
2023	12,986,019	2,431,024	8,327,128	7,968,846	934,123	18,050,197	50,697,337
2024	13,115,880	2,455,334	8,410,400	8,048,535	943,464	18,230,699	51,204,312
2025	13,247,038	2,479,887	8,494,504	8,129,020	952,899	18,413,006	51,716,354
2026	13,379,509	2,504,686	8,579,449	8,210,310	962,428	18,597,136	52,233,518
2027	13,513,304	2,529,733	8,665,243	8,292,413	972,052	18,783,108	52,755,853
2028	13,648,437	2,555,031	8,751,896	8,375,338	981,772	18,970,939	53,283,413
2029	13,784,921	2,580,581	8,839,415	8,459,091	991,590	19,160,648	53,816,246
2030	13,922,771	2,606,387	8,927,809	8,543,682	1,001,506	19,352,255	54,354,410
2031	14,061,998	2,632,450	9,017,087	8,629,119	1,011,521	19,545,777	54,897,952
2032	14,202,618	2,658,775	9,107,258	8,715,410	1,021,636	19,741,235	55,446,932
2033	14,344,644	2,685,363	9,198,330	8,802,564	1,031,853	19,938,647	56,001,401
2034	14,488,091	2,712,216	9,290,314	8,890,590	1,042,171	20,138,034	56,561,416
2035	14,632,972	2,739,339	9,383,217	8,979,495	1,052,593	20,339,414	57,127,030
<b>TOTAL</b>	<b>466,704,151</b>	<b>94,398,916</b>	<b>353,962,071</b>	<b>289,934,187</b>	<b>38,817,361</b>	<b>448,505,513</b>	<b>1,692,322,199</b>

**TABLE B-11 Minimum OMP&R Costs of Each Aqueduct Reach to be Reimbursed through Minimum OMP&R Component of Transportation Charge (in dollars)**

Sheet 9 of 9

Calendar Year	CALIFORNIA AQUEDUCT (continued)							GRAND TOTAL
	COASTAL BRANCH						Total	
	Reach 31A*	Reach 33A	Reach 33B	Reach 34	Reach 35	Subtotal		
	[76]	[77]	[78]	[79]	[80]	[81]	[82]	[83]
1961	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	42,918
1963	0	0	0	0	0	0	0	168,358
1964	0	0	0	0	0	0	0	184,729
1965	0	0	0	0	0	0	0	378,874
1966	0	0	0	0	0	0	0	408,397
1967	0	0	0	0	0	0	0	634,505
1968	0	0	0	0	0	0	2,160,548	2,745,160
1969	509,728	0	0	0	0	509,728	3,324,718	4,074,939
1970	609,988	0	0	0	0	609,988	3,983,062	4,676,282
1971	699,052	0	0	0	0	699,052	5,614,013	6,185,714
1972	697,576	0	0	0	0	697,576	12,353,356	12,998,869
1973	641,626	0	0	0	0	641,626	14,590,688	15,194,233
1974	669,279	0	0	0	0	669,279	16,598,762	17,372,561
1975	806,429	0	0	0	0	806,429	19,569,999	20,517,423
1976	840,927	0	0	0	0	840,927	19,002,859	20,027,213
1977	872,169	0	0	0	0	872,169	23,267,885	24,213,489
1978	934,119	0	0	0	0	934,119	24,818,739	26,012,786
1979	871,688	0	0	0	0	871,688	23,421,881	24,675,598
1980	1,047,396	4,790	0	30	75	1,052,291	30,105,348	32,038,398
1981	1,037,469	4,790	0	30	75	1,042,364	33,884,524	35,516,366
1982	1,015,555	4,790	0	30	75	1,020,450	39,515,188	41,611,655
1983	1,146,269	4,957	0	30	77	1,151,333	54,543,263	56,802,781
1984	1,427,192	5,051	0	31	78	1,432,352	63,947,633	67,105,188
1985	1,849,827	5,051	0	31	78	1,854,987	69,700,009	73,272,898
1986	1,714,723	5,051	0	31	78	1,719,883	73,437,761	76,707,917
1987	1,689,141	4,324	0	26	67	1,693,558	71,443,424	75,217,576
1988	1,964,428	4,509	0	28	70	1,969,035	72,349,117	76,060,618
1989	1,768,942	4,509	0	28	70	1,773,549	73,894,076	78,662,348
1990	2,274,772	0	0	0	0	2,274,772	86,130,115	91,361,385
1991	2,187,841	0	0	0	0	2,187,841	86,877,284	90,982,870
1992	2,465,364	0	0	0	0	2,465,364	94,167,321	99,235,524
1993	2,811,441	0	0	0	0	2,811,441	100,019,568	107,299,130
1994	3,894,639	0	0	0	0	3,894,639	92,336,811	99,944,106
1995	3,481,049	0	0	0	0	3,481,049	98,887,435	105,659,504
1996	5,144,684	0	0	0	0	5,144,684	105,119,193	112,018,784
1997	2,523,741	(33)	0	0	0	2,523,708	107,647,058	113,385,326
1998	4,302,712	1,878,365	1,386	160,400	88,026	6,430,889	120,649,996	127,316,519
1999	4,235,897	1,957,943	16,646	184,325	87,373	6,482,183	126,770,225	136,051,673
2000	2,879,118	2,533,780	20,786	253,538	109,328	5,796,549	121,867,778	130,506,829
2001	3,113,568	2,233,156	14,426	151,374	57,878	5,570,402	135,961,807	143,312,316
2002	3,174,177	2,686,500	49,511	189,458	81,857	6,181,502	124,841,131	136,450,562
2003	3,333,348	2,780,287	44,211	200,986	85,015	6,443,847	126,100,659	135,009,046
2004	3,535,885	2,673,103	69,895	240,426	109,830	6,629,139	144,433,611	154,516,038
2005	3,837,238	2,979,942	120,379	292,354	137,878	7,367,791	122,350,247	130,424,375
2006	2,514,944	3,182,628	56,543	154,568	71,756	5,980,438	127,023,731	134,970,200
2007	3,215,040	2,947,240	24,929	13,664	18,235	6,219,107	158,361,980	168,001,926
2008	5,595,179	4,234,972	10,299	5,521	8,567	9,854,537	178,456,714	188,944,834
2009	5,184,588	3,721,283	20,503	8,770	8,182	8,943,325	159,837,620	170,177,273
2010	6,475,063	6,418,684	77,603	19,136	23,139	13,013,624	160,998,991	172,837,881
2011	6,183,012	5,772,017	39,858	13,760	15,156	12,023,804	173,356,054	186,221,357
2012	5,316,241	6,435,779	24,816	11,514	10,418	11,798,768	192,011,031	208,033,783
2013	5,960,212	7,983,102	54,228	26,376	22,921	14,046,838	218,746,448	233,591,114
2014	7,958,084	4,183,688	15,209	7,392	15,843	12,180,216	240,519,484	258,461,154
2015	10,129,075	6,792,122	(1,296)	7,644	22,043	16,949,588	231,303,023	251,069,052
2016	8,777,026	5,934,430	0	0	0	14,711,456	248,086,949	276,432,577
2017	8,129,107	6,229,226	0	0	0	14,358,333	276,249,842	303,639,481
2018	8,989,556	6,235,823	0	0	0	15,225,379	273,457,566	298,154,075
2019	8,718,215	6,194,491	0	0	0	14,912,706	268,590,766	295,669,465
2020	8,805,397	6,256,436	0	0	0	15,061,833	271,276,673	298,626,159
2021	8,893,451	6,319,001	0	0	0	15,212,452	273,989,440	301,612,420
2022	8,982,386	6,382,191	0	0	0	15,364,577	276,729,334	304,628,543
2023	9,072,210	6,446,012	0	0	0	15,518,222	279,496,629	307,674,831
2024	9,162,932	6,510,473	0	0	0	15,673,405	282,291,593	310,751,578
2025	9,254,561	6,575,577	0	0	0	15,830,138	285,114,511	313,859,095
2026	9,347,107	6,641,333	0	0	0	15,988,440	287,965,657	316,997,685
2027	9,440,578	6,707,746	0	0	0	16,148,324	290,845,310	320,167,661
2028	9,534,984	6,774,824	0	0	0	16,309,808	293,753,766	323,369,341
2029	9,630,333	6,842,572	0	0	0	16,472,905	296,691,305	326,603,035
2030	9,726,637	6,910,998	0	0	0	16,637,635	299,658,216	329,869,063
2031	9,823,903	6,980,108	0	0	0	16,804,011	302,654,800	333,167,755
2032	9,922,142	7,049,909	0	0	0	16,972,051	305,681,347	336,499,433
2033	10,021,364	7,120,408	0	0	0	17,141,772	308,738,160	339,864,427
2034	10,121,577	7,191,612	0	0	0	17,313,189	311,825,540	343,263,066
2035	10,222,793	7,263,528	0	0	0	17,486,321	314,943,799	346,695,702
TOTAL	321,116,692	204,009,076	659,930	1,941,500	974,187	528,701,385	10,134,343,371	11,006,835,745

<sup>a</sup> Includes certain costs to be assigned directly to Kern County Water Agency. Refer to Appendix B text discussion of Table B-16A under "Project Water Charges."

## Tables B-12 through B-31

Note: Where applicable, the projected data values shown in this appendix are shaded and the bill year data are in **bold** type.

**TABLE B-12 Variable OMP&R Costs to be Reimbursed through Variable OMP&R Component of Transportation Charge<sup>a</sup> (in dollars)**

Calendar Year	NORTH BAY AQUEDUCT				SOUTH BAY AQUEDUCT	CALIFORNIA AQUEDUCT		
	Reach 1	Reach 3A	Reach 3B	Total	Reach 1	Reach 1	Reach 4	Reach 14A
	Barker Slough Pumping Plant	Cordelia Pumping Plant (Solano)	Cordelia Pumping Plant (Napa) <sup>b</sup>		South Bay and Del Valle Pumping Plants <sup>c</sup>	Banks Pumping Plant	Dos Amigos Pumping Plant	Buena Vista Pumping Plant
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
1962	0	0	0	0	36,970	0	0	0
1963	0	0	0	0	57,711	0	0	0
1964	0	0	0	0	74,134	0	0	0
1965	0	0	0	0	142,609	0	0	0
1966	0	0	0	0	192,605	0	0	0
1967	0	0	0	0	223,117	13,881	0	0
1968	0	0	6,989	6,989	336,671	452,630	202,947	0
1969	0	0	8,551	8,551	257,579	293,741	135,425	0
1970	0	0	13,598	13,598	396,358	346,215	211,197	1
1971	0	0	10,609	10,609	381,662	574,015	225,188	115,801
1972	0	0	14,434	14,434	598,702	933,292	502,196	198,914
1973	0	0	14,449	14,449	493,490	688,030	381,232	263,468
1974	0	0	17,473	17,473	565,575	783,562	447,772	315,939
1975	0	0	14,779	14,779	349,758	1,341,019	518,816	508,060
1976	0	0	20,856	20,856	571,361	1,638,453	641,115	712,947
1977	0	0	22,635	22,635	512,996	1,013,307	284,828	267,467
1978	0	0	21,692	21,692	586,355	2,339,502	607,042	689,236
1979	0	0	16,237	16,237	605,136	3,554,256	1,008,564	776,016
1980	0	0	19,945	19,945	523,369	2,083,336	1,129,152	1,051,629
1981	0	0	23,842	23,842	567,692	3,952,931	1,939,189	1,336,867
1982	0	0	12,157	12,157	605,780	3,082,031	1,363,705	1,200,226
1983	0	0	2,342	2,342	82,222	1,001,612	396,086	450,801
1984	0	0	4,822	4,822	271,543	1,856,959	976,773	1,203,681
1985	0	0	10,188	10,188	451,020	3,186,029	1,621,418	1,409,980
1986	0	0	15,501	15,501	814,111	6,595,625	2,627,407	2,405,224
1987	0	0	27,223	27,223	888,558	5,740,403	2,518,308	2,231,491
1988	17,813	0	24,020	41,833	911,176	6,276,214	2,610,048	2,560,122
1989	29,819	43,846	26,519	100,184	1,163,619	9,847,706	3,953,735	4,042,211
1990	52,210	67,109	40,775	160,094	1,834,626	10,460,533	4,498,260	5,779,750
1991	10,429	10,118	5,252	25,799	420,688	1,882,952	491,071	904,541
1992	13,319	13,070	9,406	35,795	339,021	3,129,419	1,147,502	1,221,282
1993	(11,941)	(8,753)	(5,392)	(26,086)	(150,856)	497,455	326,100	(108,089)
1994	46,791	39,624	29,189	115,604	801,374	5,677,009	2,305,603	2,523,572
1995	20,014	20,620	11,791	52,425	302,558	3,805,713	1,451,578	815,572
1996	57,320	47,288	23,483	128,091	718,807	8,192,821	4,009,531	2,493,264
1997	67,416	52,935	21,955	142,306	1,038,568	6,900,694	2,845,506	2,589,077
1998	(11,427)	(10,141)	(4,879)	(26,447)	(130,734)	185,756	(336,341)	(263,072)
1999	31,419	25,288	11,623	68,330	408,566	6,753,244	2,307,304	1,581,950
2000	58,046	42,597	15,125	115,767	904,390	7,961,599	3,043,655	2,952,780
2001	359,270	250,964	214,751	824,984	4,079,017	23,842,925	9,743,418	14,600,626
2002	190,349	104,564	61,470	356,383	2,324,926	17,025,395	6,894,112	8,423,370
2003	180,192	118,387	97,762	396,341	2,568,880	21,142,127	8,873,082	10,393,189
2004	250,597	139,241	107,251	497,090	2,554,982	21,514,887	9,305,543	12,252,400
2005	285,238	147,895	149,083	582,216	2,835,209	28,306,243	12,456,894	11,506,677
2006	234,970	116,406	147,445	498,821	2,764,840	23,330,330	10,474,002	11,242,457
2007	451,874	228,029	257,003	936,906	4,242,890	25,193,715	10,890,726	16,129,285
2008	423,721	195,656	301,951	921,328	3,332,734	17,276,071	6,116,442	11,199,859
2009	218,859	103,270	163,048	485,178	2,487,492	9,192,019	4,049,968	6,861,490
2010	260,455	112,283	215,355	588,094	2,375,172	24,513,390	9,468,531	10,594,566
2011	270,486	116,076	228,382	614,944	3,410,523	35,599,947	15,173,838	14,431,218
2012	272,391	123,844	189,952	586,187	3,538,975	27,319,377	12,014,879	13,731,449
2013	435,741	208,054	322,814	966,610	5,453,846	22,827,935	8,721,713	12,308,957
2014	361,021	184,702	445,584	991,306	4,103,966	11,268,486	3,525,274	6,999,090
2015	389,135	239,088	358,785	987,009	5,749,403	16,835,825	5,310,736	9,802,435
2016	547,986	306,673	375,538	1,230,197	4,687,929	41,020,893	11,480,039	16,117,828
2017	628,775	178,375	600,564	1,407,714	4,792,711	37,126,485	15,430,355	19,364,318
2018	639,382	181,385	610,697	1,431,464	5,014,612	38,262,530	15,921,145	19,347,628
2019	572,629	193,348	545,270	1,311,247	5,204,082	43,377,004	16,903,922	19,764,712
2020	585,079	197,552	557,126	1,339,757	5,338,793	33,555,792	17,649,863	20,875,192
2021	575,903	194,453	548,388	1,318,744	5,255,057	40,043,189	17,291,815	20,401,630
2022	583,185	196,912	555,322	1,335,419	5,321,509	39,965,507	17,615,233	20,848,243
2023	580,115	195,876	552,398	1,328,389	5,293,489	35,479,730	17,637,525	20,946,983
2024	582,381	196,641	554,556	1,333,578	5,314,167	35,379,680	17,483,186	20,625,493
2025	585,786	197,790	557,798	1,341,374	5,345,235	34,052,305	17,761,816	21,064,350
2026	574,960	194,135	547,490	1,316,585	5,246,455	39,116,134	17,166,388	20,194,415
2027	579,078	195,525	551,411	1,326,014	5,284,025	37,191,938	17,598,242	20,895,444
2028	581,316	196,281	553,542	1,331,139	5,304,457	36,501,526	17,442,995	20,573,011
2029	583,190	196,914	555,327	1,335,431	5,321,555	36,973,453	17,657,284	20,924,197
2030	585,393	197,658	557,424	1,340,475	5,341,656	29,746,152	17,503,430	20,606,478
2031	585,536	197,706	557,560	1,340,802	5,342,951	39,970,446	18,417,854	22,283,175
2032	575,411	194,287	547,919	1,317,617	5,250,565	41,587,512	16,760,014	19,470,403
2033	587,720	198,444	559,640	1,345,804	5,362,893	29,218,439	18,463,283	22,322,370
2034	579,253	195,585	551,578	1,326,416	5,285,627	37,275,572	16,980,193	19,789,428
2035	575,771	194,409	548,262	1,318,442	5,253,848	65,638,351	19,351,556	24,347,145
TOTAL	16,654,377	6,732,010	14,755,636	38,142,023	175,533,359	1,209,713,251	521,927,209	623,090,218

<sup>a</sup> Excludes extra peaking costs assigned directly to contractors. Refer to Appendix B text discussion of Table B-17 under "Project Water Charges."

<sup>b</sup> Costs for the period 1968 through 1987 are for an interim facility.

<sup>c</sup> The relatively minor costs of Del Valle Pumping Plant have been combined with those of South Bay Pumping Plant to simplify the allocation procedures.



**TABLE B-12 Variable OMP&R Costs to be Reimbursed through Variable OMP&R Component of Transportation Charge<sup>a</sup> (in dollars)**

Sheet 2 of 4

Calendar Year	CALIFORNIA AQUEDUCT (continued)						
	Reach 15A	Reach 16A	Reach 17E	Reach 18A	Reach 22B	Reach 23	Reach 24
	Wheeler Ridge Pumping Plant	Chrisman Pumping Plant	Edmonston Pumping Plant	Alamo Pumping Plant	Pearblossom Pumping Plant	Mojave Siphon Powerplant	Silverwood Lake <sup>d</sup>
	[9]	[10]	[11]	[12]	[13]	[14]	[15]
1962	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0
1971	2,564	0	0	0	0	0	0
1972	68,304	142,902	542,625	0	3,468	0	0
1973	236,623	387,198	1,548,428	0	202,289	0	0
1974	324,966	564,464	2,164,223	0	324,993	0	0
1975	552,952	1,095,331	4,010,395	0	575,061	0	0
1976	713,875	1,506,985	5,443,936	0	889,544	0	0
1977	303,107	657,108	2,360,624	0	315,128	0	0
1978	616,104	1,132,296	4,180,131	0	1,508,115	0	0
1979	749,188	1,526,850	5,475,688	0	1,838,687	0	0
1980	1,047,495	2,102,439	7,028,235	0	1,762,063	0	0
1981	1,319,739	2,838,773	9,351,931	0	2,296,771	0	0
1982	1,213,660	2,424,920	8,352,207	0	1,498,620	0	0
1983	432,165	793,915	2,375,225	0	397,766	0	0
1984	770,618	1,479,784	4,585,198	0	624,213	0	0
1985	1,411,621	2,812,461	9,365,591	0	1,226,515	0	0
1986	2,432,322	4,999,949	16,956,023	(1,013,756)	2,359,599	0	0
1987	2,213,047	4,434,510	14,612,448	(1,017,868)	1,814,728	0	243,983
1988	2,557,952	5,120,998	16,801,811	(742,800)	2,370,395	0	37,927
1989	4,061,396	8,559,270	28,732,499	(788,139)	4,228,697	0	50,884
1990	6,013,924	13,616,111	48,319,508	(832,947)	6,490,357	0	187,259
1991	1,032,050	2,427,880	8,647,065	(269,625)	996,352	0	0
1992	1,274,895	2,560,253	8,575,989	(916,154)	1,142,454	0	317,172
1993	(86,676)	(490,235)	(2,223,221)	(55,346)	(245,059)	0	(79,954)
1994	2,537,943	5,323,430	18,470,003	(59,356)	2,605,813	0	0
1995	725,389	1,435,098	4,738,967	(1,187,312)	972,086	0	777,343
1996	2,299,388	4,875,010	17,027,386	(2,788,262)	2,647,473	(914,092)	1,053,254
1997	2,417,154	5,424,334	19,413,834	(2,488,338)	3,037,087	(1,680,469)	0
1998	(236,322)	(524,933)	(1,809,182)	(1,969,187)	(431,135)	(1,217,950)	(149,186)
1999	1,288,328	3,316,481	12,854,526	(2,851,993)	1,861,548	(2,533,429)	71,918
2000	3,028,152	6,960,756	25,109,200	(5,070,499)	3,912,220	(4,371,978)	0
2001	14,956,504	33,675,515	124,395,398	(3,276,174)	18,951,103	(3,621,886)	932,664
2002	8,731,681	19,721,183	72,470,283	(4,919,131)	10,667,925	(5,247,076)	95,264
2003	10,813,824	24,634,501	90,645,034	(3,362,477)	14,524,405	(6,610,346)	231,993
2004	12,865,130	29,371,203	107,981,335	(6,248,061)	16,993,228	(7,691,613)	0
2005	11,769,639	26,675,193	94,388,290	(5,791,742)	17,552,651	(6,359,950)	0
2006	11,416,278	26,012,299	81,782,430	(4,022,339)	15,973,485	(6,347,742)	0
2007	16,657,505	37,657,877	125,592,420	(2,976,651)	19,486,841	(5,872,118)	0
2008	12,257,369	24,863,347	77,772,541	(3,305,736)	10,660,557	(3,203,162)	320,480
2009	7,289,924	15,752,135	70,995,351	(3,096,612)	9,125,041	(2,225,065)	2,053
2010	10,761,094	24,291,392	88,798,635	(4,904,985)	16,693,927	(5,529,305)	0
2011	14,469,169	32,456,256	113,763,699	(6,340,454)	23,162,701	(7,675,700)	496,252
2012	13,819,789	31,232,852	109,484,761	(2,424,628)	17,308,629	(8,836,129)	0
2013	12,514,624	28,331,949	99,615,990	(1,989,602)	12,082,796	(4,750,469)	0
2014	7,210,625	16,315,446	57,032,086	(1,305,981)	5,099,627	(1,023,443)	136,848
2015	10,787,103	24,240,558	87,565,766	(2,190,585)	8,908,201	(2,008,918)	821,286
2016	16,973,365	38,393,993	139,927,484	(9,991,405)	25,788,106	(11,125,765)	0
2017	<b>19,935,226</b>	<b>45,461,208</b>	<b>166,563,053</b>	<b>(11,209,881)</b>	<b>23,693,526</b>	<b>(14,011,324)</b>	<b>0</b>
2018	19,895,799	45,352,959	166,111,918	(11,206,485)	24,025,447	(13,968,798)	0
2019	20,241,933	46,067,072	168,547,811	(9,015,575)	21,179,696	(11,830,336)	0
2020	21,418,953	48,775,958	178,561,476	(9,453,465)	22,865,682	(12,540,246)	0
2021	20,924,592	47,643,751	174,394,793	(9,425,494)	22,429,121	(12,494,087)	0
2022	21,393,677	48,720,206	178,363,520	(9,453,994)	22,793,150	(12,541,120)	0
2023	21,507,323	48,988,393	179,377,226	(10,998,748)	23,210,974	(12,857,929)	0
2024	21,153,868	48,165,548	176,303,933	(10,445,459)	21,936,512	(12,058,770)	0
2025	21,622,684	49,247,242	180,311,720	(10,896,878)	23,183,245	(12,709,278)	0
2026	20,702,093	47,129,565	172,486,963	(10,555,010)	21,921,978	(12,215,416)	0
2027	21,453,573	48,865,330	178,924,459	(10,820,588)	22,729,793	(12,598,405)	0
2028	21,099,187	48,040,394	175,843,616	(10,677,374)	22,464,684	(12,391,303)	0
2029	21,476,067	48,911,218	179,074,308	(10,745,597)	22,705,592	(12,489,792)	0
2030	21,127,138	48,099,196	176,042,422	(10,615,914)	22,470,162	(12,302,838)	0
2031	22,950,554	52,330,221	191,799,409	(11,182,917)	23,890,087	(13,128,439)	0
2032	19,919,098	45,316,147	165,745,435	(10,155,652)	20,976,825	(11,648,085)	0
2033	22,988,171	52,413,887	192,098,881	(11,289,212)	24,248,287	(13,285,614)	0
2034	20,255,979	46,090,507	168,604,645	(10,351,894)	21,591,420	(11,925,594)	0
2035	25,247,206	57,698,832	211,928,216	(11,465,048)	24,193,172	(13,547,293)	0
<b>TOTAL</b>	<b>639,928,669</b>	<b>1,444,447,670</b>	<b>5,226,306,601</b>	<b>(288,163,334)</b>	<b>722,714,424</b>	<b>(339,391,272)</b>	<b>5,547,442</b>

<sup>a</sup>Excludes extra peaking costs assigned directly to contractors. Refer to Appendix B text discussion of Table B-17 under "Project Water Charges."<sup>d</sup>These values represent a proportionate allocation of the total variable OMP&R costs of pumping and recovery plants (Table B-3) associated with net annual withdrawals from storage for Project Transportation Facilities. The allocation is determined annually by applying the following ratio, calculated from the data shown in Table B-6: "Reservoir Storage Changes" (withdrawals, as a positive value) conveyed through each plant, divided by "Total" annual quantity conveyed through each plant, in acre-feet. The costs so determined are accumulated for all upstream plants for each year, for each respective reservoir.

**TABLE B-12 Variable OMP&R Costs to be Reimbursed through Variable OMP&R Component of Transportation Charge<sup>a</sup> (in dollars)**

Calendar Year	CALIFORNIA AQUEDUCT (continued)						
	Reach 26A	Reach 2B (EBX)	Reach 3A (EBX)	Reach 4B (EBX)	Reach 28J	Reach 29A	Reach 29G
	Devil Canyon Powerplant	Greenspot Pump Station	Crafton Hills Pump Station	Cherry Valley Pump Station	Lake Perris <sup>d</sup>	Oso Pumping Plant	Warne Powerplant
	[16]	[17]	[18]	[19]	[20]	[21]	[22]
1962	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0
1972	(3,024)	0	0	0	0	79,315	0
1973	(461,268)	0	0	0	0	122,787	0
1974	(546,156)	0	0	0	0	157,511	0
1975	(1,095,523)	0	0	0	0	314,636	0
1976	(1,566,056)	0	0	0	0	326,967	0
1977	(1,222,866)	0	0	0	0	75,335	0
1978	(3,085,094)	0	0	0	0	89,383	0
1979	(3,466,481)	0	0	0	0	102,584	0
1980	(3,318,152)	0	0	0	0	236,768	0
1981	(3,842,971)	0	0	0	0	444,280	0
1982	(2,736,072)	0	0	0	0	539,245	(783,626)
1983	(5,478,830)	0	0	0	0	214,069	(1,488,439)
1984	(7,350,989)	0	0	0	0	484,239	(4,088,209)
1985	(10,748,103)	0	0	0	0	874,069	(5,930,176)
1986	(11,484,996)	0	0	0	0	1,269,590	(5,579,301)
1987	(10,814,483)	0	0	0	53,242	1,323,472	(6,292,822)
1988	(14,495,967)	0	0	0	0	1,421,372	(6,994,588)
1989	(18,688,631)	0	0	0	0	2,046,005	(8,368,716)
1990	(20,911,839)	0	0	0	147,163	2,857,442	(11,011,193)
1991	(4,884,013)	0	0	0	0	535,456	(3,604,791)
1992	(9,513,281)	0	0	0	(61,233)	686,984	(5,272,726)
1993	(7,502,549)	0	0	0	0	51,327	(3,380,473)
1994	(11,815,745)	0	0	0	80,824	1,210,469	(5,835,219)
1995	(9,742,248)	0	0	0	0	151,109	(1,179,155)
1996	(12,358,465)	0	0	0	0	895,929	(4,248,531)
1997	(13,293,791)	0	0	0	111,776	897,657	(4,797,589)
1998	(10,108,555)	0	0	0	0	(27,767)	(746,113)
1999	(14,952,833)	0	0	0	(44,587)	655,690	(5,341,364)
2000	(25,522,757)	0	0	0	(107,824)	1,221,657	(9,464,490)
2001	(19,510,278)	0	0	0	0	6,159,709	(7,614,510)
2002	(24,676,763)	0	0	0	0	3,806,290	(10,286,903)
2003	(27,490,216)	0	0	0	1,149,448	4,337,168	(9,899,070)
2004	(31,246,167)	78,555	68,914	7,290	0	5,408,386	(11,835,098)
2005	(28,682,474)	69,542	48,909	2,544	5,151,512	3,422,443	(6,683,632)
2006	(34,389,659)	135,205	148,128	18,268	0	2,545,881	(6,870,988)
2007	(28,529,045)	248,626	256,313	11,163	589,895	6,194,316	(9,522,236)
2008	(16,403,544)	242,648	326,570	7,432	0	4,418,292	(7,184,125)
2009	(13,474,182)	360,373	391,267	7,529	418,484	4,329,384	(6,578,744)
2010	(24,427,811)	313,542	431,062	19,507	0	3,283,833	(5,697,650)
2011	(31,980,782)	372,501	500,578	33,172	0	3,283,372	(5,505,320)
2012	(23,571,258)	551,794	551,794	49,815	231,470	5,192,037	(8,230,796)
2013	(14,097,814)	487,724	570,697	69,151	0	6,312,913	(8,740,718)
2014	(3,836,008)	316,015	438,715	51,910	0	4,400,056	(4,122,547)
2015	(6,409,125)	342,464	457,405	15,029	882,882	6,702,841	(6,176,657)
2016	(22,258,127)	377,640	462,567	83,645	0	5,108,990	(5,463,764)
2017	<b>(20,313,572)</b>	<b>476,840</b>	<b>595,092</b>	<b>96,640</b>	<b>0</b>	<b>8,743,866</b>	<b>(9,116,085)</b>
2018	(20,254,933)	484,175	604,246	96,927	0	8,504,512	(8,823,100)
2019	(17,607,565)	510,297	636,847	100,892	0	9,158,535	(8,935,832)
2020	(18,643,900)	521,393	650,693	101,794	0	9,579,444	(9,160,245)
2021	(18,124,379)	513,215	640,488	100,198	0	9,303,472	(9,036,961)
2022	(17,711,882)	519,705	648,587	101,465	0	9,592,112	(9,200,836)
2023	(18,367,209)	516,968	645,172	100,931	0	9,545,861	(9,182,866)
2024	(18,092,687)	518,988	647,692	101,325	0	9,727,989	(9,334,868)
2025	(17,976,502)	522,022	651,478	101,917	0	9,648,679	(9,203,758)
2026	(18,227,464)	512,375	639,439	100,034	0	9,296,728	(9,045,243)
2027	(18,090,514)	516,044	644,018	100,750	0	9,697,011	(9,368,575)
2028	(18,273,799)	518,039	646,508	101,140	0	9,441,602	(9,064,246)
2029	(18,026,294)	519,709	648,592	101,466	0	9,713,384	(9,296,763)
2030	(18,103,854)	521,672	651,042	101,849	0	9,451,327	(9,021,026)
2031	(18,171,962)	521,799	651,200	101,874	0	10,723,777	(10,237,008)
2032	(17,569,033)	512,776	639,940	100,112	0	8,911,526	(8,663,384)
2033	(18,840,243)	523,746	653,631	102,254	0	10,586,482	(10,079,087)
2034	(17,490,135)	516,200	644,213	100,781	0	8,974,232	(8,644,339)
2035	(19,102,441)	513,097	640,340	100,175	0	13,478,835	(13,082,668)
<b>TOTAL</b>	<b>(940,983,359)</b>	<b>13,555,745</b>	<b>16,832,139</b>	<b>2,288,978</b>	<b>8,603,053</b>	<b>278,242,868</b>	<b>(393,317,169)</b>

<sup>a</sup>Excludes extra peaking costs assigned directly to contractors. Refer to Appendix B text discussion of Table B-17 under "Project Water Charges."<sup>d</sup>These values represent a proportionate allocation of the total variable OMP&R costs of pumping and recovery plants (Table B-3) associated with net annual withdrawals from storage for Project Transportation Facilities. The allocation is determined annually by applying the following ratio, calculated from the data shown in Table B-6: "Reservoir Storage Changes" (withdrawals, as a positive value) conveyed through each plant, divided by "Total" annual quantity conveyed through each plant, in acre-feet. The costs so determined are accumulated for all upstream plants for each year, for each respective reservoir.

**TABLE B-12 Variable OMP&R Costs to be Reimbursed through Variable OMP&R Component of Transportation Charge<sup>a</sup> (in dollars)**

Sheet 4 of 4

Calendar Year	CALIFORNIA AQUEDUCT (continued)						Grand Total
	Reach 29H	Reach 29J	Reach 30	Reach 31A	Reach 33A	Total	
	Pyramid Lake <sup>d</sup>	Castaic Powerplant	Castaic Lake <sup>d</sup>	Las Perillas and Badger Hill Pumping Plants	Devil's Den, Bluestone, and Polonio Pass Pumping Plants		
	[23]	[24]	[25]	[26]	[27]	[28]	[29]
1962	0	0	0	0	0	0	36,970
1963	0	0	0	0	0	0	57,711
1964	0	0	0	0	0	0	74,134
1965	0	0	0	0	0	0	142,609
1966	0	0	0	0	0	0	192,605
1967	0	0	0	0	0	13,881	236,998
1968	0	0	0	118,676	0	774,253	1,117,913
1969	0	0	0	78,350	0	507,516	773,646
1970	0	0	0	136,429	0	693,842	1,103,798
1971	0	0	0	166,296	0	1,083,864	1,476,135
1972	0	(211,144)	0	237,638	0	2,494,486	3,107,622
1973	0	(1,057,564)	0	120,913	0	2,432,136	2,940,075
1974	0	(1,547,884)	0	118,582	0	3,107,972	3,691,020
1975	0	(2,455,461)	0	94,848	0	5,460,134	5,824,671
1976	0	(2,827,557)	0	141,260	0	7,621,469	8,213,686
1977	0	(3,734,462)	0	71,311	0	390,887	926,518
1978	0	(1,542,479)	0	179,925	0	6,714,161	7,322,208
1979	0	(2,773,323)	0	192,126	0	8,984,155	9,605,528
1980	0	(3,408,863)	0	168,458	0	9,882,560	10,425,874
1981	0	(2,834,322)	0	169,177	0	16,972,365	17,563,899
1982	0	(3,463,971)	0	168,390	0	12,859,335	13,477,272
1983	0	(6,649,626)	0	17,920	0	(7,537,336)	(7,452,772)
1984	0	(4,710,802)	0	112,679	0	(4,435,856)	(4,159,491)
1985	0	(15,698,638)	0	146,843	0	(10,322,390)	(9,861,182)
1986	0	(11,072,448)	0	297,886	0	10,793,124	11,622,736
1987	80,822	(11,557,616)	(43,085)	245,082	0	5,785,662	6,701,444
1988	54,038	(12,295,001)	(210,845)	214,519	0	5,286,197	6,239,206
1989	84,370	(14,812,039)	89,852	282,180	0	23,321,280	24,585,082
1990	0	(20,116,741)	245,034	416,832	0	46,159,454	48,154,174
1991	432,382	(6,579,194)	0	3,610	0	2,015,735	2,462,222
1992	29,879	(9,167,653)	(1,141,229)	101,665	0	(5,884,783)	(5,509,967)
1993	(675,438)	(7,895,978)	(2,751,590)	(111,306)	0	(24,731,032)	(24,907,974)
1994	0	(10,565,940)	(81,262)	206,086	0	12,583,232	13,500,210
1995	544,099	(4,049,615)	0	243,434	0	(497,940)	(142,957)
1996	0	(8,457,232)	0	296,170	0	15,023,644	15,870,542
1997	0	(8,727,328)	(897)	298,483	208,816	13,156,005	14,336,879
1998	(965,988)	(3,360,851)	(2,139,549)	(55,491)	(92,902)	(24,248,768)	(24,405,949)
1999	0	(9,672,802)	0	160,203	228,670	(4,317,144)	(3,840,249)
2000	0	(17,958,033)	0	231,125	381,037	(7,693,401)	(6,673,244)
2001	1,003,254	(13,495,346)	2,423,551	1,085,730	2,170,015	206,422,217	211,326,218
2002	0	(18,455,025)	0	544,053	1,351,161	86,145,817	88,827,127
2003	833,189	(16,903,355)	963,682	636,921	1,525,163	126,438,262	129,403,483
2004	222,030	(21,110,644)	685,288	672,555	1,779,029	141,074,190	144,126,262
2005	4,755,989	(12,763,664)	4,548,906	846,063	1,714,250	162,934,283	166,351,708
2006	528,663	(11,822,176)	6,064,195	848,860	1,423,676	128,491,254	131,754,915
2007	0	(19,017,327)	0	1,306,516	2,313,454	196,611,274	201,791,070
2008	0	(14,961,833)	1,320,512	1,127,445	1,732,916	124,584,081	128,838,144
2009	407,982	(15,564,065)	0	695,135	1,212,175	90,151,641	93,124,311
2010	0	(10,738,810)	0	903,993	1,484,471	140,259,384	143,222,649
2011	0	(11,102,175)	1,992,972	1,112,160	2,128,325	196,371,729	200,397,197
2012	186,883	(15,133,885)	0	1,008,578	2,019,551	176,407,019	180,532,182
2013	77,188	(15,520,329)	462,842	1,362,201	2,054,765	162,702,513	169,122,699
2014	0	(7,773,330)	2,168,085	1,559,450	2,105,230	100,565,634	105,660,906
2015	188,915	(10,877,597)	0	1,585,077	1,925,495	148,709,137	155,445,549
2016	0	(8,868,220)	0	1,111,769	2,846,359	241,985,397	247,903,523
2017	0	(15,356,565)	0	1,119,011	3,662,912	272,261,105	278,461,530
2018	0	(14,788,198)	0	1,141,752	3,742,540	274,450,064	280,896,140
2019	0	(14,626,597)	0	815,693	5,387,393	290,675,902	297,191,231
2020	0	(14,980,309)	0	834,583	5,514,870	296,127,528	302,806,078
2021	0	(14,776,554)	0	821,493	5,428,373	296,078,655	302,652,456
2022	0	(15,050,240)	0	831,881	5,497,016	302,932,230	309,589,158
2023	0	(15,057,088)	0	827,500	5,468,072	297,788,818	304,410,696
2024	0	(15,289,390)	0	830,733	5,489,433	293,143,206	299,790,951
2025	0	(15,072,238)	0	835,589	5,521,525	298,665,918	305,352,527
2026	0	(14,790,329)	0	820,148	5,419,486	290,672,284	297,235,324
2027	0	(15,328,441)	0	826,021	5,458,296	298,694,396	305,304,435
2028	0	(14,857,899)	0	829,215	5,479,402	293,716,698	300,352,294
2029	0	(15,244,330)	0	831,887	5,497,063	299,231,444	305,888,430
2030	0	(14,767,859)	0	835,030	5,517,827	287,862,234	294,544,365
2031	0	(16,797,326)	0	835,232	5,519,165	320,477,141	327,160,894
2032	0	(14,154,400)	0	820,791	5,423,732	283,993,757	290,561,939
2033	0	(16,514,398)	0	838,350	5,539,764	309,988,987	316,697,684
2034	0	(14,159,544)	0	826,272	5,459,950	284,537,886	291,149,929
2035	0	(21,608,089)	0	821,303	5,427,124	370,579,813	377,152,103
TOTAL	7,788,259	(726,532,142)	14,596,461	38,019,290	130,965,597	8,216,180,598	8,429,855,980

<sup>a</sup> Excludes extra peaking costs assigned directly to contractors. Refer to Appendix B text discussion of Table B-17 under "Project Water Charges."

<sup>d</sup> These values represent a proportionate allocation of the total variable OMP&R costs of pumping and recovery plants (Table B-3) associated with net annual withdrawals from storage for Project Transportation Facilities. The allocation is determined annually by applying the following ratio, calculated from the data shown in Table B-6: "Reservoir Storage Changes" (withdrawals, as a positive value) conveyed through each plant, divided by "Total" annual quantity conveyed through each plant, in acre-feet. The costs so determined are accumulated for all upstream plants for each year, for each respective reservoir.

**TABLE B-13 Capital and Operating Costs of Project Conservation Facilities to be Reimbursed through Delta Water Charge (in dollars)**

Calendar Year	Initial Project Conservation Facilities (Portions of Upper Feather Lakes, Oroville-Thermalito, and California Aqueduct Facilities)					Planning and Pre-operating Costs <sup>a,f</sup>	Total
	Capital Costs <sup>a</sup>	Capital Cost Credits <sup>b</sup>	Operating Costs <sup>c</sup>	Application of Oroville Power Revenues to:			
				Capital Costs <sup>d</sup>	Operating Costs <sup>e</sup>		
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
1952	171,322	0	0	0	0	0	171,322
1953	312,190	0	0	0	0	0	312,190
1954	308,624	0	0	0	0	0	308,624
1955	194,645	0	0	0	0	0	194,645
1956	1,357,077	0	0	0	0	0	1,357,077
1957	6,210,709	0	0	0	0	0	6,210,709
1958	9,510,916	0	0	0	0	0	9,510,916
1959	11,390,586	0	0	0	0	0	11,390,586
1960	14,463,274	(4,850,000)	0	0	0	0	9,613,274
1961	18,729,965	(431,527)	0	0	0	0	18,298,438
1962	9,099,967	(479,280)	0	0	0	0	8,620,687
1963	73,098,107	(478,743)	(14,000)	0	0	0	72,605,364
1964	62,629,003	(751,330)	(14,000)	0	0	107,780	61,971,453
1965	71,048,877	(763,541)	(14,000)	0	0	551,850	70,823,186
1966	125,376,541	(748,649)	(14,000)	0	0	1,081,023	125,694,915
1967	94,481,603	(812,145)	(13,446)	0	0	1,189,212	94,845,224
1968	39,986,145	(431,574)	1,303,821	(951,000)	0	793,399	40,700,791
1969	5,367,865	(259,015)	2,890,772	(11,007,000)	0	601,867	(2,405,511)
1970	4,208,411	(203,733)	4,818,634	(14,650,000)	(1,500,000)	516,659	(6,810,029)
1971	3,956,703	(193,631)	6,026,480	(14,650,000)	(1,500,000)	408,754	(5,951,694)
1972	4,662,255	(196,361)	5,393,011	(14,650,000)	(1,500,000)	287,374	(6,003,721)
1973	4,090,078	(136,997)	6,135,774	(14,650,000)	(1,500,000)	203,384	(5,857,761)
1974	6,852,718	(137,503)	6,944,723	(17,950,000)	(1,500,000)	201,907	(5,588,155)
1975	8,343,833	(234,567)	7,697,390	(14,650,000)	(1,500,000)	146,188	(197,156)
1976	6,189,618	(204,944)	7,067,037	(14,650,000)	(1,500,000)	205,234	(2,893,055)
1977	21,554,452	(150,214)	10,547,977	(14,650,000)	(1,500,000)	857,419	16,659,634
1978	8,031,393	(64,566)	12,851,158	(14,650,000)	(1,500,000)	2,131,286	6,799,271
1979	9,751,861	0	9,547,014	(14,650,000)	(1,500,000)	2,131,884	5,280,759
1980	11,345,574	0	13,258,298	(14,650,000)	(1,500,000)	3,638,851	12,092,723
1981	11,921,267	0	10,326,538	(14,650,000)	(1,500,000)	4,597,474	10,695,279
1982	17,479,059	0	16,154,872	(14,650,000)	(1,500,000)	4,594,682	22,078,613
1983	12,763,378	0	22,251,331	(34,705,000)	(8,735,000)	3,751,993	(4,673,298)
1984	9,367,268	0	22,700,224	(14,650,000)	(10,348,000)	2,979,126	10,048,618
1985	12,538,173	0	23,462,283	(14,650,000)	(8,198,000)	2,069,024	15,221,480
1986	21,586,488	0	26,479,379	(14,650,000)	(9,107,000)	1,602,419	25,911,286
1987	32,734,633	0	23,479,839	(14,650,000)	(9,451,000)	1,762,179	33,875,651
1988	33,028,679	0	25,832,491	(14,650,000)	(8,677,000)	1,808,899	37,343,069
1989	11,075,132	0	28,442,946	(14,650,000)	(8,102,000)	2,678,007	19,444,085
1990	28,764,328	0	37,430,776	(14,650,000)	(8,498,000)	1,436,712	44,483,816
1991	37,462,303	0	76,586,450	(14,650,000)	(9,487,000)	1,727,664	91,639,417
1992	29,169,134	0	32,280,229	(14,650,000)	(8,526,000)	1,707,822	39,981,185
1993	22,366,873	0	36,884,103	(14,650,000)	(8,768,000)	1,708,490	37,541,465
1994	14,709,626	0	41,193,693	(14,650,000)	(7,484,000)	2,134,392	35,903,711
1995	15,120,856	0	46,162,374	(14,650,000)	(4,976,939)	2,042,481	43,698,773
1996	11,001,852	0	50,885,567	(14,650,000)	(5,503,289)	2,448,692	44,182,822
1997	15,278,251	0	51,788,497	(14,650,000)	(5,740,515)	1,699,730	48,375,963
1998	3,864,189	0	54,726,293	(14,650,000)	(8,155,000)	1,193,198	36,978,680
1999	7,773,761	0	56,065,583	(14,650,000)	(9,198,000)	9,686	40,001,030
2000	10,847,131	0	56,064,265	(14,688,338)	(10,297,482)	13,491	41,939,067
2001	10,948,086	0	75,987,138	(16,223,803)	(14,328,482)	23,866	56,406,805
2002	20,389,719	0	67,977,990	(19,498,891)	(20,826,560)	24,426	48,066,683
2003	23,658,616	0	77,725,364	(20,605,664)	(29,982,088)	9,833	50,806,061
2004	21,653,508	0	91,157,572	(17,530,688)	(35,845,422)	7,548	59,442,518
2005	6,610,322	0	104,208,826	(15,354,462)	(22,004,805)	0	73,459,881
2006	11,469,917	0	102,783,234	(15,210,585)	(21,005,765)	0	78,036,801
2007	8,510,649	0	87,611,433	(14,734,855)	(17,033,961)	0	64,353,266
2008	7,244,557	0	105,494,597	(14,968,129)	(19,570,602)	0	78,200,423
2009	7,627,891	0	114,930,514	(15,959,419)	(20,921,647)	0	85,677,339
2010	8,249,943	0	120,615,283	(15,958,194)	(20,222,025)	0	92,685,006
2011	13,237,900	0	127,458,663	(15,958,715)	(19,207,013)	0	105,530,835
2012	28,034,954	0	127,406,898	(16,032,565)	(22,105,563)	0	117,303,723
2013	101,193,467	0	138,602,948	(16,034,532)	(20,414,514)	0	203,347,368
2014	83,349,581	0	144,423,857	(15,852,875)	(18,597,043)	0	193,323,520
2015	46,909,960	0	150,760,902	(20,661,827)	(17,587,782)	0	159,421,254
2016	160,315,285	0	202,484,836	(21,519,913)	(20,121,015)	0	321,159,193
2017	177,833,499	0	187,535,249	(28,737,811)	(16,550,456)	0	320,080,481
2018	210,234,997	0	209,698,316	(34,576,196)	(17,126,441)	0	368,230,676
2019	71,350,118	0	202,426,320	(40,187,479)	(18,111,964)	0	215,476,995
2020	410,311	0	183,379,919	(41,724,651)	(18,293,083)	0	123,772,496
2021	410,311	0	190,009,280	(41,608,625)	(18,476,014)	0	130,334,952
2022	410,311	0	184,452,023	(41,601,966)	(18,660,774)	0	124,599,594
2023	410,311	0	188,511,116	(41,598,416)	(18,847,382)	0	128,475,629
2024	410,311	0	188,374,663	(41,488,814)	(19,035,856)	0	128,260,304
2025	410,311	0	188,623,044	(41,714,406)	(19,226,214)	0	128,092,735
2026	410,311	0	200,266,613	(41,594,621)	(19,418,477)	0	139,663,826
2027	410,311	0	196,225,917	(41,592,930)	(19,612,661)	0	135,430,637
2028	410,311	0	198,611,781	(41,603,649)	(19,808,788)	0	137,609,655
2029	410,311	0	197,392,503	(41,484,751)	(20,006,876)	0	136,311,187
2030	410,311	0	200,235,302	(48,071,435)	(20,206,945)	0	132,367,233
2031	410,311	0	204,309,821	(48,075,845)	(20,409,014)	0	136,235,273
2032	410,311	0	216,410,486	(48,077,501)	(20,613,104)	0	148,130,192
2033	410,311	0	202,454,284	(48,072,951)	(20,819,235)	0	133,972,409
2034	410,311	0	214,692,110	(48,077,813)	(21,027,428)	0	145,997,180
2035	410,311	0	219,422,844	(48,066,466)	(21,237,702)	0	150,528,987
TOTAL	2,016,964,636	(11,528,320)	6,446,272,022	(1,569,562,781)	(876,014,926)	57,085,905	6,063,216,536

<sup>a</sup> Reimbursed through the capital cost component of the Delta Water Charge.<sup>b</sup> Negotiated settlements as to the magnitude of SWP planning costs from 1952 through 1978.<sup>c</sup> Reimbursed through the minimum OMP&R component of the Delta Water Charge. Credits for Gianelli power generation are reflected in these net costs.<sup>d</sup> Revenues credited through the capital cost component of the Delta Water Charge.<sup>e</sup> Revenues credited through the minimum OMP&R component of the Delta Water Charge.<sup>f</sup> Under amendments of Articles 22(e) and 22(g), planning and pre-operating costs of additional Project Conservation Facilities incurred through the previous year reflected in the Delta Water Charge.

## Tables B-14 through B-31

Note: Where applicable, the projected data values shown in this appendix are shaded and the bill year data are in **bold** type.



TABLE B-14 Capital Costs of Transportation Facilities Allocated to Each Contractor (in dollars)

Sheet 1 of 4

Calendar Year	NORTH BAY AREA			SOUTH BAY AREA				CENTRAL COASTAL AREA		
	Napa	Solano <sup>a</sup>	Total	Alameda-Zone 7	Alameda County	Santa Clara	Total	San Luis Obispo	Santa Barbara	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1952	0	0	0	83	114	410	608	122	224	346
1953	0	0	0	323	479	1,808	2,610	336	620	956
1954	0	0	0	819	1,306	5,150	7,275	421	777	1,199
1955	0	0	0	977	1,570	6,297	8,844	211	390	601
1956	0	0	0	8,844	14,459	63,816	87,120	227	418	645
1957	15,199	11,436	26,634	21,564	35,240	649,596	706,401	291	536	827
1958	33,420	16,591	50,011	67,764	71,717	733,414	872,896	720	1,328	2,048
1959	20,697	6,591	27,288	154,255	143,730	493,050	791,035	10,636	69,139	79,775
1960	9,097	8,830	17,927	296,492	275,610	1,018,661	1,590,763	15,255	99,794	115,048
1961	6,950	7,445	14,395	853,506	802,675	1,914,709	3,570,890	10,163	36,681	46,843
1962	(194)	(926)	(1,120)	545,123	615,141	1,686,041	2,846,306	17,281	39,570	56,851
1963	1,319	1,111	2,430	657,426	1,281,271	3,243,838	5,182,534	68,821	140,841	209,662
1964	38,393	35,466	73,859	712,650	1,747,783	7,251,800	9,712,233	138,614	282,003	420,617
1965	198,833	62,221	261,054	360,779	606,025	3,414,457	4,381,262	250,706	497,152	747,859
1966	461,619	49,917	511,536	592,714	592,598	2,245,215	3,430,528	587,951	1,117,486	1,705,437
1967	1,569,498	40,379	1,609,877	796,995	803,951	2,401,862	4,002,808	936,412	1,762,694	2,699,106
1968	859,613	61,691	921,304	736,470	696,075	1,997,924	3,430,469	351,131	675,220	1,026,351
1969	74,388	59,318	133,706	269,698	293,275	764,950	1,327,923	76,966	164,583	241,550
1970	43,361	67,877	111,238	58,676	61,200	135,569	255,445	47,891	109,224	157,115
1971	26,763	34,052	60,815	12,086	18,227	84,089	114,402	28,638	80,715	109,353
1972	19,643	18,905	38,548	12,293	12,763	63,610	88,666	19,289	50,230	69,519
1973	56,510	30,874	87,384	10,494	12,136	39,380	62,010	23,010	56,178	79,189
1974	165,830	65,832	231,662	15,722	24,402	73,119	113,243	25,037	61,383	86,420
1975	91,824	89,234	181,058	16,730	15,806	41,394	73,930	14,740	61,416	76,156
1976	57,765	83,651	141,416	34,004	34,663	109,610	178,277	33,638	130,440	164,078
1977	64,167	80,147	144,314	46,229	45,115	133,375	224,720	108,324	264,720	373,044
1978	69,319	81,717	151,036	71,234	66,008	174,898	312,140	21,415	103,822	125,237
1979	191,273	282,907	474,180	45,468	42,943	110,665	199,077	22,941	125,669	148,610
1980	264,433	386,006	650,439	134,522	124,352	304,614	563,488	103,258	462,895	566,153
1981	227,606	383,086	610,692	(33,738)	(29,856)	(65,637)	(129,231)	(15,416)	(135,240)	(150,656)
1982	549,164	870,611	1,419,775	7,876	8,321	27,065	43,262	4,102	(58,882)	(54,780)
1983	1,254,900	1,433,061	2,687,961	138,413	131,515	339,246	609,175	32,196	110,287	142,483
1984	2,547,878	2,750,040	5,297,918	152,992	140,971	351,921	645,884	35,448	107,723	143,171
1985	7,143,123	6,443,613	13,586,736	19,776	19,245	53,491	92,512	17,424	78,896	96,319
1986	10,565,937	16,926,630	27,492,567	32,034	31,581	88,070	151,684	44,135	306,452	350,588
1987	7,979,832	12,599,507	20,579,339	50,153	48,675	138,959	237,787	126,995	1,342,116	1,469,110
1988	2,312,909	4,343,513	6,656,422	116,181	112,294	302,461	530,935	156,473	1,479,545	1,636,018
1989	1,224,538	1,553,352	2,777,890	108,320	102,804	260,092	471,217	152,173	1,210,940	1,363,112
1990	443,002	824,055	1,267,057	224,283	224,188	625,213	1,073,684	222,208	1,559,457	1,781,665
1991	99,848	89,269	189,117	413,426	383,368	946,246	1,743,040	298,398	2,184,088	2,482,487
1992	57,045	62,083	119,128	182,231	169,968	442,055	794,255	361,210	3,504,755	3,865,965
1993	122,423	128,634	251,057	129,344	125,312	342,416	597,071	1,170,649	11,997,953	13,168,602
1994	71,274	83,270	154,544	46,042	58,050	229,649	333,741	4,260,734	46,401,596	50,662,331
1995	30,605	29,271	59,876	97,808	97,063	257,484	452,355	12,268,787	155,255,850	167,524,637
1996	20,275	19,069	39,344	49,854	48,056	127,493	225,403	11,284,548	145,409,410	156,693,959
1997	20,039	107,784	127,823	82,598	78,996	209,517	371,111	3,184,506	38,158,718	41,343,224
1998	17,423	21,572	38,995	27,302	24,121	63,057	114,480	883,110	10,563,359	11,446,469
1999	67,602	106,355	173,957	74,165	73,552	208,296	356,013	928,738	9,596,058	10,524,796
2000	16,252	37,932	54,185	27,445	28,844	80,346	136,635	488,160	5,529,102	6,017,261
2001	6,598	13,750	20,347	140,394	270,055	1,856,845	2,267,294	72,358	539,206	611,564
2002	19,917	45,940	65,857	809,721	1,193,494	5,886,086	7,889,301	69,122	387,295	456,418
2003	54,235	20,712	74,947	1,157,357	1,331,716	4,620,228	7,109,301	19,610	118,117	137,728
2004	153,240	20,534	173,774	360,395	346,065	4,106,509	4,812,969	12,286	52,406	64,692
2005	60,543	62,997	123,541	358,153	339,995	1,541,971	2,240,119	(1,979)	(161,490)	(163,469)
2006	887,892	20,086	907,978	349,395	329,656	801,023	1,480,075	8,438	65,059	73,497
2007	3,237,236	43,135	3,280,372	793,095	732,240	1,756,072	3,281,407	16,262	84,170	100,432
2008	7,903,036	61,877	7,964,914	1,466,734	1,352,530	3,236,019	6,055,283	28,452	99,415	127,867
2009	1,196,789	18,960	1,215,749	2,985,071	2,797,639	6,671,528	12,454,237	8,765	74,482	83,248
2010	396,763	3,323	400,086	3,858,703	3,511,676	8,785,887	16,156,266	75,721	140,736	216,456
2011	192,894	40,199	233,092	4,038,282	3,836,620	9,247,635	17,122,537	109,867	235,239	345,106
2012	485,208	426,760	911,967	2,717,470	2,649,415	6,713,706	12,080,591	76,346	336,174	412,520
2013	652,391	679,649	1,332,041	1,160,446	1,251,281	3,887,891	6,299,619	259,660	1,274,653	1,534,313
2014	587,364	658,937	1,246,300	(252,836)	(174,519)	(198,598)	(625,953)	334,011	1,559,222	1,893,233
2015	187,616	266,900	454,515	646,687	639,112	1,591,599	2,877,399	251,818	1,360,495	1,612,313
2016	62,069	119,157	181,226	180,661	176,185	431,563	788,409	684,646	2,503,167	3,187,813
2017	21,039	50,641	71,680	79,446	72,615	173,761	325,823	405,557	1,375,509	1,781,066
2018	120,298	300,985	421,283	492,341	461,089	1,132,409	2,085,840	335,399	1,504,273	1,839,672
2019	66,459	158,506	224,965	94,754	87,256	217,578	399,587	162,294	744,413	906,707
2020	0	0	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0
<b>TOTAL</b>	<b>55,402,981</b>	<b>53,407,027</b>	<b>108,810,008</b>	<b>29,916,717</b>	<b>31,521,823</b>	<b>96,650,476</b>	<b>158,089,015</b>	<b>41,747,654</b>	<b>453,290,872</b>	<b>495,038,526</b>

Note: Allocated capital costs as a result of permanent water transfers under the Monterey Amendment are not reflected in this table.

<sup>a</sup> Costs from Table B-10 allocated to Solano County Water Agency are reduced herein by \$2,102,700 in 1986 and \$1,823,500 in 1987 under provisions of Amendment 10 to its water supply contract.

TABLE B-14 Capital Costs of Transportation Facilities Allocated to Each Contractor (in dollars)

Sheet 2 of 4

Calendar Year	SAN JOAQUIN VALLEY AREA									
	Dudley Ridge	Empire <sup>b</sup>	Future Contractor San Joaquin Valley	Kern			Kings	Oak Flat	Tulare	Total
				Municipal and Industrial	Municipal and Industrial <sup>c</sup>	Agricultural				
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]
1952	389	20	58	938	119	9,129	20	12	785	11,470
1953	1,076	53	161	2,887	345	27,383	55	33	2,157	34,150
1954	1,350	68	201	3,373	417	32,369	69	43	2,718	40,608
1955	677	34	101	1,497	197	14,721	35	23	1,371	18,656
1956	726	34	108	2,702	273	24,255	35	25	1,416	29,575
1957	932	38	139	6,048	494	49,932	39	29	1,707	59,359
1958	2,308	102	344	14,374	1,153	119,049	104	61	4,368	141,862
1959	7,384	364	2,517	26,218	2,597	253,891	372	381	14,757	308,481
1960	12,940	630	3,666	34,054	4,155	352,166	644	498	25,696	434,448
1961	21,848	1,063	3,954	51,407	6,500	538,707	1,087	598	43,377	668,542
1962	49,320	2,410	7,867	94,933	13,834	1,017,146	2,465	1,879	98,141	1,287,996
1963	208,757	10,687	32,172	364,014	55,715	3,934,636	10,932	5,990	425,330	5,048,232
1964	328,286	16,961	64,890	600,152	88,904	6,636,279	17,350	11,942	672,013	8,436,776
1965	538,215	27,481	117,996	1,098,999	152,930	11,999,892	28,116	21,802	1,095,126	15,080,557
1966	1,107,757	52,586	279,172	2,218,832	339,222	24,857,487	53,789	38,891	2,173,090	31,120,826
1967	852,537	39,537	445,562	2,012,744	286,990	23,629,026	40,444	34,775	1,653,429	28,995,045
1968	198,739	9,739	166,267	1,104,132	70,086	11,544,942	9,962	12,238	396,075	13,512,180
1969	94,436	4,793	35,473	616,516	27,216	6,416,147	4,903	7,302	191,574	7,398,361
1970	54,344	2,720	21,686	414,659	15,520	4,145,046	2,782	3,999	109,470	4,770,226
1971	25,462	1,291	12,094	190,552	7,114	1,622,274	1,320	540	51,618	1,912,264
1972	11,589	589	8,354	82,886	3,409	723,623	602	343	23,526	854,921
1973	6,657	335	10,201	39,973	1,980	458,527	343	221	13,448	531,685
1974	9,478	469	11,044	45,420	2,766	483,866	479	326	18,979	572,828
1975	13,329	677	5,246	36,467	3,710	382,743	692	425	27,048	470,338
1976	17,506	837	12,615	53,085	5,621	654,026	856	1,152	34,455	780,152
1977	9,672	436	47,790	36,478	3,753	886,672	446	494	18,497	1,004,236
1978	23,499	(30,406)	6,178	54,219	6,579	575,169	1,209	1,402	47,446	685,296
1979	25,051	1,295	5,664	53,866	6,610	559,746	1,325	1,862	51,293	706,711
1980	144,980	(4,617)	31,160	321,890	38,126	3,211,810	7,682	7,144	297,215	4,055,391
1981	(5,427)	(15,464)	200	(44,773)	(1,223)	(385,275)	(296)	1,752	(11,324)	(461,830)
1982	49,916	2,584	6,600	83,283	13,142	654,692	2,638	1,252	102,287	916,395
1983	52,429	(35,295)	12,125	110,465	13,872	1,073,500	2,769	1,327	107,337	1,338,529
1984	86,345	4,474	14,303	154,799	22,764	1,617,225	4,572	2,678	177,020	2,084,180
1985	25,435	1,311	5,649	47,055	6,766	484,485	1,341	1,176	52,013	625,231
1986	38,309	(41,067)	9,862	71,661	10,320	796,097	2,009	778	78,142	966,110
1987	28,769	1,476	7,004	55,537	7,969	616,845	1,509	1,491	58,679	779,279
1988	52,329	2,831	17,078	70,572	12,049	909,046	2,894	4,620	109,713	1,181,132
1989	156,099	8,019	27,551	352,103	42,943	3,834,481	8,201	12,134	318,604	4,760,133
1990	292,361	15,142	50,360	553,394	87,199	6,094,021	15,487	22,729	599,233	7,729,927
1991	349,413	18,103	60,419	580,572	91,765	6,447,565	18,515	23,486	716,292	8,306,130
1992	125,891	6,439	28,019	241,559	34,559	2,711,639	6,585	10,883	256,370	3,421,943
1993	86,113	4,375	30,245	174,630	23,840	2,059,168	4,474	4,698	174,772	2,562,314
1994	64,762	3,323	23,894	124,518	17,633	1,488,418	3,398	2,173	132,095	1,860,211
1995	82,969	(1,000)	72,734	167,698	24,390	2,472,332	4,355	2,824	169,318	2,995,621
1996	27,611	(61,913)	51,990	68,870	8,812	1,233,548	1,437	1,590	56,092	1,388,037
1997	136,503	7,041	48,721	241,400	36,417	2,951,687	7,195	3,706	279,205	3,711,875
1998	70,737	(121,004)	23,083	122,934	18,622	1,474,568	3,742	1,278	144,963	1,738,923
1999	81,197	4,192	26,645	142,983	21,661	1,715,933	4,285	3,846	166,160	2,166,903
2000	21,089	1,073	9,822	45,704	6,013	547,927	1,096	(1,081)	42,826	674,466
2001	17,776	907	7,862	36,078	5,062	432,671	927	781	36,153	538,217
2002	93,258	4,801	18,852	163,537	25,021	1,835,443	4,909	1,470	190,549	2,337,839
2003	19,993	1,020	5,083	37,987	5,481	435,030	1,038	422	40,670	546,724
2004	18,558	958	4,113	34,437	4,911	374,948	980	1,518	37,972	478,394
2005	56,091	2,902	9,832	96,815	14,744	1,025,877	2,964	561	114,896	1,324,682
2006	10,670	551	1,947	30,110	2,812	197,248	564	732	21,841	266,475
2007	15,261	772	4,166	36,509	4,188	324,461	789	921	30,898	417,965
2008	62,504	3,233	11,391	104,213	16,434	1,151,588	3,304	2,079	128,030	1,482,775
2009	15,109	769	3,235	48,489	4,097	304,508	787	1,000	30,698	408,693
2010	27,193	1,410	36,031	67,633	7,112	848,012	1,443	318	55,776	1,044,927
2011	36,679	1,899	50,586	71,555	9,664	1,181,799	1,941	1,450	75,156	1,430,729
2012	42,554	2,101	23,353	90,014	11,882	1,139,946	2,149	3,019	85,122	1,400,140
2013	187,114	9,352	70,303	385,659	53,496	4,595,517	9,566	13,022	376,622	5,700,651
2014	197,108	10,063	95,812	366,806	53,569	4,666,940	10,296	15,319	401,027	5,816,940
2015	125,234	6,369	59,687	255,647	34,305	3,039,981	6,515	11,411	254,302	3,793,452
2016	293,506	14,839	243,283	581,580	80,635	8,356,946	15,177	10,396	594,215	10,190,577
2017	356,036	18,176	151,308	721,033	101,790	8,587,766	18,586	13,153	724,387	10,692,236
2018	252,480	13,103	100,292	704,291	69,157	7,237,570	13,402	11,421	518,040	8,919,758
2019	106,594	5,528	47,411	228,132	29,558	2,777,252	5,654	5,615	218,628	3,424,371
2020	0	0	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0
TOTAL	7,525,810	43,617	2,803,531	17,008,802	2,179,765	192,472,065	385,351	352,381	15,160,907	237,932,229

<sup>b</sup> Costs from Table B-10 allocated to Empire West Side Irrigation District are reduced herein by \$31,588 in 1978; \$12,129 in 1980; \$15,173 in 1981; \$38,004 in 1983; \$43,033 in 1986; \$5,261 in 1995; \$63,318 in 1996; and \$124,667 in 1998 in accordance with letters of agreement with the district.

<sup>c</sup> Costs related to maximum annual Table A of 15,000 acre-feet under Amendment 18 of the water supply contract with Kern County Water Agency.

TABLE B-14 Capital Costs of Transportation Facilities Allocated to Each Contractor (in dollars)

Sheet 3 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA									
	AVEK	Castaika Lake <sup>d</sup>	Coachella	Crestline	Desert	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel
	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]	[30]
1952	3,158	1,042	850	254	1,402	70	1,695	418	6,079	1,550
1953	10,026	3,327	2,668	799	4,401	222	5,318	1,328	19,058	4,852
1954	12,742	4,193	3,465	1,031	5,714	285	6,908	1,691	24,608	6,290
1955	5,411	1,881	1,374	401	2,267	115	2,756	715	9,229	2,377
1956	9,775	3,590	2,196	612	3,622	191	4,449	1,267	13,138	3,438
1957	26,306	9,255	6,343	1,816	10,461	540	12,767	3,450	40,646	10,534
1958	49,204	17,599	11,581	3,290	19,099	991	23,360	6,414	72,708	18,898
1959	70,247	29,740	15,869	4,616	26,171	1,347	31,759	9,030	98,596	25,519
1960	84,552	38,760	22,068	6,797	36,395	1,547	43,260	10,772	147,170	37,469
1961	126,542	54,262	34,613	12,530	57,086	2,245	63,709	16,437	236,164	57,707
1962	198,558	85,352	43,719	13,861	72,102	3,344	84,709	24,943	253,435	64,330
1963	580,138	255,252	116,797	33,149	192,624	9,828	234,926	73,256	610,277	160,624
1964	1,094,365	501,858	209,462	55,445	345,446	18,442	429,605	137,769	1,026,066	276,118
1965	1,908,076	947,523	385,533	103,757	635,825	32,819	786,986	244,587	1,913,090	512,862
1966	3,960,302	2,150,972	812,655	215,858	1,340,235	69,325	1,664,584	517,269	3,943,586	1,062,417
1967	4,976,538	4,100,531	1,077,422	296,069	1,776,892	88,301	2,182,240	653,250	5,821,681	1,550,239
1968	5,924,474	3,998,942	1,350,742	368,156	2,227,646	107,350	2,738,009	783,940	7,982,824	2,122,940
1969	5,822,708	3,079,426	1,690,259	539,851	2,787,631	121,303	3,256,507	865,455	10,898,185	2,769,647
1970	5,032,959	3,277,778	2,050,788	695,345	3,382,251	106,381	3,872,367	736,775	13,795,809	3,457,109
1971	2,577,507	2,146,954	1,071,523	338,581	1,767,179	48,337	2,087,223	347,057	8,137,053	1,987,120
1972	973,436	283,257	331,759	92,079	547,138	19,134	668,550	134,360	2,691,137	697,957
1973	354,407	914,303	158,579	82,223	261,557	6,304	238,094	46,102	1,760,570	403,582
1974	451,450	280,861	259,175	74,113	427,433	8,143	518,453	59,145	1,617,394	425,927
1975	253,438	246,492	193,632	52,821	319,337	4,954	392,110	33,995	1,533,664	407,913
1976	237,539	255,238	136,751	37,235	225,529	4,245	277,807	31,002	962,280	255,901
1977	199,554	371,469	91,384	25,858	150,711	3,757	183,609	26,834	591,445	155,537
1978	302,111	470,176	78,573	22,226	129,584	5,233	157,815	38,654	428,989	111,769
1979	357,678	938,985	81,807	21,795	134,915	5,965	166,931	44,410	403,569	108,408
1980	1,867,517	1,777,294	423,755	113,166	698,855	32,435	864,104	240,899	2,040,757	548,085
1981	(158,728)	610,795	(47,102)	(8,865)	(77,678)	(2,576)	(102,568)	(19,588)	(143,875)	(43,557)
1982	1,557,934	861,928	298,770	78,903	492,728	26,237	613,587	196,672	1,421,407	388,261
1983	2,062,512	521,349	396,033	115,678	653,134	34,699	803,945	259,939	2,126,313	581,672
1984	1,518,361	295,783	297,559	85,097	490,731	27,272	606,124	188,562	1,546,628	423,408
1985	896,226	158,810	217,115	62,532	358,064	13,104	441,299	107,533	1,116,949	305,291
1986	841,555	104,860	221,194	58,152	364,790	9,038	454,702	93,309	1,048,625	286,302
1987	333,052	105,625	166,099	43,992	273,928	5,566	340,485	40,716	783,725	213,202
1988	259,234	174,155	65,831	22,723	108,570	3,384	128,339	26,743	429,498	113,644
1989	1,045,999	434,394	323,138	97,036	532,920	16,777	649,616	125,344	1,375,722	372,048
1990	678,053	374,313	332,566	97,789	548,468	7,335	672,344	67,179	1,509,745	409,710
1991	831,687	401,961	367,196	120,925	605,579	11,966	733,443	92,625	1,979,364	540,210
1992	633,272	356,952	270,826	131,328	446,647	9,556	501,634	76,760	2,093,387	573,386
1993	634,283	332,089	222,347	171,095	366,700	10,194	353,470	73,955	3,848,084	1,046,752
1994	467,409	165,607	132,599	93,839	218,685	7,255	218,494	53,209	2,347,599	637,733
1995	459,990	293,308	132,690	78,390	218,835	7,436	232,377	54,544	1,960,100	530,656
1996	299,764	206,742	110,520	44,965	182,270	4,885	211,872	35,808	4,024,655	972,829
1997	438,898	249,699	103,382	24,640	170,497	7,397	214,534	54,452	2,892,626	397,103
1998	234,379	202,650	62,492	41,136	103,063	3,989	106,009	29,551	3,683,353	303,255
1999	268,224	175,939	89,312	40,069	147,294	4,812	167,592	35,399	5,733,587	235,054
2000	139,035	77,889	54,795	23,903	90,369	2,665	103,194	19,150	14,346,200	171,107
2001	130,754	44,790	50,816	15,641	83,805	2,989	102,254	20,949	20,292,396	96,254
2002	199,807	121,849	40,293	12,884	66,452	3,001	80,478	22,664	9,868,237	133,675
2003	76,592	42,072	24,945	7,688	41,140	1,245	50,028	9,409	4,043,119	54,302
2004	81,688	46,992	23,476	6,416	38,716	1,445	48,028	10,585	2,163,304	42,507
2005	232,323	126,137	47,108	14,116	77,691	4,011	93,862	29,628	1,028,935	71,539
2006	334,422	246,722	68,325	25,180	112,684	5,626	126,956	42,114	2,038,034	113,701
2007	258,891	182,329	57,769	22,068	95,272	4,567	111,771	33,367	2,135,050	108,623
2008	159,067	175,464	70,874	60,890	116,900	2,792	83,144	20,471	3,370,729	263,890
2009	578,474	339,864	153,763	60,390	253,597	9,843	275,836	73,253	4,780,827	271,769
2010	644,944	340,818	193,760	62,827	319,555	10,812	371,109	81,075	5,464,239	285,839
2011	341,198	219,298	230,791	59,404	380,618	5,744	474,843	42,979	7,766,883	287,950
2012	257,613	144,365	343,375	87,824	566,289	5,062	708,509	35,082	12,009,741	445,112
2013	789,946	377,704	348,815	91,411	575,262	15,285	718,195	106,713	34,509,949	488,498
2014	875,295	463,394	248,206	64,409	409,340	15,980	512,246	114,774	30,956,904	409,695
2015	1,055,137	551,459	271,019	69,580	446,961	19,980	559,583	147,636	17,918,289	460,622
2016	1,101,272	914,143	222,597	68,017	367,107	18,773	450,948	139,570	19,706,337	402,587
2017	<b>1,389,544</b>	<b>888,769</b>	<b>309,506</b>	<b>92,561</b>	<b>510,436</b>	<b>25,013</b>	<b>627,849</b>	<b>180,911</b>	<b>11,336,624</b>	<b>632,965</b>
2018	1,617,566	899,351	381,231	101,882	628,723	29,364	782,971	212,246	5,711,566	715,887
2019	801,107	562,532	175,859	45,716	290,025	13,645	362,326	102,152	2,934,515	331,647
2020	0	0	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0
<b>TOTAL</b>	<b>61,837,496</b>	<b>39,039,211</b>	<b>17,745,231</b>	<b>5,605,967</b>	<b>29,265,674</b>	<b>1,109,320</b>	<b>34,992,037</b>	<b>8,128,664</b>	<b>319,238,576</b>	<b>31,322,248</b>

<sup>d</sup> Costs from Table B-10 allocated to Castaika Lake Water Agency are reduced herein by \$14,088 in 1978 in accordance with a letter of agreement with the agency.

TABLE B-14 Capital Costs of Transportation Facilities Allocated to Each Contractor (in dollars)

Sheet 4 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA				South Bay Area Future Contractor	Grand Total
	San Gorgonio	Metropolitan <sup>a</sup>	Ventura	Total	Yuba City	Butte	Plumas	Total		
	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]	[40]
1952	962	69,020	370	86,871	0	0	0	0	59	99,353
1953	3,011	217,634	1,187	273,833	0	0	0	0	264	311,812
1954	3,904	279,967	1,496	352,294	0	0	0	0	766	402,143
1955	1,474	111,602	670	140,272	0	0	0	0	969	169,342
1956	2,127	179,335	1,299	225,040	0	0	0	0	9,172	351,551
1957	6,526	516,050	3,367	648,059	0	0	0	0	23,172	1,464,452
1958	11,701	945,684	6,390	1,186,917	0	0	2	2	32,888	2,286,623
1959	15,815	1,364,298	9,894	1,702,901	0	0	14	14	57,918	2,967,412
1960	23,307	1,914,521	12,798	2,379,418	0	0	28	28	123,202	4,660,833
1961	36,153	3,212,125	18,770	3,928,343	0	0	10	10	316,220	8,545,244
1962	40,012	3,543,471	29,069	4,456,905	0	0	32	32	228,202	8,875,171
1963	99,266	11,185,928	86,807	13,638,873	0	0	51	51	528,496	24,610,278
1964	170,012	18,065,455	164,709	22,494,750	0	0	7,791	7,791	590,034	41,736,060
1965	316,082	33,763,577	307,475	41,858,192	0	0	3,139	3,139	332,680	62,664,743
1966	654,194	74,485,027	681,898	91,558,323	0	0	(48)	(48)	783,728	129,110,330
1967	958,406	130,599,417	1,279,076	155,360,062	0	0	47	47	1,479,421	194,146,365
1968	1,314,841	147,502,290	1,360,687	177,782,842	0	0	51,573	51,573	1,254,192	197,978,911
1969	1,726,891	140,096,646	1,085,026	174,739,535	0	0	234,232	234,232	398,183	184,473,490
1970	2,160,122	161,983,078	1,147,609	201,698,371	0	0	16,227	16,227	74,028	207,082,650
1971	1,237,573	133,903,316	738,822	156,388,246	0	0	27,204	27,204	12,457	158,624,739
1972	434,507	43,931,880	66,878	50,872,072	0	0	9	9	13,182	51,936,917
1973	256,711	39,723,010	290,020	44,495,462	0	0	25	25	8,099	45,263,853
1974	264,349	18,896,593	86,362	23,369,399	0	0	45	45	28,570	24,402,166
1975	253,838	16,732,939	83,975	20,509,109	0	0	21	21	8,226	21,318,838
1976	158,850	13,545,451	84,623	16,212,450	0	0	51	51	16,486	17,492,910
1977	96,517	11,769,352	110,833	13,776,859	0	0	28	28	21,181	15,544,382
1978	69,152	15,781,696	174,876	17,770,853	0	0	38	38	28,876	19,073,475
1979	66,847	27,627,424	343,361	30,302,093	0	0	23	23	26,668	31,857,362
1980	337,811	59,493,774	641,586	69,080,039	0	0	26	26	59,169	74,974,704
1981	(26,356)	15,661,179	224,257	15,865,338	0	0	34	34	(6,746)	15,727,602
1982	238,792	30,873,857	316,107	37,365,183	0	0	11	11	16,086	39,705,931
1983	357,812	25,056,047	187,121	33,156,253	0	0	19	19	72,225	38,006,645
1984	260,327	16,317,441	103,160	22,160,455	0	0	26	26	83,252	30,414,886
1985	187,699	10,243,779	56,162	14,164,564	0	0	29	29	16,338	28,581,730
1986	176,057	8,365,310	34,777	12,058,671	0	0	31	31	16,248	41,035,899
1987	131,163	6,955,356	36,142	9,429,050	0	0	32	32	29,062	32,523,660
1988	70,260	6,626,545	57,117	8,086,041	0	0	55	55	50,083	18,140,686
1989	227,772	18,531,680	153,200	23,885,645	0	0	44	44	43,324	33,301,366
1990	251,185	17,430,869	125,376	22,504,929	0	0	63	63	96,419	34,453,743
1991	331,235	20,792,168	132,558	26,940,915	0	0	54	54	149,922	39,811,664
1992	351,492	21,196,762	116,999	26,758,999	0	0	42	42	80,900	35,041,233
1993	646,980	29,471,748	105,693	37,283,389	0	0	30	30	59,324	53,921,787
1994	394,936	16,392,019	50,941	21,180,326	0	0	14	14	34,208	74,225,377
1995	331,286	16,078,395	72,214	20,450,221	0	0	3	3	42,395	191,525,108
1996	1,079,629	23,237,696	49,282	30,460,917	0	0	0	0	21,388	188,829,048
1997	1,914,804	13,530,777	72,335	20,071,144	0	0	3	3	34,976	65,660,155
1998	3,219,136	11,284,364	65,745	19,339,120	0	0	7	7	11,234	32,689,229
1999	5,888,075	9,063,618	54,504	21,903,479	0	0	2	2	34,616	35,159,766
2000	16,301,847	5,393,221	24,010	36,747,384	0	0	24	24	16,912	43,646,866
2001	23,613,431	2,988,800	13,047	47,455,926	0	0	20	20	68,013	50,961,381
2002	11,150,014	5,787,234	39,607	27,526,196	0	0	14	14	382,151	38,657,775
2003	4,505,927	5,783,732	13,689	14,653,890	0	0	0	0	590,294	23,112,883
2004	2,291,776	4,555,521	15,942	9,326,396	0	0	0	0	156,414	15,012,639
2005	816,407	7,322,277	42,941	9,906,976	0	0	0	0	123,949	13,555,798
2006	1,805,626	13,867,322	90,203	18,876,917	0	0	5	5	120,330	21,725,278
2007	2,116,022	11,723,751	65,425	16,914,905	0	0	0	0	266,740	24,261,822
2008	2,807,622	11,885,796	60,480	19,078,119	0	0	4	4	493,279	35,202,241
2009	4,253,381	22,122,930	122,402	33,296,331	0	0	13	13	1,018,936	48,477,206
2010	5,295,528	18,062,434	107,473	31,240,413	0	0	0	0	6,354,657	55,412,806
2011	8,034,523	12,729,103	55,589	30,628,923	0	0	1	1	2,566,271	52,326,660
2012	12,375,165	17,420,517	42,735	44,441,389	0	0	0	0	1,004,833	60,251,441
2013	38,758,009	28,351,615	110,781	105,242,183	0	0	0	0	546,046	120,654,854
2014	35,045,545	21,851,724	126,201	91,093,714	0	0	0	0	(16,925)	99,407,310
2015	19,455,197	43,016,163	170,596	84,142,221	0	0	0	0	277,912	93,157,813
2016	10,342,761	55,738,581	214,717	89,687,410	0	0	0	0	81,484	104,116,919
2017	5,405,291	52,601,147	258,270	74,258,886	0	0	0	0	36,341	87,166,031
2018	2,178,612	51,649,959	280,428	65,189,785	0	0	0	0	323,822	78,780,160
2019	1,151,501	32,720,720	179,164	39,670,908	0	0	0	0	111,029	44,737,568
2020	0	0	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0
<b>TOTAL</b>	<b>234,457,429</b>	<b>1,854,122,716</b>	<b>12,867,325</b>	<b>2,649,731,894</b>	<b>0</b>	<b>0</b>	<b>341,149</b>	<b>341,149</b>	<b>21,864,249</b>	<b>3,671,807,072</b>

<sup>a</sup> Costs from Table B-10 allocated to The Metropolitan Water District of Southern California are reduced herein by \$16,425,374 in 1972 under provisions of Amendment 7 to its water supply contract.

**TABLE B-15 Capital Cost Component of Transportation Charge for Each Contractor (in dollars)<sup>a,b,c</sup>**

Sheet 1 of 4

Calendar Year	NORTH BAY AREA			SOUTH BAY AREA				CENTRAL COASTAL AREA		
	Napa	Solano	Total	Alameda-Zone 7	Alameda County	Santa Clara	Total	San Luis Obispo	Santa Barbara	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	153,778	105,673	364,827	624,278	0	0	0
1964	0	0	0	216,203	170,929	530,036	917,168	6,696	21,667	28,363
1965	0	0	0	284,369	259,943	899,371	1,443,684	13,756	36,029	49,785
1966	18,063	0	18,063	320,384	290,808	1,073,270	1,684,462	26,524	61,349	87,873
1967	41,574	0	41,574	391,262	320,989	1,187,619	1,899,870	56,469	118,263	174,731
1968	121,509	0	121,509	507,987	361,935	1,309,946	2,179,868	104,160	208,037	312,197
1969	165,289	0	165,289	610,320	397,386	1,411,701	2,419,407	122,043	242,426	364,469
1970	169,077	0	169,077	644,726	412,322	1,450,660	2,507,708	125,963	250,808	376,771
1971	171,286	0	171,286	651,690	415,439	1,457,564	2,524,693	128,402	256,371	384,773
1972	172,649	0	172,649	653,292	416,368	1,461,847	2,531,506	129,861	260,482	390,343
1973	173,649	31,366	205,015	654,759	417,018	1,465,086	2,536,863	130,843	263,040	393,883
1974	176,527	32,938	209,466	655,864	417,636	1,467,092	2,540,591	132,015	265,901	397,916
1975	184,973	36,291	221,264	658,384	418,879	1,470,816	2,548,078	133,290	269,028	402,318
1976	189,650	40,836	230,485	659,811	419,684	1,472,924	2,552,418	134,041	272,155	406,196
1977	192,592	45,096	237,688	662,613	421,449	1,478,507	2,562,568	135,754	278,799	414,553
1978	195,860	49,178	245,038	666,364	423,747	1,485,299	2,575,410	141,271	292,281	433,552
1979	199,390	53,340	252,730	671,832	427,108	1,494,207	2,593,148	142,362	297,569	439,930
1980	209,132	67,748	276,880	675,794	429,296	1,499,843	2,604,932	143,530	303,969	447,499
1981	222,599	87,408	310,007	686,138	435,629	1,515,357	2,637,124	148,789	327,544	476,333
1982	234,191	106,918	341,110	684,198	434,108	1,512,014	2,630,321	148,004	320,657	468,660
1983	262,160	151,259	413,419	685,644	434,532	1,513,393	2,633,568	148,213	317,658	465,870
1984	326,072	224,245	550,317	696,867	441,230	1,530,671	2,668,768	149,853	323,275	473,127
1985	455,836	364,305	820,141	709,462	448,410	1,548,594	2,706,466	151,658	328,761	480,419
1986	819,636	692,479	1,512,115	711,533	449,390	1,551,318	2,712,242	152,545	332,779	485,324
1987	1,360,688	1,559,243	2,919,931	714,293	451,007	1,555,828	2,721,129	154,805	348,472	503,277
1988	1,771,651	2,208,121	3,979,772	718,680	453,514	1,562,985	2,735,179	161,346	417,591	578,937
1989	1,891,484	2,433,160	4,324,645	727,688	459,332	1,578,655	2,765,675	169,453	494,247	663,699
1990	1,955,330	2,514,151	4,469,481	735,864	464,692	1,592,216	2,792,772	177,387	557,384	734,771
1991	1,978,582	2,557,403	4,535,985	752,972	476,459	1,625,032	2,854,463	189,050	639,235	828,285
1992	1,983,860	2,562,121	4,545,981	783,571	496,722	1,675,047	2,955,340	204,822	754,678	959,500
1993	1,986,897	2,565,427	4,552,324	797,930	505,773	1,698,585	3,002,289	224,056	941,300	1,165,356
1994	1,993,467	2,572,330	4,565,797	808,361	512,498	1,716,961	3,037,820	286,878	1,585,162	1,872,040
1995	1,997,323	2,576,836	4,574,159	812,837	515,639	1,729,387	3,057,862	517,412	4,095,799	4,613,211
1996	1,998,994	2,578,433	4,577,427	820,741	520,936	1,743,439	3,085,117	1,187,010	12,569,247	13,756,257
1997	2,000,110	2,579,484	4,579,594	824,791	523,583	1,750,461	3,098,835	1,808,545	20,578,178	22,386,724
1998	2,001,225	2,585,478	4,586,703	831,521	527,976	1,762,113	3,121,611	1,985,644	22,700,288	24,685,933
1999	2,002,204	2,586,690	4,588,893	833,750	529,331	1,765,656	3,128,737	2,035,260	23,293,767	25,329,027
2000	2,006,043	2,592,730	4,598,773	995,060	533,508	1,777,485	3,306,054	2,088,005	23,838,744	25,926,748
2001	2,326,959	2,783,054	5,110,013	1,129,600	535,165	1,782,101	3,446,866	2,116,046	24,156,352	26,272,398
2002	2,327,398	2,783,894	5,111,292	1,144,002	550,866	1,890,059	3,584,927	2,120,253	24,187,702	26,307,955
2003	2,328,742	2,786,703	5,115,446	1,229,165	621,150	2,236,683	4,086,998	2,124,324	24,210,510	26,334,833
2004	2,332,426	2,787,997	5,120,423	1,363,189	700,643	2,512,474	4,576,306	2,125,494	24,217,560	26,343,054
2005	2,342,974	2,789,335	5,132,309	1,399,982	721,599	2,761,150	4,882,731	2,126,238	24,220,734	26,346,972
2006	2,347,226	2,793,568	5,140,793	1,435,499	742,505	2,855,962	5,033,966	2,126,116	24,210,804	26,336,921
2007	2,410,261	2,794,938	5,205,199	1,470,671	763,106	2,906,021	5,139,797	2,126,644	24,214,870	26,341,514
2008	2,644,076	2,797,935	5,442,011	1,551,173	809,662	3,017,673	5,378,509	2,127,678	24,220,221	26,347,899
2009	3,225,451	2,802,260	6,027,711	1,702,818	897,252	3,227,237	5,827,307	2,129,520	24,226,659	26,356,180
2010	3,315,236	2,803,627	6,118,864	2,019,588	1,082,010	3,667,829	6,769,428	2,130,099	24,231,578	26,361,677
2011	3,345,630	2,803,872	6,149,502	2,738,611	1,318,824	4,260,316	8,317,751	2,135,205	24,241,069	26,376,274
2012	3,360,757	2,806,902	6,167,659	3,260,311	1,583,400	4,898,039	9,741,750	2,142,782	24,257,291	26,400,073
2013	3,399,861	2,839,745	6,239,606	3,399,722	1,664,856	5,007,406	10,071,984	2,148,174	24,281,035	26,429,210
2014	3,453,831	2,893,117	6,346,948	3,474,962	1,690,277	5,123,939	10,289,178	2,160,295	24,351,739	26,512,034
2015	3,503,780	2,946,007	6,449,786	3,374,007	1,588,262	4,739,810	9,702,079	2,178,117	24,453,526	26,631,643
2016	3,499,646	2,967,809	6,467,456	3,418,675	1,606,440	4,688,045	9,713,161	2,184,672	24,532,606	26,717,277
2017	<b>3,478,545</b>	<b>2,977,737</b>	<b>6,456,281</b>	<b>3,368,386</b>	<b>1,590,219</b>	<b>4,607,890</b>	<b>9,566,495</b>	<b>2,208,974</b>	<b>24,674,025</b>	<b>26,882,999</b>
2018	3,389,707	2,982,082	6,371,789	3,259,558	1,555,230	4,499,815	9,314,603	2,194,548	24,697,077	26,891,625
2019	3,351,709	3,008,822	6,360,531	3,232,855	1,559,047	4,494,501	9,286,403	2,205,229	24,790,797	26,996,026
2020	3,354,166	3,024,110	6,378,276	3,216,641	1,551,851	4,474,845	9,243,337	2,215,707	24,848,456	27,064,162
2021	3,351,634	3,024,110	6,375,744	3,209,443	1,548,734	4,467,940	9,226,118	2,213,268	24,842,893	27,056,161
2022	3,350,074	3,024,110	6,374,184	3,208,067	1,547,806	4,463,657	9,219,531	2,211,809	24,838,782	27,050,591
2023	3,348,931	2,990,578	6,339,508	3,206,658	1,547,156	4,460,418	9,214,232	2,210,827	24,836,224	27,047,051
2024	3,345,650	2,988,944	6,334,594	3,205,596	1,546,538	4,458,412	9,210,546	2,209,655	24,833,363	27,043,018
2025	3,336,035	2,985,367	6,321,402	3,203,260	1,545,295	4,454,688	9,203,243	2,208,380	24,830,237	27,038,616
2026	3,330,691	2,980,613	6,311,304	3,201,786	1,544,490	4,452,580	9,198,856	2,207,629	24,827,109	27,034,738
2027	3,327,320	2,976,178	6,303,498	3,198,799	1,542,725	4,446,998	9,188,521	2,205,916	24,820,465	27,026,381
2028	3,323,580	2,971,919	6,295,499	3,194,790	1,540,427	4,440,205	9,175,421	2,200,399	24,806,983	27,007,382
2029	3,319,543	2,967,551	6,287,094	3,188,792	1,537,065	4,431,297	9,157,155	2,199,308	24,801,695	27,001,004
2030	3,308,386	2,952,089	6,260,475	3,184,596	1,534,878	4,425,661	9,145,135	2,198,140	24,795,295	26,993,435
2031	3,292,970	2,931,023	6,223,992	3,173,113	1,528,545	4,410,147	9,111,805	2,192,881	24,771,720	26,964,601
2032	3,279,673	2,910,078	6,189,751	3,175,629	1,530,065	4,413,490	9,119,185	2,193,666	24,778,608	26,972,274
2033	3,247,613	2,862,627	6,110,240	3,174,388	1,529,642	4,412,111	9,116,141	2,193,457	24,781,606	26,975,063
2034	3,174,517	2,786,011	5,960,527	3,161,965	1,522,944	4,394,834	9,079,742	2,191,817	24,775,989	26,967,807
2035	3,026,373	2,639,709	5,666,082	3,148,119	1,515,764	4,376,910	9,040,793	2,190,012	24,770,503	26,960,515
<b>TOTAL</b>	<b>140,730,943</b>	<b>137,619,435</b>	<b>278,350,378</b>	<b>120,095,749</b>	<b>62,335,315</b>	<b>195,846,955</b>	<b>378,278,019</b>	<b>89,948,990</b>	<b>977,799,023</b>	<b>1,067,748,013</b>

<sup>a</sup> Unadjusted for prior overpayments or underpayments of charges.<sup>b</sup> Determined at the current Project Interest Rate of 4.610 percent per annum.<sup>c</sup> Reflects the transfers of permanent aqueduct capacity among contractors.



TABLE B-15 Capital Cost Component of Transportation Charge for Each Contractor (in dollars)<sup>a,b,c</sup>

Sheet 2 of 4

Calendar Year	SAN JOAQUIN VALLEY AREA									
	Dudley Ridge	Empire	Future Contractor San Joaquin Valley	Kern			Kings	Oak Flat	Tulare	Total
				Municipal and Industrial	Municipal and Industrial <sup>d</sup>	Agricultural				
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	2,725	0	0	0	0	0	0	2,725
1965	0	0	6,029	64,284	9,284	0	0	0	0	79,598
1966	0	0	12,039	120,256	17,073	0	0	0	0	149,368
1967	0	0	26,257	233,262	34,350	0	0	0	0	293,869
1968	80,541	1,907	48,950	335,771	48,966	437,900	9,407	4,950	67,937	1,036,329
1969	80,682	5,720	57,418	392,005	52,536	899,308	10,158	5,380	257,051	1,760,257
1970	88,426	5,720	59,224	423,404	53,922	1,093,828	10,446	5,595	190,223	1,930,788
1971	100,817	5,720	60,329	444,522	54,712	1,452,791	10,612	6,026	202,424	2,337,953
1972	112,644	5,720	60,945	454,227	55,075	2,175,428	10,694	11,548	624,464	3,510,744
1973	123,909	5,720	61,370	458,449	55,248	2,509,025	10,736	6,672	241,533	3,472,662
1974	188,060	5,720	61,890	460,485	55,349	2,809,736	10,770	7,470	400,905	4,000,384
1975	228,415	5,720	62,452	462,798	55,490	3,365,290	10,812	7,696	478,375	4,677,048
1976	174,154	5,720	62,720	464,655	55,679	3,627,755	10,853	8,692	342,219	4,752,446
1977	171,219	5,720	63,362	467,359	55,965	3,974,977	10,914	7,963	327,206	5,084,685
1978	183,047	0	65,796	469,216	56,156	4,418,522	11,019	8,393	351,053	5,563,203
1979	217,088	5,720	66,111	471,978	56,491	4,851,732	11,086	8,608	395,093	6,083,907
1980	230,921	5,720	66,399	474,721	56,828	5,294,333	11,157	12,267	397,638	6,549,984
1981	230,921	5,720	67,986	491,115	58,770	5,794,252	11,565	9,254	421,486	7,091,069
1982	230,921	5,720	67,996	488,835	58,707	6,255,660	11,552	9,685	444,778	7,573,855
1983	241,622	5,720	68,332	493,076	59,377	6,780,957	11,685	8,113	52,952	7,721,835
1984	254,013	5,720	68,950	498,702	60,083	7,117,422	11,834	10,330	347,232	8,374,286
1985	265,841	5,720	69,678	506,586	61,243	7,578,817	12,069	10,545	252,609	8,763,109
1986	277,668	5,720	69,966	508,983	61,587	7,701,383	12,141	10,976	539,058	9,187,482
1987	289,496	5,720	70,471	512,652	62,116	8,502,556	12,251	11,191	562,351	10,028,804
1988	301,324	5,720	70,832	515,513	62,526	8,937,644	12,334	11,621	585,643	10,503,156
1989	313,151	5,720	71,717	519,169	63,150	9,251,501	12,501	12,052	609,490	10,858,451
1990	162,490	5,720	73,153	537,527	65,389	9,577,588	12,936	12,267	657,185	11,104,256
1991	300,822	5,720	75,796	566,573	69,966	9,577,588	13,762	12,267	657,185	11,279,680
1992	324,979	5,720	78,990	597,260	74,817	9,577,588	14,756	12,267	657,185	11,343,562
1993	324,979	5,720	80,482	610,123	76,657	9,577,588	15,124	12,267	657,185	11,360,125
1994	324,979	5,720	82,105	619,494	77,936	9,577,588	15,397	12,267	657,185	11,372,671
1995	324,979	5,720	83,398	626,231	78,890	9,577,588	15,608	12,267	657,185	11,381,866
1996	300,592	5,720	87,367	635,384	80,221	9,248,813	15,961	12,267	657,185	11,043,511
1997	300,592	5,720	90,231	639,177	80,707	9,181,391	16,133	12,267	657,185	10,983,402
1998	300,591	5,720	92,940	652,602	82,732	8,928,998	16,588	12,267	657,185	10,749,624
1999	300,591	5,720	94,237	659,509	83,778	8,928,998	16,823	12,267	657,185	10,759,109
2000	300,591	5,720	95,750	667,629	85,008	8,282,917	17,096	12,267	657,185	10,124,164
2001	300,591	5,720	96,315	670,255	85,354	8,147,788	17,172	12,267	657,185	9,992,646
2002	323,398	5,720	96,772	672,352	85,648	8,147,788	17,237	12,267	617,226	9,978,407
2003	323,398	5,720	97,882	681,983	87,121	8,147,788	17,536	12,267	614,946	9,988,641
2004	323,398	5,720	98,185	684,250	87,449	8,135,401	46,093	12,267	530,040	9,922,803
2005	323,398	5,720	98,434	686,336	87,746	8,135,401	46,156	12,267	530,040	9,925,497
2006	323,398	5,720	99,039	692,288	88,653	8,135,401	48,078	12,267	528,303	9,933,147
2007	323,398	5,720	99,161	694,170	88,828	8,135,401	48,114	12,267	528,303	9,935,362
2008	323,398	5,720	99,425	696,491	89,095	8,135,401	48,169	12,267	528,303	9,938,269
2009	323,398	5,720	100,163	703,240	90,159	8,135,401	48,387	12,267	528,303	9,947,038
2010	283,973	5,720	100,377	706,442	90,429	7,958,283	48,442	12,267	488,415	9,694,348
2011	283,973	5,720	102,807	711,003	90,909	7,958,283	48,614	12,267	488,415	9,701,991
2012	283,973	5,720	106,295	715,938	91,575	7,958,283	48,857	12,267	488,415	9,711,323
2013	283,973	5,720	107,944	722,296	92,415	7,958,283	49,051	12,267	488,415	9,720,364
2014	272,748	5,720	110,315	750,243	96,291	7,958,283	49,852	12,267	480,147	9,735,866
2015	255,852	5,720	114,147	713,283	90,997	7,958,283	50,793	12,267	480,147	9,681,489
2016	255,852	5,720	112,718	676,928	85,841	7,958,283	51,403	12,267	480,147	9,639,159
2017	280,240	5,720	117,775	610,003	74,953	8,344,206	53,159	12,267	480,147	9,978,471
2018	280,240	5,720	107,494	566,636	68,686	8,344,206	45,559	12,267	480,147	9,910,956
2019	280,240	5,720	107,567	570,383	71,006	8,344,206	46,137	12,267	480,147	9,917,673
2020	257,710	5,720	109,966	559,222	72,243	8,344,206	46,449	12,267	480,147	9,887,930
2021	257,710	5,720	108,862	538,104	71,452	8,344,206	46,283	12,267	480,147	9,864,751
2022	257,710	5,720	108,246	528,399	71,090	8,344,206	46,201	12,267	480,147	9,853,986
2023	257,710	5,720	107,821	524,178	70,916	8,344,206	46,158	12,267	480,147	9,849,123
2024	257,710	5,720	107,301	522,142	70,815	8,344,206	46,124	12,267	480,147	9,846,432
2025	257,710	5,720	106,739	519,828	70,675	8,344,206	46,083	12,267	480,147	9,843,374
2026	257,710	5,720	106,471	517,971	70,486	8,344,206	46,042	12,267	480,147	9,841,020
2027	257,710	5,720	105,829	515,268	70,199	8,344,206	45,980	12,267	480,147	9,837,326
2028	257,710	5,720	103,395	513,410	70,008	8,344,206	45,875	12,267	480,147	9,832,738
2029	257,710	5,720	103,080	510,648	69,673	8,344,206	45,809	12,267	480,147	9,829,260
2030	257,710	5,720	102,792	507,905	69,336	8,344,206	45,738	12,267	480,147	9,825,821
2031	257,710	5,720	101,205	491,511	67,395	8,344,206	45,329	12,267	480,147	9,805,490
2032	257,710	5,720	101,195	493,791	67,457	8,344,206	45,342	12,267	480,147	9,807,835
2033	257,710	5,720	100,858	489,550	66,788	8,344,206	45,210	12,267	480,147	9,802,455
2034	257,710	5,720	100,241	483,924	66,081	8,344,206	45,061	12,267	480,147	9,795,357
2035	257,710	5,720	99,513	476,040	64,922	8,344,206	44,825	12,267	480,147	9,785,349
<b>TOTAL</b>	<b>17,423,264</b>	<b>379,427</b>	<b>6,050,720</b>	<b>38,659,946</b>	<b>4,929,478</b>	<b>494,371,127</b>	<b>1,978,096</b>	<b>759,309</b>	<b>32,900,298</b>	<b>597,451,665</b>

<sup>a</sup> Unadjusted for prior overpayments or underpayments of charges.<sup>b</sup> Determined at the current Project Interest Rate of 4.610 percent per annum.<sup>c</sup> Reflects the transfers of permanent aqueduct capacity among contractors.<sup>d</sup> Charges under Amendment No. 18 of the water supply contract with Kern County Water Agency.

**TABLE B-15 Capital Cost Component of Transportation Charge for Each Contractor (in dollars)**<sup>a,b,c</sup>

Sheet 3 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA									
	AVEK	Castaic Lake	Coachella	Crestline	Desert	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel
	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]	[30]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0
1963	34,411	0	0	0	726	0	0	0	51,729	0
1964	64,494	27,447	19,542	4,370	38,211	1,143	30,324	8,205	82,811	34,987
1965	121,484	53,007	34,348	7,194	42,701	2,082	53,730	15,222	135,069	35,344
1966	221,012	101,264	62,476	12,478	76,886	3,753	96,944	27,679	232,502	61,465
1967	427,622	210,814	121,269	23,472	148,839	7,284	188,141	54,023	433,350	115,574
1968	689,327	420,406	206,952	38,551	245,877	11,781	311,846	87,293	729,849	194,527
1969	1,003,797	624,866	318,583	57,301	368,426	17,249	468,342	127,219	1,136,415	302,649
1970	1,312,832	782,035	451,031	84,796	520,243	23,427	651,828	171,297	1,691,461	443,708
1971	1,581,850	949,590	595,102	120,210	700,914	28,845	864,650	208,821	2,394,083	619,778
1972	1,720,363	1,060,176	671,098	137,454	795,465	31,306	980,825	226,497	2,808,504	720,983
1973	1,772,377	1,075,176	696,065	142,143	825,044	32,281	1,018,759	233,340	2,945,564	756,530
1974	1,791,355	1,122,258	707,278	146,331	839,031	32,602	1,032,858	235,688	3,035,230	777,084
1975	1,815,881	1,137,517	724,295	150,105	861,611	33,017	1,062,188	238,700	3,117,604	798,777
1976	1,829,760	1,150,522	736,112	152,796	878,290	33,269	1,083,591	240,431	3,195,714	819,552
1977	1,842,615	1,164,117	744,718	154,692	890,124	33,485	1,099,294	242,010	3,244,723	832,585
1978	1,853,320	1,183,798	750,463	156,009	898,031	33,676	1,110,253	243,377	3,274,845	840,506
1979	1,869,355	1,208,488	756,140	157,141	904,987	33,943	1,120,086	245,346	3,296,693	846,199
1980	1,888,324	1,257,072	762,012	158,251	912,220	34,247	1,130,426	247,607	3,317,247	851,720
1981	1,987,339	1,348,448	796,384	164,015	950,529	35,899	1,180,521	259,877	3,421,183	879,634
1982	1,978,809	1,380,348	789,720	163,563	945,667	35,768	1,174,972	258,879	3,413,856	877,416
1983	2,061,590	1,425,149	809,319	167,582	971,692	37,104	1,209,272	268,895	3,486,248	897,190
1984	2,171,231	1,452,273	834,564	173,473	1,006,034	38,871	1,249,189	282,134	3,594,542	926,815
1985	2,251,676	1,468,130	851,720	177,807	1,031,452	40,260	1,282,056	291,738	3,673,311	948,379
1986	2,299,323	1,477,004	863,875	180,992	1,049,921	40,927	1,314,961	297,214	3,730,198	963,927
1987	2,344,046	1,483,175	876,261	183,970	1,068,826	41,390	1,331,125	301,992	3,783,895	978,588
1988	2,362,143	1,489,362	885,509	186,235	1,083,080	41,677	1,350,100	304,089	3,824,257	989,568
1989	2,376,030	1,498,925	889,631	187,412	1,088,857	41,852	1,357,872	305,475	3,846,509	995,456
1990	2,432,706	1,522,133	912,986	192,472	1,118,024	42,727	1,395,024	312,010	3,918,238	1,014,854
1991	2,469,661	1,541,780	932,659	197,604	1,147,282	43,112	1,431,131	315,536	3,997,480	1,036,359
1992	2,514,880	1,563,026	953,475	203,996	1,179,589	43,744	1,470,418	320,432	4,102,102	1,064,912
1993	2,549,874	1,582,033	969,784	210,989	1,203,773	44,253	1,497,825	324,519	4,213,571	1,095,444
1994	2,585,113	1,599,855	983,985	220,171	1,223,934	44,800	1,517,631	328,488	4,420,076	1,151,617
1995	2,611,217	1,608,815	992,587	225,248	1,236,069	45,193	1,529,979	331,367	4,547,097	1,186,123
1996	2,637,094	1,624,823	1,001,843	229,526	1,248,440	45,599	1,543,405	334,344	4,654,074	1,215,084
1997	2,654,359	1,636,210	1,010,118	232,003	1,258,944	45,868	1,555,881	336,316	4,875,746	1,268,666
1998	2,679,335	1,650,097	1,017,568	233,373	1,268,786	46,279	2,081,362	339,344	5,036,613	1,290,750
1999	2,692,811	1,661,482	1,022,130	235,684	1,274,800	46,503	2,088,636	341,005	5,243,553	1,307,788
2000	2,708,447	2,815,439	1,028,194	237,960	1,283,376	46,776	2,099,391	405,580	5,569,174	1,321,137
2001	2,716,761	2,821,380	1,032,076	239,333	1,288,723	46,930	2,106,233	406,784	6,393,264	1,330,966
2002	2,741,763	2,824,673	1,035,440	240,242	1,293,682	47,103	2,112,683	408,058	7,573,077	1,336,552
2003	2,753,701	2,833,188	1,038,552	241,001	1,297,752	47,280	2,118,334	409,493	8,154,205	1,344,434
2004	2,758,437	2,836,411	1,096,866	241,460	1,300,295	47,354	2,121,831	410,112	8,395,547	1,347,676
2005	2,763,549	2,840,340	6,717,581	241,849	2,061,704	47,442	2,125,380	410,828	8,526,549	1,350,250
2006	2,778,221	2,851,092	6,786,588	242,717	2,075,530	47,688	2,133,081	412,875	8,589,816	1,354,649
2007	2,800,019	2,876,703	6,915,867	244,290	2,099,752	48,040	2,145,806	416,072	8,717,179	1,361,754
2008	2,817,158	2,895,362	7,040,664	245,693	2,122,376	48,330	2,156,268	418,587	8,852,927	1,368,660
2009	2,827,654	2,911,185	7,132,465	249,637	2,141,770	48,511	2,162,362	419,994	9,071,215	1,385,750
2010	2,867,627	2,947,603	7,519,118	253,625	2,242,177	49,161	2,228,748	425,861	9,386,944	1,403,698
2011	2,913,247	2,983,881	7,693,412	257,862	2,286,106	49,890	2,263,565	432,482	9,755,432	1,422,974
2012	2,938,447	3,005,275	7,841,203	261,958	2,330,453	50,287	2,300,972	435,994	10,291,040	1,442,831
2013	2,924,175	3,018,765	8,028,589	268,161	2,378,543	50,644	2,353,421	438,747	11,087,568	1,461,168
2014	2,973,143	3,017,174	8,346,432	270,415	2,452,635	50,609	2,376,814	438,251	13,557,310	1,488,388
2015	2,983,474	3,028,432	8,500,428	272,390	2,485,341	50,860	2,410,975	439,905	15,811,105	1,504,844
2016	2,967,766	3,029,346	9,035,847	272,444	2,559,493	50,722	2,415,101	439,012	17,088,653	1,514,070
2017	<b>2,850,660</b>	<b>2,981,887</b>	<b>9,720,258</b>	<b>266,840</b>	<b>2,615,322</b>	<b>48,679</b>	<b>2,355,978</b>	<b>422,887</b>	<b>18,449,195</b>	<b>1,491,859</b>
2018	2,705,915	2,785,180	10,110,795	259,353	2,621,898	46,233	2,271,998	401,990	19,082,579	1,464,824
2019	2,533,951	2,585,253	10,315,539	249,280	2,592,603	43,267	2,167,586	376,514	19,162,432	1,417,670
2020	2,298,625	2,422,203	10,219,641	225,841	2,470,114	38,299	2,044,434	336,090	18,867,722	1,306,034
2021	2,029,608	2,175,124	9,547,418	190,427	2,218,104	32,881	1,791,485	292,700	18,165,100	1,129,963
2022	1,891,095	2,015,589	8,639,479	173,183	2,011,178	30,419	1,655,048	271,850	17,750,679	1,028,759
2023	1,839,081	2,007,864	7,935,719	168,493	1,889,910	29,445	1,609,651	263,813	17,613,619	993,212
2024	1,820,103	1,948,990	7,819,152	164,306	1,861,692	29,124	1,593,116	261,002	17,523,953	972,657
2025	1,795,577	1,931,126	7,703,898	160,531	1,825,843	28,709	1,561,345	257,426	17,441,579	950,965
2026	1,781,698	1,912,878	7,600,029	157,841	1,796,730	28,457	1,538,629	255,407	17,363,469	930,190
2027	1,768,843	1,894,367	7,523,677	155,945	1,775,745	28,241	1,522,190	253,595	17,314,460	917,157
2028	1,758,138	1,866,531	7,486,460	154,628	1,763,587	28,049	1,511,329	252,078	17,284,338	909,235
2029	1,742,103	1,828,217	7,454,130	153,496	1,753,031	27,783	1,500,944	249,866	17,262,490	903,543
2030	1,723,134	1,751,004	7,427,543	152,386	1,743,000	27,479	1,490,044	247,352	17,241,936	898,022
2031	1,624,119	1,607,951	7,288,932	146,622	1,690,611	25,827	1,428,048	233,189	17,138,000	870,108
2032	1,632,648	1,556,445	7,301,735	147,074	1,696,302	25,958	1,439,276	234,822	17,145,327	872,326
2033	1,549,867	1,483,894	7,220,204	143,055	1,661,911	24,622	1,401,865	224,156	17,072,935	852,552
2034	1,440,226	1,441,658	7,107,648	137,163	1,615,776	22,855	1,353,787	210,167	16,964,642	822,927
2035	1,359,782	1,419,936	7,023,722	132,829	1,581,340	21,466	1,320,104	200,270	16,885,872	801,363
<b>TOTAL</b>	<b>151,878,176</b>	<b>129,693,969</b>	<b>277,986,903</b>	<b>13,089,737</b>	<b>102,187,729</b>	<b>2,610,634</b>	<b>109,053,264</b>	<b>21,120,220</b>	<b>615,457,274</b>	<b>72,413,715</b>

<sup>a</sup> Unadjusted for prior overpayments or underpayments of charges.<sup>b</sup> Determined at the current Project Interest Rate of 4.610 percent per annum.<sup>c</sup> Reflects the transfers of permanent aqueduct capacity among contractors.

**TABLE B-15 Capital Cost Component of Transportation Charge for Each Contractor (in dollars)**<sup>a,b,c</sup>

Sheet 4 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA				South Bay Area Future Contractor	Grand Total
	San Geronio	Metropolitan	Ventura	Total	Yuba City	Butte	Plumas	Total		
	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]	[40]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0
1963	0	690,812	0	777,678	0	0	0	0	0	1,401,957
1964	21,735	1,260,513	9,378	1,603,161	0	0	0	0	0	2,551,416
1965	21,866	2,180,589	17,766	2,720,401	0	0	405	405	0	4,293,872
1966	37,964	3,900,172	33,426	4,868,023	0	0	565	565	0	6,808,355
1967	71,283	7,693,703	68,155	9,563,529	0	0	562	562	0	11,974,135
1968	120,094	14,345,147	133,299	17,534,951	0	0	564	564	0	21,185,417
1969	187,059	21,857,456	202,599	26,671,961	0	0	3,191	3,191	0	31,384,573
1970	275,010	28,992,595	257,859	35,658,122	0	0	15,121	15,121	0	40,657,587
1971	385,025	37,242,413	316,307	46,007,589	0	0	15,947	15,947	0	51,442,241
1972	448,055	44,062,125	353,935	54,016,785	0	0	17,332	17,332	0	60,639,360
1973	470,185	46,299,581	357,342	56,624,384	0	0	17,333	17,333	0	63,250,141
1974	483,259	48,322,678	372,112	58,897,764	0	0	17,334	17,334	0	66,063,456
1975	496,722	49,285,084	376,511	60,098,012	0	0	17,337	17,337	0	67,964,056
1976	509,650	50,137,295	380,788	61,147,768	0	0	17,338	17,338	0	69,106,652
1977	517,741	50,827,166	385,097	61,978,368	0	0	17,340	17,340	0	70,295,202
1978	522,656	51,426,581	390,742	62,684,258	0	0	17,342	17,342	0	71,518,803
1979	526,178	52,230,344	399,649	63,594,548	0	0	17,344	17,344	0	72,981,607
1980	529,583	53,637,412	417,136	65,143,257	0	0	17,345	17,345	0	75,039,897
1981	546,787	56,667,437	449,812	68,687,865	0	0	17,346	17,346	0	79,219,744
1982	545,445	57,465,063	461,234	69,490,738	0	0	17,348	17,348	0	80,522,031
1983	557,607	59,037,472	477,333	71,406,454	0	0	17,348	17,348	0	82,658,494
1984	575,830	60,313,580	486,863	73,105,397	0	0	17,349	17,349	0	85,189,245
1985	589,089	61,144,629	492,117	74,242,363	0	0	17,351	17,351	0	87,029,847
1986	598,648	61,666,346	494,977	74,978,314	0	0	17,352	17,352	0	88,892,829
1987	607,664	62,094,710	496,758	75,592,400	0	0	17,354	17,354	0	91,782,895
1988	614,418	62,452,912	498,619	76,081,971	0	0	17,355	17,355	0	93,896,370
1989	618,059	62,796,236	501,579	76,503,893	0	0	17,358	17,358	0	95,133,721
1990	629,934	63,762,459	509,566	77,763,133	0	0	17,360	17,360	0	96,881,773
1991	643,118	64,677,355	516,147	78,949,225	0	0	17,364	17,364	0	98,465,001
1992	660,626	65,776,353	523,154	80,376,707	0	0	17,367	17,367	0	100,198,457
1993	679,343	66,905,041	529,383	81,805,833	0	0	17,369	17,369	0	101,903,296
1994	714,062	68,486,622	535,055	83,811,409	0	0	17,370	17,370	0	104,677,108
1995	735,431	69,373,540	537,812	84,960,477	0	0	17,371	17,371	0	108,604,946
1996	753,512	70,251,056	541,753	86,080,553	0	0	17,371	17,371	0	118,560,235
1997	812,976	71,530,953	544,467	87,762,508	0	0	17,371	17,371	0	128,828,435
1998	919,464	72,283,436	548,490	89,394,898	0	0	0	0	0	132,538,767
1999	1,100,324	72,917,423	552,184	90,484,323	0	0	0	0	0	134,290,088
2000	1,434,718	73,432,162	555,279	92,937,633	0	0	0	0	0	136,893,371
2001	2,371,146	73,741,965	556,658	95,052,218	0	0	0	0	0	139,874,141
2002	3,744,046	73,915,736	557,417	97,830,482	0	0	0	0	0	142,813,063
2003	4,400,656	74,256,539	559,749	99,454,884	0	0	17,375	17,375	0	144,998,177
2004	4,669,624	74,601,782	560,566	100,387,963	0	0	17,375	17,375	0	146,367,926
2005	4,808,406	68,499,909	561,532	100,955,319	0	0	17,375	17,375	0	147,260,204
2006	4,858,605	68,876,841	564,172	101,571,876	0	0	17,375	17,375	0	148,034,078
2007	4,971,445	69,605,880	569,809	102,772,616	0	0	17,376	17,376	0	149,411,864
2008	5,105,983	70,216,830	573,969	103,862,808	0	0	17,376	17,376	0	150,986,872
2009	5,287,804	70,888,202	577,886	105,104,435	0	0	17,376	17,376	0	153,280,047
2010	5,568,700	72,114,491	585,969	107,593,722	0	0	17,377	17,377	0	156,555,416
2011	5,925,811	73,158,377	593,217	109,736,254	0	0	17,377	17,377	0	160,299,150
2012	6,479,876	73,890,701	597,050	111,866,087	0	0	17,377	17,377	0	163,904,268
2013	7,345,791	74,247,332	600,069	114,202,974	0	0	17,377	17,377	0	166,681,514
2014	10,149,401	75,383,564	598,719	121,102,854	0	0	17,377	17,377	0	174,004,257
2015	12,751,368	75,926,270	599,731	126,765,122	0	0	16,972	16,972	0	179,247,093
2016	14,228,188	76,902,197	597,162	131,100,001	0	0	16,813	16,813	0	183,653,866
2017	15,014,357	76,711,532	579,446	133,508,901	0	0	16,815	16,815	0	186,409,962
2018	15,408,912	73,875,413	535,487	131,570,578	0	0	16,813	16,813	0	184,076,364
2019	15,527,486	70,459,540	490,069	127,921,189	0	0	14,186	14,186	0	180,496,008
2020	15,541,691	66,214,749	450,703	122,436,148	0	0	2,257	2,257	0	175,012,111
2021	15,431,676	58,564,422	392,255	111,961,163	0	0	1,430	1,430	0	164,485,366
2022	15,368,646	52,689,028	354,627	103,879,581	0	0	45	45	0	156,377,917
2023	15,346,517	51,222,055	351,221	101,270,601	0	0	44	44	0	153,720,559
2024	15,333,442	49,318,542	336,450	98,982,530	0	0	43	43	0	151,417,163
2025	15,319,979	48,467,642	332,052	97,776,673	0	0	41	41	0	150,183,349
2026	15,307,051	47,719,918	327,775	96,720,072	0	0	39	39	0	149,106,029
2027	15,298,961	47,106,942	323,465	95,883,587	0	0	37	37	0	148,239,350
2028	15,294,045	46,543,253	317,820	95,169,491	0	0	35	35	0	147,480,566
2029	15,290,523	45,769,741	308,914	94,244,780	0	0	34	34	0	146,519,325
2030	15,287,119	44,386,187	291,427	92,666,629	0	0	32	32	0	144,891,527
2031	15,269,914	41,474,480	258,751	89,056,551	0	0	31	31	0	141,162,469
2032	15,271,256	40,669,887	247,329	88,240,386	0	0	29	29	0	140,329,460
2033	15,259,095	39,167,775	231,230	86,293,161	0	0	29	29	0	138,297,090
2034	15,240,871	37,990,772	221,700	84,570,192	0	0	28	28	0	136,373,653
2035	15,227,613	37,235,511	216,446	83,426,253	0	0	26	26	0	134,879,019
<b>TOTAL</b>	<b>413,667,125</b>	<b>4,009,240,460</b>	<b>30,545,529</b>	<b>5,948,944,734</b>	<b>0</b>	<b>0</b>	<b>781,795</b>	<b>781,795</b>	<b>0</b>	<b>8,271,554,604</b>

<sup>a</sup> Unadjusted for prior overpayments or underpayments of charges.<sup>b</sup> Determined at the current Project Interest Rate of 4.610 percent per annum.<sup>c</sup> Reflects the transfers of permanent aqueduct capacity among contractors.

**TABLE B-16A Minimum OMP&R Component of Transportation Charge for Each Contractor (in dollars)**

Calendar Year	NORTH BAY AREA			SOUTH BAY AREA				CENTRAL COASTAL AREA		
	Napa	Solano	Total	Alameda-Zone 7	Alameda County	Santa Clara	Total	San Luis Obispo	Santa Barbara	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	9,699	8,868	21,132	39,699	0	0	0
1963	0	0	0	38,048	34,788	82,896	155,732	0	0	0
1964	0	0	0	41,148	38,323	91,320	170,791	0	0	0
1965	0	0	0	78,529	75,616	195,793	349,937	0	0	0
1966	0	0	0	79,753	78,779	218,543	377,076	0	0	0
1967	0	0	0	127,896	123,667	335,224	586,787	0	0	0
1968	130	0	130	126,058	120,563	333,506	580,128	11,800	21,770	33,571
1969	80,875	0	80,875	145,411	138,050	372,585	656,046	63,113	116,435	179,548
1970	94,872	0	94,872	128,993	120,245	320,664	569,902	74,187	136,867	211,054
1971	45,579	0	45,579	113,071	108,346	296,004	517,421	74,011	136,541	210,552
1972	37,895	0	37,895	122,407	117,483	334,366	574,256	79,196	146,107	225,303
1973	32,993	0	32,993	122,738	116,785	325,726	565,250	75,714	139,683	215,398
1974	46,498	0	46,498	154,435	146,929	403,080	704,444	76,530	141,189	217,719
1975	37,707	0	37,707	189,175	182,087	513,823	885,086	92,605	170,845	263,450
1976	60,786	0	60,786	203,064	193,435	524,813	921,312	94,935	175,144	270,079
1977	78,400	0	78,400	179,869	169,065	500,101	849,035	102,945	189,922	292,867
1978	56,318	0	56,318	239,301	228,855	647,828	1,115,984	104,060	191,978	296,038
1979	73,852	0	73,852	236,986	232,105	666,742	1,135,833	100,748	185,868	286,617
1980	81,769	0	81,769	389,575	372,185	1,010,830	1,772,591	126,328	233,105	359,433
1981	101,340	0	101,340	317,408	302,272	834,257	1,453,937	140,208	258,712	398,920
1982	191,987	0	191,987	386,742	369,633	1,098,844	1,855,219	142,045	262,101	404,146
1983	80,215	0	80,215	438,536	428,973	1,269,373	2,136,882	171,001	315,523	486,524
1984	106,485	0	106,485	591,243	565,721	1,817,629	2,974,593	201,768	372,284	574,052
1985	215,341	0	215,341	674,975	655,490	1,840,211	3,170,677	242,935	448,233	691,167
1986	203,704	0	203,704	613,273	583,077	1,784,056	2,980,407	233,000	429,904	662,905
1987	295,505	0	295,505	687,629	652,468	2,000,817	3,340,914	230,484	463,838	694,322
1988	312,677	(58)	312,619	676,847	655,274	1,910,092	3,242,213	258,807	561,030	819,837
1989	403,330	688,185	1,091,515	716,831	712,354	1,897,149	3,326,335	244,772	668,476	913,248
1990	658,942	674,944	1,333,886	782,589	780,305	2,129,966	3,692,860	310,222	677,025	987,247
1991	726,717	860,903	1,587,620	543,178	524,741	1,520,569	2,588,488	302,369	673,858	976,227
1992	483,580	712,313	1,195,893	796,058	855,050	2,253,496	3,904,605	346,220	736,477	1,082,698
1993	524,000	708,129	1,232,129	1,280,736	1,261,431	3,338,742	5,880,908	386,060	734,138	1,120,197
1994	573,814	658,274	1,232,087	1,368,665	1,312,746	3,560,310	6,241,720	481,022	888,287	1,369,309
1995	539,407	660,770	1,200,177	1,232,272	1,187,201	3,216,470	5,635,943	477,929	881,323	1,359,251
1996	604,992	1,011,298	1,616,291	1,185,220	1,124,968	3,007,330	5,317,518	649,161	1,197,179	1,846,340
1997	563,579	741,881	1,305,460	1,029,670	968,999	2,667,649	4,666,319	406,652	749,805	1,156,456
1998	461,844	661,193	1,123,037	1,064,729	1,174,897	3,502,733	5,742,360	810,087	3,051,492	3,861,579
1999	613,368	1,006,577	1,619,945	1,243,942	1,285,417	5,135,770	7,665,129	795,894	3,101,531	3,897,425
2000	776,103	1,493,609	2,269,711	2,174,750	1,295,722	3,754,532	7,225,004	699,691	3,083,826	3,783,517
2001	652,140	1,445,102	2,097,242	4,194,623	1,038,221	3,544,696	8,777,541	723,561	2,906,335	3,629,896
2002	1,096,986	1,871,521	2,968,508	8,256,339	1,356,061	6,055,048	15,667,449	754,997	3,285,166	4,040,162
2003	1,168,961	2,247,939	3,416,900	4,901,800	1,057,277	3,547,979	9,507,055	803,488	3,440,321	4,243,809
2004	1,618,577	2,346,399	3,964,976	2,574,419	1,276,805	3,528,181	7,379,405	799,124	3,354,234	4,153,358
2005	916,728	1,796,605	2,713,333	2,391,493	1,129,780	2,947,359	6,468,631	848,861	3,682,079	4,530,940
2006	812,275	1,380,452	2,192,726	2,477,902	1,202,787	3,264,177	6,944,866	746,326	3,622,713	4,369,039
2007	775,905	1,515,458	2,291,363	3,221,595	1,566,980	4,002,251	8,790,826	827,306	3,589,163	4,416,469
2008	1,050,425	1,422,880	2,473,305	3,612,846	1,759,443	4,466,561	9,838,849	1,244,006	5,312,308	6,556,314
2009	1,115,900	1,788,056	2,903,956	3,253,083	1,473,809	4,173,538	8,900,430	1,084,857	4,523,409	5,608,266
2010	1,195,038	3,197,517	4,392,555	3,126,472	1,533,124	4,225,704	8,885,300	1,409,671	6,238,142	7,647,813
2011	1,570,749	3,658,432	5,229,181	3,492,661	1,682,351	4,499,335	9,674,347	1,449,813	6,570,102	8,019,915
2012	2,061,367	3,553,096	5,614,463	3,694,169	1,762,925	6,720,575	12,177,668	1,442,182	7,247,007	8,689,189
2013	1,501,285	3,057,899	4,559,183	4,171,803	1,964,594	5,883,634	12,020,031	1,692,848	8,805,697	10,498,545
2014	1,957,135	3,821,415	5,778,550	4,792,166	2,217,121	7,385,893	14,395,180	1,545,326	5,832,100	7,377,427
2015	2,180,263	3,637,209	5,817,472	4,976,881	2,401,565	8,907,256	16,285,702	2,033,662	8,591,988	10,625,650
2016	2,401,212	4,031,064	6,432,276	5,924,931	2,836,344	15,660,540	24,421,815	1,829,566	7,603,778	9,433,344
2017	2,843,708	4,731,067	7,574,775	6,214,664	3,020,017	13,312,757	22,547,439	1,826,540	7,808,421	9,634,961
2018	2,732,122	4,458,491	7,190,613	7,131,577	3,459,298	9,737,687	20,328,562	1,927,131	7,998,678	9,925,809
2019	2,683,869	4,448,088	7,131,958	6,483,143	3,133,761	13,026,721	22,643,626	1,878,195	7,878,943	9,757,138
2020	2,687,352	4,454,141	7,141,493	6,483,089	3,131,305	13,076,526	22,690,920	1,876,862	7,921,134	9,797,995
2021	2,714,225	4,498,682	7,212,907	6,547,920	3,162,618	13,207,291	22,917,829	1,895,630	8,000,345	9,895,976
2022	2,741,368	4,543,668	7,285,036	6,613,398	3,194,244	13,339,364	23,147,006	1,914,587	8,080,349	9,994,936
2023	2,768,781	4,589,105	7,357,886	6,679,533	3,226,186	13,472,758	23,378,477	1,933,733	8,161,152	10,094,884
2024	2,796,469	4,634,996	7,431,465	6,746,328	3,258,448	13,607,486	23,612,262	1,953,070	8,242,764	10,195,834
2025	2,824,433	4,681,347	7,505,780	6,813,791	3,291,033	13,743,560	23,848,384	1,972,601	8,325,191	10,297,791
2026	2,852,678	4,728,159	7,580,837	6,881,929	3,323,943	13,880,995	24,086,867	1,992,327	8,408,443	10,400,777
2027	2,881,205	4,775,441	7,656,646	6,950,749	3,357,182	14,019,806	24,327,737	2,012,250	8,492,527	10,504,770
2028	2,910,017	4,823,196	7,733,213	7,020,256	3,390,754	14,160,004	24,571,015	2,032,372	8,577,453	10,609,825
2029	2,939,117	4,871,428	7,810,545	7,090,459	3,424,662	14,301,604	24,816,724	2,052,696	8,663,227	10,715,923
2030	2,968,509	4,920,142	7,888,651	7,161,363	3,458,908	14,444,620	25,064,892	2,073,223	8,749,860	10,823,083
2031	2,998,193	4,969,343	7,967,536	7,232,977	3,493,498	14,589,067	25,315,542	2,093,955	8,837,358	10,931,314
2032	3,028,175	5,019,037	8,047,213	7,305,307	3,528,432	14,734,957	25,568,696	2,114,895	8,925,732	11,040,627
2033	3,058,457	5,069,227	8,127,684	7,378,360	3,563,717	14,882,307	25,824,384	2,136,044	9,014,989	11,151,033
2034	3,089,041	5,119,919	8,208,961	7,452,143	3,599,354	15,031,129	26,082,625	2,157,404	9,105,139	11,262,543
2035	3,119,932	5,171,118	8,291,050	7,526,664	3,635,347	15,181,441	26,343,452	2,178,978	9,196,190	11,375,168
<b>TOTAL</b>	<b>85,877,201</b>	<b>141,155,658</b>	<b>227,032,859</b>	<b>217,308,286</b>	<b>109,214,807</b>	<b>406,297,782</b>	<b>732,820,875</b>	<b>65,864,583</b>	<b>266,532,935</b>	<b>332,397,518</b>

TABLE B-16A Minimum OMP&amp;R Component of Transportation Charge for Each Contractor (in dollars)

Sheet 2 of 4

Calendar Year	SAN JOAQUIN VALLEY AREA								
	Dudley Ridge	Empire	Future Contractor San Joaquin Valley	Kern		Kings	Oak Flat	Tulare	Total
				Municipal and Industrial	Agricultural				
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]
1961	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0
1968	37,806	1,963	5,639	60,701	678,086	2,008	2,073	77,591	865,867
1969	45,479	2,235	30,158	80,554	1,197,126	2,286	2,085	90,773	1,450,698
1970	46,969	2,292	35,450	96,673	1,381,493	2,344	2,158	93,408	1,660,786
1971	47,997	2,314	35,366	106,654	1,643,163	2,366	2,288	94,874	1,935,021
1972	49,866	2,414	37,844	122,313	1,729,169	2,469	2,254	98,777	2,045,106
1973	50,006	2,385	36,180	125,553	1,719,873	2,440	2,310	98,330	2,037,076
1974	52,818	2,556	36,570	135,661	1,823,065	2,614	2,529	104,609	2,160,424
1975	66,963	3,243	44,251	162,738	2,235,242	3,317	3,191	132,663	2,651,608
1976	66,504	3,328	45,364	159,303	2,215,999	3,404	2,919	133,940	2,630,761
1977	75,595	3,812	49,192	189,661	2,522,290	3,898	3,708	152,838	3,000,994
1978	70,688	3,503	49,725	174,897	2,427,163	3,583	3,644	141,672	2,874,875
1979	68,879	3,436	48,142	173,677	2,378,315	3,514	3,492	138,493	2,817,948
1980	95,898	4,722	59,551	235,741	3,146,570	4,830	4,777	191,582	3,743,671
1981	118,448	5,965	66,183	266,353	3,440,557	6,099	5,187	239,323	4,148,116
1982	134,083	6,711	67,061	311,879	3,848,922	6,862	6,382	270,061	4,651,960
1983	184,902	9,242	80,869	426,485	5,030,031	9,450	8,494	372,182	6,121,656
1984	194,228	9,656	95,555	471,854	5,636,134	9,874	8,719	389,892	6,815,912
1985	200,694	9,957	115,227	486,162	6,042,593	10,182	8,982	402,457	7,276,254
1986	207,028	10,302	110,479	530,803	6,372,710	10,536	10,341	415,776	7,667,975
1987	205,002	10,259	109,401	533,451	6,378,437	10,493	10,517	412,889	7,670,450
1988	203,711	10,223	122,903	516,432	6,388,497	10,455	10,341	410,868	7,673,430
1989	224,049	11,269	116,197	564,169	6,747,046	11,526	11,102	452,406	8,137,763
1990	271,051	13,666	148,238	664,040	8,111,616	13,976	13,206	547,974	9,783,767
1991	275,748	13,854	144,486	662,755	8,111,610	14,168	13,218	556,474	9,792,313
1992	317,889	16,027	162,466	764,224	9,115,453	16,393	18,209	642,672	11,053,333
1993	359,879	17,989	184,477	831,662	10,372,245	18,399	19,560	724,397	12,528,608
1994	309,084	15,486	224,254	738,619	9,789,833	15,839	16,434	622,879	11,732,427
1995	395,441	19,918	220,899	898,339	11,190,121	20,373	21,551	799,070	13,565,713
1996	362,623	19,968	301,835	902,162	11,872,821	20,424	21,664	796,711	14,298,209
1997	366,476	20,154	186,450	942,987	10,558,144	20,613	19,344	806,084	12,920,252
1998	453,033	24,560	288,906	1,098,213	12,207,920	25,122	21,594	995,194	15,114,543
1999	384,169	21,168	275,698	980,700	11,106,789	21,650	21,913	844,306	13,656,391
2000	384,501	21,145	206,873	1,022,780	9,948,383	21,647	22,809	844,101	12,472,238
2001	463,902	25,523	231,686	1,212,212	11,269,413	26,115	31,799	1,018,751	14,279,401
2002	426,218	21,572	223,769	1,080,829	10,227,644	22,080	25,646	813,667	12,841,425
2003	494,764	25,202	242,079	1,178,001	11,268,644	25,794	30,740	944,674	14,209,898
2004	442,087	22,638	244,299	1,124,271	10,636,853	61,698	25,463	731,719	13,289,028
2005	427,271	21,928	257,146	1,013,649	10,307,500	59,685	24,396	708,154	12,819,729
2006	463,217	23,692	195,878	1,106,863	10,300,213	71,531	26,336	763,664	12,951,394
2007	525,633	26,655	234,501	1,266,196	11,655,504	82,238	27,088	861,943	14,679,758
2008	624,293	32,182	369,287	1,523,401	15,043,805	101,213	32,491	1,034,422	18,761,093
2009	513,758	26,120	335,108	1,262,679	12,702,505	83,728	26,737	843,841	15,794,477
2010	498,092	28,934	407,061	1,310,281	13,109,586	93,958	27,637	864,438	16,339,987
2011	601,955	35,251	403,956	1,641,598	15,521,232	111,512	39,520	1,050,483	19,405,507
2012	569,774	33,277	360,992	1,608,982	15,233,911	103,899	31,071	992,497	18,934,404
2013	653,998	38,322	411,882	1,721,174	16,708,527	118,623	31,522	1,141,754	20,825,802
2014	696,810	42,085	524,826	1,852,808	19,005,950	133,537	44,538	1,237,039	23,537,592
2015	650,067	42,399	633,520	1,822,700	19,505,682	137,273	44,441	1,241,357	24,077,439
2016	705,783	45,833	576,016	1,917,094	20,072,047	144,917	51,401	1,343,708	24,856,799
2017	886,889	52,608	563,050	2,159,937	23,304,069	162,833	60,657	1,541,962	28,732,004
2018	909,779	53,993	610,358	2,199,336	23,925,685	168,212	61,560	1,582,318	29,511,241
2019	865,205	51,319	588,973	2,108,322	22,959,340	160,241	58,451	1,504,222	28,296,073
2020	803,538	51,833	594,863	2,065,290	23,184,412	161,844	59,036	1,519,265	28,440,079
2021	811,573	52,351	600,812	2,085,943	23,416,256	163,463	59,626	1,534,457	28,724,481
2022	819,689	52,874	606,820	2,106,802	23,650,419	165,097	60,222	1,549,802	29,011,725
2023	827,886	53,403	612,888	2,127,870	23,886,923	166,748	60,824	1,565,300	29,301,843
2024	836,165	53,937	619,017	2,149,149	24,125,792	168,416	61,433	1,580,953	29,594,861
2025	844,526	54,477	625,207	2,170,640	24,367,050	170,100	62,047	1,596,762	29,890,810
2026	852,972	55,021	631,459	2,192,347	24,610,721	171,801	62,668	1,612,730	30,189,718
2027	861,501	55,571	637,774	2,214,270	24,856,828	173,519	63,294	1,628,857	30,491,615
2028	870,116	56,127	644,152	2,236,413	25,105,396	175,254	63,927	1,645,146	30,796,532
2029	878,818	56,688	650,593	2,258,777	25,356,450	177,007	64,566	1,661,597	31,104,497
2030	887,606	57,255	657,099	2,281,365	25,610,014	178,777	65,212	1,678,213	31,415,541
2031	896,482	57,828	663,670	2,304,178	25,866,115	180,564	65,864	1,694,995	31,729,697
2032	905,447	58,406	670,307	2,327,220	26,124,776	182,370	66,523	1,711,945	32,046,994
2033	914,501	58,990	677,010	2,350,492	26,386,024	184,194	67,188	1,729,065	32,367,464
2034	923,646	59,580	683,780	2,373,997	26,649,884	186,036	67,860	1,746,356	32,691,139
2035	932,883	60,176	690,618	2,397,737	26,916,383	187,896	68,539	1,763,819	33,018,050
TOTAL	31,614,347	1,869,777	21,422,347	80,191,021	880,238,970	4,995,326	2,047,316	59,535,138	1,081,914,242



TABLE B-16A Minimum OMP&amp;R Component of Transportation Charge for Each Contractor (in dollars)

Sheet 3 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA									
	AVEK	Castaic Lake	Coachella	Crestline	Desert	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel
	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0
1968	65,074	28,085	11,697	2,958	19,291	1,089	24,380	8,173	52,315	14,399
1969	86,339	70,342	15,522	3,925	25,598	1,445	32,348	10,844	69,419	19,106
1970	107,807	84,577	19,392	4,904	31,981	1,804	40,391	13,540	86,727	23,865
1971	178,820	105,979	32,228	8,150	53,151	2,992	66,999	22,459	144,136	39,636
1972	363,555	202,625	106,740	30,967	176,037	6,601	213,032	48,102	548,123	144,113
1973	404,661	222,765	121,341	34,674	200,116	7,346	243,320	53,975	724,535	190,156
1974	434,868	235,528	130,627	37,062	215,432	7,677	262,735	56,383	786,107	207,019
1975	504,791	289,501	151,031	43,176	249,082	9,082	303,108	65,580	905,424	238,842
1976	559,013	262,420	160,686	44,454	265,004	10,030	325,512	73,253	964,524	256,570
1977	675,504	335,749	184,813	47,743	304,792	11,890	381,161	87,355	1,069,446	289,793
1978	600,343	376,946	187,028	54,156	308,449	10,711	373,192	78,304	1,148,279	300,751
1979	661,123	349,072	196,264	52,211	323,677	12,124	401,469	87,126	1,125,452	302,508
1980	858,039	415,571	253,090	71,921	417,398	15,435	508,379	112,853	1,518,405	401,223
1981	1,001,503	511,087	284,970	73,534	469,970	18,046	588,024	131,992	1,548,350	420,523
1982	1,128,643	557,494	320,938	89,560	529,292	20,193	649,204	148,012	1,870,559	497,871
1983	1,744,932	832,687	450,049	119,275	742,218	30,643	922,072	225,793	2,373,149	639,682
1984	2,105,780	943,524	548,784	150,179	905,055	36,810	1,112,196	271,187	3,018,294	803,394
1985	2,157,936	1,055,744	584,697	157,841	964,282	38,972	1,191,309	277,250	3,230,403	860,780
1986	2,311,841	1,102,466	618,750	162,748	1,020,438	40,051	1,268,806	295,987	3,318,638	893,069
1987	2,366,343	1,032,918	628,222	167,262	1,036,061	41,773	1,283,836	307,844	3,400,838	913,933
1988	2,303,274	1,042,113	649,276	175,694	1,070,784	40,604	1,321,553	298,438	3,587,873	960,968
1989	2,280,051	1,088,176	613,266	169,993	1,011,401	39,501	1,240,888	292,775	3,499,964	932,519
1990	2,636,186	1,275,150	708,829	201,242	1,169,006	45,472	1,424,445	336,069	4,084,211	1,078,392
1991	2,737,441	1,454,172	763,989	210,644	1,259,974	48,936	1,546,583	358,165	4,348,900	1,150,633
1992	2,781,586	1,579,025	750,248	198,232	1,237,307	49,829	1,538,733	362,844	4,131,745	1,115,632
1993	3,109,819	1,689,775	850,589	234,719	1,402,796	56,125	1,722,415	411,539	5,023,595	1,338,111
1994	2,825,193	1,608,731	794,991	225,121	1,311,100	51,259	1,634,886	376,180	4,794,820	1,267,565
1995	3,121,440	1,720,649	848,101	231,718	1,398,686	58,749	1,766,297	444,998	4,828,432	1,273,345
1996	3,093,678	1,966,634	862,720	228,008	1,422,789	56,813	1,817,427	423,444	4,707,473	1,256,549
1997	3,250,394	1,810,292	918,428	281,067	1,514,687	59,547	1,853,224	446,127	5,705,741	1,477,757
1998	3,876,512	2,050,254	1,070,517	299,639	1,765,491	73,835	3,207,848	561,246	6,076,375	1,634,942
1999	3,832,428	2,108,765	1,114,208	311,154	1,837,547	75,908	3,226,793	549,879	6,454,799	1,738,148
2000	3,751,246	3,379,197	1,035,809	291,749	1,708,257	68,397	3,000,267	594,476	5,876,829	1,572,232
2001	4,466,081	3,774,256	1,111,995	298,109	1,833,891	80,995	3,288,756	701,008	5,755,346	1,555,635
2002	3,640,169	3,495,749	1,017,609	282,351	1,678,240	62,563	2,999,670	549,516	5,628,787	1,510,425
2003	4,067,238	3,392,425	1,123,332	298,423	1,852,588	68,045	3,294,976	608,585	6,599,063	1,603,957
2004	4,444,794	4,031,985	1,441,819	322,933	1,908,894	76,792	3,426,109	676,844	7,222,338	1,765,213
2005	3,834,679	3,548,174	5,894,144	289,387	2,247,118	66,837	2,910,013	581,713	6,801,965	1,600,286
2006	4,065,824	3,227,620	8,392,469	307,024	2,802,655	74,378	3,141,641	637,731	6,978,778	1,684,736
2007	4,471,736	4,386,577	8,615,852	327,740	2,896,056	78,587	3,332,816	681,107	8,081,288	1,888,501
2008	4,911,498	5,273,310	9,668,253	370,220	3,280,149	81,753	4,093,082	744,040	9,279,740	2,026,829
2009	4,558,861	4,472,820	8,662,536	354,650	2,989,534	77,841	3,711,164	690,315	9,013,489	1,982,918
2010	4,115,793	4,274,406	9,273,129	361,341	3,189,762	72,678	3,754,171	616,601	8,959,609	1,965,077
2011	4,893,499	4,719,132	10,754,286	411,789	3,649,302	85,936	4,334,281	763,864	9,476,615	2,161,740
2012	5,430,973	5,140,657	11,269,605	454,099	3,921,703	97,044	4,567,961	833,318	10,748,233	2,361,046
2013	6,357,752	6,022,293	11,902,152	494,208	4,304,584	112,050	5,208,547	972,884	11,657,319	2,650,790
2014	7,028,850	6,479,531	15,524,841	535,726	5,070,762	117,698	5,910,720	1,051,263	12,813,247	2,905,423
2015	6,461,842	6,187,954	13,210,682	526,089	4,718,493	110,485	6,003,266	939,078	12,769,014	2,967,880
2016	6,665,253	6,622,669	13,548,757	559,666	4,797,842	110,205	5,948,960	972,859	13,208,699	3,044,195
2017	7,326,448	7,241,233	15,586,762	604,061	5,389,838	121,174	6,485,731	1,067,965	15,183,059	3,352,754
2018	7,386,436	7,121,668	17,116,462	601,304	5,548,725	121,837	6,491,195	1,075,409	14,669,678	3,340,459
2019	7,188,648	7,059,452	15,571,501	593,880	5,297,923	118,916	6,366,347	1,047,859	14,491,216	3,278,261
2020	7,138,824	7,049,900	15,722,023	594,930	5,348,787	120,020	6,528,586	1,040,437	14,549,600	3,309,948
2021	7,210,212	7,120,399	15,879,243	600,879	5,402,275	121,220	6,593,872	1,050,841	14,695,097	3,343,048
2022	7,282,314	7,191,603	16,038,036	606,888	5,456,297	122,433	6,659,810	1,061,350	14,842,048	3,376,478
2023	7,355,137	7,263,519	16,198,417	612,957	5,510,860	123,657	6,726,409	1,071,963	14,990,468	3,410,243
2024	7,428,688	7,336,154	16,360,400	619,086	5,565,969	124,893	6,793,673	1,082,683	15,140,372	3,444,345
2025	7,502,976	7,409,516	16,524,005	625,277	5,621,629	126,142	6,861,609	1,093,510	15,291,776	3,478,789
2026	7,578,005	7,483,611	16,689,245	631,530	5,677,845	127,404	6,930,225	1,104,445	15,444,695	3,513,577
2027	7,653,785	7,558,447	16,856,137	637,845	5,734,623	128,678	6,999,528	1,115,489	15,599,141	3,548,712
2028	7,730,323	7,634,032	17,024,698	644,224	5,791,970	129,965	7,069,523	1,126,644	15,755,132	3,584,200
2029	7,807,626	7,710,372	17,194,946	650,666	5,849,889	131,264	7,140,218	1,137,911	15,912,684	3,620,042
2030	7,885,703	7,787,476	17,366,895	657,173	5,908,388	132,577	7,211,620	1,149,290	16,071,811	3,656,242
2031	7,964,560	7,865,350	17,540,564	663,745	5,967,472	133,903	7,283,737	1,160,783	16,232,529	3,692,804
2032	8,044,205	7,944,004	17,715,969	670,382	6,027,147	135,242	7,356,574	1,172,391	16,394,854	3,729,733
2033	8,124,647	8,023,444	17,893,129	677,086	6,087,418	136,594	7,430,140	1,184,114	16,558,802	3,767,030
2034	8,205,894	8,103,678	18,072,060	683,857	6,148,292	137,960	7,504,441	1,195,956	16,724,391	3,804,700
2035	8,287,953	8,184,715	18,252,781	690,695	6,209,775	139,340	7,579,486	1,207,915	16,891,635	3,842,747
TOTAL	282,433,389	249,926,145	467,002,575	22,675,901	186,053,845	4,856,795	233,431,685	40,999,874	531,456,400	125,021,788

TABLE B-16A Minimum OMP&amp;R Component of Transportation Charge for Each Contractor (in dollars)

Sheet 4 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA				South Bay Area Future Contractor	Grand Total
	San Geronio	Metropolitan	Ventura	Total	Yuba City	Butte	Plumas	Total		
	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	3,219	42,918
1963	0	0	0	0	0	0	0	0	12,626	168,358
1964	0	0	0	0	0	0	0	0	13,938	184,729
1965	0	0	0	0	0	0	0	0	28,937	378,874
1966	0	0	0	0	0	0	0	0	31,321	408,397
1967	0	0	0	0	0	0	0	0	47,718	634,505
1968	8,821	972,734	9,504	1,218,520	0	0	0	0	46,945	2,745,160
1969	11,704	1,295,607	12,610	1,654,810	0	0	0	0	52,963	4,074,939
1970	14,623	1,624,569	15,746	2,069,923	0	0	0	0	69,744	4,676,282
1971	24,302	2,716,584	26,118	3,421,555	0	0	54	54	55,532	6,185,714
1972	89,131	8,038,463	68,369	10,035,857	0	0	40	40	80,412	12,998,869
1973	117,779	9,890,316	78,313	12,289,296	0	0	1	1	54,219	15,194,233
1974	128,169	11,581,491	83,453	14,166,551	0	0	143	143	76,783	17,372,561
1975	147,899	13,584,548	101,893	16,593,957	0	0	1,069	1,069	84,547	20,517,423
1976	158,664	12,862,489	94,799	16,037,419	0	0	139	139	106,717	20,027,213
1977	178,774	16,203,699	121,966	19,892,683	0	0	892	892	98,618	24,213,489
1978	186,384	17,811,770	132,435	21,568,747	0	0	39	39	100,786	26,012,786
1979	186,688	16,414,289	126,756	20,238,761	0	0	3,235	3,235	119,352	24,675,598
1980	248,399	20,926,898	154,096	25,901,706	0	0	416	416	178,812	32,038,398
1981	259,244	23,731,024	186,592	29,224,860	0	0	3,847	3,847	185,347	35,516,366
1982	307,955	27,994,510	209,141	34,323,374	0	0	11,075	11,075	173,894	41,611,655
1983	394,524	38,953,367	326,258	47,754,649	0	0	1,928	1,928	220,926	56,802,781
1984	496,808	45,597,671	382,104	56,371,786	0	0	3,765	3,765	225,959	67,072,552
1985	531,765	50,064,444	416,652	61,532,075	0	0	2,888	2,888	340,322	73,228,724
1986	551,066	52,858,915	442,334	64,885,109	0	0	2,787	2,787	279,227	76,682,113
1987	564,352	50,737,631	411,276	62,892,287	0	0	2,388	2,388	345,116	75,240,981
1988	593,787	51,262,231	406,248	63,712,844	0	0	545	545	365,207	76,126,695
1989	576,852	52,638,942	431,020	64,815,349	0	0	1,800	1,800	422,329	78,708,338
1990	667,687	61,053,824	494,721	75,175,234	0	0	788	788	474,284	91,448,066
1991	711,803	60,874,529	470,139	75,935,908	0	0	3,654	3,654	214,683	91,098,893
1992	688,558	67,460,598	502,131	82,396,469	0	0	647	647	443,676	100,077,320
1993	828,208	68,749,547	538,751	85,955,990	0	0	3,630	3,630	599,571	107,321,034
1994	783,691	63,898,029	473,897	80,045,461	0	0	2,279	2,279	609,966	101,233,250
1995	785,191	68,079,888	523,512	85,080,005	0	0	2,906	2,906	534,971	107,378,966
1996	773,653	72,757,439	561,100	89,927,727	0	0	8,007	8,007	571,857	113,585,948
1997	917,372	75,655,465	564,455	94,454,555	0	0	7,449	7,449	428,638	114,939,131
1998	1,000,558	80,540,695	608,294	102,766,204	0	0	0	0	465,095	129,072,817
1999	1,066,898	86,320,578	637,626	109,274,730	0	0	(0)	(0)	584,116	136,697,736
2000	964,334	82,432,338	635,349	105,310,501	0	0	0	0	0	131,060,971
2001	949,248	93,016,285	709,327	117,540,934	0	0	0	0	0	146,325,014
2002	922,151	85,415,139	657,493	107,859,863	0	0	(0)	(0)	0	143,377,406
2003	1,514,514	82,358,489	621,310	107,402,945	0	0	3,425	3,425	0	138,784,032
2004	1,435,507	99,527,399	761,599	127,042,226	0	0	3,455	3,455	0	155,832,448
2005	1,587,021	74,184,438	652,293	104,198,067	0	0	3,452	3,452	0	130,734,153
2006	1,447,103	76,147,507	598,995	109,506,460	0	0	3,904	3,904	0	135,968,390
2007	1,833,598	105,091,465	863,260	142,548,583	0	0	3,517	3,517	0	172,730,516
2008	2,482,168	113,274,967	979,577	156,465,586	0	0	5,036	5,036	0	194,100,185
2009	2,373,282	99,895,425	829,566	139,612,401	0	0	844	844	0	172,820,374
2010	2,583,425	97,926,307	786,760	137,879,060	0	0	1,071	1,071	0	175,145,786
2011	2,646,540	105,598,030	850,140	150,345,154	0	0	2,754	2,754	0	192,676,858
2012	2,628,237	118,229,648	954,152	166,636,677	0	0	1,093	1,093	0	212,053,494
2013	2,727,617	133,540,862	1,129,336	187,080,395	0	0	289	289	0	234,984,245
2014	3,192,991	147,378,197	1,183,103	209,192,353	0	0	116	116	0	260,281,218
2015	3,161,234	137,650,749	1,098,502	195,805,269	0	0	117	117	0	252,611,649
2016	3,351,786	153,073,428	1,222,188	213,126,509	0	0	111	111	0	278,270,854
2017	4,179,183	169,408,883	1,359,420	237,306,511	0	0	111	111	0	305,795,800
2018	3,862,368	164,820,220	1,303,117	233,458,878	0	0	111	111	0	300,415,214
2019	3,834,722	163,944,264	1,307,857	230,100,847	0	0	112	112	0	297,929,753
2020	3,858,482	163,973,812	1,320,210	230,555,559	0	0	113	113	0	298,626,159
2021	3,897,067	165,613,549	1,333,412	232,861,114	0	0	114	114	0	301,612,420
2022	3,936,037	167,269,685	1,346,746	235,189,724	0	0	116	116	0	304,628,543
2023	3,975,398	168,942,382	1,360,213	237,541,623	0	0	117	117	0	307,674,831
2024	4,015,152	170,631,805	1,373,815	239,917,037	0	0	118	118	0	310,751,578
2025	4,055,303	172,338,124	1,387,554	242,316,210	0	0	119	119	0	313,859,095
2026	4,095,856	174,061,506	1,401,429	244,739,373	0	0	120	120	0	316,997,685
2027	4,136,815	175,802,119	1,415,443	247,186,763	0	0	122	122	0	320,167,661
2028	4,178,183	177,560,142	1,429,598	249,658,633	0	0	123	123	0	323,369,341
2029	4,219,965	179,335,745	1,443,894	252,155,221	0	0	124	124	0	326,603,035
2030	4,262,164	181,129,101	1,458,333	254,676,771	0	0	125	125	0	329,869,063
2031	4,304,787	182,940,392	1,472,916	257,223,541	0	0	126	126	0	333,167,755
2032	4,347,835	184,769,795	1,487,645	259,795,775	0	0	128	128	0	336,499,433
2033	4,391,312	186,617,494	1,502,522	262,393,733	0	0	129	129	0	339,864,427
2034	4,435,226	188,483,668	1,517,547	265,017,668	0	0	130	130	0	343,263,066
2035	4,479,578	190,368,506	1,532,722	267,667,848	0	0	132	132	0	346,695,702
TOTAL	128,267,516	6,365,904,649	50,899,654	8,688,930,217	0	0	97,884	97,884	8,748,370	11,071,941,965

**TABLE B-16B Minimum OMP&R Component of Transportation Charge for Each Contractor for Off-Aqueduct Power Facilities<sup>a,b</sup> (in dollars)**

Sheet 1 of 4

Calendar Year	NORTH BAY AREA			SOUTH BAY AREA				CENTRAL COASTAL AREA		
	Napa	Solano	Total	Alameda-Zone 7	Alameda County	Santa Clara	Total	San Luis Obispo	Santa Barbara	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1971	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0
1983	10,070	0	10,070	47,473	31,446	863,937	942,856	0	0	0
1984	29,957	0	29,957	157,280	77,388	2,040,188	2,274,856	0	0	0
1985	54,709	0	54,709	458,427	582,679	2,696,450	3,737,556	0	0	0
1986	45,887	0	45,887	312,938	365,147	2,595,765	3,273,850	0	0	0
1987	90,385	0	90,385	622,029	674,111	2,306,079	3,602,219	0	0	0
1988	115,970	114,196	230,166	616,865	804,606	2,116,236	3,537,707	0	0	0
1989	64,584	138,240	202,824	407,353	396,069	1,389,347	2,192,769	0	0	0
1990	77,126	138,805	215,931	535,269	514,372	1,490,250	2,539,891	0	0	0
1991	35,178	245,181	280,359	355,578	477,883	1,065,488	1,898,949	0	165,930	165,930
1992	74,573	230,716	305,289	405,244	529,119	1,183,466	2,117,829	0	0	0
1993	89,214	247,977	337,191	841,383	256,930	1,552,562	2,650,875	0	0	0
1994	111,942	229,598	341,540	501,812	559,683	1,395,238	2,456,733	0	0	0
1995	96,842	235,605	332,447	833,227	492,578	796,524	2,122,329	0	0	0
1996	63,698	205,414	269,112	367,297	304,845	1,189,291	1,861,433	711	105	816
1997	48,518	193,255	241,773	455,751	294,951	1,220,497	1,971,199	44,788	298,986	343,774
1998	82,317	251,217	333,534	380,321	380,282	1,103,662	1,864,265	198,376	1,028,220	1,226,596
1999	58,017	195,562	253,579	559,900	446,655	1,039,572	2,046,127	147,204	791,946	939,150
2000	28,759	128,393	157,152	374,808	237,138	748,820	1,360,766	82,628	474,268	556,896
2001	81,666	157,196	238,862	396,340	233,205	673,431	1,302,976	134,574	595,294	729,868
2002	40,236	127,750	167,986	383,365	229,280	519,819	1,132,464	91,639	583,933	675,572
2003	37,618	92,735	130,353	301,657	180,804	643,729	1,126,190	78,771	477,048	555,819
2004	50,289	128,180	178,469	447,802	210,093	546,342	1,204,237	92,836	662,110	754,946
2005	53,455	149,328	202,783	452,896	265,252	772,420	1,490,568	106,901	587,036	693,937
2006	59,239	127,708	186,947	476,295	277,304	798,098	1,551,697	109,498	605,502	715,000
2007	82,724	182,954	265,678	445,250	246,862	740,211	1,432,323	103,331	759,114	862,445
2008	200,185	304,502	504,687	861,568	428,737	1,074,975	2,365,280	184,501	997,507	1,182,008
2009	167,186	237,569	404,755	708,409	418,456	1,279,442	2,406,307	209,684	853,143	1,062,827
2010	186,503	221,486	407,989	876,092	407,548	1,266,270	2,549,910	203,422	963,122	1,166,544
2011	121,673	145,499	267,172	685,604	372,699	1,174,038	2,232,341	147,645	829,034	976,679
2012	130,199	185,005	315,204	830,163	319,227	1,135,648	2,285,038	186,059	920,215	1,106,274
2013	114,869	172,310	287,179	609,808	327,688	1,046,787	1,984,283	121,826	607,752	729,578
2014	97,013	94,810	191,823	317,446	235,476	541,866	1,094,788	83,501	442,785	526,286
2015	35,945	49,630	85,575	146,118	96,412	319,724	562,254	39,698	160,291	199,989
2016	5,130	8,834	13,964	30,254	16,590	62,636	109,480	5,556	32,260	37,816
2017	4,296	7,981	12,277	26,609	17,407	58,184	102,200	5,251	25,656	30,907
2018	6,766	4,598	11,364	27,855	9,491	35,993	73,339	18,335	38,125	56,459
2019	408	277	685	1,680	583	2,084	4,347	1,109	2,299	3,408
2020	408	277	685	1,680	593	2,084	4,357	1,115	2,299	3,414
2021	408	277	685	1,680	593	2,084	4,357	1,115	2,299	3,414
2022	408	277	685	1,680	593	2,084	4,357	1,115	2,299	3,414
2023	408	277	685	1,680	593	2,084	4,357	1,115	2,299	3,414
2024	408	277	685	1,680	593	2,084	4,357	1,115	2,299	3,414
2025	408	277	685	1,680	593	2,084	4,357	1,115	2,299	3,414
2026	408	277	685	1,680	593	2,084	4,357	1,115	2,299	3,414
2027	408	277	685	1,680	593	2,084	4,357	1,115	2,299	3,414
2028	408	277	685	1,680	593	2,084	4,357	1,115	2,299	3,414
2029	408	277	685	1,680	593	2,084	4,357	1,115	2,299	3,414
2030	408	277	685	1,680	593	2,084	4,357	1,115	2,299	3,414
2031	408	277	685	1,680	593	2,084	4,357	1,115	2,299	3,414
2032	408	277	685	1,680	593	2,084	4,357	1,115	2,299	3,414
2033	408	277	685	1,680	593	2,084	4,357	1,115	2,299	3,414
2034	408	277	685	1,680	593	2,084	4,357	1,115	2,299	3,414
2035	408	277	685	1,680	593	2,084	4,357	1,115	2,299	3,414
<b>TOTAL</b>	<b>2,659,675</b>	<b>4,956,947</b>	<b>7,616,622</b>	<b>16,285,044</b>	<b>11,728,488</b>	<b>39,518,409</b>	<b>67,531,941</b>	<b>2,415,685</b>	<b>12,938,468</b>	<b>15,354,153</b>

<sup>a</sup> 1983 through 2015 charges are debt service only and do not include bond cover; 2016 charges and after include both debt service and bond cover.<sup>b</sup> 2009 through 2017 charges include Reid Gardner separation costs that are allocated to contractors based on theoretical energy use over the facility service life, 1983–2013.

**TABLE B-16B Minimum OMP&R Component of Transportation Charge for Each Contractor for Off-Aqueduct Power Facilities<sup>a,b</sup> (in dollars)**

Sheet 2 of 4

Calendar Year	SAN JOAQUIN VALLEY AREA							
	Dudley Ridge	Empire	Kern		Kings	Oak Flat	Tulare	Total
			Municipal and Industrial	Agricultural				
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]
1971	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0
1983	159,191	0	34,366	2,964,185	13,174	9,673	3,733	3,184,322
1984	389,518	0	816,103	9,095,509	26,774	33,576	49,601	10,411,081
1985	527,952	59,322	1,053,957	11,978,046	38,810	42,297	1,253,257	14,953,641
1986	552,172	12,858	885,988	11,788,714	40,659	38,275	872,008	14,190,674
1987	450,941	24,936	1,192,388	10,448,063	39,134	37,538	911,938	13,104,938
1988	425,261	31,146	1,130,988	9,910,050	35,851	26,779	850,225	12,410,300
1989	331,852	17,226	607,908	7,400,983	22,959	24,306	754,007	9,159,241
1990	219,381	7,731	428,482	5,216,562	12,089	12,046	344,943	6,241,234
1991	13,048	3,111	570,942	146,276	0	1,354	30,685	765,416
1992	244,630	13,395	706,155	5,788,599	18,587	15,716	480,903	7,267,985
1993	471,706	25,543	1,202,455	11,405,212	37,276	36,803	1,159,908	14,338,903
1994	262,029	15,161	901,463	6,786,208	19,257	19,061	567,521	8,570,700
1995	626,214	16,830	1,486,494	12,489,555	41,275	36,377	1,051,178	15,747,923
1996	407,919	13,446	1,226,968	9,219,091	28,668	24,001	1,691,135	12,611,228
1997	423,144	(6)	794,476	7,471,645	(31)	22,025	137,304	8,848,557
1998	471,993	4,597	837,228	8,366,817	127	25,458	175,371	9,881,591
1999	360,554	19,182	874,948	7,723,883	24,159	20,065	1,749,925	10,772,716
2000	193,895	5,762	392,659	4,215,772	11,530	9,847	667,127	5,496,592
2001	200,485	6,563	113,854	2,948,087	7,528	11,821	287,409	3,575,747
2002	153,306	4,540	308,554	2,797,916	9,223	10,767	299,940	3,584,246
2003	125,188	3,901	301,142	2,626,386	10,030	7,904	287,531	3,362,082
2004	168,005	12,193	457,106	2,914,113	30,989	10,807	278,204	3,871,417
2005	315,142	14,807	358,007	5,609,958	76,490	11,047	540,681	6,926,132
2006	287,977	13,112	401,503	5,488,668	38,075	11,559	432,313	6,673,207
2007	189,684	8,758	242,253	3,662,405	24,280	10,224	365,975	4,503,579
2008	184,682	7,887	381,864	3,930,067	31,949	11,276	282,379	4,830,104
2009	181,200	8,817	63,082	4,518,839	28,827	11,595	314,621	5,126,981
2010	250,194	27,117	96,128	5,774,210	40,474	16,580	488,098	6,692,801
2011	362,592	11,506	290,168	7,797,111	39,939	11,233	338,448	8,850,997
2012	139,042	16,387	281,108	5,881,018	53,747	16,121	654,940	7,042,363
2013	174,617	9,247	247,481	4,100,710	25,730	11,818	300,486	4,870,089
2014	121,811	4,353	114,780	2,211,296	10,098	7,131	151,394	2,620,863
2015	60,603	2,503	94,999	1,282,664	5,431	3,379	99,348	1,548,927
2016	14,208	647	27,049	300,454	1,691	884	26,996	371,929
2017	14,491	621	26,002	306,323	1,421	882	27,495	377,235
2018	6,515	386	19,703	144,810	1,223	500	11,259	184,397
2019	354	23	1,188	8,734	74	30	679	11,082
2020	354	23	1,188	8,733	74	30	679	11,081
2021	354	23	1,188	8,733	74	30	679	11,081
2022	354	23	1,188	8,733	74	30	679	11,081
2023	354	23	1,188	8,733	74	30	679	11,081
2024	354	23	1,188	8,733	74	30	679	11,081
2025	354	23	1,188	8,733	74	30	679	11,081
2026	354	23	1,188	8,733	74	30	679	11,081
2027	354	23	1,188	8,733	74	30	679	11,081
2028	354	23	1,188	8,733	74	30	679	11,081
2029	354	23	1,188	8,733	74	30	679	11,081
2030	354	23	1,188	8,733	74	30	679	11,081
2031	354	23	1,188	8,733	74	30	679	11,081
2032	354	23	1,188	8,733	74	30	679	11,081
2033	354	23	1,188	8,733	74	30	679	11,081
2034	354	23	1,188	8,733	74	30	679	11,081
2035	354	23	1,188	8,733	74	30	679	11,081
<b>TOTAL</b>	<b>9,487,160</b>	<b>423,981</b>	<b>18,988,951</b>	<b>204,858,668</b>	<b>848,696</b>	<b>601,238</b>	<b>17,949,829</b>	<b>253,158,524</b>

<sup>a</sup> 1983 through 2015 charges are debt service only and do not include bond cover; 2016 charges and after include both debt service and bond cover.<sup>b</sup> 2009 through 2017 charges include Reid Gardner separation costs that are allocated to contractors based on theoretical energy use over the facility service life, 1983–2013.

**TABLE B-16B Minimum OMP&R Component of Transportation Charge for Each Contractor for Off-Aqueduct Power Facilities<sup>a,b</sup> (in dollars)**

Sheet 3 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA									
	AVEK	Castaic Lake	Coachella	Crestline	Desert	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel
	[19]	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]
1971	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0
1983	1,083,881	411,247	565,798	35,432	894,572	1,250	0	0	233,134	28,548
1984	2,499,848	1,122,640	1,427,428	102,114	2,263,172	77	0	0	502,967	693,074
1985	3,749,257	1,572,025	2,032,672	170,137	3,230,451	0	0	157,601	884,188	601,583
1986	3,159,857	1,694,487	2,097,408	173,460	3,340,188	15,873	0	301,486	739,563	1,088,901
1987	3,167,759	1,694,698	1,991,841	190,149	3,230,424	95,994	1,786	258,719	1,951,799	1,091,691
1988	2,688,113	1,776,471	1,940,156	187,156	3,194,137	30,395	846	126,639	2,000,664	839,774
1989	2,357,669	1,348,806	1,326,863	132,076	2,218,516	50,948	13,206	493,424	1,257,332	792,087
1990	2,528,625	1,335,341	1,463,452	115,746	2,413,745	110,678	0	545,342	1,192,997	1,054,762
1991	1,048,414	531,160	1,022,405	125,256	1,686,304	65,111	473,291	488,207	540,119	796,531
1992	2,760,199	1,548,472	1,124,775	55,985	1,855,065	22,891	1,130,876	367,996	362,232	853,047
1993	3,559,487	1,332,392	2,256,338	29,498	3,721,492	60,615	1,101,799	640,919	425,969	1,406,255
1994	3,963,982	1,450,328	1,345,145	74,879	2,218,411	88,549	1,371,116	678,876	871,358	1,452,741
1995	4,324,009	1,901,361	2,498,462	44,237	4,120,837	43,892	881,146	636,541	75,278	1,397,623
1996	3,572,856	1,507,542	4,652,945	77,384	7,674,388	31,691	760,763	723,670	458,246	1,201,941
1997	3,411,379	1,468,949	4,294,703	42,135	4,319,206	24,319	891,191	648,652	625,340	1,175,556
1998	3,977,988	1,599,394	7,554,910	16,624	6,174,031	30,365	508,248	657,806	166,952	827,650
1999	3,696,973	1,694,851	3,195,685	71,662	3,678,076	18,305	501,486	710,674	815,001	1,375,575
2000	2,372,130	994,396	1,420,806	40,083	1,954,947	0	374,972	257,146	617,664	508,258
2001	2,680,895	1,418,179	460,256	53,460	759,169	0	213,385	445,872	1,339,699	119,363
2002	1,668,457	1,384,832	567,521	74,145	936,215	0	140,035	529,674	2,414,011	841,746
2003	1,445,146	1,353,956	411,258	44,506	678,236	0	405,376	277,984	780,631	624,561
2004	1,813,317	1,677,090	554,874	71,974	760,283	0	465,965	368,929	2,072,770	449,963
2005	2,047,638	1,443,555	1,721,141	32,667	1,987,091	0	542,366	400,828	1,568,493	566,063
2006	2,845,985	1,617,750	5,071,235	26,843	2,093,821	0	1,417,777	442,278	1,533,665	681,916
2007	2,990,954	1,864,667	3,225,680	77,880	1,331,802	0	2,023,088	710,515	2,639,102	177,256
2008	3,547,772	3,303,503	4,059,802	74,029	2,237,582	1,845	2,200,333	1,052,126	3,410,480	629,597
2009	3,350,539	3,010,931	4,067,070	79,671	1,633,327	3,263	2,559,670	1,152,062	3,948,007	1,025,723
2010	4,321,133	2,663,067	7,385,867	31,714	2,730,993	177	3,304,241	810,142	4,668,858	1,673,291
2011	4,952,954	1,811,301	5,605,548	13,018	2,290,872	407	309,065	551,068	2,185,513	1,468,910
2012	5,401,397	2,619,529	8,864,502	48,852	3,451,280	495	848,848	1,072,349	7,388,666	1,677,958
2013	2,563,236	2,266,914	3,520,765	77,123	1,425,559	3,270	475,946	512,798	1,986,377	591,150
2014	1,148,978	1,191,895	1,021,712	56,389	644,953	3,804	273,011	348,413	787,781	231,637
2015	563,666	564,243	859,445	26,404	488,140	2,405	213,055	137,848	587,116	195,205
2016	181,611	93,466	187,451	4,645	127,772	704	39,240	31,322	114,853	48,299
2017	155,616	90,283	145,329	4,087	122,748	825	40,344	27,869	91,387	44,030
2018	167,877	113,121	186,658	7,825	75,216	0	89,483	37,154	132,799	38,856
2019	9,888	6,823	11,258	472	4,536	0	5,729	2,241	8,349	2,343
2020	9,887	6,822	11,257	472	4,536	0	5,729	2,241	8,348	2,343
2021	9,887	6,822	11,257	472	4,536	0	5,729	2,241	8,348	2,343
2022	9,887	6,822	11,257	472	4,536	0	5,729	2,241	8,348	2,343
2023	9,887	6,822	11,257	472	4,536	0	5,729	2,241	8,348	2,343
2024	9,887	6,822	11,257	472	4,536	0	5,729	2,241	8,348	2,343
2025	9,887	6,822	11,257	472	4,536	0	5,729	2,241	8,348	2,343
2026	9,887	6,822	11,257	472	4,536	0	5,729	2,241	8,348	2,343
2027	9,887	6,822	11,257	472	4,536	0	5,729	2,241	8,348	2,343
2028	9,887	6,822	11,257	472	4,536	0	5,729	2,241	8,348	2,343
2029	9,887	6,822	11,257	472	4,536	0	5,729	2,241	8,348	2,343
2030	9,887	6,822	11,257	472	4,536	0	5,729	2,241	8,348	2,343
2031	9,887	6,822	11,257	472	4,536	0	5,729	2,241	8,348	2,343
2032	9,887	6,822	11,257	472	4,536	0	5,729	2,241	8,348	2,343
2033	9,887	6,822	11,257	472	4,536	0	5,729	2,241	8,348	2,343
2034	9,887	6,822	11,257	472	4,536	0	5,729	2,241	8,348	2,343
2035	9,887	6,822	11,257	472	4,536	0	5,729	2,241	8,348	2,343
<b>TOTAL</b>	<b>95,937,680</b>	<b>53,588,816</b>	<b>90,319,270</b>	<b>2,497,268</b>	<b>82,040,134</b>	<b>708,148</b>	<b>23,669,341</b>	<b>16,641,019</b>	<b>51,512,926</b>	<b>28,310,957</b>

<sup>a</sup> 1983 through 2015 charges are debt service only and do not include bond cover; 2016 charges and after include both debt service and bond cover.<sup>b</sup> 2009 through 2017 charges include Reid Gardner separation costs that are allocated to contractors based on theoretical energy use over the facility service life, 1983–2013.



**TABLE B-16B Minimum OMP&R Component of Transportation Charge for Each Contractor for Off-Aqueduct Power Facilities<sup>a,b</sup> (in dollars)**

Sheet 4 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA				Total State Water Project <sup>c</sup>
	San Geronio	Metropolitan	Ventura	Total	Yuba City	Butte	Plumas	Total	
	[29]	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]
1971	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0
1983	0	12,791,358	0	16,045,220	0	0	0	0	20,182,468
1984	0	39,229,567	0	47,840,887	0	0	0	0	60,556,781
1985	0	77,446,523	0	89,844,437	0	0	0	0	108,590,343
1986	0	77,581,287	0	90,192,510	0	0	0	0	107,702,921
1987	0	68,939,195	0	82,614,055	0	0	0	0	99,411,597
1988	0	79,936,309	0	92,720,660	0	0	0	0	108,898,833
1989	0	68,311,546	0	78,302,473	0	0	0	0	89,857,307
1990	0	83,964,409	277,885	95,002,982	0	0	0	0	104,000,038
1991	0	54,214,229	132,209	61,123,236	0	0	0	0	64,233,890
1992	0	72,401,054	0	82,482,592	0	0	0	0	92,173,695
1993	0	55,312,615	0	69,847,379	0	0	0	0	87,174,348
1994	0	72,838,621	0	86,354,006	0	0	0	0	97,722,979
1995	0	40,862,813	0	56,786,199	0	0	0	0	74,988,898
1996	0	36,536,259	401	57,198,086	0	0	0	0	71,940,675
1997	0	37,121,379	108,559	54,131,368	0	0	0	0	65,536,671
1998	0	30,341,609	149,170	52,004,747	0	0	0	0	65,310,733
1999	0	42,257,580	106,226	58,122,094	0	0	0	0	72,133,666
2000	0	43,977,877	123,318	52,641,597	0	0	0	0	60,213,003
2001	0	49,405,276	84,868	56,980,422	0	0	0	0	62,827,875
2002	0	45,412,974	153,549	54,123,159	0	0	0	0	59,683,427
2003	3,303	41,917,356	129,134	48,071,447	0	0	0	0	53,245,891
2004	44,648	58,676,035	170,851	67,126,699	0	0	0	0	73,135,768
2005	41,448	56,220,579	61,131	66,633,000	0	0	0	0	75,946,420
2006	265,078	60,701,335	70,268	76,767,951	0	0	0	0	85,894,802
2007	248,328	61,354,857	119,861	76,763,990	0	0	0	0	83,828,015
2008	616,986	72,144,765	300,729	93,579,549	0	0	0	0	102,461,628
2009	819,589	71,530,603	313,357	93,493,812	0	0	0	0	102,494,682
2010	1,048,807	88,263,837	322,003	117,224,130	0	0	0	0	128,041,374
2011	954,501	80,381,761	225,564	100,750,482	0	0	0	0	113,077,671
2012	1,225,982	78,031,475	299,385	110,930,718	0	0	0	0	121,679,597
2013	679,437	49,351,291	144,019	63,597,885	0	0	0	0	71,469,014
2014	284,110	24,242,063	30,070	30,264,816	0	0	0	0	34,698,576
2015	92,664	15,050,985	28,825	18,810,001	0	0	0	0	21,206,746
2016	17,610	3,261,543	7,192	4,115,708	0	0	0	0	4,648,897
2017	11,267	3,037,319	6,277	3,777,381	0	0	0	0	4,300,000
2018	34,282	2,085,052	6,119	2,974,441	0	0	0	0	3,300,000
2019	2,067	126,403	369	180,477	0	0	0	0	200,000
2020	2,066	126,393	369	180,462	0	0	0	0	200,000
2021	2,066	126,393	369	180,462	0	0	0	0	200,000
2022	2,066	126,393	369	180,462	0	0	0	0	200,000
2023	2,066	126,393	369	180,462	0	0	0	0	200,000
2024	2,066	126,393	369	180,462	0	0	0	0	200,000
2025	2,066	126,393	369	180,462	0	0	0	0	200,000
2026	2,066	126,393	369	180,462	0	0	0	0	200,000
2027	2,066	126,393	369	180,462	0	0	0	0	200,000
2028	2,066	126,393	369	180,462	0	0	0	0	200,000
2029	2,066	126,393	369	180,462	0	0	0	0	200,000
2030	2,066	126,393	369	180,462	0	0	0	0	200,000
2031	2,066	126,393	369	180,462	0	0	0	0	200,000
2032	2,066	126,393	369	180,462	0	0	0	0	200,000
2033	2,066	126,393	369	180,462	0	0	0	0	200,000
2034	2,066	126,393	369	180,462	0	0	0	0	200,000
2035	2,066	126,393	369	180,462	0	0	0	0	200,000
<b>TOTAL</b>	<b>6,423,164</b>	<b>1,857,282,022</b>	<b>3,377,242</b>	<b>2,312,307,988</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2,655,969,229</b>

<sup>a</sup> 1983 through 2015 charges are debt service only and do not include bond cover; 2016 charges and after include both debt service and bond cover.<sup>b</sup> 2009 through 2017 charges include Reid Gardner separation costs that are allocated to contractors based on theoretical energy use over the facility service life, 1983–2013.<sup>c</sup> Costs allocated to contractors in 1989 through 2002 are reduced by credits for Off-Aqueduct Power Facility costs allocated to the pumping of non-SWP water.

TABLE B-17 Unit Variable OMP&amp;R Component of Transportation Charge (in dollars per acre-foot)

Sheet 1 of 5

Calendar Year	NORTH BAY AQUEDUCT						SOUTH BAY AQUEDUCT		CALIFORNIA AQUEDUCT	
	Reach 1 Barker Slough Pumping Plant		Reach 3A Cordelia Pumping Plant Solano		Reach 3B Cordelia Pumping Plant Napa <sup>a</sup>		Reach 1 South Bay and Del Valle Pumping Plants <sup>b</sup>		Reach 1 Banks Pumping Plant	
	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	4.1511341	4.1511341	0	0
1963	0	0	0	0	0	0	4.5639383	4.5639383	0	0
1964	0	0	0	0	0	0	3.5452154	3.5452154	0	0
1965	0	0	0	0	0	0	4.1911773	4.1911773	0	0
1966	0	0	0	0	0	0	3.5074573	3.5074573	0	0
1967	0	0	0	0	0	0	3.9306767	4.1752198	0.2445431	0.2445431
1968	0	0	0	0	5.7570017	5.7570017	3.3315620	4.8750942	1.5435322	1.5435322
1969	0	0	0	0	3.1823595	3.1823595	3.6949019	4.8016170	1.1067151	1.1067151
1970	0	0	0	0	3.7584301	3.7584301	4.4256141	5.3721490	0.9465349	0.9465349
1971	0	0	0	0	4.2082507	4.2082507	3.8714396	4.7522833	0.8808437	0.8808437
1972	0	0	0	0	3.9577735	3.9577735	4.3250690	5.2281686	0.9030996	0.9030996
1973	0	0	0	0	3.8103903	3.8103903	5.2455409	6.1841801	0.9386391	0.9386391
1974	0	0	0	0	3.5878850	3.5878850	6.3321503	7.2293909	0.8972406	0.8972406
1975	0	0	0	0	2.1606725	2.1606725	3.7365711	4.8327731	1.0962020	1.0962020
1976	0	0	0	0	2.9283909	2.9283909	4.5191527	5.7132795	1.1941268	1.1941268
1977	0	0	0	0	2.7516411	2.7516411	4.7630172	6.5309908	1.7679736	1.7679736
1978	0	0	0	0	3.5949619	3.5949619	5.2086183	6.8200210	1.6114026	1.6114026
1979	0	0	0	0	2.4747752	2.4747752	4.9524184	7.0944849	2.1420665	2.1420665
1980	0	0	0	0	2.9737588	2.9737588	4.5186576	5.8810391	1.3623815	1.3623815
1981	0	0	0	0	2.6488168	2.6488168	4.3834851	6.4541818	2.0706967	2.0706967
1982	0	0	0	0	10.0222589	10.0222589	5.6383622	7.4005197	1.7621575	1.7621575
1983	0	0	0	0	1.0240490	1.0240490	0.8686401	1.7143948	0.8457546	0.8457546
1984	0	0	0	0	1.6496750	1.6496750	2.7674018	3.9368186	1.1694168	1.1694168
1985	0	0	0	0	2.5224065	2.5224065	3.6942206	5.2987621	1.6045415	1.6045415
1986	0	0	0	0	4.4049446	4.4049446	7.2799222	10.5919298	3.3120077	3.3120077
1987	0	0	0	0	3.5386715	3.5386715	6.4837861	9.2276309	2.7438448	2.7438448
1988	1.1782643	1.1782643	0	1.1782643	4.4547478	5.6330121	6.1750026	8.8623074	2.6873049	2.6873049
1989	1.2715449	1.2715449	2.5423866	3.8139316	4.2807103	5.5522552	8.1617218	11.6840191	3.5222973	3.5222973
1990	2.0026083	2.0026083	4.2324041	6.2350124	5.8753602	7.8779685	11.7200790	15.8516543	4.1315753	4.1315753
1991	1.2486830	1.2486830	2.6246433	3.8733263	3.8057971	5.0544801	7.5402615	11.2354099	3.6951485	3.6951485
1992	0.7094386	0.7094386	1.4175705	2.1270091	2.3509123	3.0603509	4.0600958	6.3925272	2.3324315	2.3324315
1993	-0.3464574	-0.3464574	-0.6048649	-0.9513223	-1.0200530	-1.3665104	-1.4929934	-1.2571378	0.2358556	0.2358556
1994	1.4600287	1.4600287	2.6570107	4.1170394	4.2975560	5.7575847	7.9510779	11.2405895	3.2895116	3.2895116
1995	0.7544766	0.7544766	1.2974265	2.0519031	2.2753763	3.0298529	3.2312761	5.2610469	2.0297708	2.0297708
1996	1.6427835	1.6427835	2.7704025	4.4131859	4.7993051	6.4420886	8.0186492	11.3633990	3.3447498	3.3447498
1997	1.7801484	1.7801484	3.0246843	4.8048327	5.0575904	6.8377388	9.6521246	12.6148370	2.9627125	2.9627125
1998	-0.3253238	-0.3253238	-0.5570754	-0.8823992	-0.9104311	-1.2357549	-1.8866894	-1.7684350	0.1182544	0.1182544
1999	0.7843563	0.7843563	1.2927037	2.0770600	2.1913971	2.9757534	3.9861234	6.3557474	2.3696240	2.3696240
2000	1.3829278	1.3829278	1.9789654	3.3618932	3.0505466	4.4334744	6.3152141	8.6279347	2.3127206	2.3127206
2001	8.1780479	8.1780479	12.7154051	20.8934529	22.9802761	31.1583239	42.7861432	55.6945641	12.9084209	12.9084209
2002	4.1894843	4.1894843	5.3026984	9.4921827	8.9411156	13.1306000	18.1280636	24.2060285	6.0779649	6.0779649
2003	4.3318595	4.3318595	7.0890449	11.4209044	12.8010554	17.1329149	19.2856231	26.0104983	6.7248752	6.7248752
2004	4.9006056	4.9006056	6.4207890	11.3213946	12.6192952	17.5199009	19.8710473	27.1446743	7.2736270	7.2736270
2005	6.2706237	6.2706237	7.7072771	13.9779008	18.6144338	24.8850574	25.9514011	34.0659018	8.1145007	8.1145007
2006	5.4259377	5.4259377	6.2412600	11.6671976	18.2458557	23.6717934	22.8226972	29.6194124	6.7967153	6.7967153
2007	7.7565590	7.7565590	8.2045346	15.9610936	22.7900532	30.5466123	31.6227665	40.8504831	9.2277166	9.2277166
2008	7.5787563	7.5787563	10.0666989	17.8254552	21.9760357	29.7347920	28.5919449	40.9578318	12.3658869	12.3658869
2009	5.2291150	5.2291150	6.6742086	11.9033236	14.3314002	19.5605152	21.2131796	27.0988402	5.8856607	5.8856607
2010	6.0244466	6.0244466	8.7803566	14.8048032	16.7630949	22.7875415	24.7925097	35.7184619	10.9259523	10.9259523
2011	6.8810183	6.8810183	9.0458323	15.9268506	20.2556452	27.1366636	29.9707962	40.8032460	10.8324498	10.8324498
2012	6.9391963	6.9391963	9.6107660	16.5499622	19.2648925	26.2040888	31.5821999	42.0741970	10.4919971	10.4919971
2013	9.0016171	9.0016171	10.7222346	19.7238517	25.8706892	34.8723063	36.5729919	49.6652267	13.0922348	13.0922348
2014	10.6675197	10.6675197	14.9362696	25.6037893	31.5502018	42.2177215	45.0411127	64.6008573	19.5597446	19.5597446
2015	11.1070333	11.1070333	15.6052627	26.7122960	32.2272002	43.3342335	47.6577519	67.6344777	19.9767258	19.9767258
2016	12.0505437	12.0505437	17.0043249	29.0548686	27.3496651	39.4002088	42.4158667	61.0998848	18.6840181	18.6840181
2017	<b>13.6482513</b>	<b>13.6482513</b>	<b>22.5991385</b>	<b>36.2473898</b>	<b>34.4854191</b>	<b>48.1336704</b>	<b>40.1120752</b>	<b>55.4900856</b>	<b>15.3780104</b>	<b>15.3780104</b>
2018	13.8784935	13.8784935	22.9804890	36.8589826	35.0672790	48.9457725	41.0438323	57.1268034	16.0829711	16.0829711
2019	12.4298135	12.4298135	24.4961358	36.9259494	31.3103904	43.7402039	43.3114054	61.1859824	17.8745769	17.8745769
2020	12.7000651	12.7000651	25.0287597	37.7288247	31.9911596	44.6912246	44.2557523	58.0828204	13.8270681	13.8270681
2021	12.5008890	12.5008890	24.6361333	37.1370223	31.4893800	43.9902690	43.5616307	60.0619089	16.5002782	16.5002782
2022	12.6589549	12.6589549	24.9476752	37.6066301	31.8875431	44.5464980	44.1124805	60.5807489	16.4682684	16.4682684
2023	12.5923027	12.5923027	24.8164196	37.4087223	31.7196900	44.3119927	43.8802116	58.5000618	14.6198502	14.6198502
2024	12.6415004	12.6415004	24.9133409	37.5548414	31.8435706	44.4850710	44.0516216	58.6302448	14.5786233	14.5786233
2025	12.7153946	12.7153946	25.0589130	37.7743076	32.0297359	44.7451306	44.3091586	58.3408211	14.0316625	14.0316625
2026	12.4804206	12.4804206	24.5958444	37.0762651	31.4378301	43.9182507	43.4903205	59.6085946	16.1182741	16.1182741
2027	12.5697962	12.5697962	24.7719498	37.3417460	31.6629736	44.2327698	43.8017542	59.1271401	15.3253859	15.3253859
2028	12.6183868	12.6183868	24.8677309	37.4861177	31.7853617	44.4037485	43.9711302	59.0120236	15.0408934	15.0408934
2029	12.6590633	12.6590633	24.9479285	37.6069919	31.8878301	44.5468934	44.1128584	59.3482150	15.2353566	15.2353566
2030	12.7068734	12.7068734	25.0421893	37.7490627	32.0082664	44.7151397	44.2794848	56.5367451	12.2572603	12.2572603
2031	12.7099740	12.7099740	25.0482706	37.7582446	32.0160735	44.7260475	44.2902256	60.7605292	16.4703036	16.4703036
2032	12.4901995	12.4901995	24.6151020	37.1053015	31.4624570	43.9526564	43.5243918	60.6610271	17.1366353	17.1366353
2033	12.7573938	12.7573938	25.1417712	37.8991650	32.1355339	44.8929276	44.4555336	56.4953435	12.0398099	12.0398099
2034	12.5735906	12.5735906	24.7795515	37.3531421	31.6725603	44.2461509	43.8150355	59.1748840	15.3598486	15.3598486
2035	12.4980052	12.4980052	24.6305587	37.1285639	31.4821470	43.9801522	43.5516055	70.5986786	27.0470731	27.0470731

<sup>a</sup> For the period 1968 through 1987, rates are for an interim facility.<sup>b</sup> The relatively minor costs of Del Valle Pumping Plant have been combined with those of South Bay Pumping Plant to simplify the allocation procedure.

TABLE B-17 Unit Variable OMP&amp;R Component of Transportation Charge (in dollars per acre-foot)

Sheet 2 of 5

Calendar Year	CALIFORNIA AQUEDUCT (continued)									
	Reach 4 Dos Amigos Pumping Plant		Reach 14A Buena Vista Pumping Plant		Reach 15A Teerink Pumping Plant		Reach 16A Chrisman Pumping Plant		Reach 17E Edmonston Pumping Plant	
	Unit Rate	Cumulative	Unit Rate	Cumulative	Unit Rate	Cumulative	Unit Rate	Cumulative	Unit Rate	Cumulative
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0
1968	1.0732031	2.6167353	0	0	0	0	0	0	0	0
1969	0.7028165	1.8095316	0	0	0	0	0	0	0	0
1970	0.7813430	1.7278778	0.3333333	2.0612111	0	0	0	0	0	0
1971	0.4125312	1.2933749	1.1407617	2.4341366	0.7218469	3.1559834	0	0	0	0
1972	0.5662758	1.4693754	0.8894941	2.3588694	0.8040021	3.1628715	1.8113853	4.9742569	7.3206022	12.2948591
1973	0.5996892	1.5383283	0.8469026	2.3852309	1.0302066	3.4154375	1.8458304	5.2612679	7.4512435	12.7125113
1974	0.5736894	1.4709300	0.8122890	2.2832190	0.9665911	3.2498101	1.7739395	5.0237496	6.9004732	11.9242227
1975	0.4606980	1.5569000	0.7554447	2.3123448	0.8894108	3.2017555	1.8682537	5.0700092	6.9962702	12.0662794
1976	0.5163828	1.7105095	0.9081491	2.6186586	0.9640628	3.5827214	2.1499640	5.7326854	7.9384515	13.6711369
1977	0.6138931	2.3818668	0.9835371	3.3654038	1.2303967	4.5958005	2.7357728	7.3315733	9.9990004	17.3305737
1978	0.4545898	2.0659925	0.9044582	2.9704506	0.9762058	3.9466564	1.8872449	5.8339014	7.0810192	12.9149206
1979	0.6587934	2.8008600	1.0519199	3.8527798	1.1976258	5.0504056	2.6012890	7.6516946	9.6345625	17.2862572
1980	0.8021465	2.1645280	1.3516057	3.5161337	1.5041463	5.0202800	3.1923433	8.2126233	10.9860288	19.1986521
1981	1.0923907	3.1630874	1.2409168	4.4040042	1.3219771	5.7259813	2.9592932	8.6852745	9.9649551	18.6502296
1982	0.8326785	2.5948359	1.2041660	3.7990019	1.3723736	5.1713756	2.8986491	8.0700247	10.2096358	18.2796606
1983	0.3647859	1.2105406	0.7590265	1.9695670	0.8857383	2.8553053	1.7623405	4.6176458	5.5086367	10.1262825
1984	0.6581523	1.8275691	1.0533611	2.8809302	1.2188270	4.0997572	2.5407768	6.6405340	8.2344665	14.8750006
1985	0.8726163	2.4771579	1.4204831	3.8976409	1.6516291	5.5492701	3.4695783	9.0188484	11.8181234	20.8369718
1986	1.3996542	4.7116618	2.3713282	7.0829901	2.7567970	9.8397871	5.9534613	15.7932484	20.6010240	36.3942724
1987	1.2912643	4.0351091	2.2344385	6.2695476	2.5459999	8.8155474	5.3141190	14.1296664	17.7628277	31.8924941
1988	1.1947837	3.8820886	2.1129991	5.9950877	2.4017135	8.3968012	5.0055748	13.4023759	16.6001692	30.0025452
1989	1.4935226	5.0158199	2.6947446	7.7105645	3.0084211	10.7189856	6.5499538	17.2689394	22.1795336	39.4484730
1990	1.8962463	6.0278216	3.3080372	9.3358588	3.7483036	13.0841624	8.6832678	21.7674302	31.0405219	52.8079521
1991	1.0437991	4.7389476	2.1132495	6.8521971	2.4154810	9.2676780	5.6823745	14.9500525	20.4744695	35.4245220
1992	0.9002103	3.2326417	1.4836761	4.7163178	1.7077297	6.4240475	3.5445788	9.9686263	12.0459599	22.0145862
1993	0.1605206	0.3963762	-0.1405164	0.2558598	-0.1312944	0.1245654	-0.7754796	-0.6509143	-3.5828989	-4.2338132
1994	1.4208578	4.7103693	2.5100856	7.2204549	2.8029168	10.0233717	6.0772944	16.1006661	21.5000984	37.6007645
1995	0.7974861	2.8272569	1.3474564	4.1747133	1.4945529	5.6692662	3.1250716	8.7943378	10.7461772	19.5405149
1996	1.6726383	5.0173881	2.5952092	7.6125973	2.8425227	10.4551200	6.3087407	16.7638607	22.6420778	39.4059385
1997	1.2769880	4.2397005	2.5012144	6.7409148	2.6893394	9.4302542	6.2890095	15.7192637	23.0714697	38.7907334
1998	-0.2195574	-0.1013030	-0.4232465	-0.5245494	-0.4504610	-0.9750105	-1.0585256	-2.0335361	-3.8077856	-5.8413217
1999	0.8412976	3.2109216	1.4071463	4.6180679	1.2831855	5.9012534	3.4289262	9.3301795	13.6776471	23.0078267
2000	0.9329791	3.2456997	1.6371180	4.8828178	1.8023858	6.6852036	4.2443196	10.9295232	15.5370734	26.4665966
2001	6.1327071	19.0411280	11.3023513	30.3434793	12.3930201	42.7364994	28.6439963	71.3804957	107.2108863	178.5913820
2002	2.6241510	8.7021160	4.6014508	13.3035668	5.0195661	18.3231329	11.6145173	29.9376502	43.1568537	73.0945038
2003	3.1186670	9.8435422	5.5847004	15.4282425	6.0839458	21.5121883	14.1509765	35.6631648	52.6129029	88.2760677
2004	3.3308086	10.6044356	5.8670943	16.4715299	6.3736662	22.8451961	14.8467033	37.6918994	55.1954462	92.8873456
2005	3.8324365	11.9469372	6.8775620	18.8244992	7.4553008	26.2798000	17.3347915	43.6145915	62.0851423	105.6997338
2006	3.1056782	9.9023935	5.7702305	15.6726240	6.2099396	21.8825636	14.5146252	36.3971888	46.2231736	82.6203624
2007	4.5130560	13.7407726	8.0770771	21.8178497	8.7444274	30.5622771	20.2730047	50.8352818	68.5883222	119.4236041
2008	4.7806627	17.1465496	8.8992367	26.0457863	10.3464784	36.3922647	21.5891194	57.9813841	68.8617605	126.8431446
2009	3.0950474	8.9807080	5.6803844	14.6610924	6.2868178	20.9479102	13.8621915	34.8101017	63.6310725	98.4411742
2010	4.1025490	15.0285013	7.0390876	22.0675889	7.6367372	29.7043261	17.4759473	47.1802734	64.8578039	112.0380773
2011	4.5736663	15.4061160	8.0443320	23.4504480	8.6659945	32.1164425	19.9425101	52.0589526	70.8487617	122.9077144
2012	4.7414022	15.2333993	8.2301173	23.4635165	9.0103751	32.4738916	20.7355174	53.2094090	73.2888314	127.0382404
2013	5.6432914	18.7355262	9.6815642	28.4170904	10.5484550	38.9655454	24.4524881	63.4180334	87.5980614	151.0160948
2014	8.3591575	27.9189021	13.6747187	41.5936208	15.1053722	56.6989930	34.5276323	91.2266253	125.6600845	216.8867098
2015	7.4153962	27.3921220	13.4330537	40.8251758	14.7882390	55.6134148	33.4446627	89.0580774	124.0000930	213.0581704
2016	5.4964895	24.1805076	10.7967261	34.9772337	11.8325979	46.8098315	27.1594948	73.9693264	100.4531234	174.4224497
2017	<b>6.7379845</b>	<b>22.1159949</b>	<b>12.0583164</b>	<b>34.1743113</b>	<b>13.0672326</b>	<b>47.2415438</b>	<b>30.3117361</b>	<b>77.5532799</b>	<b>112.6969523</b>	<b>190.2502323</b>
2018	7.0692342	23.1522052	12.8202492	35.9724544	13.9243827	49.8968371	32.3246413	82.2214784	120.2637636	202.4852421
2019	7.3435669	25.2181438	13.0716229	38.2897667	14.1380739	52.4278406	32.7662161	85.1940567	121.7728942	206.9669510
2020	7.6689718	21.4960399	13.8060515	35.3020914	14.9601690	50.2622604	34.6929708	84.9552312	129.0075948	213.9628260
2021	7.5133981	24.0136763	13.4928562	37.5065325	14.6148804	52.1214129	33.8876640	86.0090769	125.9972379	212.0063148
2022	7.6539251	24.1221935	13.7882287	37.9104222	14.9425150	52.8529372	34.6533160	87.5062532	128.8645747	216.3708279
2023	7.6636111	22.2834614	13.8535313	36.1369926	15.0218914	51.1588840	34.8440697	86.0029537	129.5969599	215.5999135
2024	7.5965498	22.1751731	13.6409105	35.8160836	14.7750193	50.5911029	34.2588035	84.8499064	127.3765585	212.2264648
2025	7.7176163	21.7492788	13.9311533	35.6804321	15.1024662	50.7828984	35.0281821	85.8110805	130.2721158	216.0831962
2026	7.4588993	23.5771734	13.3558116	36.9329850	14.4594751	51.3924601	33.5219381	84.9143982	124.6188637	209.5332619
2027	7.6465425	22.9719284	13.8194456	36.7913740	14.9843492	51.7757234	34.7565388	86.5322623	129.2698435	215.8021058
2028	7.5790867	22.6199801	13.6062010	36.2261811	14.7368269	50.9630080	34.1697846	85.1327927	127.0439875	212.1767801
2029	7.6721964	22.9075531	13.8384620	36.7460150	15.0000607	51.7460757	34.7891775	86.5352532	129.3781071	215.9133603
2030	7.6053462	19.8626065	13.6283347	33.4909412	14.7563496	48.2472908	34.2116094	82.4589002	127.1876218	209.6465220
2031	8.0026688	24.4729724	14.7372376	39.2102100	16.0299233	55.2401333	37.2210183	92.4611516	138.5717733	231.0329249
2032	7.2823271	24.4189624	12.8769780	37.2959404	13.9125881	51.2085285	32.2321043	83.4406328	119.7482257	203.1888585
2033	8.0224081	20.0622180	14.7631599	34.8253779	16.0561971	50.8815750	37.2805276	88.1621027	138.7881370	226.9502396
2034	7.3779964	22.7378449	13.0879691	35.8258140	14.1478842	49.9736982	32.7828852	82.7565834	121.8139557	204.5705391
2035	8.4083678	35.4554408	16.1022683	51.5577092	17.6340306	69.1917398	41.0395607	110.2313005	153.1144904	263.3457909

TABLE B-17 Unit Variable OMP&amp;R Component of Transportation Charge (in dollars per acre-foot)

Sheet 3 of 5

Calendar Year	CALIFORNIA AQUEDUCT (continued)							
	Reach 18A		Reach 22B		Reach 23		Reach 26A	
	Alamo Powerplant		Pearblossom Pumping Plant		Mojave Siphon Powerplant		Devil Canyon Powerplant	
	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate
	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]
1961	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0
1972	0	0	1.9331104	14.2279695	0	0	-2.3717647	11.8562048
1973	0	0	3.8751940	16.5877053	0	0	-8.9027252	7.6849801
1974	0	0	3.1602116	15.0844343	0	0	-5.3440968	9.7403376
1975	0	0	3.0210558	15.0873353	0	0	-5.7803309	9.3070043
1976	0	0	3.7579009	17.4290378	0	0	-6.6439666	10.7850713
1977	0	0	3.0796474	20.4102211	0	0	-12.0911833	8.3190378
1978	0	0	4.0233030	16.9382236	0	0	-8.2569506	8.6812730
1979	0	0	5.0776468	22.3639040	0	0	-9.7140035	12.6499005
1980	0	0	4.3918283	23.5904804	0	0	-8.3797007	15.2107797
1981	0	0	3.9973528	22.6475824	0	0	-6.7528590	15.8947235
1982	0	0	3.6829998	21.9626604	0	0	-6.9238898	15.0387706
1983	0	0	1.7205305	11.8468130	0	0	-23.7923457	-11.9455328
1984	0	0	2.4763871	17.3513877	0	0	-29.2940447	-11.9426570
1985	0	0	3.4967556	24.3337274	0	0	-30.7672356	-6.4335082
1986	-2.3583180	34.0359544	5.9864597	40.0224141	0	0	-29.2499580	10.7724561
1987	-2.5482255	29.3442686	5.0535029	34.3977715	0	0	-29.7006534	4.6971181
1988	-1.3847067	28.6178385	4.7392460	33.3570844	0	0	-29.0334518	4.3236326
1989	-1.1019487	38.3465243	6.4066114	44.7531357	0	0	-28.3706997	16.3824360
1990	-1.0673268	51.7406253	8.9787944	60.7194197	0	0	-28.8797266	31.8396931
1991	-1.5206590	33.9038630	6.0785417	39.9824047	0	0	-30.3294563	9.6529484
1992	-2.6080003	19.4065859	3.6219501	23.0285360	0	0	-29.7938993	-6.7653633
1993	-0.1885524	-4.4223656	-1.0192774	-5.4416430	0	0	-30.6629489	-36.1045919
1994	-0.1279266	37.4728379	6.4513573	43.9241952	0	0	-30.4781656	13.4460296
1995	-3.4425314	16.0979836	3.3643070	19.4622905	0	0	-30.3517624	-10.8894719
1996	-5.9839345	33.4220040	6.6794995	40.1015035	-2.3423415	37.7591620	-29.5900574	8.1691046
1997	-4.7847600	34.0059734	6.8397922	40.8457656	-3.8632009	36.9825646	-30.6066647	6.3758999
1998	-5.0614104	-10.9027321	-1.3239652	-12.2266973	-3.7700558	-15.9967531	-30.4293072	-46.4260603
1999	-4.8990186	18.1088081	3.7378677	21.8466757	-5.1563836	16.6902921	-30.2385322	-13.5482400
2000	-5.3488706	21.1177260	4.5812734	25.6989994	-5.1804371	20.5185623	-30.2852311	-9.7666688
2001	-4.6452108	173.9461712	30.0519705	203.9981416	-5.7699537	198.2281879	-30.9018397	167.3263483
2002	-5.4660286	67.6284752	12.9716035	80.6000788	-6.4072101	74.1928686	-30.1661590	44.0267096
2003	-3.1421256	84.9618520	15.4235840	100.3854360	-7.1779336	93.2075024	-30.3892607	62.8182418
2004	-5.5767140	87.3106316	16.2223264	103.5329580	-7.4292488	96.1037093	-30.2389380	65.8647713
2005	-5.5017080	100.1980258	17.9086202	118.1066460	-6.6110924	111.4955536	-30.2939296	81.2016240
2006	-3.1387155	79.4816469	13.4499174	92.9315643	-5.4976224	87.4339418	-29.8005787	57.6333631
2007	-2.7809944	116.6426096	20.0909768	136.7335865	-6.1785168	130.5550697	-30.0961198	100.4589500
2008	-5.4028716	121.4402730	19.4618461	140.9021191	-6.0198040	134.8823151	-30.7631237	104.1191914
2009	-6.3446584	92.0965158	21.4368911	113.5334069	-5.4878092	108.0455978	-33.3163094	74.7292884
2010	-5.1259757	106.9121016	18.8366105	125.7487121	-6.4398404	119.3088717	-28.6783430	90.6305287
2011	-5.2103711	117.6973433	20.8526451	138.5499884	-7.1272044	131.4227840	-29.9982569	101.4245272
2012	-2.7221204	124.3161200	21.7626077	146.0787277	-11.4254128	134.6533149	-30.6216868	104.0316281
2013	-3.7638094	147.2522854	25.9234628	173.1757482	-10.3251093	162.8506389	-30.7664075	132.0842314
2014	-8.1801225	208.7065873	38.3996499	247.1062372	-7.8617556	239.2444816	-29.6636049	209.5808766
2015	-9.0904712	203.9676992	40.2283289	244.1960281	-9.4086610	234.7873672	-29.7044693	205.0828979
2016	-11.2000464	163.2224033	32.5872380	195.8096412	-14.2556316	181.5540097	-28.5973974	152.9566123
2017	-13.6285375	176.6216947	33.1870920	209.8087867	-20.5814926	189.2272941	-30.2784086	158.9488855
2018	-15.0172257	187.4680164	37.6781100	225.1461264	-23.1085927	202.0375337	-34.0416188	167.9959149
2019	-12.0347589	194.9321921	32.9592745	227.8914665	-19.4902619	208.4012046	-29.4683835	178.9328211
2020	-12.6192915	201.3435345	35.5829609	236.9264954	-20.6598260	216.2666694	-31.2028139	185.0638555
2021	-12.5819538	199.4243610	34.9035961	234.3279571	-20.5837808	213.7441764	-30.3333339	183.4108425
2022	-12.6199978	203.7508301	35.4700894	239.2209195	-20.6612656	218.5596538	-29.6429696	188.9166842
2023	-14.6820674	200.9178461	36.1202949	237.0381410	-21.1832038	215.8549372	-30.7397390	185.1151982
2024	-13.9434906	198.2829742	34.1370111	232.4199853	-19.8666037	212.5533816	-30.2802924	182.2730892
2025	-14.5460828	201.5371134	36.0771439	237.6142573	-20.9383041	216.6759532	-30.0858431	186.5901101
2026	-14.0897278	195.4435341	34.1143937	229.5579278	-20.1246754	209.4332523	-30.5058592	178.9273932
2027	-14.4442451	201.3578607	35.3714948	236.7293554	-20.7556426	215.9737128	-30.2766567	185.6970561
2028	-14.2530704	197.9237098	34.9589391	232.8826489	-20.4144459	212.4682030	-30.5834057	181.8847973
2029	-14.3441399	201.5692204	35.3338333	236.9030537	-20.5767035	216.3263502	-30.1691756	186.1571746
2030	-14.1710283	195.4754937	34.9674634	230.4429571	-20.2687015	210.1742556	-30.2989829	179.8752727
2031	-14.9279127	216.1050123	37.1771132	253.2821255	-21.6288643	231.6532611	-30.4129691	201.2402921
2032	-13.5566311	189.6322273	32.6435721	222.2757995	-19.1900078	203.0857917	-29.4038947	173.6818970
2033	-15.0698094	211.8804302	37.7345332	249.6149634	-21.8878068	227.7271566	-31.5314181	196.1957385
2034	-13.8185923	190.7519467	33.5999892	224.3519360	-19.6471984	204.7047376	-29.2718498	175.4328878
2035	-15.3045246	248.0412664	37.6487651	285.6900314	-22.3189175	263.3711139	-31.9702383	231.4008756

TABLE B-17 Unit Variable OMP&amp;R Component of Transportation Charge (in dollars per acre-foot)

Sheet 4 of 5

Calendar Year	CALIFORNIA AQUEDUCT (continued)							
	Reach 2B (EBX)		Reach 3A (EBX)		Reach 4B (EBX)		Reach 29A	
	Greenspot Pump Station		Crafton Hills Pump Station		Cherry Valley Pump Station		Oso Pumping Plant	
	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate
	[29]	[30]	[31]	[32]	[33]	[34]	[35]	[36]
1961	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	1.1017349	13.3965941
1973	0	0	0	0	0	0	0.7905574	13.5030687
1974	0	0	0	0	0	0	0.7530214	12.6772442
1975	0	0	0	0	0	0	0.8405850	12.9068644
1976	0	0	0	0	0	0	0.7771828	14.4483197
1977	0	0	0	0	0	0	0.6152458	17.9458194
1978	0	0	0	0	0	0	0.5222831	13.4372037
1979	0	0	0	0	0	0	0.7045701	17.9908273
1980	0	0	0	0	0	0	1.4269064	20.6255585
1981	0	0	0	0	0	0	1.5684309	20.2186605
1982	0	0	0	96.5158553	0	0	1.4942585	19.7739190
1983	0	0	0	0	0	0	1.2818887	11.4081712
1984	0	0	0	144.7489837	0	0	1.7796296	16.6546302
1985	0	0	0	0	0	0	2.1683838	23.0053556
1986	0	0	0	0	0	0	3.2288411	39.6231134
1987	0	0	0	0	0	0	3.1272967	35.0197908
1988	0	0	0	0	0	0	2.9878581	32.9904032
1989	0	0	0	0	0	0	3.5262089	42.9746819
1990	0	0	0	0	0	0	3.6810660	56.4890182
1991	0	0	0	0	0	0	2.1853025	37.6098245
1992	0	0	0	0	0	0	1.9048343	23.9194204
1993	0	0	0	0	0	0	0.1569728	-4.0768404
1994	0	0	0	0	0	0	3.0638504	40.6646149
1995	0	0	0	0	0	0	1.5724835	21.1129984
1996	0	0	0	0	0	0	3.1318961	42.5378346
1997	0	0	0	0	0	0	2.7928728	41.5836062
1998	0	0	0	0	0	0	-0.3226129	-6.1639346
1999	0	0	0	0	0	0	1.8332567	24.8410833
2000	0	0	0	0	0	0	1.8284824	28.2950790
2001	0	0	0	0	0	0	13.5376135	192.1289954
2002	0	0	0	0	0	0	4.8843428	77.9788467
2003	0	0	0	0	0	0	6.1233062	94.3993738
2004	20.6831806	86.5479519	21.4551370	108.0030889	8.6683948	116.6714837	6.4696629	99.3570085
2005	18.8666468	100.0682708	17.9350642	118.0033350	3.6760116	121.6793465	7.3193726	113.0191064
2006	17.3897441	75.0231072	21.4927481	96.5158553	22.6369517	119.1528070	5.2194188	87.8397812
2007	20.4327334	120.8916834	28.3594988	149.2511821	63.0683616	212.3195437	8.1423808	127.5659848
2008	16.8411646	120.9603561	23.7886276	144.7489837	7.1321689	151.8811526	8.5368878	135.3800324
2009	17.5432149	92.2725032	23.7664326	116.0389358	3.9665543	120.0054901	6.8975698	105.3387440
2010	17.0449437	107.6754724	24.2469592	131.9224316	3.4313175	135.3537491	7.9658290	120.0039063
2011	18.0948625	119.5193897	25.1711299	144.6905196	3.5706900	148.2612096	8.4441273	131.3518416
2012	18.9924808	123.0241089	26.7679364	149.7920452	4.5245631	154.3166083	8.7667646	135.8050050
2013	23.7219961	155.8062275	32.5629060	188.3691335	7.3214018	195.6905353	10.3732537	161.3893485
2014	32.1056030	241.6864796	46.3366508	288.0231304	10.2913997	298.3145301	14.9556969	231.8424066
2015	34.9774528	240.0603506	48.6136114	288.6739621	4.3175352	292.9914972	14.4085461	227.4667165
2016	35.7410562	188.6976685	44.9618002	233.6594687	10.0353929	243.6948616	10.2000898	184.6225395
2017	<b>45.9383430</b>	<b>204.8872284</b>	<b>57.3306358</b>	<b>262.2178643</b>	<b>11.8141809</b>	<b>274.0320452</b>	<b>13.3403914</b>	<b>203.5906237</b>
2018	46.6449904	214.6409053	58.2125241	272.8534294	11.9959158	284.8493452	13.3931861	215.8784282
2019	49.1615607	228.0943818	61.3532755	289.4476573	12.6431078	302.0907651	14.4231622	221.3901131
2020	50.2305395	235.2943950	62.6871869	297.9815819	12.9180203	310.8996022	15.0860244	229.0488504
2021	49.4426782	232.8535207	61.7040462	294.5575669	12.7154822	307.2730492	14.6514131	226.6577278
2022	50.0679191	238.9846033	62.4842967	301.4689000	12.8762690	314.3451690	15.1059740	231.4768019
2023	49.8042389	234.9194371	62.1552987	297.0747358	12.8085025	309.8832383	15.0331358	230.6330494
2024	49.9988439	232.2719331	62.3980732	294.6700063	12.8585025	307.5285089	15.3199566	227.5464214
2025	50.2911368	236.8812469	62.7628131	299.6440600	12.9336294	312.5776895	15.1950566	231.2782528
2026	49.3617534	228.2891465	61.6029865	289.8921331	12.6946701	302.5868031	14.6407933	224.1740551
2027	49.7152216	235.4122777	62.0441233	297.4564010	12.7855330	310.2419340	15.2711728	231.0732786
2028	49.9074181	231.7922154	62.2840077	294.0762231	12.8350254	306.9112485	14.8689448	227.0457249
2029	50.0683044	236.2254790	62.4847784	298.7102574	12.8763959	311.5866533	15.2969575	231.2103178
2030	50.2574181	230.1326908	62.7208093	292.8535001	12.9250000	305.7785001	14.8842614	224.5307834
2031	50.2696532	251.5099453	62.7360308	314.2459761	12.9281726	327.1741487	16.8881565	247.9210814
2032	49.4003854	223.0822824	61.6512524	284.7335348	12.7045685	297.4381033	14.0341648	217.2230232
2033	50.4572254	246.6529639	62.9702312	309.6231951	12.9763959	322.5995911	16.6719395	243.6221792
2034	49.7302505	225.1631383	62.0629094	287.2260477	12.7894670	300.0155147	14.1329165	218.7034555
2035	49.4313102	280.8321858	61.6897881	342.5219739	12.7125635	355.2345373	21.2269134	284.5727043



TABLE B-17 Unit Variable OMP&amp;R Component of Transportation Charge (in dollars per acre-foot)

Sheet 5 of 5

Calendar Year	CALIFORNIA AQUEDUCT (continued)							
	Reach 29G Warne Powerplant		Reach 29J Castaic Powerplant		Reach 31A Las Perillas and Badger Hill Pumping Plants		Reach 33A Devil's Den, Bluestone, and Polonio Pass Pumping Plants	
	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate	Unit Rate	Cumulative Unit Rate
	[37]	[38]	[39]	[40]	[41]	[42]	[43]	[44]
1961	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0
1968	0	0	0	0	1.5014866	4.1182219	0	0
1969	0	0	0	0	1.2624066	3.0719381	0	0
1970	0	0	0	0	1.6309699	3.3588477	0	0
1971	0	0	0	0	1.4985537	2.7919286	0	0
1972	0	0	-2.9350830	10.4615111	1.9517720	3.4211474	0	0
1973	0	0	-6.8099448	6.6931239	1.5374531	3.0757814	0	0
1974	0	0	-7.4013274	5.2759168	1.5168982	2.9878282	0	0
1975	0	0	-6.5604921	6.3463723	1.1130304	2.6699305	0	0
1976	0	0	-6.7213324	7.7269873	1.5685447	3.2790543	0	0
1977	0	0	-30.4985994	-12.5527800	1.7573375	4.1392043	0	0
1978	0	0	-9.0130187	4.4241850	1.9429506	4.0089431	0	0
1979	0	0	-19.0478097	-1.0569824	1.5600341	4.3608941	0	0
1980	0	0	-20.5438586	0.0816999	1.5124754	3.6770034	0	0
1981	0	0	-10.0059379	10.2127225	1.5414199	4.7045073	0	0
1982	-2.1714430	17.6024760	-9.5987314	8.0037446	1.7581649	4.3530008	0	0
1983	-8.9130752	2.4950960	-39.8193120	-37.3242160	0.1782765	1.3888171	0	0
1984	-15.0246012	1.6300290	-17.3126964	-15.6826674	0.8546712	2.6822403	0	0
1985	-14.7115359	8.2938197	-38.9450629	-30.6512432	1.2014351	3.6785929	0	0
1986	-14.1893653	25.4337481	-28.1596224	-2.7258742	2.2635886	6.9752505	0	0
1987	-14.8696165	20.1501743	-27.0536484	-6.9034741	1.9135072	5.9486162	0	0
1988	-14.7032843	18.2871189	-25.6857024	-7.3985835	1.7733386	5.6554272	0	0
1989	-14.4231503	28.5515316	-25.3986130	3.1529186	2.4159040	7.4317239	0	0
1990	-14.1850383	42.3039798	-26.0776142	16.2263657	3.7962150	9.8240367	0	0
1991	-14.7118704	22.8979541	-25.0234633	-2.1255092	2.4131016	7.1520492	0	0
1992	-14.6199430	9.2994774	-25.1951357	-15.8956583	1.2766372	4.5092789	0	0
1993	-10.3386607	-14.4155011	-21.1218973	-35.5373984	-1.1726172	-0.7762411	0	0
1994	-14.7696788	25.8949361	-26.7437304	-0.8487943	2.3645104	7.0748798	0	0
1995	-12.2705974	8.8424010	-25.6907993	-16.8483983	2.5750402	5.4022971	0	0
1996	-14.8515762	27.6862584	-29.5639188	-1.8776604	2.5837041	7.6010922	0	0
1997	-14.9272063	26.6563999	-27.1541858	-0.4977859	2.7029648	6.9426653	24.4572499	31.3999152
1998	-8.6695834	-14.8335180	-22.2303491	-37.0638671	-0.5072304	-0.6085333	-4.1828906	-4.7914239
1999	-14.9340263	9.9070570	-27.0443818	-17.1373248	1.3343489	4.5452705	9.5757906	14.1210611
2000	-14.1657261	14.1293529	-26.9670096	-12.8376567	1.9210288	5.1667286	14.2694428	19.4361713
2001	-16.7349304	175.3940651	-29.2914159	146.1026492	12.3497747	31.3909026	93.4183473	124.8092500
2002	-13.2004543	64.7783923	-23.7780808	41.0003115	5.4523570	14.1544730	42.2356453	56.3901183
2003	-13.9757172	80.4236566	-23.8496317	56.5740249	6.2991021	16.1426444	48.5395958	64.6822401
2004	-14.1574758	85.1995327	-25.2967499	59.9027828	6.4579354	17.0623710	52.5252011	69.5875721
2005	-14.2938796	98.7252268	-24.7472457	73.9779811	8.2000327	20.1469699	62.1217478	82.2687176
2006	-14.0865037	73.7532775	-23.8861273	49.8671502	7.3537028	17.2560963	51.8001830	69.0562794
2007	-12.5169061	115.0490788	-25.0603889	89.9868899	9.9286839	23.6694565	73.4057069	97.0751634
2008	-13.8809446	121.4990878	-29.0198140	92.4792738	10.5133875	27.6599371	79.5098036	107.1697407
2009	-10.4812488	94.8574952	-24.7512646	70.1062306	6.7812125	15.7619205	62.9603277	78.7222483
2010	-13.8211960	106.1827104	-26.2504816	79.9322288	8.4810305	23.5095318	68.9425325	92.4520643
2011	-14.1584994	117.1933422	-28.7386599	88.4546823	9.7860943	25.1922104	85.5814464	110.7736567
2012	-13.8982775	121.9067275	-25.6245942	96.2821334	9.2206114	24.4540107	86.2392613	110.6932719
2013	-14.3636831	147.0256653	-25.5768325	121.4488329	12.3037862	31.0393124	94.6940145	125.7333269
2014	-14.0124517	217.8299550	-26.4213846	191.4085704	16.5250256	44.4439277	105.4565722	149.9004999
2015	-13.2774506	214.1892659	-23.3700144	190.8192516	16.8218942	44.2140162	127.4233757	171.6373919
2016	-10.9083940	173.7141455	-17.7724471	155.9416984	10.7730599	34.9535675	97.7156539	132.6692213
2017	-13.9082802	189.6823434	-23.4970454	166.1852981	11.7369335	33.8529284	90.7829882	124.6359166
2018	-13.8949087	201.9835195	-23.3584656	178.6250539	11.9667921	35.1189973	92.5981688	127.7171661
2019	-14.0724428	207.3176703	-23.1032119	184.2144584	8.5461204	33.7642643	133.1765892	166.9408535
2020	-14.4258559	214.6229945	-23.6619122	190.9610823	8.7370749	30.2331148	136.0721877	166.3053025
2021	-14.2317030	212.4260248	-23.3400745	189.0859504	8.6000374	32.6137137	133.9379986	166.5517123
2022	-14.4897801	216.9870218	-23.7723701	193.2146517	8.7087849	32.8309784	135.6316733	168.4626517
2023	-14.4614789	216.1715705	-23.7831872	192.3883833	8.6629293	30.9463906	134.9175278	165.8639184
2024	-14.7008567	212.8455648	-24.1501159	188.6954489	8.6967734	30.8719465	135.4445644	166.3165109
2025	-14.4943806	216.7838722	-23.8071162	192.9767560	8.7476122	30.4968910	136.2363958	166.7332868
2026	-14.2447458	209.9293093	-23.3618322	186.5674771	8.5859599	32.1631333	133.7187109	165.8818442
2027	-14.7539403	216.3193384	-24.2117981	192.1075402	8.6474399	31.6193683	134.6762966	166.2956649
2028	-14.2746730	212.7710519	-23.4685615	189.3024904	8.6808791	31.3008592	135.1970742	166.4979334
2029	-14.6408478	216.5694700	-24.0789419	192.4905280	8.7088576	31.6164107	135.6328269	167.2492376
2030	-14.2066091	210.3241743	-23.3263404	186.9978339	8.7417570	28.6043635	136.1451609	164.7495244
2031	-16.1215775	231.7995039	-26.5319523	205.2675516	8.7438748	33.2168472	136.1781743	169.3950216
2032	-13.6433816	203.5796416	-22.3573597	181.2222819	8.5926872	33.0116496	133.8234948	166.8351443
2033	-15.8728786	227.7493005	-26.0850574	201.6642431	8.7765147	28.8387327	136.6864338	165.5251665
2034	-13.6133890	205.0906666	-22.3654849	182.7245817	8.6500664	31.3879114	134.7171154	166.1050268
2035	-20.6030162	263.9696881	-34.1307171	229.8389710	8.5980545	44.0534953	133.9071697	177.9606650

## Tables B-18 through B-31

Note: Where applicable, the projected data values shown in this appendix are shaded and the bill year data are in **bold** type.

TABLE B-18 Variable OMP&R Component of Transportation Charge for Each Contractor<sup>a</sup> (in dollars)

Sheet 1 of 4

Calendar Year	NORTH BAY AREA			SOUTH BAY AREA				CENTRAL COASTAL AREA		
	Napa	Solano	Total	Alameda-Zone 7	Alameda County	Santa Clara	Total	San Luis Obispo	Santa Barbara	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	2,051	34,919	0	36,970	0	0	0
1963	0	0	0	7,900	49,811	0	57,711	0	0	0
1964	0	0	0	5,931	68,203	0	74,134	0	0	0
1965	0	0	0	10,918	68,765	62,926	142,609	0	0	0
1966	0	0	0	19,330	52,135	121,141	192,606	0	0	0
1967	0	0	0	19,958	53,785	163,255	236,998	0	0	0
1968	6,989	0	6,989	29,899	120,985	341,768	492,652	0	0	0
1969	8,551	0	8,551	31,859	3,904	298,968	334,731	0	0	0
1970	13,598	0	13,598	49,687	0	431,443	481,130	0	0	0
1971	10,609	0	10,609	23,842	28,328	416,329	468,499	0	0	0
1972	14,434	0	14,434	54,838	144,669	524,208	723,715	0	0	0
1973	14,449	0	14,449	18,398	15,590	547,807	581,795	0	0	0
1974	17,473	0	17,473	9,499	29	636,186	645,714	0	0	0
1975	14,779	0	14,779	22,318	4,765	425,284	452,367	0	0	0
1976	20,856	0	20,856	97,874	121,693	502,769	722,336	0	0	0
1977	22,635	0	22,635	82,578	123,044	497,792	703,414	0	0	0
1978	21,692	0	21,692	74,911	39,986	652,860	767,757	0	0	0
1979	16,237	0	16,237	137,101	77,145	652,629	866,875	0	0	0
1980	19,945	0	19,945	98,743	64,891	517,531	681,165	0	0	0
1981	23,842	0	23,842	126,437	141,456	567,968	835,861	0	0	0
1982	12,157	0	12,157	97,117	46,742	651,246	795,105	0	0	0
1983	2,342	0	2,342	8,171	5,412	148,743	162,326	0	0	0
1984	4,822	0	4,822	26,707	13,141	349,314	389,162	0	0	0
1985	10,188	0	10,188	79,863	102,790	466,291	648,944	0	0	0
1986	15,501	0	15,501	112,370	131,118	932,090	1,175,578	0	0	0
1987	27,223	0	27,223	216,211	234,290	812,631	1,263,132	0	0	0
1988	31,265	11,533	42,798	229,578	297,129	779,537	1,306,244	0	0	0
1989	37,874	66,850	104,724	306,533	304,275	1,051,562	1,662,370	0	0	0
1990	54,736	105,421	160,157	524,114	502,545	1,456,008	2,482,667	0	0	0
1991	8,159	18,824	26,983	105,736	142,105	316,839	564,680	0	(2,636)	(2,636)
1992	12,515	23,808	36,323	93,772	122,436	273,849	490,057	0	0	0
1993	(7,223)	(17,293)	(24,516)	(36,162)	(12,912)	(78,024)	(127,098)	0	0	0
1994	39,106	77,257	116,363	231,800	257,533	642,006	1,131,339	0	0	0
1995	15,701	36,724	52,425	160,663	93,610	151,287	405,560	0	0	0
1996	31,526	96,570	128,096	214,883	186,694	735,431	1,137,008	502	0	502
1997	29,683	116,555	146,238	351,185	219,799	912,861	1,483,845	34,932	233,584	268,516
1998	(6,622)	(19,825)	(26,447)	(8,777)	(18,989)	(72,459)	(100,225)	(17,211)	(89,207)	(106,418)
1999	15,783	52,547	68,330	251,523	188,675	432,833	873,031	52,855	284,356	337,211
2000	21,981	93,786	115,767	376,893	238,402	752,225	1,367,520	77,006	441,998	519,004
2001	291,175	533,810	824,984	1,698,720	1,002,725	2,485,014	5,186,458	534,558	2,364,636	2,899,194
2002	90,273	266,110	356,383	1,067,733	640,899	1,453,943	3,162,575	245,579	1,558,397	1,803,976
2003	130,947	265,394	396,341	1,076,957	647,785	2,301,141	4,025,883	288,030	1,744,351	2,032,381
2004	141,670	355,420	497,090	1,325,708	624,580	1,613,968	3,564,256	289,832	2,067,099	2,356,931
2005	189,098	393,118	582,216	1,483,817	849,101	2,494,389	4,827,307	349,724	1,920,481	2,270,205
2006	181,883	316,938	498,821	1,297,386	734,802	2,170,785	4,202,973	290,658	1,607,285	1,897,943
2007	332,074	604,832	936,906	1,610,876	899,784	2,704,487	5,215,147	366,556	2,692,865	3,059,421
2008	394,616	526,713	921,328	1,565,262	766,551	1,938,341	4,270,154	364,591	1,971,173	2,335,765
2009	213,081	272,097	485,178	842,422	500,631	1,550,921	2,893,974	299,212	1,216,304	1,515,516
2010	282,394	305,699	588,094	1,422,050	661,372	2,041,523	4,124,944	347,342	1,643,335	1,990,678
2011	306,587	308,357	614,944	1,751,514	950,308	2,966,321	5,668,143	423,045	2,359,387	2,782,431
2012	259,150	327,037	586,187	1,779,054	675,142	2,425,114	4,879,309	436,574	2,155,641	2,592,215
2013	436,320	530,290	966,610	2,152,841	1,099,144	3,140,284	6,392,269	462,824	2,265,463	2,728,287
2014	597,291	394,016	991,306	1,537,793	1,197,100	2,159,473	4,894,366	477,960	2,493,770	2,971,730
2015	484,203	502,806	987,009	1,468,763	937,040	3,123,464	5,529,267	595,557	1,993,900	2,589,457
2016	521,798	708,400	1,230,198	2,734,504	685,491	4,479,782	7,899,777	534,922	3,329,599	3,864,522
2017	838,248	569,466	1,407,714	2,684,111	928,176	3,329,405	6,941,692	1,627,247	3,401,563	5,028,810
2018	852,391	579,073	1,431,464	2,763,281	967,484	3,570,539	7,301,305	1,676,288	3,485,657	5,161,945
2019	761,736	549,512	1,311,248	2,959,627	1,059,342	3,671,159	7,690,128	2,197,109	4,556,150	6,753,258
2020	778,298	561,460	1,339,757	2,809,524	990,400	3,484,969	7,284,894	2,201,383	4,538,804	6,740,188
2021	766,091	552,653	1,318,744	2,905,255	1,047,240	3,603,715	7,556,209	2,204,645	4,545,529	6,750,174
2022	775,777	559,642	1,335,419	2,930,351	1,055,007	3,634,845	7,620,203	2,229,940	4,597,683	6,827,623
2023	771,693	556,696	1,328,389	2,829,706	1,005,704	3,510,004	7,345,414	2,195,541	4,526,758	6,722,299
2024	774,708	558,871	1,333,578	2,836,004	1,005,899	3,517,815	7,359,718	2,201,532	4,539,110	6,740,642
2025	779,236	562,137	1,341,373	2,822,004	996,841	3,500,449	7,319,294	2,207,049	4,550,485	6,757,533
2026	764,836	551,749	1,316,585	2,883,327	1,036,034	3,576,516	7,495,877	2,195,778	4,527,247	6,723,025
2027	770,314	555,700	1,326,014	2,860,039	1,022,300	3,547,628	7,429,967	2,201,256	4,538,541	6,739,797
2028	773,291	557,848	1,331,140	2,854,471	1,016,336	3,540,721	7,411,528	2,203,933	4,544,062	6,747,995
2029	775,784	559,647	1,335,431	2,870,733	1,024,179	3,560,893	7,455,804	2,213,878	4,564,566	6,778,444
2030	778,714	561,761	1,340,475	2,734,739	950,309	3,392,205	7,077,253	2,180,789	4,496,344	6,677,133
2031	778,904	561,898	1,340,802	2,939,048	1,061,750	3,645,632	7,646,429	2,242,282	4,623,129	6,865,411
2032	765,436	552,181	1,317,617	2,934,235	1,059,831	3,639,662	7,633,727	2,208,397	4,553,265	6,761,662
2033	781,810	563,994	1,345,805	2,732,736	952,384	3,389,721	7,074,841	2,191,057	4,517,513	6,708,569
2034	770,547	555,869	1,326,415	2,862,348	1,019,858	3,550,493	7,432,699	2,198,732	4,533,338	6,732,071
2035	765,914	552,527	1,318,441	3,414,929	1,324,474	4,235,921	8,975,323	2,355,665	4,856,902	7,212,568
<b>TOTAL</b>	<b>20,259,093</b>	<b>17,896,476</b>	<b>38,155,569</b>	<b>83,708,117</b>	<b>36,664,899</b>	<b>125,026,373</b>	<b>245,399,389</b>	<b>47,387,549</b>	<b>118,748,429</b>	<b>166,135,978</b>

<sup>a</sup> B-18 includes Extra Peaking Charges for additional power shown in Table 9.

TABLE B-18 Variable OMP&R Component of Transportation Charge for Each Contractor <sup>a</sup> (in dollars)

Sheet 2 of 4

Calendar Year	SAN JOAQUIN VALLEY AREA								
	Dudley Ridge	Empire	Future Contractor San Joaquin Valley	Kern		Kings	Oak Flat	Tulare	Total
				Municipal and Industrial	Agricultural				
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]
1961	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0
1968	68,977	5,176	0	0	440,922	2,355	4,760	65,680	587,870
1969	56,774	101	0	0	321,387	181	3,338	17,956	399,737
1970	69,818	6,811	0	0	470,867	0	5,595	16,550	569,641
1971	53,097	7,747	0	0	769,054	4,785	6,353	158,419	999,455
1972	62,365	8,515	0	0	1,151,788	2,057	7,375	379,686	1,611,786
1973	33,931	4,615	0	0	770,121	2,307	3,017	77,630	891,621
1974	49,114	4,413	0	46,752	677,660	2,206	3,114	106,332	889,591
1975	63,140	4,671	0	34,580	848,249	2,491	3,920	134,295	1,091,346
1976	70,851	5,132	0	94,653	966,820	2,737	4,910	100,597	1,245,701
1977	26,565	1,758	0	84,875	498,624	3,644	2,602	43,067	661,135
1978	108,944	938	0	190,675	1,616,975	4,319	6,294	24,901	1,953,046
1979	107,956	4,871	0	194,048	2,371,175	5,602	13,172	434,472	3,131,297
1980	88,746	1,935	0	121,603	1,731,588	4,762	7,766	163,301	2,119,701
1981	129,687	18,533	0	263,077	2,398,339	7,275	8,904	263,922	3,089,737
1982	108,561	937	0	145,246	2,375,404	4,541	6,763	48,137	2,689,589
1983	61,443	0	0	13,954	929,183	5,662	3,232	1,218	1,014,692
1984	82,423	0	0	216,437	1,996,259	5,946	7,475	10,496	2,319,036
1985	114,571	12,938	0	242,645	2,567,184	8,422	8,815	271,970	3,226,545
1986	236,756	5,513	0	377,798	4,876,960	17,433	16,927	376,088	5,907,475
1987	187,090	10,273	0	504,168	4,230,949	16,140	15,529	375,604	5,339,753
1988	188,170	14,894	0	524,965	4,250,194	15,528	11,928	374,528	5,380,207
1989	285,261	15,450	0	681,238	6,158,648	20,063	21,693	649,604	7,831,957
1990	218,786	7,710	0	845,877	4,778,185	12,056	12,072	344,008	6,218,694
1991	4,393	1,047	0	185,013	47,869	0	521	10,331	249,174
1992	76,840	4,426	0	227,332	1,699,824	6,059	5,222	151,055	2,170,758
1993	20,064	4,843	0	78,585	340,588	2,090	1,467	123,913	571,550
1994	135,626	7,854	0	471,316	3,417,815	9,967	10,102	293,748	4,346,428
1995	181,772	4,611	0	409,656	3,437,735	11,619	10,492	288,010	4,343,895
1996	286,064	9,577	0	715,404	6,328,965	21,039	16,403	1,196,303	8,573,755
1997	308,515	0	0	650,416	5,627,735	0	15,559	94,838	6,697,063
1998	16,993	(54)	0	(16,341)	91,651	(2)	1,171	(2,095)	91,324
1999	191,682	10,198	0	463,890	3,954,090	12,844	11,542	937,238	5,581,485
2000	196,491	5,839	0	152,159	4,295,523	11,685	10,426	643,664	5,315,788
2001	797,861	25,896	0	158,463	12,010,806	29,704	46,367	1,134,128	14,203,225
2002	425,664	12,226	0	183,569	8,013,780	24,836	29,691	839,772	9,529,537
2003	453,610	14,135	0	493,493	9,967,016	36,342	28,688	1,041,850	12,035,136
2004	520,466	37,773	0	1,406,702	8,942,325	96,002	33,670	861,689	11,898,625
2005	977,603	45,805	0	836,724	17,643,647	236,621	34,032	1,672,595	21,447,026
2006	713,765	32,500	0	987,951	13,704,881	94,370	28,832	1,071,508	16,633,806
2007	620,190	28,636	0	772,081	12,112,916	79,441	32,915	1,196,588	14,842,766
2008	380,208	16,238	0	757,234	7,707,593	65,774	24,546	581,337	9,532,929
2009	190,558	9,286	0	65,697	5,114,787	30,454	11,730	330,525	5,753,036
2010	445,465	48,978	0	156,191	9,867,515	72,659	31,751	863,810	11,486,369
2011	934,952	29,503	0	711,326	19,844,714	103,332	29,410	852,561	22,505,797
2012	278,984	34,153	0	550,050	11,928,370	112,803	33,658	1,359,827	14,297,847
2013	506,721	29,359	0	634,801	12,216,148	87,027	36,920	826,808	14,337,783
2014	521,916	14,406	0	217	7,059,386	35,027	29,731	249,271	7,909,955
2015	430,474	17,093	0	476,478	8,963,183	33,665	21,515	474,870	10,417,277
2016	698,828	44,057	0	1,806,547	13,822,645	173,057	57,005	1,318,007	17,920,145
2017	671,619	39,809	0	1,999,389	14,657,412	125,621	52,593	1,160,714	18,707,157
2018	703,086	41,674	0	2,100,395	15,369,698	131,449	55,004	1,215,097	19,616,403
2019	690,069	45,393	0	2,256,908	16,319,058	142,357	61,131	1,323,524	20,838,439
2020	588,218	38,693	0	2,011,169	14,524,702	121,611	47,289	1,128,177	18,459,857
2021	657,110	43,225	0	2,183,707	15,775,968	135,642	56,431	1,260,310	20,112,393
2022	660,080	43,420	0	2,201,427	15,898,762	136,268	56,321	1,266,005	20,262,282
2023	609,765	40,110	0	2,070,219	14,944,731	125,994	50,000	1,169,503	19,010,322
2024	606,801	39,915	0	2,054,951	14,845,423	125,396	49,859	1,163,820	18,886,165
2025	595,147	39,149	0	2,033,835	14,683,993	123,027	47,988	1,141,467	18,664,606
2026	645,166	42,439	0	2,147,333	15,517,842	133,203	55,125	1,237,401	19,778,508
2027	628,604	41,349	0	2,119,108	15,298,518	129,835	52,413	1,205,636	19,475,463
2028	618,973	40,716	0	2,086,120	15,071,120	127,876	51,440	1,187,164	19,183,409
2029	626,842	41,234	0	2,114,909	15,271,341	129,487	52,105	1,202,257	19,438,174
2030	543,520	35,753	0	1,886,388	13,630,492	112,493	41,920	1,042,449	17,293,014
2031	669,678	44,051	0	2,259,522	16,280,932	138,233	56,328	1,284,415	20,733,160
2032	668,200	43,954	0	2,192,088	15,861,420	137,904	58,607	1,281,580	20,243,753
2033	548,983	36,112	0	1,939,872	13,971,626	113,613	41,176	1,052,925	17,704,307
2034	622,198	40,928	0	2,077,017	15,024,721	128,528	52,531	1,193,350	19,139,274
2035	970,203	63,820	0	3,105,475	22,325,795	199,521	92,501	1,860,808	28,618,123
<b>TOTAL</b>	<b>25,112,995</b>	<b>1,433,058</b>	<b>0</b>	<b>58,757,374</b>	<b>550,631,592</b>	<b>4,054,982</b>	<b>1,809,682</b>	<b>46,227,215</b>	<b>688,026,898</b>

<sup>a</sup> B-18 includes Extra Peaking Charges for additional power shown in Table 9.

**TABLE B-18 Variable OMP&R Component of Transportation Charge for Each Contractor <sup>a</sup> (in dollars)**

Calendar Year	SOUTHERN CALIFORNIA AREA									
	AVEK	Castaic Lake	Coachella	Crestline	Desert	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel
	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0
1968	0	30,401	0	0	0	0	0	0	0	0
1969	0	30,627	0	0	0	0	0	0	0	0
1970	0	39,430	0	0	0	0	0	0	0	0
1971	0	34,871	0	0	0	0	0	0	0	0
1972	780	47,571	0	12,785	0	4,496	1,515	0	32,107	0
1973	286	28,968	102,812	6,896	159,536	3,855	0	0	301,444	0
1974	15,558	28,982	100,955	9,890	157,742	4,932	221	0	177,173	5,961
1975	99,186	28,568	108,253	12,758	170,111	6,391	0	0	136,066	50,723
1976	385,090	38,365	135,276	17,835	213,594	8,164	0	0	139,354	65,476
1977	199,166	21,006	0	23,598	0	1,974	1,702	0	239,663	74,838
1978	581,729	45,550	174,116	20,875	264,178	2,731	0	0	37,043	67,462
1979	1,058,904	83,940	228,437	28,603	340,510	2,328	90,803	0	236	3,668
1980	1,390,117	51,143	256,759	29,229	401,038	3,667	94,362	0	0	16,504
1981	1,480,362	118,583	274,149	33,632	430,304	23,861	90,590	0	254,649	57,523
1982	923,973	132,575	292,674	27,190	461,216	0	230,608	0	126,461	189,895
1983	333,772	(333,712)	172,336	10,792	272,477	385	0	0	(71,602)	(8,768)
1984	485,847	(142,910)	273,597	19,572	433,785	15	0	0	(66,353)	(91,433)
1985	821,069	(335,343)	413,406	34,603	657,011	0	0	32,464	(47,544)	(32,348)
1986	1,109,047	54,812	728,808	60,274	1,160,650	5,548	0	105,375	69,170	101,843
1987	1,019,605	(40,745)	668,383	63,601	1,083,530	32,651	585	157,843	88,076	49,930
1988	1,019,793	(74,006)	688,891	66,914	1,134,141	11,991	300	50,654	92,465	38,688
1989	1,736,901	178,359	978,885	97,114	1,633,489	38,269	8,951	350,953	340,460	210,334
1990	2,442,558	422,502	1,402,619	110,934	2,313,410	90,472	0	446,408	599,573	530,099
1991	286,485	(3,054)	277,078	33,945	456,999	17,978	128,405	132,700	35,339	52,116
1992	587,340	(208,900)	240,119	11,952	396,022	4,871	241,338	78,306	(22,718)	(53,500)
1993	(190,611)	(491,161)	(809,033)	(2,389)	(1,334,429)	(3,246)	(61,112)	(29,466)	(157,452)	(519,798)
1994	1,841,902	66,338	189,616	34,480	312,714	41,201	731,185	315,446	122,829	204,783
1995	761,209	(247,735)	(251,547)	7,960	(414,889)	7,727	165,622	114,342	(7,579)	(140,714)
1996	1,883,530	72,171	508,274	18,313	838,330	16,510	289,044	385,745	49,537	133,848
1997	2,121,818	22,440	365,342	24,076	330,153	15,099	414,596	438,212	61,553	115,882
1998	(577,005)	(733,387)	(3,979,131)	(2,991)	(3,279,862)	(4,405)	(46,209)	(84,367)	(87,188)	(432,227)
1999	1,250,830	(475,206)	(683,915)	18,893	(787,153)	6,193	172,541	252,025	(174,420)	(244,303)
2000	1,764,956	(351,789)	(413,355)	24,499	(568,752)	0	286,220	191,327	(179,697)	(147,867)
2001	10,902,727	4,524,359	1,522,670	209,527	2,511,568	0	862,702	1,813,737	4,432,140	394,890
2002	3,940,463	1,972,885	737,668	102,408	1,216,898	0	332,517	1,250,856	3,146,931	1,094,108
2003	5,100,175	3,152,858	907,284	145,683	1,496,268	0	1,429,244	981,055	1,640,373	1,377,855
2004	5,219,256	3,252,471	1,018,599	192,784	1,395,675	0	1,344,310	1,061,872	3,812,708	826,010
2005	5,994,948	3,011,986	3,452,612	89,977	3,986,107	0	1,580,568	1,173,519	2,654,327	1,135,524
2006	6,389,053	2,240,777	6,979,400	56,045	2,881,668	0	3,147,242	992,885	2,153,123	938,502
2007	9,366,901	4,237,414	7,356,408	230,821	3,037,276	0	6,174,449	2,222,474	6,072,123	404,247
2008	5,826,218	3,776,714	4,820,401	114,380	2,608,488	3,036	3,532,110	1,731,131	4,041,217	750,908
2009	4,113,756	2,594,973	3,412,249	96,587	1,364,781	3,868	3,227,850	1,412,580	3,431,699	860,858
2010	6,253,182	2,829,987	7,631,114	42,593	2,826,132	0	4,715,229	1,172,719	4,880,349	1,738,294
2011	11,068,964	2,825,443	9,156,505	62,294	3,689,723	0	660,924	1,243,209	3,592,673	2,392,706
2012	10,478,619	3,721,197	12,171,833	84,024	4,691,930	0	1,614,087	2,076,495	10,304,783	2,294,730
2013	7,516,830	5,764,719	8,479,616	222,780	2,746,163	0	1,262,325	1,556,015	4,736,630	1,222,043
2014	3,652,197	5,111,757	2,557,711	294,891	639,012	0	844,642	1,754,114	2,521,184	251,380
2015	2,613,821	5,186,525	7,450,071	294,189	2,300,415	0	2,115,097	1,190,355	5,508,810	1,181,277
2016	14,039,123	4,868,654	14,150,016	366,558	5,202,972	0	2,288,151	2,302,252	8,533,799	2,460,766
2017	<b>15,596,542</b>	<b>9,227,839</b>	<b>13,194,347</b>	<b>734,202</b>	<b>5,316,840</b>	<b>0</b>	<b>8,225,116</b>	<b>3,451,718</b>	<b>9,721,314</b>	<b>2,746,637</b>
2018	16,554,569	9,916,051	13,945,341	703,091	5,619,463	0	8,818,467	3,663,687	9,921,503	2,902,969
2019	16,810,350	10,221,429	14,853,213	725,236	5,985,303	0	9,512,199	3,809,560	11,015,104	3,091,959
2020	17,363,398	10,586,241	15,362,151	752,608	6,190,386	0	9,885,804	3,934,857	11,392,531	3,197,903
2021	17,197,859	10,487,645	15,224,934	743,830	6,135,093	0	9,776,726	3,897,350	11,290,771	3,169,339
2022	17,570,944	10,715,654	15,681,974	760,588	6,319,263	0	9,983,126	3,981,902	11,629,711	3,264,480
2023	17,326,749	10,666,340	15,366,413	751,175	6,192,103	0	9,886,931	3,926,537	11,395,692	3,198,791
2024	17,099,372	10,462,637	15,130,489	739,686	6,097,035	0	9,700,834	3,875,044	11,220,731	3,149,679
2025	17,380,138	10,697,873	15,488,845	754,032	6,241,439	0	9,912,853	3,938,640	11,486,487	3,224,277
2026	16,854,553	10,347,926	14,852,763	728,828	5,985,121	0	9,578,017	3,819,553	11,014,770	3,091,865
2027	17,364,612	10,652,206	15,414,713	751,589	6,211,567	0	9,877,057	3,935,137	11,431,511	3,208,845
2028	17,068,478	10,496,955	15,098,257	739,389	6,084,046	0	9,716,445	3,868,023	11,196,828	3,142,969
2029	17,382,832	10,673,311	15,452,907	752,816	6,226,957	0	9,885,524	3,939,267	11,459,836	3,216,796
2030	16,857,394	10,364,529	14,931,446	731,406	6,016,828	0	9,613,923	3,820,178	11,073,122	3,108,245
2031	18,636,292	11,380,781	16,704,957	806,153	6,731,488	0	10,571,733	4,223,340	12,388,352	3,477,432
2032	16,353,355	10,054,995	14,417,334	706,739	5,809,659	0	9,276,292	3,705,983	10,691,858	3,001,223
2033	18,272,104	11,173,411	16,286,208	792,491	6,562,747	0	10,414,291	4,140,779	12,077,810	3,390,262
2034	16,449,993	10,134,555	14,562,684	712,372	5,868,230	0	9,360,706	3,727,865	10,799,649	3,031,480
2035	21,389,883	12,756,831	19,208,587	916,531	7,740,359	0	11,940,568	4,847,470	14,245,038	3,998,607
<b>TOTAL</b>	<b>466,839,844</b>	<b>258,227,181</b>	<b>385,425,525</b>	<b>17,824,136</b>	<b>167,164,862</b>	<b>350,562</b>	<b>223,909,326</b>	<b>101,380,125</b>	<b>289,004,132</b>	<b>80,236,472</b>

<sup>a</sup> B-18 includes Extra Peaking Charges for additional power shown in Table 9.



TABLE B-18 Variable OMP&R Component of Transportation Charge for Each Contractor<sup>a</sup> (in dollars)

Sheet 4 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA				South Bay Area Future Contractor	Grand Total
	San Gorgonio	Metropolitan	Ventura	Total	Yuba City	Butte	Plumas	Total		
	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	36,970
1963	0	0	0	0	0	0	0	0	0	57,711
1964	0	0	0	0	0	0	0	0	0	74,134
1965	0	0	0	0	0	0	0	0	0	142,609
1966	0	0	0	0	0	0	0	0	0	192,606
1967	0	0	0	0	0	0	0	0	0	236,998
1968	0	0	0	30,401	0	0	0	0	0	1,117,912
1969	0	0	0	30,627	0	0	0	0	0	773,646
1970	0	0	0	39,430	0	0	0	0	0	1,103,799
1971	0	0	0	34,871	0	0	0	0	0	1,513,434
1972	0	848,011	0	947,266	0	0	0	0	0	3,297,202
1973	0	1,083,328	0	1,687,126	0	0	0	0	0	3,174,991
1974	0	1,872,297	0	2,373,712	0	0	0	0	0	3,926,489
1975	0	3,887,152	0	4,499,209	0	0	0	0	0	6,057,701
1976	0	5,485,263	0	6,488,418	0	0	0	0	0	8,477,311
1977	0	(796,686)	0	(234,739)	0	0	0	0	0	1,152,444
1978	0	3,696,428	0	4,890,112	0	0	0	0	0	7,632,606
1979	0	4,021,960	0	5,859,389	0	0	0	0	0	9,873,798
1980	0	5,362,245	0	7,605,064	0	0	0	0	0	10,425,875
1981	0	10,862,932	0	13,626,585	0	0	0	0	0	17,576,025
1982	0	7,685,168	0	10,069,760	0	0	0	0	0	13,566,611
1983	0	(8,994,497)	0	(8,620,817)	0	0	0	0	0	(7,441,457)
1984	0	(7,633,741)	0	(6,721,621)	0	0	0	0	0	(4,008,601)
1985	0	(15,739,366)	0	(14,196,048)	0	0	0	0	0	(10,310,371)
1986	0	1,135,478	0	4,531,005	0	0	0	0	0	11,629,559
1987	0	(3,007,097)	0	116,362	0	0	0	0	0	6,746,470
1988	0	(3,407,929)	0	(378,098)	0	0	0	0	0	6,351,151
1989	0	9,488,536	0	15,062,251	0	0	0	0	0	24,661,302
1990	0	30,759,725	204,582	39,322,882	0	0	0	0	0	48,184,400
1991	0	184,870	22,623	1,625,484	0	0	0	0	0	2,463,685
1992	0	(9,471,028)	0	(8,196,198)	0	0	0	0	0	(5,499,060)
1993	0	(21,473,875)	0	(25,072,572)	0	0	0	0	0	(24,652,636)
1994	0	4,059,683	0	7,920,177	0	0	0	0	0	13,514,307
1995	0	(4,895,977)	0	(4,901,581)	0	0	0	0	0	(99,701)
1996	0	1,859,275	0	6,054,577	0	0	0	0	0	15,893,938
1997	0	2,428,729	(921)	6,336,979	0	0	0	0	0	14,932,641
1998	0	(14,593,773)	(68,568)	(23,889,113)	0	0	0	0	0	(24,030,879)
1999	0	(9,859,076)	(31,704)	(10,555,295)	0	0	0	0	0	(3,695,239)
2000	0	(14,604,199)	7,335	(13,991,323)	0	0	0	0	0	(6,673,244)
2001	0	160,767,744	270,290	188,212,355	0	0	0	0	0	211,326,217
2002	0	59,840,151	279,773	73,974,657	0	0	0	0	0	88,827,129
2003	7,287	94,317,664	357,996	110,913,742	0	0	0	0	0	129,403,482
2004	98,121	107,170,690	416,866	125,809,361	0	0	0	0	0	144,126,263
2005	84,202	113,938,011	123,173	137,224,954	0	0	0	0	0	166,351,708
2006	431,163	82,219,262	92,254	108,521,373	0	0	0	0	0	131,754,915
2007	598,467	137,718,921	317,330	177,736,829	0	0	0	0	0	201,791,069
2008	717,425	83,447,245	408,696	111,777,969	0	0	0	0	0	128,838,145
2009	749,806	60,856,856	350,744	82,476,606	0	0	0	0	0	93,124,310
2010	1,106,548	91,428,005	408,413	125,032,565	0	0	0	0	0	143,222,650
2011	1,552,856	132,154,342	426,240	168,825,881	0	0	0	0	0	200,397,197
2012	1,699,026	108,540,066	499,834	158,176,624	0	0	0	0	0	180,532,182
2013	1,848,297	108,934,271	408,330	144,698,019	0	0	0	0	0	169,122,969
2014	1,504,444	69,744,415	17,801	88,893,548	0	0	0	0	0	105,660,905
2015	1,019,903	106,856,531	205,542	135,922,538	0	0	0	0	0	155,445,548
2016	2,031,197	160,243,981	501,415	216,988,883	0	0	0	0	0	247,903,525
2017	2,818,461	174,800,176	542,965	246,376,157	0	0	0	0	0	278,461,529
2018	2,929,146	171,830,714	580,023	247,385,024	0	0	0	0	0	280,896,140
2019	3,105,359	180,872,136	596,308	260,598,157	0	0	0	0	0	297,191,230
2020	3,194,843	186,503,055	617,604	268,981,380	0	0	0	0	0	302,806,076
2021	3,157,706	185,222,311	611,371	266,914,935	0	0	0	0	0	302,652,455
2022	3,230,712	189,780,703	624,574	273,543,630	0	0	0	0	0	309,589,158
2023	3,184,567	187,486,859	622,115	270,004,272	0	0	0	0	0	304,410,696
2024	3,160,000	184,223,611	611,730	265,470,848	0	0	0	0	0	299,790,950
2025	3,212,222	188,308,989	623,926	271,269,720	0	0	0	0	0	305,352,527
2026	3,109,114	181,934,961	603,856	261,921,328	0	0	0	0	0	297,235,324
2027	3,188,347	187,675,525	622,083	270,333,191	0	0	0	0	0	305,304,433
2028	3,153,651	184,500,917	612,263	265,678,222	0	0	0	0	0	300,352,293
2029	3,202,078	188,065,274	622,981	270,880,579	0	0	0	0	0	305,888,432
2030	3,141,668	181,892,671	605,080	262,156,490	0	0	0	0	0	294,544,365
2031	3,363,747	201,624,868	665,948	290,575,092	0	0	0	0	0	327,160,893
2032	3,055,646	176,946,173	585,922	254,605,180	0	0	0	0	0	290,561,938
2033	3,316,143	196,783,624	654,293	283,864,163	0	0	0	0	0	316,697,685
2034	3,082,187	178,199,304	590,445	256,519,470	0	0	0	0	0	291,149,929
2035	3,655,553	229,574,195	754,024	331,027,647	0	0	0	0	0	377,152,102
TOTAL	73,709,893	5,214,648,057	16,965,556	7,295,685,673	0	0	0	0	0	8,433,403,508

<sup>a</sup> B-18 includes Extra Peaking Charges for additional power shown in Table 9.

TABLE B-19 Total Transportation Charge for Each Contractor<sup>a</sup> (in dollars)

Sheet 1 of 4

Calendar Year	NORTH BAY AREA			SOUTH BAY AREA				CENTRAL COASTAL AREA		
	Napa	Solano	Total	Alameda-Zone 7	Alameda County	Santa Clara	Total	San Luis	Santa Barbara	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	11,750	43,787	21,132	76,669	0	0	0
1963	0	0	0	199,726	190,272	447,723	837,721	0	0	0
1964	0	0	0	263,282	277,455	621,356	1,162,093	6,696	21,667	28,363
1965	0	0	0	373,816	404,324	1,158,090	1,936,230	13,756	36,029	49,785
1966	18,063	0	18,063	419,468	421,723	1,412,954	2,254,144	26,524	61,349	87,873
1967	41,574	0	41,574	539,115	498,441	1,686,098	2,723,655	56,469	118,263	174,731
1968	128,628	0	128,628	663,944	603,483	1,985,220	3,252,647	115,961	229,807	345,768
1969	254,715	0	254,715	787,590	539,340	2,083,253	3,410,184	185,156	358,861	544,017
1970	277,547	0	277,547	823,406	532,567	2,202,767	3,558,740	200,150	387,675	587,825
1971	227,474	0	227,474	788,603	552,113	2,169,897	3,510,613	202,413	392,912	595,325
1972	224,978	0	224,978	830,536	678,520	2,320,421	3,829,477	209,057	406,589	615,646
1973	221,091	31,366	252,457	795,896	549,393	2,338,620	3,683,908	206,557	402,724	609,281
1974	240,498	32,938	273,437	819,798	564,593	2,506,358	3,890,749	208,545	407,090	615,635
1975	237,459	36,291	273,750	869,877	605,731	2,409,923	3,885,531	225,895	439,873	665,768
1976	271,292	40,836	312,127	960,749	734,812	2,500,506	4,196,066	228,976	447,299	676,275
1977	293,627	45,096	338,723	925,060	713,558	2,476,399	4,115,017	238,699	468,721	707,420
1978	273,870	49,178	323,048	980,577	692,587	2,785,987	4,459,151	245,331	484,259	729,590
1979	289,479	53,340	342,819	1,045,919	736,358	2,813,578	4,595,856	243,110	483,437	726,547
1980	310,846	67,748	378,594	1,164,112	866,372	3,028,204	5,058,688	269,858	537,074	806,932
1981	347,781	87,408	435,189	1,129,983	879,357	2,917,582	4,926,922	288,997	586,257	875,254
1982	438,335	106,918	545,254	1,168,058	850,483	3,262,104	5,280,645	290,049	582,757	872,806
1983	354,787	151,259	506,046	1,179,824	900,363	3,795,446	5,875,633	319,214	633,181	952,395
1984	467,336	224,245	691,581	1,472,097	1,097,480	5,737,801	8,307,379	351,620	695,559	1,047,179
1985	736,074	364,305	1,100,379	1,922,727	1,789,369	6,551,546	10,263,642	394,593	776,994	1,171,586
1986	1,084,728	692,479	1,777,207	1,750,114	1,528,732	6,863,230	10,142,076	385,545	762,684	1,148,229
1987	1,773,801	1,559,243	3,333,044	2,240,162	2,011,876	6,675,355	10,927,393	385,289	812,310	1,197,599
1988	2,231,563	2,333,792	4,565,355	2,241,970	2,210,523	6,368,850	10,821,343	420,153	978,621	1,398,774
1989	2,397,272	3,326,436	5,723,708	2,158,405	1,872,030	5,916,714	9,947,149	414,224	1,162,723	1,576,947
1990	2,746,135	3,433,320	6,179,455	2,577,836	2,261,914	6,668,440	11,508,190	487,609	1,234,409	1,722,018
1991	2,748,636	3,682,311	6,430,947	1,757,464	1,621,188	4,527,928	7,906,580	491,419	1,476,387	1,967,806
1992	2,554,528	3,528,958	6,083,486	2,078,645	2,003,328	5,385,858	9,467,831	551,042	1,491,156	2,042,198
1993	2,592,888	3,504,240	6,097,128	2,883,887	2,011,222	6,511,865	11,406,974	610,115	1,675,438	2,285,553
1994	2,718,329	3,537,459	6,255,788	2,910,638	2,642,460	7,314,515	12,867,612	767,900	2,473,449	3,241,348
1995	2,649,273	3,509,935	6,159,208	3,038,999	2,289,027	5,893,667	11,221,693	995,341	4,977,122	5,972,462
1996	2,699,210	3,891,715	6,590,926	2,588,141	2,137,443	6,675,492	11,401,075	1,837,384	13,766,531	15,603,915
1997	2,641,891	3,631,175	6,273,066	2,661,398	2,007,332	6,551,469	11,220,199	2,294,917	21,860,553	24,155,470
1998	2,538,764	3,478,062	6,016,827	2,267,794	2,064,166	6,296,050	10,628,010	2,976,896	26,690,793	29,667,689
1999	2,689,372	3,841,375	6,530,748	2,889,115	2,450,078	8,373,830	13,713,024	3,031,213	27,471,599	30,502,813
2000	2,832,886	4,308,518	7,141,404	3,921,511	2,304,770	7,033,063	13,259,343	2,947,330	27,838,836	30,786,166
2001	3,351,939	4,919,162	8,271,101	7,419,283	2,809,316	8,485,242	18,713,841	3,508,739	30,022,618	33,531,357
2002	3,554,893	5,049,275	8,604,169	8,604,169	2,777,107	9,918,869	23,547,414	3,212,467	29,615,198	32,827,666
2003	3,666,268	5,392,771	9,059,039	7,509,579	2,507,016	8,729,531	18,746,126	3,294,613	29,872,229	33,166,842
2004	4,142,962	5,617,996	9,760,958	7,111,118	2,812,121	8,200,965	16,724,205	3,307,286	30,301,003	33,608,289
2005	3,502,255	5,128,386	8,630,641	5,728,188	2,965,732	8,975,318	17,669,237	3,431,724	30,410,329	33,842,054
2006	3,400,622	4,618,665	8,019,287	5,687,082	2,957,398	9,089,022	17,733,502	3,272,598	30,046,304	33,318,902
2007	3,600,964	5,098,183	8,699,147	6,748,392	3,476,732	10,352,970	20,578,093	3,423,837	31,256,011	34,679,848
2008	4,289,301	5,052,031	9,341,332	7,590,849	3,764,393	10,497,550	21,852,792	3,920,777	32,501,210	36,421,986
2009	4,721,617	5,099,982	9,821,599	6,506,732	3,290,149	10,231,137	20,028,018	3,723,273	30,819,516	34,542,789
2010	4,979,172	6,528,330	11,507,502	7,444,202	3,684,053	11,201,327	22,329,582	4,090,534	33,076,178	37,166,712
2011	5,344,639	6,916,161	12,260,800	8,668,390	4,324,182	12,900,011	25,892,583	4,155,708	33,999,591	38,155,300
2012	5,811,473	6,872,040	12,683,513	9,563,697	4,340,693	15,179,375	29,083,765	4,207,597	34,580,154	38,787,751
2013	5,452,335	6,600,244	12,052,578	10,334,175	5,056,283	15,078,110	30,468,567	4,425,673	35,959,947	40,385,620
2014	6,105,270	7,203,358	13,308,628	10,122,366	5,339,975	15,211,171	30,673,512	4,267,082	33,120,394	37,387,477
2015	6,204,190	7,135,651	13,339,842	9,965,769	5,023,279	17,090,255	32,079,302	4,847,034	35,199,705	40,046,739
2016	6,427,786	7,716,107	14,143,893	12,108,365	5,144,865	24,891,003	42,144,233	4,554,716	35,498,243	40,052,959
2017	7,164,797	8,286,250	15,451,047	12,293,770	5,555,819	21,308,236	39,157,826	5,668,011	35,909,666	41,577,677
2018	6,980,985	8,024,245	15,005,230	13,182,271	5,991,503	17,844,035	37,017,809	5,816,301	36,219,536	42,035,838
2019	6,797,722	8,006,700	14,804,422	12,677,305	5,752,733	21,194,465	39,624,503	6,281,641	37,228,189	43,509,830
2020	6,820,224	8,039,988	14,860,211	12,510,934	5,674,150	21,038,424	39,223,508	6,295,067	37,310,693	43,605,760
2021	6,832,358	8,075,723	14,908,081	12,664,297	5,759,185	21,281,030	39,704,513	6,314,658	37,391,067	43,705,725
2022	6,867,627	8,127,697	14,995,324	12,753,497	5,797,650	21,439,950	39,991,097	6,357,451	37,519,113	43,876,564
2023	6,889,813	8,136,656	15,026,469	12,717,577	5,779,639	21,445,263	39,942,479	6,341,215	37,526,433	43,867,648
2024	6,917,235	8,183,088	15,100,323	12,789,607	5,811,479	21,585,797	40,186,882	6,365,372	37,617,536	43,982,908
2025	6,940,113	8,229,127	15,169,240	12,840,735	5,833,762	21,700,782	40,375,278	6,389,144	37,708,211	44,097,355
2026	6,948,614	8,260,798	15,209,412	12,968,723	5,905,060	21,912,175	40,785,958	6,396,849	37,765,098	44,161,947
2027	6,979,246	8,307,596	15,286,843	13,011,266	5,922,801	22,016,516	40,950,583	6,420,536	37,853,833	44,274,369
2028	7,007,296	8,353,241	15,360,537	13,071,196	5,948,110	22,143,014	41,162,321	6,437,820	37,930,797	44,368,616
2029	7,034,852	8,398,903	15,433,755	13,151,663	5,986,499	22,295,878	41,434,040	6,466,997	38,031,788	44,498,785
2030	7,056,017	8,434,269	15,490,286	13,082,378	5,944,689	22,264,570	41,291,636	6,453,267	38,043,798	44,497,065
2031	7,070,475	8,462,540	15,533,015	13,346,817	6,084,385	22,646,930	42,078,132	6,530,233	38,234,506	44,764,739
2032	7,073,692	8,481,574	15,555,266	13,416,850	6,118,922	22,790,193	42,325,965	6,518,073	38,259,903	44,777,976
2033	7,088,288	8,496,126	15,584,414	13,287,164	6,046,336	22,686,223	42,019,723	6,521,673	38,316,408	44,838,080
2034	7,034,513	8,462,076	15,496,589	13,478,137	6,142,748	22,978,539	42,599,424	6,549,069	38,416,766	44,965,835
2035	6,912,628	8,363,631	15,276,259	14,091,392	6,476,178	23,796,355	44,363,925	6,725,771	38,825,895	45,551,666
TOTAL	249,526,913	301,628,515	551,155,428	437,397,196	219,943,510	766,689,519	1,424,030,225	205,616,808	1,376,018,854	1,581,635,662

<sup>a</sup> Capital charges repaid through bond debt service prior to 2015 exclude bond cover; 2016 and after includes both bond debt service and bond cover.

TABLE B-19 Total Transportation Charge for Each Contractor <sup>a</sup> (in dollars)

Sheet 2 of 4

Calendar Year	SAN JOAQUIN VALLEY AREA								
	Dudley Ridge	Empire	Future Contractor San Joaquin Valley	Kern		Kings	Oak Flat	Tulare	Total
				Municipal and Industrial	Agricultural				
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]
1961	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0
1964	0	0	2,725	0	0	0	0	0	2,725
1965	0	0	6,029	73,569	0	0	0	0	79,598
1966	0	0	12,039	137,330	0	0	0	0	149,368
1967	0	0	26,257	267,611	0	0	0	0	293,869
1968	187,324	9,046	54,588	445,439	1,556,908	13,770	11,783	211,208	2,490,065
1969	182,935	8,056	87,576	525,094	2,417,821	12,625	10,803	365,780	3,610,691
1970	205,213	14,823	94,675	573,998	2,946,188	12,790	13,348	300,181	4,161,215
1971	201,911	15,781	95,695	605,889	3,865,008	17,763	14,667	455,717	5,272,430
1972	224,875	16,649	98,788	631,615	5,056,385	15,220	21,177	1,102,927	7,167,636
1973	207,846	12,720	97,550	639,250	4,999,018	15,483	11,999	417,493	6,401,359
1974	289,992	12,689	98,460	698,247	5,310,461	15,590	13,113	611,846	7,050,399
1975	358,518	13,634	106,703	715,606	6,448,781	16,620	14,807	745,333	8,420,001
1976	311,509	14,180	108,084	774,291	6,810,574	16,993	16,521	576,756	8,628,908
1977	273,379	11,290	112,554	797,859	6,995,891	18,457	14,273	523,111	8,746,814
1978	362,679	4,441	115,521	890,945	8,462,660	18,921	18,331	517,626	10,391,124
1979	393,923	14,027	114,253	896,194	9,601,223	20,202	25,272	968,058	12,033,151
1980	415,565	12,377	125,950	888,893	10,172,491	20,749	24,810	752,521	12,413,356
1981	479,056	30,218	134,169	1,079,315	11,633,148	24,939	23,345	924,731	14,328,922
1982	473,565	13,368	135,057	1,004,667	12,479,986	22,955	22,830	762,976	14,915,404
1983	647,158	14,962	149,202	1,027,258	15,704,356	39,971	29,512	430,085	18,042,505
1984	920,182	15,376	164,505	2,063,179	23,845,324	54,427	60,100	797,221	27,920,315
1985	1,109,058	87,937	184,905	2,350,593	28,166,640	69,483	70,639	2,180,293	34,219,549
1986	1,273,624	34,393	180,445	2,365,159	30,739,767	80,769	76,519	2,202,930	36,953,606
1987	1,132,529	51,188	179,872	2,804,776	29,560,005	78,018	74,775	2,262,782	36,143,945
1988	1,118,466	61,983	193,735	2,750,424	29,486,385	74,168	60,669	2,221,264	35,967,093
1989	1,154,313	49,665	187,913	2,435,635	29,558,178	67,048	69,153	2,465,507	35,987,412
1990	871,708	34,827	221,392	2,541,316	27,683,951	51,058	49,591	1,894,110	33,347,951
1991	594,011	23,732	220,282	2,055,250	17,883,343	27,930	27,360	1,254,675	22,086,583
1992	964,338	39,568	241,455	2,369,788	26,181,464	55,795	51,414	1,931,815	31,835,638
1993	1,176,628	54,095	264,959	2,799,482	31,695,633	72,889	70,097	2,665,403	38,799,186
1994	1,031,718	44,221	306,359	2,808,829	29,571,444	60,460	57,864	2,141,333	36,022,227
1995	1,528,406	47,079	304,297	3,499,611	36,694,999	88,875	80,687	2,795,443	45,039,398
1996	1,357,198	48,711	389,203	3,560,139	36,669,690	86,092	74,335	4,341,334	46,526,702
1997	1,398,727	25,868	276,681	3,107,763	32,838,915	36,715	69,195	1,695,411	39,449,275
1998	1,242,611	34,823	381,847	2,654,434	29,595,386	41,835	60,491	1,825,655	35,837,081
1999	1,236,996	56,268	369,935	3,062,825	31,713,760	75,476	65,787	4,188,654	40,769,701
2000	1,075,478	38,466	302,623	2,320,236	26,742,595	61,957	55,348	2,812,077	33,408,781
2001	1,762,840	63,702	328,001	2,240,137	34,376,094	80,519	102,254	3,097,473	42,051,019
2002	1,328,586	44,059	320,541	2,330,952	29,187,128	73,376	78,371	2,570,604	35,933,615
2003	1,396,960	48,958	339,961	2,741,740	32,009,834	89,703	79,599	2,889,002	39,595,757
2004	1,453,956	78,324	342,484	3,759,777	30,628,692	234,783	82,207	2,401,651	38,981,874
2005	2,043,413	88,260	355,581	2,982,461	41,696,506	418,952	81,742	3,451,470	51,118,385
2006	1,788,356	75,024	294,916	3,277,258	37,629,163	252,054	78,994	2,795,788	46,191,553
2007	1,658,905	69,769	333,662	3,063,528	35,566,226	234,073	82,494	2,952,809	43,961,465
2008	1,512,581	62,027	468,712	3,448,084	34,816,866	247,105	80,580	2,426,440	43,062,395
2009	1,208,915	49,943	435,271	2,184,856	30,471,532	191,396	62,330	2,017,290	36,621,533
2010	1,477,724	110,749	507,438	2,359,472	36,709,593	255,532	88,235	2,704,762	44,213,506
2011	2,183,472	81,979	506,763	3,445,004	51,121,340	303,397	92,431	2,729,907	60,464,292
2012	1,271,774	89,538	467,287	3,247,652	41,001,582	319,307	93,117	3,495,679	49,985,937
2013	1,619,309	82,647	519,826	3,418,166	40,983,668	280,430	92,527	2,757,464	49,754,038
2014	1,613,285	66,564	635,140	2,814,339	36,234,915	228,514	93,666	2,117,851	43,804,275
2015	1,396,995	67,715	747,667	3,198,458	37,709,812	227,162	81,602	2,295,722	45,725,132
2016	1,674,671	96,257	688,733	4,513,460	42,153,429	371,068	121,557	3,168,858	52,788,032
2017	1,853,238	98,757	680,826	4,870,285	46,612,010	343,034	126,399	3,210,317	57,794,867
2018	1,899,620	101,773	717,852	4,954,757	47,784,400	346,443	129,331	3,288,821	59,222,997
2019	1,835,868	102,455	696,540	5,007,807	47,631,337	348,808	131,879	3,308,572	59,063,267
2020	1,649,819	96,269	704,830	4,709,112	46,062,052	329,978	118,621	3,128,267	56,798,948
2021	1,726,747	101,319	709,674	4,880,394	47,545,163	345,461	128,354	3,275,593	58,712,706
2022	1,737,833	102,038	715,066	4,908,906	47,902,119	347,640	128,841	3,296,633	59,139,075
2023	1,695,714	99,257	720,709	4,794,371	47,184,594	338,974	123,122	3,215,629	58,172,369
2024	1,701,030	99,596	726,318	4,798,246	47,324,154	340,009	123,589	3,225,598	58,338,540
2025	1,697,738	99,369	731,946	4,796,166	47,403,982	339,283	122,333	3,219,056	58,409,872
2026	1,756,201	103,203	737,931	4,929,325	48,481,502	351,119	130,089	3,330,957	59,820,327
2027	1,748,169	102,664	743,603	4,920,034	48,508,285	349,408	128,004	3,315,319	59,815,486
2028	1,747,154	102,586	747,547	4,907,139	48,529,455	349,079	127,664	3,313,136	59,823,760
2029	1,763,724	103,665	753,674	4,955,195	48,980,730	352,376	128,968	3,344,681	60,383,012
2030	1,689,190	98,751	759,891	4,746,182	47,593,445	337,081	119,429	3,201,489	58,545,458
2031	1,824,224	107,623	764,875	5,123,794	50,499,986	364,200	134,490	3,460,236	62,279,428
2032	1,831,711	108,104	771,502	5,081,745	50,339,135	365,690	137,427	3,474,352	62,109,665
2033	1,721,548	100,846	777,868	4,847,890	48,710,589	343,091	120,661	3,262,816	59,885,308
2034	1,803,908	106,252	784,021	5,002,208	50,027,543	359,699	132,688	3,420,532	61,636,850
2035	2,161,149	129,739	790,130	6,045,362	57,595,117	432,316	173,337	4,105,453	71,432,604
TOTAL	83,637,766	4,106,242	27,473,067	201,526,770	2,130,100,357	11,877,101	5,217,546	156,612,481	2,620,551,329

<sup>a</sup> Capital charges repaid through bond debt service prior to 2015 exclude bond cover; 2016 and after includes both bond debt service and bond cover.

TABLE B-19 Total Transportation Charge for Each Contractor<sup>a</sup> (in dollars)

Sheet 3 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA									
	AVEK	Castaic Lake	Coachella	Crestline	Desert	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel
	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0
1963	34,411	0	0	0	726	0	0	0	51,729	0
1964	64,494	27,447	19,542	4,370	38,211	1,143	30,324	8,205	82,811	34,987
1965	121,484	53,007	34,348	7,194	42,701	2,082	53,730	15,222	135,069	35,344
1966	221,012	101,264	62,476	12,478	76,886	3,753	96,944	27,679	232,502	61,465
1967	427,622	210,814	121,269	23,472	148,839	7,284	188,141	54,023	433,350	115,574
1968	754,401	478,892	218,649	41,509	265,168	12,870	336,227	95,466	782,163	208,927
1969	1,090,136	725,835	334,105	61,226	394,024	18,693	500,689	138,063	1,205,834	321,755
1970	1,420,639	906,043	470,423	89,700	552,223	25,231	692,219	184,837	1,778,187	467,573
1971	1,760,670	1,090,440	627,331	128,360	754,065	31,837	931,649	231,280	2,538,219	659,414
1972	2,084,699	1,310,372	777,838	181,206	971,501	42,404	1,195,372	274,599	3,388,734	865,095
1973	2,177,324	1,326,909	920,218	183,713	1,184,696	43,482	1,262,078	287,315	3,971,543	946,686
1974	2,241,780	1,386,769	938,860	193,283	1,212,205	45,212	1,295,813	292,071	3,998,510	990,064
1975	2,419,858	1,455,585	983,580	206,040	1,280,804	48,490	1,365,296	304,281	4,159,094	1,088,341
1976	2,773,862	1,451,307	1,032,075	215,084	1,356,888	51,463	1,409,102	313,685	4,299,592	1,141,598
1977	2,717,286	1,520,872	929,532	226,032	1,194,916	47,348	1,482,157	329,365	4,553,831	1,197,216
1978	3,035,392	1,606,294	1,111,606	231,040	1,470,658	47,118	1,483,445	321,681	4,460,167	1,208,720
1979	3,589,381	1,641,500	1,180,841	237,955	1,569,175	48,396	1,612,358	332,472	4,422,382	1,152,375
1980	4,136,480	1,723,785	1,271,861	259,401	1,730,656	53,348	1,733,166	360,461	4,835,652	1,269,447
1981	4,469,204	1,978,119	1,355,504	271,181	1,850,802	77,806	1,859,135	391,869	5,224,182	1,357,680
1982	4,031,426	2,070,417	1,403,332	280,313	1,936,175	55,961	2,054,784	406,891	5,410,876	1,565,182
1983	5,224,176	2,333,372	1,997,502	333,081	2,880,959	69,381	2,131,344	494,688	6,020,929	1,556,652
1984	7,262,706	3,375,527	3,084,372	445,339	4,608,046	75,773	2,361,384	553,321	7,049,449	2,331,849
1985	8,979,937	3,760,557	3,882,496	540,388	5,883,196	79,232	2,473,365	759,052	7,740,359	2,378,394
1986	8,880,068	4,328,769	4,308,841	577,474	6,571,197	102,400	2,583,767	1,000,062	7,857,569	3,047,741
1987	8,897,753	4,170,045	4,164,707	604,982	6,418,841	211,809	2,617,332	1,026,398	9,224,608	3,034,142
1988	8,373,323	4,233,940	4,163,832	615,999	6,482,143	124,667	2,672,799	779,820	9,505,259	2,828,998
1989	8,750,651	4,114,266	3,808,646	586,595	5,952,262	170,570	2,620,917	1,442,627	8,944,266	2,930,395
1990	10,040,074	4,555,126	4,487,886	620,394	7,014,185	289,349	2,819,468	1,639,830	9,795,019	3,678,107
1991	6,542,001	3,524,058	2,996,131	567,450	4,550,559	175,137	3,579,410	1,294,608	8,921,839	3,035,638
1992	8,644,005	4,481,624	3,068,616	470,165	4,667,984	121,335	4,381,364	1,129,578	8,573,361	2,980,091
1993	9,028,570	4,113,039	3,267,678	472,817	4,993,632	157,747	4,260,927	1,347,511	9,505,683	3,320,012
1994	11,216,190	4,725,251	3,313,737	554,651	5,066,159	225,809	5,254,817	1,698,990	10,209,083	4,076,706
1995	10,817,875	4,983,090	4,087,603	509,163	6,340,703	155,561	4,343,044	1,527,248	9,443,228	3,715,377
1996	11,187,158	5,171,170	7,025,782	553,232	11,183,947	150,612	4,410,639	1,867,203	9,869,329	3,807,422
1997	11,437,950	4,937,891	6,588,591	579,281	7,422,990	144,833	4,714,892	1,869,307	11,268,380	4,037,862
1998	9,956,830	4,566,358	5,663,864	546,645	5,928,447	146,074	5,751,249	1,474,029	11,192,751	3,321,115
1999	11,473,042	4,989,892	4,648,108	637,393	6,003,270	146,909	5,989,455	1,853,582	12,338,933	4,177,208
2000	10,596,779	6,837,243	3,071,454	594,291	4,377,827	115,173	5,760,850	1,448,529	11,883,970	3,253,760
2001	20,766,464	12,538,175	4,126,996	800,429	6,393,351	127,925	6,471,076	3,367,401	17,920,450	3,400,854
2002	11,990,852	9,678,139	3,358,238	759,146	5,125,035	109,667	5,584,904	2,738,104	18,762,806	4,782,841
2003	13,366,259	10,732,427	3,480,426	729,614	5,324,844	115,325	7,247,931	2,277,117	17,174,271	4,950,808
2004	14,235,804	11,797,957	4,112,158	829,151	5,365,147	124,146	7,358,215	2,517,757	21,503,364	4,388,862
2005	14,640,814	10,844,055	17,785,478	653,880	10,282,020	114,279	7,158,326	2,566,888	19,551,335	4,652,123
2006	16,079,083	9,937,239	27,229,693	632,629	9,853,675	122,066	9,839,741	2,485,769	19,255,382	4,659,802
2007	19,629,610	13,365,361	26,113,808	880,732	9,364,886	126,627	13,676,159	4,030,167	25,509,692	3,831,758
2008	17,102,645	15,248,889	25,589,120	804,323	10,248,596	134,964	11,981,793	3,945,884	25,584,364	4,775,994
2009	14,850,810	12,989,909	23,274,321	780,545	8,129,412	133,483	11,661,046	3,674,951	25,464,410	5,255,249
2010	17,557,736	12,715,063	31,809,228	689,273	10,989,064	122,016	14,002,388	3,025,322	27,895,761	6,780,360
2011	23,828,664	12,339,758	32,209,751	744,963	11,916,002	136,233	7,567,835	2,990,623	25,010,233	7,446,330
2012	24,249,437	14,486,658	40,147,143	848,933	14,395,366	147,826	9,331,869	4,418,156	38,732,722	7,776,565
2013	19,361,992	17,072,691	31,931,123	1,062,272	10,854,849	165,964	9,300,239	3,480,443	29,467,894	5,925,151
2014	14,803,167	15,800,357	27,450,696	1,157,421	8,807,362	172,112	9,405,188	3,592,040	29,679,522	4,876,828
2015	12,622,803	14,967,155	30,020,626	1,119,071	9,992,389	163,750	10,742,393	2,707,186	34,676,045	5,849,206
2016	23,853,753	14,614,135	36,922,072	1,203,313	12,688,080	161,631	10,691,452	3,745,445	38,946,003	7,067,330
2017	25,929,265	19,541,243	38,646,697	1,609,190	13,444,748	170,678	17,107,169	4,970,439	43,444,955	7,635,280
2018	26,814,797	19,936,021	41,359,255	1,571,573	13,865,303	168,070	17,671,142	5,178,240	43,806,559	7,747,109
2019	26,542,837	19,872,957	40,751,511	1,568,868	13,880,366	162,183	18,051,861	5,236,173	44,677,101	7,790,234
2020	26,810,734	20,065,166	41,315,071	1,573,851	14,013,823	158,319	18,464,553	5,313,625	44,818,202	7,816,229
2021	26,447,565	19,789,990	40,662,853	1,535,608	13,760,007	154,101	18,167,811	5,243,132	44,159,316	7,644,693
2022	26,754,239	19,929,667	40,370,746	1,541,130	13,791,274	152,852	18,303,713	5,317,343	44,230,786	7,672,061
2023	26,530,854	19,944,545	39,511,805	1,533,097	13,597,410	153,102	18,228,720	5,264,555	44,008,127	7,604,589
2024	26,358,050	19,754,604	39,321,298	1,523,550	13,529,232	154,017	18,093,351	5,220,970	43,893,405	7,569,025
2025	26,688,577	20,045,336	39,728,004	1,540,313	13,693,447	154,851	18,341,536	5,291,817	44,228,190	7,656,374
2026	26,224,143	19,751,236	39,153,293	1,518,671	13,464,233	155,861	18,052,600	5,181,646	43,831,283	7,537,975
2027	26,797,127	20,111,842	39,805,783	1,545,850	13,726,471	156,918	18,404,503	5,306,462	44,353,460	7,677,078
2028	26,566,826	20,004,339	39,620,672	1,538,713	13,644,139	158,014	18,303,026	5,248,986	44,244,647	7,638,747
2029	26,942,448	20,218,722	40,113,239	1,557,449	13,834,414	159,047	18,532,415	5,329,284	44,643,357	7,742,724
2030	26,476,118	19,909,830	39,737,141	1,541,437	13,672,752	160,056	18,321,315	5,219,060	44,395,216	7,664,852
2031	28,234,858	20,860,904	41,545,709	1,616,992	14,394,107	159,730	19,289,246	5,619,553	45,767,229	8,042,688
2032	26,040,096	19,562,267	39,446,295	1,524,666	13,537,644	161,200	18,077,871	5,115,435	44,240,387	7,605,625
2033	27,956,506	20,687,571	41,410,798	1,613,103	14,316,613	161,216	19,252,025	5,551,291	45,717,895	8,012,187
2034	26,106,000	19,686,713	39,753,649	1,533,865	13,636,835	160,815	18,224,663	5,136,229	44,497,029	7,661,451
2035	31,047,505	22,368,305	44,496,347	1,740,528	15,536,010	160,805	20,845,886	6,257,896	48,030,892	8,645,060
TOTAL	997,089,089	691,436,112	1,220,734,273	56,087,043	537,446,570	8,526,139	590,063,616	180,141,239	1,487,430,732	305,982,932

<sup>a</sup> Capital charges repaid through bond debt service prior to 2015 exclude bond cover; 2016 and after includes both bond debt service and bond cover.

TABLE B-19 Total Transportation Charge for Each Contractor <sup>a</sup> (in dollars)

Sheet 4 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA				South Bay Area Future Contractor	Grand Total
	San Gorgonio	Metropolitan	Ventura	Total	Yuba City	Butte	Plumas	Total		
	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	3,219	79,888
1963	0	690,812	0	777,678	0	0	0	0	12,626	1,628,026
1964	21,735	1,260,513	9,378	1,603,161	0	0	0	0	13,938	2,810,279
1965	21,866	2,180,589	17,766	2,720,401	0	0	405	405	28,937	4,815,355
1966	37,964	3,900,172	33,426	4,868,023	0	0	565	565	31,321	7,409,358
1967	71,283	7,693,703	68,155	9,563,529	0	0	562	562	47,718	12,845,638
1968	128,915	15,317,881	142,803	18,783,872	0	0	564	564	46,945	25,048,489
1969	198,764	23,153,064	215,209	28,357,398	0	0	3,191	3,191	52,963	36,233,158
1970	289,633	30,617,164	273,605	37,767,476	0	0	15,121	15,121	69,744	46,437,668
1971	409,327	39,958,997	342,425	49,464,015	0	0	16,001	16,001	55,532	59,141,390
1972	537,186	52,948,599	422,304	64,999,909	0	0	17,372	17,372	80,412	76,935,430
1973	587,963	57,273,225	435,655	70,600,806	0	0	17,334	17,334	54,219	81,619,365
1974	611,428	61,776,466	455,565	75,438,027	0	0	17,477	17,477	76,783	87,362,507
1975	644,621	66,756,784	478,403	81,191,178	0	0	18,406	18,406	84,547	94,539,180
1976	668,315	68,485,047	475,587	83,673,605	0	0	17,477	17,477	106,717	97,611,176
1977	696,515	66,234,179	507,063	81,636,312	0	0	18,232	18,232	98,618	95,661,135
1978	709,040	72,934,779	523,177	89,143,116	0	0	17,381	17,381	100,786	105,164,195
1979	712,866	72,666,594	526,405	89,692,699	0	0	20,579	20,579	119,352	107,531,003
1980	777,981	79,926,555	571,232	98,650,027	0	0	17,761	17,761	178,812	117,504,170
1981	806,031	91,261,394	636,404	111,539,309	0	0	21,193	21,193	185,347	132,312,136
1982	853,400	93,144,741	670,375	113,883,872	0	0	28,423	28,423	173,894	135,700,297
1983	952,131	101,787,700	803,591	126,585,506	0	0	19,276	19,276	220,926	152,202,286
1984	1,072,639	137,507,077	868,967	170,596,449	0	0	21,114	21,114	225,959	208,809,977
1985	1,120,854	172,916,230	908,769	211,422,827	0	0	20,239	20,239	340,322	258,538,543
1986	1,149,714	193,242,026	937,311	234,586,938	0	0	20,139	20,139	279,227	284,907,422
1987	1,172,015	178,764,439	908,034	221,215,104	0	0	19,742	19,742	345,116	273,181,943
1988	1,208,206	190,243,523	904,868	232,137,377	0	0	17,900	17,900	365,207	285,273,049
1989	1,194,911	193,235,261	932,599	234,683,966	0	0	19,158	19,158	422,329	288,360,668
1990	1,297,621	239,540,417	1,486,755	287,264,231	0	0	18,148	18,148	474,284	340,514,277
1991	1,354,921	179,950,983	1,141,118	217,633,853	0	0	21,018	21,018	214,683	256,261,469
1992	1,349,184	196,166,977	1,025,285	237,059,570	0	0	18,014	18,014	443,676	286,950,412
1993	1,507,550	169,493,328	1,068,135	212,536,630	0	0	20,999	20,999	599,571	271,746,042
1994	1,497,753	209,282,955	1,008,952	258,131,053	0	0	19,649	19,649	609,966	317,147,644
1995	1,520,622	173,420,265	1,061,324	221,925,100	0	0	20,277	20,277	534,971	290,873,109
1996	1,527,165	181,404,029	1,103,254	239,260,943	0	0	25,378	25,378	571,857	319,980,796
1997	1,730,348	186,736,527	1,216,560	242,685,410	0	0	24,820	24,820	428,638	324,236,878
1998	1,920,021	168,571,967	1,237,386	220,276,736	0	0	0	0	465,095	302,891,438
1999	2,167,221	191,636,505	1,264,332	247,325,851	0	0	(0)	(0)	584,116	339,426,251
2000	2,399,072	185,238,178	1,321,281	236,898,408	0	0	0	0	0	321,494,102
2001	3,320,394	376,931,270	1,621,143	457,785,929	0	0	0	0	0	560,353,246
2002	4,666,197	264,584,000	1,648,232	333,788,162	0	0	(0)	(0)	0	434,701,025
2003	5,925,760	292,850,048	1,668,190	365,843,019	0	0	20,800	20,800	0	466,431,583
2004	6,247,900	339,975,906	1,909,882	420,366,249	0	0	20,830	20,830	0	519,462,405
2005	6,521,078	312,842,936	1,398,129	409,011,340	0	0	20,827	20,827	0	520,292,484
2006	7,001,949	287,944,945	1,325,689	396,367,660	0	0	21,280	21,280	0	501,652,185
2007	7,651,837	373,771,122	1,870,260	499,822,019	0	0	20,893	20,893	0	607,761,465
2008	8,922,562	339,083,808	2,262,970	465,685,913	0	0	22,412	22,412	0	576,386,830
2009	9,230,481	303,171,086	2,071,553	420,687,254	0	0	18,220	18,220	0	521,719,413
2010	10,307,480	349,732,641	2,103,145	487,729,477	0	0	18,448	18,448	0	602,965,226
2011	11,079,708	391,292,510	2,095,161	529,657,771	0	0	20,131	20,131	0	666,450,876
2012	12,033,121	378,691,890	2,350,421	547,610,106	0	0	18,470	18,470	0	678,169,541
2013	12,601,142	366,073,756	2,281,754	509,579,273	0	0	17,666	17,666	0	642,257,742
2014	15,130,946	316,748,240	1,829,693	449,453,571	0	0	17,493	17,493	0	574,644,956
2015	17,025,170	335,484,534	1,932,601	477,302,931	0	0	17,089	17,089	0	608,511,035
2016	19,628,780	393,481,149	2,327,958	565,331,101	0	0	16,924	16,924	0	714,477,142
2017	22,023,268	423,957,910	2,488,108	620,968,950	0	0	16,926	16,926	0	774,967,291
2018	22,234,708	412,611,400	2,424,745	615,388,921	0	0	16,924	16,924	0	768,687,718
2019	22,469,633	415,402,342	2,394,604	618,800,671	0	0	14,298	14,298	0	775,816,992
2020	22,597,082	416,818,009	2,388,886	622,153,549	0	0	2,370	2,370	0	776,644,346
2021	22,488,515	409,526,676	2,337,407	611,917,673	0	0	1,544	1,544	0	768,950,242
2022	22,537,462	409,865,808	2,326,316	612,793,397	0	0	161	161	0	770,795,617
2023	22,508,548	407,777,688	2,333,919	608,996,959	0	0	161	161	0	766,006,085
2024	22,510,660	404,300,351	2,322,365	604,550,877	0	0	161	161	0	762,159,692
2025	22,589,571	409,241,148	2,343,900	611,543,065	0	0	160	160	0	769,594,970
2026	22,514,088	403,842,777	2,333,429	603,561,235	0	0	159	159	0	763,539,038
2027	22,626,189	410,710,980	2,361,360	613,584,004	0	0	159	159	0	773,911,444
2028	22,627,945	408,730,704	2,360,050	610,686,808	0	0	158	158	0	771,402,201
2029	22,714,632	413,297,152	2,376,158	617,461,042	0	0	158	158	0	779,210,792
2030	22,693,017	407,534,351	2,355,209	609,680,352	0	0	157	157	0	769,504,955
2031	22,940,514	426,166,133	2,397,984	637,035,646	0	0	157	157	0	801,691,117
2032	22,676,804	402,512,248	2,321,266	602,821,803	0	0	157	157	0	767,590,831
2033	22,968,616	422,695,285	2,388,414	632,731,519	0	0	158	158	0	795,059,202
2034	22,760,350	404,800,136	2,330,060	606,287,793	0	0	158	158	0	770,986,648
2035	23,364,810	457,304,605	2,503,561	682,302,210	0	0	158	158	0	858,926,822
TOTAL	622,067,698	17,447,075,188	101,787,982	24,245,868,612	0	0	879,679	879,679	8,748,370	30,432,869,305

<sup>a</sup> Capital charges repaid through bond debt service prior to 2015 exclude bond cover; 2016 and after includes both bond debt service and bond cover.



**TABLE B-20A Calculation of Delta Water Rates**

**Calculation in Accordance with Article 53(i) of the Monterey Amendment**  
 (Values in millions of dollars [\$] or millions of acre-feet [af] discounted to 2016 at 4.610 percent per annum)

Procedure	Capital Cost Component		Minimum Operation, Maintenance, Power and Replacement Component <sup>a</sup>		Total Delta Water Rate	
	[1]		[2]		[3]	
<b>Commencing in 2017</b>						
Total Costs of "Initial" Project Conservation Facilities to be Reimbursed and Project Water Table A Amounts During the Project Repayment Period	\$8,606.93 <sup>b</sup>	466.11 af	\$7,723.93 <sup>c</sup>	466.11 af	\$16,330.86	466.11 af
Less, Project Power Revenues to be Realized During the Project Repayment Period	(\$4,267.49)		(\$3,926.98)		(\$8,194.47)	
Less, Delta Water Charges Paid and Project Water Table A Amounts, Prior to 2017	(\$3,229.25) <sup>d</sup>	(414.04) af	(\$1,320.64)	(414.04) af	(\$4,549.89)	(414.04) af
TOTAL	\$1,110.19	52.07 af	\$2,476.31	52.07 af	\$3,586.50	52.07 af
Rate Applicable in 2017	\$21.32 per acre-foot		\$47.56 per acre-foot		\$68.88 per acre-foot	

**Calculation Under Original Provisions, without the Monterey Amendment**  
 (for Plumas and Empire)

Procedure	Capital Cost Component		Minimum Operation, Maintenance, Power and Replacement Component <sup>a</sup>		Total Delta Water Rate	
	[4]		[5]		[6]	
<b>Commencing in 2017</b>						
Total Costs of "Initial" Project Conservation Facilities to be Reimbursed and Project Water Table A Amounts during the Project Repayment Period	\$8,587.90 <sup>b</sup>	466.11 af	\$7,690.03 <sup>c</sup>	466.11 af	\$16,277.93	466.11 af
Less, Project Power Revenues to be Realized During the Project Repayment Period	(\$4,267.49)		(\$3,926.98)		(\$8,194.47)	
Less, Delta Water Charges Paid and Project Water Table A Amounts, Prior to 2017	(\$3,229.25) <sup>d</sup>	(414.04) af	(\$1,320.64)	(414.04) af	(\$4,549.89)	(414.04) af
TOTAL	\$1,091.15	52.07 af	\$2,442.42	52.07 af	\$3,533.57	52.07 af
Rate Applicable in 2017	\$20.95 per acre-foot		\$46.91 per acre-foot		\$67.86 per acre-foot	

<sup>a</sup> Considering that all operating costs of Project Conservation Facilities will not vary with annual amounts of Project water delivered, and therefore are properly classified as "Minimum" OMP&R Costs. OMP&R costs exclude amounts for Conservation Replacement Accounting System.

<sup>b</sup> Including net credits of \$4,850,000 for settlements as to the magnitude of Project Capital costs incurred prior to December 31, 1960, and net credits of \$6,678,320 for settlement as to the magnitude of Project Capital costs incurred during the 1961 through 1978 period.

<sup>c</sup> Includes conservation power costs and credits at San Luis Reservoir.

<sup>d</sup> Applying all Delta Water Charges paid prior to 1970 to reimburse Capital costs (the charge was not divided into components until 1970).

**TABLE B-20B Delta Water Rates by Facility (in dollars per acre-foot)**

Item	Capital Cost Component	Minimum Operation, Maintenance, Power and Replacement Component	Total Delta Water Rate
	[1]	[2]	[3]
<b>Initial Conservation Facilities</b>			
Oroville Division			
Water Supply and Power Costs <sup>a</sup>	97.42	65.90	163.32
Less, Oroville Power Revenues	<u>-59.66</u>	<u>-25.36</u>	<u>-85.02</u>
Subtotal	37.76	40.54	78.30
Delta Facilities <sup>b</sup>	31.70	50.83	82.53
California Aqueduct portion			
Reach1	5.95	11.95	17.90
Reach 2A	3.41	1.43	4.83
Reach 2B	1.72	1.00	2.73
Reach 3	<u>1.21</u>	<u>0.52</u>	<u>1.73</u>
Subtotal	12.29	14.90	27.19
San Luis Facilities	18.65	16.05	34.70
Planning and Preoperating Costs through 2015	4.87	0.00	4.87
45,000 af Relinquished Costs	0.37	0.65	1.02
Less, Capital Cost Credits	-2.35	0.00	-2.35
Less, Delta Water Charges paid prior to 2017	<u>-81.95</u>	<u>-75.42</u>	<u>-157.37</u>
Rate Applicable in 2017	21.32	47.56	68.88

<sup>a</sup> Includes revenue received from non-SWP contractors.<sup>b</sup> Includes: 1. Delta Facility planning costs; 2. Delta Studies costs; and 3. Suisun Marsh Facilities Costs.

TABLE B-21 Total Delta Water Charge for Each Contractor (in dollars)

Calendar Year	NORTH BAY AREA			SOUTH BAY AREA				CENTRAL COASTAL AREA		
	Napa	Solano	Total	Alameda-Zone 7	Alameda County	Santa Clara	Total	San Luis	Santa Barbara	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	14,000	50,050	177,100	241,150	0	0	0
1968	0	0	0	19,156	29,701	193,245	242,102	0	0	0
1969	0	0	0	30,324	44,096	215,483	289,903	0	0	0
1970	0	0	0	80,908	107,730	585,200	773,838	0	0	0
1971	0	0	0	57,320	123,080	637,120	817,520	0	0	0
1972	0	0	0	99,668	143,877	707,328	950,873	0	0	0
1973	0	0	0	120,880	167,099	782,167	1,070,146	0	0	0
1974	0	0	0	137,684	182,339	818,664	1,138,687	0	0	0
1975	0	0	0	146,204	187,324	804,123	1,137,651	0	0	0
1976	0	0	0	168,489	208,652	862,036	1,239,177	0	0	0
1977	0	0	0	172,931	208,645	827,062	1,208,638	0	0	0
1978	0	0	0	206,378	243,231	926,594	1,376,203	0	0	0
1979	0	0	0	237,771	273,208	1,005,955	1,516,934	0	0	0
1980	0	18,325	18,325	272,717	307,426	1,090,867	1,671,010	12,396	3,479	15,875
1981	0	25,440	25,440	415,564	469,768	1,589,984	2,475,316	18,068	10,414	28,482
1982	0	34,917	34,917	457,988	519,053	1,679,289	2,656,330	38,166	99,788	137,954
1983	0	12,035	12,035	316,703	359,775	1,114,795	1,791,273	38,004	68,902	106,906
1984	0	22,453	22,453	334,587	380,914	1,132,448	1,847,949	57,909	105,498	163,407
1985	0	22,001	22,001	381,970	435,728	1,244,939	2,062,637	106,103	192,937	299,040
1986	35,358	21,767	57,125	423,378	485,372	1,330,615	2,239,365	151,206	275,347	426,553
1987	0	22,984	22,984	430,024	493,786	1,304,900	2,228,710	185,355	336,664	522,019
1988	88,878	150,466	239,344	464,114	533,731	1,361,400	2,359,245	239,792	436,607	676,399
1989	102,688	305,328	408,016	513,853	591,760	1,491,833	2,597,446	331,518	602,402	933,920
1990	112,723	355,132	467,855	534,787	616,676	1,537,512	2,688,975	417,802	760,166	1,177,968
1991	129,296	395,515	524,811	603,028	681,067	1,667,194	2,951,289	443,403	806,745	1,250,148
1992	158,879	489,808	648,687	729,545	808,579	1,945,453	3,483,577	506,628	921,780	1,428,408
1993	172,457	530,778	703,235	771,894	840,958	1,990,673	3,603,525	507,825	923,957	1,431,782
1994	177,824	546,610	724,434	778,647	817,579	1,946,615	3,542,841	486,654	885,437	1,372,091
1995	203,738	713,497	917,235	874,946	874,946	2,083,205	3,833,097	520,801	947,567	1,468,368
1996	213,506	774,152	987,658	901,129	860,168	2,048,020	3,809,317	512,005	931,562	1,443,567
1997	250,558	866,141	1,116,699	1,041,633	951,056	2,264,420	4,257,109	566,105	1,029,994	1,596,099
1998	266,952	882,469	1,149,421	1,048,658	957,470	2,279,691	4,285,819	141,683	888,760	1,030,443
1999	290,688	923,459	1,214,147	1,084,480	990,178	2,357,566	4,432,224	589,391	1,072,362	1,661,753
2000	390,936	948,784	1,339,720	1,628,402	1,005,778	2,394,709	5,028,889	598,677	1,089,257	1,687,934
2001	496,412	1,097,880	1,594,292	1,868,283	1,005,998	2,395,234	5,269,515	598,809	1,089,496	1,688,305
2002	512,928	1,125,429	1,638,357	1,896,134	1,020,996	2,430,942	5,348,072	607,736	1,105,738	1,713,474
2003	511,059	1,112,692	1,623,751	1,856,232	999,510	2,379,785	5,235,527	594,946	1,082,469	1,677,415
2004	569,615	1,230,627	1,800,242	2,033,406	1,094,911	2,606,931	5,735,248	651,732	1,185,788	1,837,520
2005	573,729	1,219,893	1,793,622	2,081,144	1,084,212	2,581,456	5,746,812	645,364	1,174,201	1,819,565
2006	606,343	1,272,001	1,878,344	2,167,748	1,129,330	2,688,880	5,985,958	672,220	1,223,064	1,895,284
2007	623,728	1,291,247	1,914,975	2,198,222	1,145,206	2,726,679	6,070,107	681,671	1,240,257	1,921,928
2008	647,091	1,322,240	1,969,331	2,248,610	1,171,457	2,789,182	6,209,249	697,295	1,268,688	1,965,983
2009	717,087	1,446,549	2,163,636	2,457,420	1,280,240	3,048,190	6,785,850	762,047	1,386,499	2,148,546
2010	1,105,529	1,809,450	2,914,979	3,070,686	1,599,732	3,808,886	8,479,304	1,072,222	1,732,510	2,684,732
2011	1,216,921	1,993,865	3,210,786	3,380,086	1,760,920	4,192,667	9,333,673	1,048,166	1,907,076	2,955,242
2012	1,270,523	2,083,876	3,354,399	3,528,968	1,838,483	4,377,339	9,744,790	1,094,335	1,991,077	3,085,412
2013	1,344,704	2,207,862	3,552,566	3,735,010	1,945,825	4,632,915	10,313,750	1,158,229	2,107,328	3,265,557
2014	1,276,099	2,097,420	3,373,519	3,544,457	1,846,552	4,396,552	9,787,561	1,099,138	1,999,815	3,098,953
2015	1,736,721	2,857,498	4,594,219	4,823,867	2,513,086	5,983,536	13,320,489	1,495,884	2,721,671	4,217,555
2016	2,075,875	3,415,521	5,491,396	5,765,891	3,003,850	7,152,025	15,921,766	1,788,006	3,253,170	5,041,176
2017	1,999,142	3,289,270	5,288,412	5,552,760	2,892,816	6,887,657	15,333,233	1,721,914	3,132,919	4,854,833
2018	1,999,142	3,289,270	5,288,412	5,552,760	2,892,816	6,887,657	15,333,233	1,721,914	3,132,919	4,854,833
2019	1,999,142	3,289,270	5,288,412	5,552,760	2,892,816	6,887,657	15,333,233	1,721,914	3,132,919	4,854,833
2020	1,999,142	3,289,270	5,288,412	5,552,760	2,892,816	6,887,657	15,333,233	1,721,914	3,132,919	4,854,833
2021	1,999,142	3,289,270	5,288,412	5,552,760	2,892,816	6,887,657	15,333,233	1,721,914	3,132,919	4,854,833
2022	1,999,142	3,289,270	5,288,412	5,552,760	2,892,816	6,887,657	15,333,233	1,721,914	3,132,919	4,854,833
2023	1,999,142	3,289,270	5,288,412	5,552,760	2,892,816	6,887,657	15,333,233	1,721,914	3,132,919	4,854,833
2024	1,999,142	3,289,270	5,288,412	5,552,760	2,892,816	6,887,657	15,333,233	1,721,914	3,132,919	4,854,833
2025	1,999,142	3,289,270	5,288,412	5,552,760	2,892,816	6,887,657	15,333,233	1,721,914	3,132,919	4,854,833
2026	1,999,142	3,289,270	5,288,412	5,552,760	2,892,816	6,887,657	15,333,233	1,721,914	3,132,919	4,854,833
2027	1,999,142	3,289,270	5,288,412	5,552,760	2,892,816	6,887,657	15,333,233	1,721,914	3,132,919	4,854,833
2028	1,999,142	3,289,270	5,288,412	5,552,760	2,892,816	6,887,657	15,333,233	1,721,914	3,132,919	4,854,833
2029	1,999,142	3,289,270	5,288,412	5,552,760	2,892,816	6,887,657	15,333,233	1,721,914	3,132,919	4,854,833
2030	1,999,142	3,289,270	5,288,412	5,552,760	2,892,816	6,887,657	15,333,233	1,721,914	3,132,919	4,854,833
2031	1,999,142	3,289,270	5,288,412	5,552,760	2,892,816	6,887,657	15,333,233	1,721,914	3,132,919	4,854,833
2032	1,999,142	3,289,270	5,288,412	5,552,760	2,892,816	6,887,657	15,333,233	1,721,914	3,132,919	4,854,833
2033	1,999,142	3,289,270	5,288,412	5,552,760	2,892,816	6,887,657	15,333,233	1,721,914	3,132,919	4,854,833
2034	1,999,142	3,289,270	5,288,412	5,552,760	2,892,816	6,887,657	15,333,233	1,721,914	3,132,919	4,854,833
2035	1,999,142	3,289,270	5,288,412	5,552,760	2,892,816	6,887,657	15,333,233	1,721,914	3,132,919	4,854,833
TOTAL	55,862,543	98,142,241	154,004,784	167,658,364	95,354,612	233,454,887	496,467,863	53,733,657	98,383,933	152,117,590

TABLE B-21 Total Delta Water Charge for Each Contractor (in dollars)

Sheet 2 of 4

Calendar Year	SAN JOAQUIN VALLEY AREA								
	Dudley Ridge	Empire	Future Contractor San Joaquin Valley	Kern		Kings	Oak Flat	Tulare	Total
				Municipal and Industrial	Agricultural				
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]
1964	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0
1968	40,695	10,469	0	0	165,522	3,177	8,073	98,608	326,544
1969	61,267	3,281	0	0	337,686	4,200	8,805	102,478	517,717
1970	104,405	19,950	0	0	964,915	8,645	17,290	228,095	1,343,300
1971	129,596	21,720	0	0	1,377,772	9,412	20,272	264,260	1,823,032
1972	160,756	24,113	0	0	2,175,835	11,253	43,131	905,057	3,320,145
1973	195,541	26,664	0	386,638	2,373,167	13,333	27,553	373,307	3,396,203
1974	224,202	27,909	0	446,545	2,781,595	13,954	29,770	445,138	3,969,113
1975	329,688	27,413	0	481,560	3,041,048	14,620	33,702	827,591	4,755,622
1976	414,245	29,388	0	549,549	3,931,785	15,673	35,966	877,151	5,853,757
1977	312,532	28,195	0	569,545	4,071,218	15,977	40,289	626,210	5,663,966
1978	342,208	31,588	0	674,939	4,950,959	20,006	41,065	666,516	6,727,281
1979	395,523	34,294	0	772,757	5,901,986	22,863	45,725	771,613	7,944,761
1980	555,341	37,679	0	881,371	6,984,026	27,272	70,658	933,481	9,489,828
1981	740,789	54,204	0	1,351,487	11,140,730	41,556	77,692	1,373,168	14,779,626
1982	782,396	57,248	0	1,518,993	12,703,436	47,707	85,873	1,530,443	16,726,096
1983	543,462	38,004	0	1,057,789	9,141,315	35,471	58,273	78,506	10,952,820
1984	580,379	13,572	0	1,333,200	9,741,623	39,893	61,770	756,132	12,526,569
1985	667,740	42,441	0	1,540,611	11,403,920	48,100	69,320	644,383	14,416,515
1986	745,447	45,362	0	1,714,679	12,925,113	55,946	77,115	1,469,725	17,033,387
1987	762,180	44,485	0	1,766,065	13,410,817	59,314	77,108	1,503,601	17,623,570
1988	827,669	46,411	0	1,916,790	14,707,763	61,882	83,540	1,633,680	19,277,735
1989	921,621	49,728	0	2,125,033	16,312,361	66,304	92,825	1,821,693	21,389,565
1990	964,288	50,136	0	1,998,766	17,276,959	66,848	95,259	1,980,383	22,432,639
1991	1,023,374	53,208	0	2,121,239	18,335,590	70,944	101,096	2,101,729	23,807,180
1992	1,169,299	60,795	0	2,727,688	20,646,125	81,061	115,511	2,401,419	27,201,898
1993	1,172,060	60,939	0	2,734,129	20,694,874	81,252	115,784	2,407,089	27,266,127
1994	1,123,198	58,398	0	2,156,809	20,295,455	77,865	110,957	2,306,739	26,129,421
1995	1,202,009	62,497	0	2,803,995	21,223,694	83,328	118,743	2,468,598	27,962,864
1996	534,818	69,191	0	2,756,635	19,492,814	81,921	102,219	2,426,904	25,464,502
1997	1,208,521	67,162	0	3,047,908	22,148,973	90,576	129,072	2,683,338	29,375,550
1998	1,216,671	77,807	0	2,726,511	22,070,376	91,188	129,942	2,820,148	29,132,643
1999	1,258,233	69,974	0	2,819,648	22,824,299	94,303	134,381	2,793,715	29,994,553
2000	1,278,056	70,943	0	3,223,279	21,220,235	95,788	136,498	2,837,730	28,862,529
2001	1,278,336	71,058	0	2,864,700	21,110,372	95,809	136,528	2,838,352	28,395,155
2002	1,393,975	72,121	0	3,272,056	21,060,431	97,237	138,564	2,711,156	28,745,540
2003	1,364,640	70,550	0	3,203,191	20,617,243	95,192	135,648	2,654,103	28,140,567
2004	1,494,892	77,810	0	3,508,929	22,585,122	104,277	148,595	2,897,005	30,816,630
2005	1,480,284	77,153	0	3,474,640	22,307,136	232,331	147,143	2,739,621	30,458,308
2006	1,541,884	80,380	0	3,619,232	23,235,418	242,000	153,266	2,587,428	31,459,608
2007	1,563,559	81,479	0	3,670,110	23,562,051	253,717	155,421	2,615,486	31,901,823
2008	1,599,401	83,191	0	3,754,239	24,102,160	259,533	158,984	2,675,439	32,632,947
2009	1,747,923	90,846	0	4,102,863	26,340,321	283,634	173,747	2,923,885	35,663,219
2010	1,917,507	113,466	0	5,126,760	32,304,300	354,417	217,107	3,386,937	43,420,494
2011	2,110,714	123,965	0	5,643,329	35,559,263	390,127	238,982	3,728,203	47,794,583
2012	2,203,684	129,358	0	5,891,899	37,125,531	407,312	249,508	3,892,417	49,899,709
2013	2,332,348	136,898	0	6,235,904	39,293,142	431,093	264,076	4,119,681	52,813,142
2014	2,125,733	129,639	0	5,917,760	37,288,481	409,099	250,603	3,845,708	49,967,023
2015	2,713,534	176,957	0	8,053,840	50,748,164	556,768	341,062	5,233,858	67,824,183
2016	3,243,443	211,761	0	9,626,626	60,658,473	665,496	407,666	6,255,949	81,069,414
2017	3,123,553	203,580	0	9,270,786	58,416,281	640,896	392,596	6,024,702	78,072,394
2018	3,123,553	203,580	0	9,270,786	58,416,281	640,896	392,596	6,024,702	78,072,394
2019	3,123,553	203,580	0	9,270,786	58,416,281	640,896	392,596	6,024,702	78,072,394
2020	2,848,046	203,580	0	9,270,786	58,416,281	640,896	392,596	6,024,702	77,796,887
2021	2,848,046	203,580	0	9,270,786	58,416,281	640,896	392,596	6,024,702	77,796,887
2022	2,848,046	203,580	0	9,270,786	58,416,281	640,896	392,596	6,024,702	77,796,887
2023	2,848,046	203,580	0	9,270,786	58,416,281	640,896	392,596	6,024,702	77,796,887
2024	2,848,046	203,580	0	9,270,786	58,416,281	640,896	392,596	6,024,702	77,796,887
2025	2,848,046	203,580	0	9,270,786	58,416,281	640,896	392,596	6,024,702	77,796,887
2026	2,848,046	203,580	0	9,270,786	58,416,281	640,896	392,596	6,024,702	77,796,887
2027	2,848,046	203,580	0	9,270,786	58,416,281	640,896	392,596	6,024,702	77,796,887
2028	2,848,046	203,580	0	9,270,786	58,416,281	640,896	392,596	6,024,702	77,796,887
2029	2,848,046	203,580	0	9,270,786	58,416,281	640,896	392,596	6,024,702	77,796,887
2030	2,848,046	203,580	0	9,270,786	58,416,281	640,896	392,596	6,024,702	77,796,887
2031	2,848,046	203,580	0	9,270,786	58,416,281	640,896	392,596	6,024,702	77,796,887
2032	2,848,046	203,580	0	9,270,786	58,416,281	640,896	392,596	6,024,702	77,796,887
2033	2,848,046	203,580	0	9,270,786	58,416,281	640,896	392,596	6,024,702	77,796,887
2034	2,848,046	203,580	0	9,270,786	58,416,281	640,896	392,596	6,024,702	77,796,887
2035	2,848,046	203,580	0	9,270,786	58,416,281	640,896	392,596	6,024,702	77,796,887
TOTAL	107,039,461	7,009,820	0	302,315,170	1,984,580,933	18,606,698	13,171,501	214,733,194	2,647,456,777

TABLE B-21 Total Delta Water Charge for Each Contractor (in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA									
	AVEK	Castaic	Coachella	Crestline	Desert	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel
	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0
1968	0	13,060	0	0	0	0	0	0	0	0
1969	0	17,804	0	0	0	0	0	0	0	0
1970	0	37,905	0	0	0	0	0	0	0	0
1971	0	48,508	0	0	0	0	0	0	0	0
1972	160,756	74,751	41,797	4,662	64,303	1,367	67,518	13,021	369,739	85,202
1973	222,207	107,163	51,552	7,279	79,994	2,577	95,104	26,131	54,908	14,338
1974	279,090	143,266	59,539	10,791	93,030	3,721	121,869	39,631	465,150	114,427
1975	319,822	166,307	63,964	13,250	100,515	4,752	140,722	50,989	479,733	119,705
1976	431,018	207,673	74,449	17,045	117,550	6,269	174,366	67,591	538,772	137,142
1977	469,922	226,502	79,144	19,079	122,180	6,861	189,848	77,255	540,410	139,097
1978	600,180	274,819	97,313	24,428	147,413	9,687	236,913	98,345	631,768	165,313
1979	720,173	320,077	115,033	29,836	171,470	11,889	284,640	117,285	714,457	189,760
1980	857,818	376,845	134,920	35,949	210,736	14,256	337,177	138,590	811,952	215,694
1981	1,355,100	592,631	218,713	57,637	343,292	22,946	534,813	211,396	1,237,658	330,644
1982	1,551,434	664,082	254,298	66,408	400,739	26,335	313,057	235,100	1,341,923	364,482
1983	1,110,994	472,521	184,283	47,759	291,367	19,002	434,517	163,925	943,775	252,096
1984	450,405	509,602	202,914	52,247	321,718	20,719	472,282	174,500	1,003,760	266,383
1985	565,881	591,346	240,344	61,540	381,970	24,474	551,734	200,605	1,152,983	308,405
1986	635,066	659,259	275,347	70,160	438,498	27,822	625,994	223,785	1,285,253	350,799
1987	652,450	676,176	288,131	73,104	467,095	29,064	648,002	228,654	1,319,729	364,779
1988	711,641	742,582	319,496	80,756	525,996	32,024	711,641	248,146	1,438,752	402,232
1989	2,083,593	830,453	362,565	91,333	605,021	36,301	803,932	276,155	1,607,864	454,180
1990	2,207,667	869,029	386,049	96,930	636,731	38,438	848,974	289,119	1,696,277	481,308
1991	2,454,678	961,298	409,704	102,869	675,746	40,793	900,994	306,835	1,819,725	510,800
1992	2,804,695	1,098,371	468,125	117,538	772,102	46,610	1,029,469	350,587	2,079,203	583,636
1993	2,811,318	1,100,964	469,230	117,815	773,925	46,720	1,031,900	351,415	2,084,113	585,014
1994	2,694,116	1,055,065	449,668	112,905	741,661	44,772	988,880	336,766	1,997,227	560,625
1995	2,883,156	1,129,097	481,220	120,826	793,702	47,914	1,058,269	360,394	2,137,369	599,963
1996	2,834,460	1,110,027	473,093	118,785	780,296	47,104	1,040,394	354,307	2,101,269	589,830
1997	3,133,957	1,227,316	523,081	131,336	862,744	52,082	1,150,325	391,745	2,323,295	652,153
1998	3,155,093	1,235,593	526,609	132,222	868,562	52,433	1,728,006	394,387	2,338,963	656,551
1999	3,262,870	1,277,800	544,598	136,739	898,233	54,224	1,787,034	407,859	2,418,863	678,979
2000	3,314,278	2,279,763	553,178	138,893	912,384	55,078	1,815,190	510,073	2,456,972	689,676
2001	3,315,004	2,280,263	553,299	138,924	912,584	55,090	1,815,587	510,185	2,457,510	689,827
2002	3,437,351	2,314,256	561,548	140,995	926,188	55,912	1,842,654	517,791	2,494,146	700,112
2003	3,365,016	2,265,555	549,731	138,028	906,698	54,735	1,803,877	506,894	2,441,659	685,379
2004	3,686,201	2,481,798	602,201	151,202	993,241	59,960	1,976,053	555,277	2,674,711	750,797
2005	3,650,179	2,457,547	596,316	149,725	983,535	59,374	1,956,744	549,850	2,648,574	743,459
2006	3,802,076	2,559,814	3,256,234	155,955	1,344,440	61,844	2,038,171	572,732	2,758,791	774,397
2007	3,855,524	2,595,798	3,302,008	158,148	1,363,339	62,714	2,066,822	580,783	2,797,573	785,284
2008	3,943,904	2,655,301	3,377,700	161,772	1,394,591	64,151	2,114,200	594,096	2,861,701	803,284
2009	4,310,140	2,901,877	3,691,358	176,795	1,524,095	70,109	2,310,528	649,264	3,127,443	877,878
2010	5,385,764	3,626,059	5,269,593	220,916	2,123,453	87,605	3,153,757	811,293	3,907,916	1,096,959
2011	5,928,431	3,991,418	5,800,554	243,174	2,337,412	96,432	3,471,528	893,038	4,301,676	1,207,488
2012	6,189,558	4,167,227	6,056,050	253,886	2,440,367	100,679	3,624,437	932,373	4,491,150	1,260,674
2013	6,550,942	4,410,535	6,409,638	268,709	2,582,850	106,557	3,836,054	986,811	4,753,371	1,334,279
2014	6,368,143	4,185,518	6,082,630	255,000	2,451,078	101,120	3,640,346	936,466	4,510,863	1,266,208
2015	8,666,793	5,696,327	8,278,222	347,045	3,335,822	137,621	5,133,874	1,274,493	6,139,108	1,723,258
2016	10,359,280	6,808,728	9,894,827	414,817	3,987,255	164,497	6,136,437	1,523,381	7,337,978	2,059,784
2017	9,976,357	6,557,049	9,529,073	399,484	3,839,869	158,416	5,909,610	1,467,071	7,066,735	1,983,645
2018	9,976,357	6,557,049	9,529,073	399,484	3,839,869	158,416	5,909,610	1,467,071	7,066,735	1,983,645
2019	9,976,357	6,557,049	9,529,073	399,484	3,839,869	158,416	5,909,610	1,467,071	7,066,735	1,983,645
2020	9,976,357	6,557,049	9,529,073	399,484	3,839,869	158,416	6,185,116	1,467,071	7,066,735	1,983,645
2021	9,976,357	6,557,049	9,529,073	399,484	3,839,869	158,416	6,185,116	1,467,071	7,066,735	1,983,645
2022	9,976,357	6,557,049	9,529,073	399,484	3,839,869	158,416	6,185,116	1,467,071	7,066,735	1,983,645
2023	9,976,357	6,557,049	9,529,073	399,484	3,839,869	158,416	6,185,116	1,467,071	7,066,735	1,983,645
2024	9,976,357	6,557,049	9,529,073	399,484	3,839,869	158,416	6,185,116	1,467,071	7,066,735	1,983,645
2025	9,976,357	6,557,049	9,529,073	399,484	3,839,869	158,416	6,185,116	1,467,071	7,066,735	1,983,645
2026	9,976,357	6,557,049	9,529,073	399,484	3,839,869	158,416	6,185,116	1,467,071	7,066,735	1,983,645
2027	9,976,357	6,557,049	9,529,073	399,484	3,839,869	158,416	6,185,116	1,467,071	7,066,735	1,983,645
2028	9,976,357	6,557,049	9,529,073	399,484	3,839,869	158,416	6,185,116	1,467,071	7,066,735	1,983,645
2029	9,976,357	6,557,049	9,529,073	399,484	3,839,869	158,416	6,185,116	1,467,071	7,066,735	1,983,645
2030	9,976,357	6,557,049	9,529,073	399,484	3,839,869	158,416	6,185,116	1,467,071	7,066,735	1,983,645
2031	9,976,357	6,557,049	9,529,073	399,484	3,839,869	158,416	6,185,116	1,467,071	7,066,735	1,983,645
2032	9,976,357	6,557,049	9,529,073	399,484	3,839,869	158,416	6,185,116	1,467,071	7,066,735	1,983,645
2033	9,976,357	6,557,049	9,529,073	399,484	3,839,869	158,416	6,185,116	1,467,071	7,066,735	1,983,645
2034	9,976,357	6,557,049	9,529,073	399,484	3,839,869	158,416	6,185,116	1,467,071	7,066,735	1,983,645
2035	9,976,357	6,557,049	9,529,073	399,484	3,839,869	158,416	6,185,116	1,467,071	7,066,735	1,983,645
TOTAL	317,098,927	201,079,607	253,682,653	13,055,408	116,163,432	5,174,538	183,735,319	46,913,667	233,363,997	65,311,535



TABLE B-21 Total Delta Water Charge for Each Contractor (in dollars)

Sheet 4 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA				South Bay Area Future Contractor	Grand Total
	San Geronio	Metropolitan	Ventura	Total	Yuba City	Butte	Plumas	Total		
	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	241,150
1968	0	0	0	13,060	0	1,050	875	1,925	0	583,631
1969	0	0	0	17,804	0	1,225	929	2,154	0	827,578
1970	0	0	0	37,905	0	3,848	1,995	5,843	0	2,160,886
1971	0	0	0	48,508	0	4,546	3,186	7,732	0	2,696,792
1972	0	2,043,211	0	2,926,327	0	4,929	3,778	8,707	0	7,206,052
1973	0	2,317,893	0	2,979,146	0	7,059	4,444	11,503	0	7,456,998
1974	0	4,231,933	0	5,562,447	0	8,336	4,931	13,267	0	10,683,514
1975	0	5,073,286	0	6,533,045	0	9,416	5,117	14,533	0	12,440,851
1976	0	6,422,167	0	8,194,042	0	7,004	5,780	12,784	0	15,299,760
1977	0	7,104,278	0	8,974,576	0	16,917	5,827	22,744	0	15,869,924
1978	0	9,016,389	0	11,302,568	0	12,635	6,844	19,479	0	19,425,531
1979	0	10,935,192	0	13,609,812	0	16,575	7,773	24,348	0	23,095,855
1980	84,294	13,102,796	12,396	16,333,423	0	19,834	8,801	28,635	0	27,557,096
1981	140,930	20,910,099	36,136	25,991,995	0	21,682	13,370	35,052	0	43,335,911
1982	167,929	23,998,560	57,248	29,441,595	0	16,117	14,694	30,811	0	49,027,703
1983	124,148	17,203,307	50,672	21,298,366	0	15,202	10,134	25,336	0	34,186,736
1984	138,982	18,766,458	64,344	22,444,314	20,590	15,442	10,681	46,713	0	37,051,405
1985	166,935	22,050,974	84,882	26,382,073	24,050	16,976	12,166	53,192	0	43,235,458
1986	195,056	25,089,658	120,965	29,997,662	31,753	18,145	13,457	63,355	0	49,817,447
1987	207,598	26,095,043	148,284	31,198,109	37,071	17,794	13,642	68,507	0	51,663,899
1988	233,604	28,781,238	201,116	34,429,224	46,722	18,565	14,852	80,139	0	57,062,086
1989	268,530	32,505,376	265,215	40,190,518	61,184	19,891	16,576	97,651	0	65,617,116
1990	289,119	33,616,369	334,242	41,790,252	63,506	20,055	17,381	100,942	0	68,658,631
1991	306,835	35,676,185	354,722	44,521,184	170,267	21,283	19,155	210,705	0	73,265,317
1992	350,587	40,763,329	405,303	50,869,555	194,545	24,318	22,697	241,560	0	83,873,685
1993	351,415	40,859,579	406,260	50,989,668	195,005	24,376	23,563	242,944	0	84,237,281
1994	336,766	39,156,173	389,323	48,863,947	186,875	23,360	23,360	233,595	0	80,866,329
1995	360,394	41,903,674	416,641	52,292,619	199,987	24,999	26,040	251,026	0	86,725,209
1996	0	41,195,923	409,604	51,055,092	196,610	24,576	26,624	247,810	0	83,007,946
1997	0	45,548,810	447,746	56,444,590	214,918	27,173	30,223	272,314	0	93,062,361
1998	0	45,855,992	450,529	57,394,940	107,459	27,356	31,537	166,352	0	93,159,618
1999	47,152	47,422,430	466,491	59,403,272	226,327	28,291	33,820	288,438	0	96,994,387
2000	71,841	48,169,576	478,942	61,445,844	229,892	69,207	35,708	334,807	0	98,699,723
2001	95,809	48,180,135	479,047	61,483,264	229,942	83,833	37,187	350,962	0	98,781,493
2002	97,237	48,898,394	486,188	62,472,772	233,371	85,083	39,185	357,639	0	100,275,854
2003	118,989	47,869,376	475,957	61,181,894	228,460	83,293	39,743	351,496	0	98,210,650
2004	156,416	52,438,419	521,386	67,047,662	250,266	92,048	0	342,314	0	107,579,616
2005	167,795	51,925,988	516,291	66,405,377	247,820	717,290	0	965,110	0	107,188,794
2006	188,222	51,397,939	537,776	69,448,391	258,133	32,606	8,699	299,438	0	110,967,023
2007	204,501	52,120,469	545,336	70,438,299	268,738	33,950	19,600	322,288	0	112,569,420
2008	482,528	53,315,217	557,837	72,326,282	274,736	794,785	56,138	1,125,659	0	116,229,451
2009	527,337	58,266,144	609,638	79,042,606	292,626	844,842	63,417	1,200,885	0	127,004,742
2010	658,937	72,806,845	761,778	99,910,875	365,653	1,054,033	81,825	1,501,511	0	158,911,895
2011	725,331	80,142,822	838,533	109,977,837	414,001	1,185,940	92,561	1,692,502	0	174,964,623
2012	757,280	83,672,846	875,468	114,821,995	424,826	1,216,951	100,037	1,741,814	0	182,648,119
2013	801,494	88,558,170	926,583	121,525,993	444,760	1,274,052	109,975	1,828,787	0	193,299,795
2014	760,603	84,040,101	879,310	115,477,386	431,273	1,235,416	108,033	1,774,722	0	183,479,164
2015	1,035,151	114,375,290	1,196,707	157,339,711	574,420	1,645,472	153,363	2,373,255	0	249,669,412
2016	1,237,301	136,710,965	1,430,405	188,065,655	686,595	1,966,807	190,584	2,843,986	0	298,433,393
2017	1,191,565	131,657,554	1,377,531	181,113,959	703,970	2,016,581	183,222	2,903,773	0	287,566,604
2018	1,191,565	131,657,554	1,377,531	181,113,959	703,970	2,016,581	183,222	2,903,773	0	287,566,603
2019	1,191,565	131,657,554	1,377,531	181,113,959	703,970	2,016,581	183,222	2,903,773	0	287,566,603
2020	1,191,565	131,657,554	1,377,531	181,389,465	703,970	2,016,581	183,222	2,903,773	0	287,566,603
2021	1,191,565	131,657,554	1,377,531	181,389,465	703,970	2,016,581	183,222	2,903,773	0	287,566,603
2022	1,191,565	131,657,554	1,377,531	181,389,465	703,970	2,016,581	183,222	2,903,773	0	287,566,603
2023	1,191,565	131,657,554	1,377,531	181,389,465	703,970	2,016,581	183,222	2,903,773	0	287,566,603
2024	1,191,565	131,657,554	1,377,531	181,389,465	703,970	2,016,581	183,222	2,903,773	0	287,566,603
2025	1,191,565	131,657,554	1,377,531	181,389,465	703,970	2,016,581	183,222	2,903,773	0	287,566,603
2026	1,191,565	131,657,554	1,377,531	181,389,465	703,970	2,016,581	183,222	2,903,773	0	287,566,603
2027	1,191,565	131,657,554	1,377,531	181,389,465	703,970	2,016,581	183,222	2,903,773	0	287,566,603
2028	1,191,565	131,657,554	1,377,531	181,389,465	703,970	2,016,581	183,222	2,903,773	0	287,566,603
2029	1,191,565	131,657,554	1,377,531	181,389,465	703,970	2,016,581	183,222	2,903,773	0	287,566,603
2030	1,191,565	131,657,554	1,377,531	181,389,465	703,970	2,016,581	183,222	2,903,773	0	287,566,603
2031	1,191,565	131,657,554	1,377,531	181,389,465	703,970	2,016,581	183,222	2,903,773	0	287,566,603
2032	1,191,565	131,657,554	1,377,531	181,389,465	703,970	2,016,581	183,222	2,903,773	0	287,566,603
2033	1,191,565	131,657,554	1,377,531	181,389,465	703,970	2,016,581	183,222	2,903,773	0	287,566,603
2034	1,191,565	131,657,554	1,377,531	181,389,465	703,970	2,016,581	183,222	2,903,773	0	287,566,603
2035	1,191,565	131,657,554	1,377,531	181,389,465	703,970	2,016,581	183,222	2,903,773	0	287,566,603
TOTAL	34,496,781	4,362,028,544	43,412,390	5,875,516,798	21,207,811	51,249,622	5,051,525	77,508,958	0	9,403,072,770

TABLE B-22 Water System Revenue Bond Surcharge for Each Contractor<sup>a</sup> (in dollars)

Sheet 1 of 4

Calendar Year	NORTH BAY AREA			SOUTH BAY AREA				CENTRAL COASTAL AREA		
	Napa	Solano	Total	Alameda-Zone 7	Alameda County	Santa Clara	Total	San Luis Obispo	Santa Barbara	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1971	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0
1988	29,131	40,505	69,636	25,436	30,176	100,035	155,647	13,126	24,392	37,518
1989	48,804	69,621	118,425	43,343	51,681	170,303	265,327	26,828	49,634	76,462
1990	41,166	60,482	101,648	38,407	51,185	149,440	239,032	27,956	51,795	79,751
1991	63,389	92,401	155,790	62,470	81,991	235,712	380,173	44,887	83,709	128,596
1992	84,320	126,227	210,547	89,247	115,208	325,629	530,084	61,137	113,925	175,062
1993	90,152	137,473	227,625	98,432	125,174	347,457	571,063	67,725	126,662	194,387
1994	91,785	141,222	233,007	102,021	126,216	352,415	580,652	81,420	159,156	240,576
1995	108,311	181,787	290,098	126,001	149,377	416,956	692,334	131,675	270,726	402,401
1996	132,305	232,343	364,648	158,514	180,787	505,042	844,343	242,654	534,449	777,103
1997	135,556	237,492	373,048	171,263	187,162	522,127	880,552	141,810	846,617	988,427
1998	130,346	228,366	358,712	164,682	179,971	502,065	846,718	136,361	814,087	950,448
1999	182,507	316,416	498,923	227,072	248,031	691,830	1,166,933	188,835	1,124,110	1,312,945
2000	238,571	364,418	602,989	260,766	284,875	794,730	1,340,371	218,359	1,364,019	1,582,378
2001	234,773	358,616	593,389	561,965	280,341	782,078	1,624,384	214,883	1,342,304	1,557,187
2002	257,520	391,851	649,371	610,230	288,977	806,174	1,705,381	221,503	1,383,661	1,605,164
2003	268,151	408,027	676,178	635,422	300,907	839,455	1,775,784	230,647	1,440,782	1,671,429
2004	268,425	408,444	676,869	636,070	301,214	840,312	1,777,596	230,883	1,442,252	1,673,135
2005	253,413	385,602	639,015	610,756	284,369	793,318	1,688,443	217,970	1,361,594	1,579,564
2006	274,219	417,261	691,480	660,900	307,716	858,451	1,827,067	235,866	1,473,385	1,709,251
2007	177,891	270,066	447,957	441,730	197,505	550,975	1,190,210	152,478	975,872	1,128,350
2008	254,590	386,862	641,452	773,686	288,283	803,089	1,865,058	223,659	1,369,892	1,593,551
2009	285,324	434,158	719,482	687,665	320,178	893,215	1,901,058	245,418	1,533,052	1,778,470
2010	273,015	415,428	688,443	657,998	306,365	854,681	1,819,044	234,831	1,466,914	1,701,745
2011	294,866	448,677	743,543	710,662	330,884	923,085	1,964,631	253,625	1,584,318	1,837,943
2012	383,092	455,983	839,075	753,264	330,355	933,048	2,016,667	229,311	1,456,050	1,685,361
2013	416,223	495,679	911,902	820,192	360,039	1,013,496	2,193,727	249,613	1,583,700	1,833,313
2014	454,438	541,511	995,949	894,353	392,064	1,103,675	2,390,092	271,760	1,722,805	1,994,565
2015	436,482	520,709	957,191	854,027	375,378	1,053,325	2,282,730	260,767	1,649,215	1,909,982
2016	785,679	940,036	1,725,715	1,537,135	675,549	1,890,817	4,103,501	469,895	2,967,716	3,437,611
2017	825,082	988,823	1,813,905	1,735,420	711,139	1,988,098	4,434,657	494,547	3,122,046	3,616,593
2018	838,436	1,004,827	1,843,263	1,763,508	722,649	2,020,276	4,506,433	502,551	3,172,578	3,675,129
2019	917,602	1,099,704	2,017,306	1,930,020	790,882	2,211,032	4,931,934	550,003	3,472,134	4,022,137
2020	886,730	1,062,706	1,949,436	1,865,087	764,274	2,136,644	4,766,005	531,498	3,355,318	3,886,816
2021	887,015	1,063,047	1,950,062	1,865,685	764,519	2,137,330	4,767,534	531,669	3,356,395	3,888,064
2022	857,192	1,027,305	1,884,497	1,802,957	738,814	2,065,469	4,607,240	513,793	3,243,546	3,757,339
2023	866,635	1,038,623	1,905,258	1,822,820	746,954	2,088,224	4,657,998	519,454	3,279,280	3,798,734
2024	845,721	1,013,558	1,859,279	1,778,831	728,928	2,037,829	4,545,588	506,918	3,200,143	3,707,061
2025	800,892	959,833	1,760,725	1,684,541	690,290	1,929,811	4,304,642	480,048	3,030,515	3,510,563
2026	758,624	909,176	1,667,800	1,595,637	653,859	1,827,962	4,077,458	454,713	2,870,574	3,325,287
2027	805,047	964,812	1,769,859	1,693,280	693,871	1,939,823	4,326,974	482,538	3,046,236	3,528,774
2028	683,762	819,457	1,503,219	1,438,177	589,335	1,647,576	3,675,088	409,841	2,587,301	2,997,142
2029	716,316	858,472	1,574,788	1,506,649	617,393	1,726,018	3,850,060	429,354	2,710,484	3,139,838
2030	518,342	621,209	1,139,551	1,090,244	446,759	1,248,984	2,785,987	310,690	1,961,366	2,272,056
2031	518,648	621,575	1,140,223	1,090,887	447,023	1,249,721	2,787,631	310,873	1,962,522	2,273,395
2032	518,720	621,662	1,140,382	1,091,039	447,085	1,249,895	2,788,019	310,916	1,962,796	2,273,712
2033	518,742	621,688	1,140,430	1,091,085	447,104	1,249,948	2,788,137	310,929	1,962,878	2,273,807
2034	518,710	621,650	1,140,360	1,091,019	447,077	1,249,871	2,787,967	310,910	1,962,758	2,273,668
2035	518,639	621,565	1,140,204	1,090,869	447,016	1,249,700	2,787,585	310,868	1,962,490	2,273,358
<b>TOTAL</b>	<b>20,495,299</b>	<b>26,047,355</b>	<b>46,542,654</b>	<b>42,441,464</b>	<b>19,046,929</b>	<b>53,307,146</b>	<b>114,795,539</b>	<b>13,597,995</b>	<b>82,538,153</b>	<b>96,136,148</b>

<sup>a</sup> 1988 through 2015 charges are debt service only and do not include bond cover; 2016 charges and after include bond cover.

TABLE B-22 Water System Revenue Bond Surcharge for Each Contractor<sup>a</sup> (in dollars)

Sheet 2 of 4

Calendar Year	SAN JOAQUIN VALLEY AREA								
	Dudley Ridge	Empire	Future Contractor San Joaquin Valley	Kern		Kings	Oak Flat	Tulare	Total
				Municipal and Industrial	Agricultural				
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]
1971	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0
1988	33,986	1,657	0	67,288	726,501	2,228	2,851	66,748	901,259
1989	59,273	2,785	0	116,689	1,251,452	3,733	4,927	116,736	1,555,595
1990	53,349	2,419	0	287,811	947,351	3,248	4,367	109,118	1,407,663
1991	82,252	3,731	0	359,380	1,564,983	5,035	6,771	168,217	2,190,369
1992	112,566	5,127	0	452,691	2,153,423	6,927	9,285	230,217	2,970,236
1993	119,670	5,459	0	272,449	2,491,672	7,381	9,894	244,813	3,151,338
1994	118,265	5,379	0	244,671	2,485,820	7,300	9,766	241,933	3,113,134
1995	139,226	6,340	0	317,885	2,894,181	8,599	11,490	284,798	3,662,519
1996	169,333	7,703	0	354,341	2,722,240	10,461	13,978	346,367	3,624,423
1997	165,364	7,980	0	366,285	2,673,847	10,826	14,465	357,986	3,596,753
1998	159,011	7,672	0	352,211	2,571,110	10,410	13,909	344,232	3,458,555
1999	218,784	10,373	0	485,897	3,371,115	14,376	19,166	476,017	4,595,728
2000	251,339	11,735	0	557,296	3,620,348	16,500	21,990	546,406	5,025,614
2001	247,338	11,547	0	548,424	3,461,158	16,238	21,640	537,707	4,844,052
2002	273,542	11,904	0	565,321	3,496,023	16,737	22,306	521,659	4,907,492
2003	284,834	12,395	0	588,659	3,640,346	17,428	23,227	543,193	5,110,082
2004	285,125	12,408	0	589,259	3,644,059	17,446	23,251	543,748	5,115,296
2005	269,179	11,714	0	556,305	3,431,851	39,485	21,951	488,483	4,818,968
2006	291,279	12,676	0	601,979	3,713,614	42,726	23,753	528,589	5,214,616
2007	187,144	8,113	0	383,463	2,314,841	34,088	15,230	285,915	3,228,794
2008	271,383	11,832	0	563,171	3,478,837	41,080	22,094	445,805	4,834,202
2009	303,076	13,189	0	626,357	3,864,004	46,037	24,715	497,108	5,374,486
2010	257,209	12,620	0	599,335	3,631,924	44,051	23,648	440,950	5,009,737
2011	277,794	13,630	0	647,304	3,922,606	47,577	25,542	476,242	5,410,695
2012	271,192	12,709	0	666,489	5,450,478	40,125	23,964	510,822	6,975,779
2013	286,050	13,814	0	724,170	5,680,875	43,592	26,041	521,112	7,295,654
2014	302,692	15,056	0	790,204	6,189,586	47,573	28,404	561,312	7,934,827
2015	278,438	14,506	0	758,484	5,949,402	45,814	27,366	540,099	7,614,109
2016	503,415	26,336	0	1,371,356	10,760,127	83,031	49,670	977,911	13,771,846
2017	531,373	27,824	0	1,443,220	11,382,800	88,473	52,401	1,042,586	14,568,677
2018	539,973	28,274	0	1,466,579	11,567,035	89,905	53,249	1,059,461	14,804,476
2019	590,958	30,944	0	1,605,054	12,659,202	98,394	58,277	1,159,496	16,202,325
2020	571,076	29,903	0	1,551,054	12,233,297	95,084	56,316	1,120,486	15,657,216
2021	571,259	29,913	0	1,551,552	12,237,224	95,114	56,334	1,120,845	15,662,241
2022	552,052	28,907	0	1,499,386	11,825,784	91,916	54,440	1,083,160	15,135,645
2023	558,134	29,225	0	1,515,904	11,956,067	92,929	55,040	1,095,093	15,302,392
2024	544,665	28,520	0	1,479,321	11,667,535	90,686	53,712	1,068,666	14,933,105
2025	515,794	27,008	0	1,400,908	11,049,082	85,879	50,865	1,012,020	14,141,556
2026	488,572	25,583	0	1,326,973	10,465,948	81,347	48,180	958,609	13,395,212
2027	518,470	27,148	0	1,408,175	11,106,401	86,325	51,129	1,017,270	14,214,918
2028	440,359	23,058	0	1,196,025	9,433,152	73,319	43,426	864,012	12,073,351
2029	461,325	24,156	0	1,252,968	9,882,268	76,810	45,493	905,148	12,648,168
2030	333,825	17,480	0	906,675	7,151,026	55,581	32,920	654,985	9,152,492
2031	334,022	17,490	0	907,210	7,155,243	55,614	32,939	655,371	9,157,889
2032	334,068	17,493	0	907,337	7,156,241	55,622	32,944	655,462	9,159,167
2033	334,082	17,493	0	907,375	7,156,541	55,624	32,945	655,490	9,159,550
2034	334,062	17,492	0	907,319	7,156,104	55,621	32,943	655,450	9,158,991
2035	334,016	17,490	0	907,195	7,155,125	55,613	32,939	655,360	9,157,738
<b>TOTAL</b>	<b>15,160,193</b>	<b>758,210</b>	<b>0</b>	<b>38,955,404</b>	<b>292,499,849</b>	<b>2,209,908</b>	<b>1,422,153</b>	<b>29,393,213</b>	<b>380,398,930</b>

<sup>a</sup> 1988 through 2015 charges are debt service only and do not include bond cover; 2016 charges and after include bond cover.

**TABLE B-22 Water System Revenue Bond Surcharge for Each Contractor<sup>a</sup> (in dollars)**

Calendar Year	SOUTHERN CALIFORNIA AREA									
	AVEK	Castaic Lake	Coachella	Crestline	Desert	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel
	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]
1971	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0
1988	64,266	57,111	27,032	7,656	44,492	2,154	55,996	16,240	151,182	39,907
1989	205,668	98,720	46,993	13,263	78,104	3,763	97,138	27,981	259,860	69,104
1990	185,010	87,808	42,449	11,905	69,970	3,385	87,327	24,956	231,650	61,851
1991	296,854	140,371	65,947	18,548	108,704	5,236	135,623	38,641	363,310	96,172
1992	402,015	234,421	89,358	25,192	147,297	7,053	183,813	52,160	491,537	130,372
1993	424,871	247,076	93,981	26,566	154,919	7,437	193,361	55,045	517,379	137,298
1994	424,023	247,222	94,502	26,865	155,776	7,431	194,191	54,968	525,394	139,422
1995	500,084	290,998	111,730	31,822	184,170	8,769	229,530	64,852	623,848	165,593
1996	606,388	353,132	135,428	38,634	223,237	10,640	278,178	78,696	760,333	201,821
1997	626,151	362,776	139,565	39,802	230,058	10,972	286,779	81,146	808,482	207,472
1998	602,091	348,838	134,202	38,273	221,218	10,550	275,761	78,028	777,418	199,501
1999	826,108	479,470	184,524	52,650	304,166	14,475	642,815	107,060	1,041,566	277,200
2000	940,325	1,150,965	210,453	60,212	346,906	16,486	736,157	121,898	1,191,538	316,860
2001	925,355	1,132,642	207,102	59,254	341,384	16,224	724,438	135,581	1,172,568	311,816
2002	974,814	1,167,539	213,483	61,079	351,902	16,724	746,758	139,071	1,208,696	321,423
2003	1,015,056	1,215,738	222,296	63,601	366,429	17,415	777,586	144,812	1,258,593	334,692
2004	1,016,092	1,216,978	222,523	63,666	366,803	17,432	778,379	144,960	1,259,877	335,033
2005	959,268	1,148,920	210,078	60,105	346,290	16,457	734,849	136,853	1,189,420	316,297
2006	1,038,026	1,243,248	1,213,645	65,040	501,286	17,809	795,182	148,089	1,287,074	342,266
2007	666,215	820,799	1,036,396	41,723	354,543	11,413	520,847	95,550	825,932	219,727
2008	999,433	1,167,531	1,157,440	61,924	478,719	17,175	757,686	144,009	1,367,672	325,069
2009	1,080,062	1,293,596	1,262,793	67,674	521,586	18,529	827,383	154,087	1,339,196	356,126
2010	1,033,467	1,237,788	1,283,384	64,754	524,108	17,731	824,481	147,438	1,281,421	340,762
2011	1,116,181	1,336,855	1,386,101	69,937	566,054	19,149	890,469	159,239	1,383,979	368,035
2012	1,090,934	915,850	1,073,158	67,263	523,945	18,453	731,452	154,732	1,323,822	351,925
2013	1,186,869	996,745	1,172,413	73,154	570,092	20,052	795,549	168,130	1,438,513	382,372
2014	1,345,233	1,085,473	1,276,763	79,660	621,395	21,838	866,523	183,142	1,568,301	416,868
2015	1,288,246	1,039,717	1,228,651	76,255	595,985	20,924	868,542	175,577	1,500,551	398,955
2016	2,323,705	1,873,178	2,223,587	137,172	1,074,426	37,709	1,565,138	316,644	2,698,764	717,704
2017	<b>2,441,561</b>	<b>1,968,931</b>	<b>2,487,883</b>	<b>144,061</b>	<b>1,130,096</b>	<b>39,617</b>	<b>1,645,505</b>	<b>332,754</b>	<b>2,834,899</b>	<b>753,972</b>
2018	2,481,079	2,000,799	2,528,150	146,393	1,148,387	40,258	1,672,138	338,140	2,880,783	766,175
2019	2,715,344	2,189,716	2,766,860	160,215	1,256,818	44,059	1,830,022	370,067	3,152,788	838,518
2020	2,623,989	2,116,045	2,673,772	154,825	1,214,534	42,577	1,768,453	357,617	3,046,716	810,307
2021	2,624,831	2,116,724	2,674,630	154,875	1,214,924	42,591	1,769,021	357,731	3,047,694	810,567
2022	2,536,579	2,045,556	2,584,704	149,667	1,174,076	41,159	1,709,543	345,704	2,945,225	783,314
2023	2,564,524	2,068,091	2,613,179	151,316	1,187,011	41,612	1,728,377	349,512	2,977,672	791,944
2024	2,502,635	2,018,183	2,550,116	147,665	1,158,365	40,608	1,686,667	341,078	2,905,813	772,832
2025	2,369,980	1,911,206	2,414,944	139,837	1,096,964	38,456	1,597,262	322,998	2,751,786	731,867
2026	2,244,900	1,810,339	2,287,491	132,457	1,039,070	36,426	1,512,964	305,952	2,606,556	693,242
2027	2,382,275	1,921,121	2,427,472	140,563	1,102,655	38,655	1,605,549	324,674	2,766,061	735,664
2028	2,023,370	1,631,692	2,061,758	119,386	936,533	32,831	1,363,663	275,760	2,349,337	624,832
2029	2,119,703	1,709,378	2,159,919	125,070	981,122	34,395	1,428,587	288,889	2,461,190	654,580
2030	1,533,864	1,236,943	1,562,965	90,504	709,961	24,889	1,033,757	209,046	1,780,971	473,668
2031	1,534,768	1,237,673	1,563,886	90,557	710,380	24,903	1,034,367	209,170	1,782,021	473,948
2032	1,534,982	1,237,845	1,564,105	90,570	710,479	24,907	1,034,511	209,199	1,782,270	474,014
2033	1,535,047	1,237,897	1,564,170	90,573	710,509	24,908	1,034,554	209,208	1,782,345	474,034
2034	1,534,953	1,237,821	1,564,075	90,568	710,465	24,906	1,034,491	209,195	1,782,236	474,005
2035	1,534,743	1,237,652	1,563,861	90,555	710,368	24,903	1,034,350	209,166	1,781,992	473,940
<b>TOTAL</b>	<b>65,001,937</b>	<b>55,925,117</b>	<b>58,379,917</b>	<b>3,913,306</b>	<b>29,276,681</b>	<b>1,076,045</b>	<b>44,125,712</b>	<b>8,915,445</b>	<b>77,266,231</b>	<b>20,493,066</b>

<sup>a</sup> 1988 through 2015 charges are debt service only and do not include bond cover; 2016 charges and after include bond cover.

TABLE B-22 Water System Revenue Bond Surcharge for Each Contractor<sup>a</sup> (in dollars)

Sheet 4 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA				South Bay Area Future Contractor	Grand Total
	San Gorgonio	Metropolitan	Ventura	Total	Yuba City	Butte	Plumas	Total		
	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]
1971	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0
1988	24,019	2,642,354	18,118	3,150,527	1,336	552	853	2,741	0	4,317,328
1989	42,040	4,587,641	34,565	5,564,840	0	918	1,454	2,372	0	7,583,021
1990	38,023	4,037,980	34,994	4,917,308	2,535	800	1,283	4,618	0	6,750,020
1991	59,122	6,259,893	54,115	7,642,536	9,945	1,243	2,027	13,215	0	10,510,679
1992	80,131	8,435,312	72,892	10,351,553	13,671	1,710	2,806	18,187	0	14,255,669
1993	84,371	8,885,273	76,858	10,904,435	14,608	1,827	3,026	19,461	0	15,068,309
1994	85,698	8,926,755	76,794	10,959,041	14,409	1,801	3,070	19,280	0	15,145,690
1995	101,792	10,539,430	90,436	12,943,054	16,958	2,119	3,705	22,782	0	18,013,188
1996	124,074	12,810,359	109,783	15,730,703	20,640	2,579	4,620	27,839	0	21,369,059
1997	28,259	13,168,230	112,960	16,102,652	21,382	2,674	4,872	28,928	0	21,970,360
1998	27,174	12,662,268	108,619	15,483,941	20,562	2,571	4,685	27,818	0	21,126,192
1999	53,545	17,454,651	149,123	21,587,353	28,348	3,543	6,765	38,656	0	29,200,538
2000	70,117	19,805,800	168,259	25,135,976	32,271	9,794	7,996	50,061	0	33,737,389
2001	69,001	19,490,499	165,580	24,751,444	31,757	9,638	7,869	49,264	0	33,419,720
2002	71,126	20,091,004	170,682	25,534,301	32,736	9,935	8,112	50,783	0	34,452,492
2003	74,063	20,920,403	177,728	26,588,412	34,087	10,345	8,446	52,878	0	35,874,763
2004	74,138	20,941,743	177,910	26,615,534	34,121	10,356	8,456	52,933	0	35,911,363
2005	69,992	19,770,593	167,960	25,127,082	32,213	9,776	7,983	49,972	0	33,903,044
2006	75,738	20,330,228	181,750	27,239,381	34,858	10,579	8,638	54,075	0	36,735,870
2007	45,192	12,752,863	116,415	17,507,615	22,362	7,007	5,579	34,948	0	23,537,874
2008	250,631	19,303,204	173,561	26,204,054	32,180	9,751	7,973	49,904	0	35,188,221
2009	78,805	21,153,536	189,110	28,342,483	36,270	11,008	8,988	56,266	0	38,172,245
2010	75,405	20,240,944	180,952	27,252,635	34,705	10,532	8,600	53,837	0	36,525,441
2011	81,440	21,860,932	195,434	29,433,805	37,482	11,375	9,289	58,146	0	39,448,763
2012	215,055	22,686,017	191,051	29,343,657	35,313	101,156	12,344	148,813	0	41,009,352
2013	233,662	23,602,562	207,636	30,847,749	38,359	109,882	13,628	161,869	0	43,244,214
2014	254,740	25,718,327	226,122	33,664,385	41,861	119,916	15,370	177,147	0	47,156,965
2015	243,775	24,614,514	216,476	32,268,168	40,374	115,656	15,317	171,347	0	45,203,527
2016	438,500	44,298,522	389,777	58,094,826	73,332	210,067	28,720	312,119	0	81,445,618
2017	460,639	46,536,525	409,305	61,185,748	77,392	221,697	30,266	329,355	0	85,948,935
2018	468,095	47,289,738	415,930	62,176,065	78,645	225,285	30,756	334,686	0	87,340,052
2019	512,292	51,754,865	455,202	68,046,766	86,070	246,557	33,660	366,287	0	95,586,755
2020	495,057	50,013,628	439,887	65,757,407	83,175	238,262	32,527	353,964	0	92,370,844
2021	495,216	50,029,689	440,029	65,778,522	83,201	238,338	32,538	354,077	0	92,400,500
2022	478,566	48,347,582	425,234	63,566,909	80,404	230,325	31,444	342,173	0	89,293,803
2023	483,838	48,880,225	429,919	64,267,220	81,290	232,862	31,790	345,942	0	90,277,544
2024	472,162	47,700,612	419,544	62,716,280	79,328	227,243	31,023	337,594	0	88,098,907
2025	447,134	45,172,179	397,305	59,391,918	75,123	215,197	29,379	319,699	0	83,429,103
2026	423,536	42,788,138	376,337	56,257,408	71,158	203,840	27,828	302,826	0	79,025,991
2027	449,454	45,406,514	399,366	59,700,023	75,513	216,314	29,531	321,358	0	83,861,906
2028	381,741	38,565,743	339,199	50,705,845	64,136	183,725	25,082	272,943	0	71,227,588
2029	399,915	40,401,867	355,349	53,119,964	67,190	192,472	26,276	285,938	0	74,618,756
2030	289,388	29,235,680	257,138	38,438,774	48,620	139,277	19,014	206,911	0	53,995,771
2031	289,558	29,252,920	257,290	38,461,441	48,649	139,359	19,025	207,033	0	54,027,612
2032	289,599	29,257,000	257,326	38,466,807	48,655	139,378	19,028	207,061	0	54,035,148
2033	289,611	29,258,229	257,336	38,468,421	48,658	139,384	19,029	207,071	0	54,037,416
2034	289,593	29,256,438	257,321	38,466,067	48,655	139,376	19,028	207,059	0	54,034,112
2035	289,554	29,252,441	257,285	38,460,810	48,648	139,357	19,025	207,030	0	54,026,725
<b>TOTAL</b>	<b>10,874,576</b>	<b>1,266,391,850</b>	<b>11,081,962</b>	<b>1,652,721,845</b>	<b>2,083,185</b>	<b>4,507,358</b>	<b>728,723</b>	<b>7,319,266</b>	<b>0</b>	<b>2,297,914,382</b>

<sup>a</sup> 1988 through 2015 charges are debt service only and do not include bond cover; 2016 charges and after include bond cover.



TABLE B-23 Total Transportation and Delta Water Charge for Each Contractor<sup>a</sup> (in dollars)

Sheet 1 of 4

Calendar Year	NORTH BAY AREA			SOUTH BAY AREA				CENTRAL COASTAL AREA		
	Napa	Solano	Total	Alameda-Zone 7	Alameda County	Santa Clara	Total	San Luis	Santa Barbara	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	11,750	43,787	21,132	76,669	0	0	0
1963	0	0	0	199,726	190,272	447,723	837,721	0	0	0
1964	0	0	0	263,282	277,455	621,356	1,162,093	6,696	21,667	28,363
1965	0	0	0	373,816	404,324	1,158,090	1,936,230	13,756	36,029	49,785
1966	18,063	0	18,063	419,468	421,723	1,412,954	2,254,144	26,524	61,349	87,873
1967	41,574	0	41,574	553,115	548,491	1,863,198	2,964,805	56,469	118,263	174,731
1968	128,628	0	128,628	683,100	633,184	2,178,465	3,494,749	115,961	229,807	345,768
1969	254,715	0	254,715	817,914	583,436	2,298,736	3,700,087	185,156	358,861	544,017
1970	277,547	0	277,547	904,314	640,297	2,787,967	4,332,578	200,150	387,675	587,825
1971	227,474	0	227,474	845,923	675,193	2,807,017	4,328,133	202,413	392,912	595,325
1972	224,978	0	224,978	930,204	822,397	3,027,749	4,780,350	209,057	406,589	615,646
1973	221,091	31,366	252,457	916,776	716,492	3,120,787	4,754,054	206,557	402,724	609,281
1974	240,498	32,938	273,437	957,482	746,932	3,325,022	5,029,436	208,545	407,090	615,635
1975	237,459	36,291	273,750	1,016,081	793,055	3,214,046	5,023,182	225,895	439,873	665,768
1976	271,292	40,836	312,127	1,129,238	943,464	3,362,542	5,435,243	228,976	447,299	676,275
1977	293,627	45,096	338,723	1,097,991	922,203	3,303,461	5,323,655	238,699	468,721	707,420
1978	273,870	49,178	323,048	1,186,955	935,818	3,712,581	5,835,354	245,331	484,259	729,590
1979	289,479	53,340	342,819	1,283,690	1,009,566	3,819,533	6,112,790	243,110	483,437	726,547
1980	310,846	86,073	396,919	1,436,829	1,173,798	4,119,071	6,729,698	282,254	540,553	822,807
1981	347,781	112,848	460,629	1,545,547	1,349,125	4,507,566	7,402,238	307,065	596,671	903,736
1982	438,335	141,835	580,171	1,626,046	1,369,536	4,941,393	7,936,975	328,215	682,545	1,010,760
1983	354,787	163,294	518,081	1,496,527	1,260,138	4,910,241	7,666,906	357,218	702,083	1,059,301
1984	467,336	246,698	714,034	1,806,684	1,478,394	6,870,249	10,155,328	409,529	801,057	1,210,586
1985	736,074	386,306	1,122,380	2,304,697	2,225,097	7,796,485	12,326,279	500,696	969,931	1,470,626
1986	1,120,086	714,246	1,834,332	2,173,492	2,014,104	8,193,845	12,381,441	536,751	1,038,031	1,574,782
1987	1,773,801	1,582,227	3,356,028	2,670,186	2,505,662	7,980,255	13,156,103	570,644	1,148,974	1,719,618
1988	2,349,572	2,524,763	4,874,335	2,731,520	2,774,430	7,830,285	13,336,235	673,071	1,439,620	2,112,691
1989	2,548,764	3,701,385	6,250,149	2,715,601	2,515,471	7,578,850	12,809,922	772,570	1,814,759	2,587,329
1990	2,900,024	3,848,934	6,748,958	3,151,030	2,929,775	8,355,392	14,436,197	933,367	2,046,370	2,979,737
1991	2,941,321	4,170,227	7,111,548	2,422,962	2,384,246	6,430,834	11,238,042	979,709	2,366,841	3,346,550
1992	2,797,727	4,144,993	6,942,720	2,897,437	2,927,115	7,656,940	13,481,492	1,118,807	2,526,861	3,645,668
1993	2,855,497	4,172,491	7,027,988	3,754,213	2,977,354	8,849,995	15,581,562	1,185,665	2,726,057	3,911,722
1994	2,987,938	4,225,291	7,213,229	3,791,306	3,586,255	9,613,545	16,991,105	1,335,974	3,518,042	4,854,015
1995	2,961,322	4,405,219	7,366,541	4,039,946	3,313,350	8,393,828	15,747,124	1,647,817	6,195,415	7,843,231
1996	3,045,021	4,898,210	7,943,232	3,647,784	3,178,398	9,228,554	16,054,735	2,592,043	15,232,542	17,824,585
1997	3,028,005	4,734,808	7,762,813	3,874,294	3,145,550	9,338,016	16,357,860	3,002,832	23,737,164	26,739,996
1998	2,936,062	4,588,897	7,524,960	3,481,134	3,201,607	9,077,806	15,760,547	3,254,940	28,393,640	31,648,580
1999	3,162,567	5,081,250	8,243,818	4,200,667	3,688,287	11,423,226	19,312,181	3,809,439	29,668,071	33,477,511
2000	3,462,393	5,621,720	9,084,113	5,810,679	3,595,423	10,222,502	19,628,603	3,764,366	30,292,112	34,056,478
2001	4,083,124	6,375,658	10,458,782	9,849,531	4,095,655	11,662,554	25,607,740	4,322,431	32,454,418	36,776,849
2002	4,325,341	6,566,555	10,891,897	13,357,803	4,087,080	13,155,985	30,600,867	4,041,706	32,104,597	36,146,304
2003	4,445,478	6,913,490	11,358,968	10,001,233	3,807,433	11,948,771	25,757,437	4,120,206	32,395,480	36,515,686
2004	4,981,002	7,257,067	12,238,069	8,380,594	4,208,246	11,648,208	24,237,049	4,189,901	32,929,043	37,118,944
2005	4,329,397	6,733,881	11,063,278	8,420,088	4,334,313	12,350,092	25,104,492	4,295,058	32,946,124	37,241,183
2006	4,281,184	6,307,927	10,589,111	8,515,730	4,394,444	12,636,353	25,546,527	4,180,684	32,742,753	36,923,437
2007	4,402,583	6,659,496	11,062,079	9,388,344	4,819,443	13,630,624	27,838,410	4,257,986	33,472,140	37,730,126
2008	5,190,982	6,761,133	11,952,115	10,613,145	5,224,133	14,089,821	29,927,099	4,841,731	35,139,790	39,981,520
2009	5,724,028	6,980,689	12,704,717	9,651,817	4,890,567	14,172,542	28,714,926	4,730,738	33,739,067	38,469,805
2010	6,357,716	8,753,208	15,110,924	11,172,886	5,590,150	15,864,894	32,627,930	5,277,587	36,275,602	41,553,189
2011	6,856,426	9,358,703	16,215,129	12,759,138	6,415,986	18,015,763	37,190,887	5,457,499	37,490,985	42,948,485
2012	7,465,088	9,411,899	16,876,987	13,845,929	6,509,531	20,489,762	40,845,222	5,531,243	38,027,281	43,558,524
2013	7,213,262	9,303,785	16,517,046	14,889,377	7,362,147	20,724,521	42,976,044	5,833,515	39,650,975	45,484,490
2014	7,835,807	9,842,289	17,678,096	14,561,176	7,578,591	20,171,398	42,851,165	5,637,980	36,843,014	42,480,995
2015	8,377,393	10,513,858	18,891,252	15,643,663	7,911,743	24,127,116	47,682,521	6,603,685	39,570,591	46,174,276
2016	9,289,340	12,071,664	21,361,004	19,411,391	8,824,264	33,933,845	62,169,500	6,812,617	41,719,129	48,531,746
2017	9,989,021	12,564,343	22,553,364	19,581,950	9,159,774	30,183,991	58,925,716	7,884,472	42,164,631	50,049,103
2018	9,818,563	12,318,342	22,136,905	20,498,539	9,606,968	26,751,968	56,857,475	8,040,766	42,525,033	50,565,800
2019	9,714,466	12,395,674	22,110,140	20,160,085	9,436,431	30,293,154	59,889,670	8,553,558	43,833,242	52,386,800
2020	9,706,096	12,391,964	22,098,059	19,928,781	9,331,240	30,062,725	59,322,746	8,548,479	43,798,930	52,347,409
2021	9,718,515	12,428,040	22,146,555	20,082,742	9,416,520	30,306,017	59,805,280	8,568,241	43,880,381	52,448,622
2022	9,723,961	12,444,272	22,168,233	20,109,214	9,429,280	30,393,076	59,931,570	8,593,158	43,895,578	52,488,736
2023	9,755,590	12,464,549	22,220,139	20,093,157	9,419,409	30,421,144	59,933,710	8,582,583	43,938,632	52,521,215
2024	9,762,098	12,485,916	22,248,014	20,121,198	9,433,223	30,511,283	60,065,703	8,594,204	43,950,598	52,544,802
2025	9,740,147	12,478,230	22,218,377	20,078,036	9,416,868	30,518,250	60,013,153	8,591,106	43,871,645	52,462,751
2026	9,706,380	12,459,244	22,165,624	20,117,120	9,451,735	30,627,794	60,196,649	8,573,476	43,768,591	52,342,067
2027	9,783,435	12,561,678	22,345,114	20,257,306	9,509,488	30,843,996	60,610,790	8,624,988	44,032,988	52,657,976
2028	9,690,200	12,461,968	22,152,168	20,062,133	9,430,261	30,678,247	60,170,642	8,569,575	43,651,017	52,220,591
2029	9,750,310	12,546,645	22,296,955	20,211,072	9,496,708	30,909,553	60,617,333	8,618,265	43,875,191	52,493,456
2030	9,573,501	12,344,748	21,918,249	19,725,382	9,284,264	30,401,211	59,410,856	8,485,871	43,138,083	51,623,954
2031	9,588,265	12,373,385	21,961,650	19,990,464	9,424,224	30,784,308	60,198,996	8,563,020	43,329,947	51,892,967
2032	9,591,554	12,392,506	21,984,060	20,060,649	9,458,823	30,927,745	60,447,217	8,550,903	43,355,618	51,906,521
2033	9,606,172	12,407,084	22,013,256	19,931,009	9,386,256	30,823,828	60,141,093	8,554,516	43,412,205	51,966,720
2034	9,552,365	12,372,996	21,925,361	20,121,916	9,482,641	31,116,067	60,720,624	8,581,893	43,512,443	52,094,336
2035	9,430,409	12,274,466	21,704,875	20,735,021	9,816,010	31,933,712	62,484,743	8,758,553	43,921,304	52,679,857
TOTAL	325,884,755	425,818,111	751,702,866	647,497,024	334,345,051	1,053,451,552	2,035,293,627	272,948,460	1,556,940,940	1,829,889,400

<sup>a</sup> Capital charges repaid through bond debt service prior to 2015 exclude bond cover; capital charges for 2016 and after include both bond debt service and bond cover.

TABLE B-23 Total Transportation and Delta Water Charge for Each Contractor<sup>a</sup> (in dollars)

Sheet 2 of 4

Calendar Year	SAN JOAQUIN VALLEY AREA								
	Dudley Ridge	Empire	Future Contractor San Joaquin Valley	Kern		Kings	Oak Flat	Tulare	Total
				Municipal and Industrial	Agricultural				
	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]
1961	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0
1964	0	0	2,725	0	0	0	0	0	2,725
1965	0	0	6,029	73,569	0	0	0	0	79,598
1966	0	0	12,039	137,330	0	0	0	0	149,368
1967	0	0	26,257	267,611	0	0	0	0	293,869
1968	228,019	19,515	54,588	445,439	1,722,430	16,947	19,856	309,816	2,816,609
1969	244,202	11,337	87,576	525,094	2,755,507	16,825	19,608	468,258	4,128,408
1970	309,618	34,773	94,675	573,998	3,911,103	21,435	30,638	528,276	5,504,515
1971	331,507	37,501	95,695	605,889	5,242,780	27,175	34,939	719,977	7,095,462
1972	385,631	40,762	98,788	631,615	7,232,220	26,473	64,308	2,007,984	10,487,781
1973	403,387	39,384	97,550	1,025,888	7,372,185	28,816	39,552	790,800	9,797,562
1974	514,194	40,598	98,460	1,144,792	8,092,056	29,544	42,883	1,056,984	11,019,512
1975	688,206	41,047	106,703	1,197,166	9,489,829	31,240	48,509	1,572,924	13,175,623
1976	725,754	43,568	108,084	1,323,840	10,742,359	32,666	52,487	1,453,907	14,482,665
1977	585,911	39,485	112,554	1,367,404	11,067,109	34,434	54,562	1,149,321	14,410,780
1978	704,887	36,029	115,521	1,565,884	13,413,619	38,927	59,396	1,184,142	17,118,405
1979	789,446	48,321	114,253	1,668,951	15,503,209	43,065	70,997	1,739,671	19,977,912
1980	970,906	50,056	125,950	1,770,264	17,156,517	48,021	95,468	1,686,002	21,903,184
1981	1,219,845	84,422	134,169	2,430,802	22,773,878	66,495	101,037	2,297,899	29,108,548
1982	1,255,961	70,616	135,057	2,523,660	25,183,422	70,662	108,703	2,293,419	31,641,500
1983	1,190,620	52,966	149,202	2,085,047	24,845,671	75,442	87,785	508,591	28,995,325
1984	1,500,561	28,948	164,505	3,396,379	33,586,947	94,320	121,870	1,553,353	40,446,884
1985	1,776,798	130,378	184,905	3,891,204	39,570,560	117,583	139,959	2,824,676	48,636,064
1986	2,019,071	79,755	180,445	4,079,838	43,664,880	136,715	153,634	3,672,655	53,986,993
1987	1,894,709	95,673	179,872	4,570,841	42,970,822	137,332	151,883	3,766,383	53,767,515
1988	1,980,121	110,051	193,735	4,734,502	44,920,649	138,278	147,060	3,921,692	56,146,087
1989	2,135,207	102,178	187,913	4,677,357	47,121,991	137,085	166,905	4,403,936	58,932,572
1990	1,889,345	87,382	221,392	4,827,893	45,908,261	121,154	149,217	3,983,611	57,188,253
1991	1,699,637	80,671	220,282	4,535,869	37,783,916	103,909	135,227	3,524,621	48,084,132
1992	2,246,203	105,490	241,455	5,550,167	48,981,012	143,783	176,210	4,563,451	62,007,772
1993	2,468,358	120,493	264,959	5,806,060	54,882,179	161,522	195,775	5,317,305	69,216,651
1994	2,273,181	107,998	306,359	5,210,309	52,352,719	145,625	178,587	4,690,005	65,264,782
1995	2,869,641	115,916	304,297	6,621,491	60,812,874	180,802	210,920	5,548,839	76,664,781
1996	2,061,349	125,605	389,203	6,671,115	58,884,744	178,474	190,532	7,114,605	75,615,627
1997	2,772,612	101,010	276,681	6,521,956	57,661,735	138,117	212,732	4,736,735	72,421,578
1998	2,618,293	120,302	381,847	5,733,156	54,236,872	143,433	204,342	4,990,035	68,428,279
1999	2,714,013	136,615	369,935	6,368,370	57,909,174	184,155	219,334	7,458,386	75,359,982
2000	2,604,873	121,144	302,623	6,100,811	51,583,178	174,245	213,836	6,196,213	67,296,924
2001	3,288,514	146,307	328,001	5,653,261	58,947,624	192,566	260,422	6,473,532	75,290,226
2002	2,996,103	128,084	320,541	6,168,329	53,743,582	187,350	239,241	5,803,419	69,586,647
2003	3,046,434	131,903	339,961	6,533,590	56,267,423	202,323	238,474	6,086,298	72,846,406
2004	3,233,973	168,542	342,484	7,857,965	56,857,873	356,506	254,053	5,842,404	74,913,800
2005	3,792,876	177,127	355,581	7,013,406	67,435,493	690,768	250,836	6,679,574	86,395,661
2006	3,621,519	168,080	294,916	7,498,469	64,578,195	536,780	256,013	5,911,805	82,865,777
2007	3,409,608	159,361	333,662	7,117,101	61,443,118	521,878	253,145	5,854,210	79,092,082
2008	3,383,365	157,050	468,712	7,765,494	62,397,863	547,718	261,658	5,547,684	80,529,544
2009	3,259,914	153,978	435,271	6,914,076	60,675,857	521,067	260,792	5,438,283	77,659,238
2010	3,652,440	236,835	507,438	8,085,567	72,645,817	654,000	328,990	6,532,649	92,643,737
2011	4,571,980	219,574	506,763	9,735,637	90,603,209	741,101	356,955	6,934,352	113,669,570
2012	3,746,650	231,605	467,287	9,806,040	83,577,591	766,744	366,589	7,898,918	106,861,425
2013	4,237,707	233,359	519,826	10,378,240	85,957,685	755,115	382,644	7,398,257	109,862,834
2014	4,041,710	211,259	635,140	9,522,303	79,712,982	685,186	372,673	6,524,871	101,706,125
2015	4,388,967	259,178	747,667	12,010,782	94,407,378	829,744	450,030	8,069,679	121,163,424
2016	5,421,529	334,354	688,733	15,511,442	113,572,029	1,119,595	578,893	10,402,718	147,629,292
2017	5,508,164	330,161	680,826	15,584,291	116,411,091	1,072,403	571,396	10,277,605	150,435,938
2018	5,563,146	333,627	717,852	15,692,122	117,767,716	1,077,244	575,176	10,372,984	152,099,867
2019	5,550,379	336,979	696,540	15,883,647	118,706,820	1,088,098	582,752	10,492,770	153,337,986
2020	5,068,941	329,752	704,830	15,530,952	116,711,630	1,065,958	567,533	10,273,455	150,253,051
2021	5,146,052	334,812	709,674	15,702,732	118,198,668	1,081,471	577,284	10,421,140	152,171,834
2022	5,137,931	334,525	715,066	15,679,078	118,144,184	1,080,452	575,877	10,404,495	152,071,607
2023	5,101,894	332,062	720,709	15,581,061	117,556,942	1,072,799	570,758	10,335,424	151,271,648
2024	5,093,741	331,696	726,318	15,548,353	117,407,970	1,071,591	569,897	10,318,966	151,068,532
2025	5,061,578	329,957	731,946	15,467,860	116,869,345	1,066,058	565,794	10,255,778	150,348,315
2026	5,092,819	332,366	737,931	15,527,084	117,363,731	1,073,362	570,865	10,314,268	151,012,426
2027	5,114,685	333,392	743,603	15,598,995	118,030,967	1,076,629	571,729	10,357,291	151,827,291
2028	5,035,559	329,224	747,547	15,373,950	116,378,888	1,063,294	563,686	10,201,850	149,693,998
2029	5,073,095	331,401	753,674	15,478,949	117,279,279	1,070,082	567,057	10,274,531	150,828,067
2030	4,871,061	319,811	759,891	14,923,643	113,160,752	1,033,558	544,945	9,881,176	145,494,837
2031	5,006,292	328,693	764,875	15,301,790	116,071,510	1,060,710	560,025	10,140,309	149,234,204
2032	5,013,825	329,177	771,502	15,259,868	115,911,657	1,062,208	562,967	10,154,516	149,065,719
2033	4,903,676	321,919	777,868	15,026,051	114,283,411	1,039,611	546,202	9,943,008	146,841,745
2034	4,986,016	327,324	784,021	15,180,313	115,599,928	1,056,216	558,227	10,100,684	148,592,728
2035	5,343,211	350,809	790,130	16,223,343	123,166,523	1,128,825	598,872	10,785,515	158,387,229
<b>TOTAL</b>	<b>205,837,420</b>	<b>11,874,272</b>	<b>27,473,067</b>	<b>542,797,344</b>	<b>4,407,181,139</b>	<b>32,693,707</b>	<b>19,811,200</b>	<b>400,738,888</b>	<b>5,648,407,036</b>

<sup>a</sup> Capital charges repaid through bond debt service prior to 2015 exclude bond cover; capital charges for 2016 and after include both bond debt service and bond cover.

TABLE B-23 Total Transportation and Delta Water Charge for Each Contractor<sup>a</sup> (in dollars)

Sheet 3 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA									
	AVEK	Castaic Lake	Coachella	Crestline	Desert	Littlerock	Mojave	Palmdale	San Bernardino	San Gabriel
	[20]	[21]	[22]	[23]	[24]	[25]	[26]	[27]	[28]	[29]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0
1963	34,411	0	0	0	726	0	0	0	51,729	0
1964	64,494	27,447	19,542	4,370	38,211	1,143	30,324	8,205	82,811	34,987
1965	121,484	53,007	34,348	7,194	42,701	2,082	53,730	15,222	135,069	35,344
1966	221,012	101,264	62,476	12,478	76,886	3,753	96,944	27,679	232,502	61,465
1967	427,622	210,814	121,269	23,472	148,839	7,284	188,141	54,023	433,350	115,574
1968	754,401	491,952	218,649	41,509	265,168	12,870	336,227	95,466	782,163	208,927
1969	1,090,136	743,639	334,105	61,226	394,024	18,693	500,689	138,063	1,205,834	321,755
1970	1,420,639	943,948	470,423	89,700	552,223	25,231	692,219	184,837	1,778,187	467,573
1971	1,760,670	1,138,948	627,331	128,360	754,065	31,837	931,649	231,280	2,538,219	659,414
1972	2,245,455	1,385,123	819,635	185,868	1,035,804	43,771	1,262,890	287,620	3,758,473	950,297
1973	2,399,531	1,434,072	971,770	190,992	1,264,690	46,059	1,357,182	313,446	4,026,451	961,024
1974	2,520,870	1,530,035	998,399	204,074	1,305,235	48,933	1,417,682	331,702	4,463,660	1,104,491
1975	2,739,680	1,621,892	1,047,544	219,290	1,381,319	53,242	1,506,018	355,270	4,638,827	1,208,046
1976	3,204,880	1,658,980	1,106,524	232,129	1,474,438	57,732	1,583,468	381,276	4,838,364	1,278,740
1977	3,187,208	1,747,374	1,008,676	245,111	1,317,096	54,209	1,672,005	406,620	5,094,241	1,336,313
1978	3,635,572	1,881,113	1,208,919	255,468	1,618,071	56,805	1,720,358	420,026	5,091,935	1,374,033
1979	4,309,554	1,961,577	1,295,874	267,791	1,740,645	60,285	1,896,998	449,757	5,136,839	1,342,135
1980	4,994,298	2,100,630	1,406,781	295,350	1,941,392	67,604	2,070,343	499,051	5,647,604	1,485,141
1981	5,824,304	2,570,750	1,574,217	328,818	2,194,094	100,752	2,393,948	603,265	6,461,840	1,688,324
1982	5,582,860	2,734,499	1,657,630	346,721	2,336,914	88,296	2,367,841	641,991	6,752,799	1,929,664
1983	6,335,170	2,805,893	2,181,785	380,840	3,172,326	88,383	2,565,861	658,613	6,964,704	1,808,748
1984	7,713,111	3,885,129	3,287,286	497,586	4,929,764	96,492	2,833,666	727,821	8,053,209	2,598,232
1985	9,545,818	4,351,903	4,122,840	601,928	6,265,166	103,706	3,025,099	959,657	8,893,342	2,686,799
1986	9,515,134	4,988,028	4,584,188	647,634	7,009,695	130,222	3,209,761	1,223,847	9,142,822	3,398,540
1987	9,550,203	4,846,221	4,452,838	678,086	6,885,936	240,873	3,265,334	1,255,052	10,544,337	3,398,921
1988	9,149,230	5,033,633	4,510,360	704,411	7,052,631	158,845	3,440,436	1,044,206	11,095,193	3,271,137
1989	11,039,912	5,043,439	4,218,204	691,191	6,635,387	210,634	3,521,987	1,746,763	10,811,990	3,453,679
1990	12,432,751	5,511,963	4,916,384	729,229	7,720,886	331,172	3,755,769	1,953,905	11,722,946	4,221,266
1991	9,293,533	4,625,727	3,471,782	688,867	5,335,009	221,166	4,616,027	1,640,084	11,104,874	3,642,610
1992	11,850,715	5,814,416	3,626,099	612,895	5,587,383	174,998	5,594,646	1,532,325	11,144,101	3,694,099
1993	12,264,759	5,461,079	3,830,889	617,198	5,922,476	211,904	5,486,188	1,753,971	12,107,175	4,042,324
1994	14,334,329	6,027,538	3,857,907	694,421	5,963,596	278,012	6,437,888	2,090,724	12,731,704	4,776,753
1995	14,201,115	6,403,185	4,680,553	661,811	7,318,575	212,244	5,630,843	1,952,494	12,204,445	4,480,933
1996	14,628,006	6,634,329	7,634,303	710,651	12,187,480	208,356	5,729,211	2,300,206	12,730,931	4,599,073
1997	15,198,058	6,527,983	7,251,237	750,419	8,515,792	207,887	6,151,996	2,342,198	14,400,157	4,897,487
1998	13,714,014	6,150,789	6,324,675	717,140	7,018,227	209,057	7,755,016	1,946,444	14,309,132	4,177,167
1999	15,562,020	6,747,162	5,377,230	826,782	7,205,669	215,608	8,419,304	2,368,501	15,799,362	5,133,387
2000	14,851,382	10,267,971	3,835,085	793,396	5,637,117	186,737	8,312,197	2,080,500	15,532,480	4,260,296
2001	25,006,823	15,951,080	4,887,397	998,607	7,647,319	199,239	9,011,101	4,013,167	21,550,528	4,402,497
2002	16,403,017	13,159,934	4,133,269	961,220	6,403,125	182,303	8,174,316	3,394,966	22,465,648	5,804,376
2003	17,746,331	14,213,720	4,252,453	931,243	6,597,971	187,475	9,829,394	2,928,823	20,874,523	5,970,879
2004	18,938,097	15,496,733	4,936,882	1,044,019	6,725,191	201,538	10,112,647	3,217,994	25,437,952	5,474,692
2005	19,250,261	14,450,522	18,591,872	863,710	11,611,845	190,110	9,849,919	3,253,591	23,389,329	5,711,879
2006	20,919,185	13,740,301	31,699,572	853,624	11,699,401	201,719	12,673,094	3,206,590	23,301,247	5,776,465
2007	24,151,349	16,781,958	30,452,212	1,080,603	11,082,768	200,754	16,263,828	4,706,500	29,133,197	4,836,769
2008	22,045,982	19,071,721	30,124,260	1,028,019	12,121,906	216,290	14,853,679	4,683,989	29,813,737	5,904,347
2009	20,241,012	17,185,382	28,228,472	1,025,014	10,175,093	222,121	14,798,957	4,478,302	29,931,049	6,489,253
2010	23,976,967	17,578,910	38,362,205	974,943	13,636,625	227,352	17,980,626	3,984,053	33,085,098	8,218,081
2011	30,873,276	17,668,031	40,396,406	1,058,074	14,819,468	251,814	11,929,832	4,042,900	30,695,888	9,021,853
2012	31,529,929	19,569,735	47,276,351	1,170,082	17,359,678	266,958	13,687,758	5,505,261	44,547,694	9,389,164
2013	27,099,803	22,479,971	39,513,174	1,404,135	14,007,791	292,573	13,931,842	4,635,384	35,659,778	7,641,802
2014	22,516,543	21,071,348	34,810,089	1,492,081	11,879,835	295,070	13,912,057	4,711,648	35,758,686	6,559,904
2015	22,577,842	21,703,199	39,527,499	1,542,371	13,924,196	322,295	16,744,809	4,157,256	42,315,704	7,971,419
2016	36,536,738	23,296,041	49,040,486	1,755,302	17,749,761	363,837	18,393,027	5,585,470	48,982,745	9,844,818
2017	38,347,183	28,067,223	50,663,653	2,152,735	18,414,713	368,711	24,662,284	6,770,264	53,346,589	10,372,897
2018	39,272,233	28,493,869	53,416,478	2,117,450	18,853,559	366,744	25,252,890	6,983,451	53,754,077	10,496,929
2019	39,234,538	28,619,722	53,047,444	2,128,567	18,977,053	364,658	25,791,493	7,073,311	54,896,624	10,612,397
2020	39,411,080	28,738,260	53,517,916	2,128,160	19,068,226	359,312	26,418,122	7,138,313	54,931,653	10,610,181
2021	39,048,753	28,463,763	52,866,556	2,089,967	18,814,800	355,108	26,121,948	7,067,934	54,273,745	10,438,905
2022	39,267,175	28,532,272	52,484,523	2,090,281	18,805,219	352,427	26,198,372	7,130,118	54,242,746	10,439,020
2023	39,071,735	28,569,685	51,654,057	2,083,897	18,624,290	353,130	26,142,213	7,081,138	54,052,534	10,380,178
2024	38,837,042	28,329,836	51,400,487	2,070,699	18,527,466	353,041	25,965,134	7,029,119	53,865,953	10,325,502
2025	39,034,914	28,513,591	51,672,021	2,079,634	18,630,280	351,723	26,123,914	7,081,886	54,046,711	10,371,886
2026	38,445,400	28,118,624	50,969,857	2,050,612	18,343,172	350,703	25,750,680	6,954,669	53,504,574	10,214,862
2027	39,155,759	28,590,012	51,762,328	2,085,897	18,668,995	353,989	26,195,168	7,098,207	54,186,256	10,396,367
2028	38,566,553	28,193,080	51,211,503	2,057,583	18,420,541	349,261	25,851,805	6,991,817	53,660,719	10,247,224
2029	39,038,508	28,485,149	51,802,231	2,082,003	18,655,405	351,858	26,146,118	7,085,244	54,171,282	10,380,949
2030	37,986,339	27,703,822	50,829,179	2,031,425	18,222,582	343,361	25,540,188	6,895,177	53,242,922	10,122,165
2031	39,745,983	28,655,626	52,638,668	2,107,033	18,944,356	343,049	26,508,729	7,295,794	54,615,985	10,500,281
2032	37,551,435	27,357,161	50,539,473	2,014,720	18,087,992	344,523	25,297,498	6,791,705	53,089,392	10,063,284
2033	39,467,910	28,482,517	52,504,041	2,103,160	18,866,991	344,540	26,471,695	7,227,570	54,566,975	10,469,866
2034	37,617,310	27,481,583	50,846,797	2,023,917	18,187,169	344,137	25,444,270	6,812,495	53,346,000	10,119,101
2035	42,558,605	30,163,006	55,589,281	2,230,567	20,086,247	344,124	28,065,352	7,934,133	56,879,619	11,102,645
TOTAL	1,379,189,953	948,440,836	1,532,796,843	73,055,757	682,886,683	14,776,722	817,924,647	235,970,351	1,798,060,960	391,787,533

<sup>a</sup> Capital charges repaid through bond debt service prior to 2015 exclude bond cover; capital charges for 2016 and after include both bond debt service and bond cover.

TABLE B-23 Total Transportation and Delta Water Charge for Each Contractor<sup>a</sup> (in dollars)

Sheet 4 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)				FEATHER RIVER AREA				South Bay Area Future Contractor	Grand Total
	San Gorgonio	Metropolitan	Ventura	Total	Yuba City	Butte	Plumas	Total		
	[30]	[31]	[32]	[33]	[34]	[35]	[36]	[37]	[38]	[39]
1961	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	3,219	79,888
1963	0	690,812	0	777,678	0	0	0	0	12,626	1,628,026
1964	21,735	1,260,513	9,378	1,603,161	0	0	0	0	13,938	2,810,279
1965	21,866	2,180,589	17,766	2,720,401	0	0	405	405	28,937	4,815,355
1966	37,964	3,900,172	33,426	4,868,023	0	0	565	565	31,321	7,409,358
1967	71,283	7,693,703	68,155	9,563,529	0	0	562	562	47,718	13,086,788
1968	128,915	15,317,881	142,803	18,796,932	0	1,050	1,439	2,489	46,945	25,632,120
1969	198,764	23,153,064	215,209	28,375,202	0	1,225	4,120	5,345	52,963	37,060,736
1970	289,633	30,617,164	273,605	37,805,381	0	3,848	17,116	20,964	69,744	48,598,554
1971	409,327	39,958,997	342,425	49,512,523	0	4,546	19,187	23,733	55,532	61,838,182
1972	537,186	54,991,810	422,304	67,926,236	0	4,929	21,150	26,079	80,412	84,141,482
1973	587,963	59,591,118	435,655	73,579,952	0	7,059	21,778	28,837	54,219	89,076,363
1974	611,428	66,008,399	455,565	81,000,474	0	8,336	22,408	30,744	76,783	98,046,021
1975	644,621	71,830,070	478,403	87,724,223	0	9,416	23,523	32,939	84,547	106,980,031
1976	668,315	74,907,214	475,587	91,867,647	0	7,004	23,257	30,261	106,717	112,910,936
1977	696,515	73,338,457	507,063	90,610,888	0	16,917	24,059	40,976	98,618	111,531,059
1978	709,040	81,951,168	523,177	100,445,684	0	12,635	24,225	36,860	100,786	124,589,726
1979	712,866	83,601,786	526,405	103,302,511	0	16,575	28,352	44,927	119,352	130,626,858
1980	862,275	93,029,351	583,628	114,983,450	0	19,834	26,562	46,396	178,812	145,061,266
1981	946,961	112,171,493	672,540	137,531,304	0	21,682	34,563	56,245	185,347	175,648,047
1982	1,021,329	117,143,301	727,623	143,325,467	0	16,117	43,117	59,234	173,894	184,728,000
1983	1,076,279	118,991,007	854,263	147,883,872	0	15,202	29,410	44,612	220,926	186,389,022
1984	1,211,621	156,273,535	933,311	193,040,763	20,590	15,442	31,795	67,827	225,959	245,861,382
1985	1,287,789	194,967,204	993,651	237,804,900	24,050	16,976	32,405	73,431	340,322	301,774,001
1986	1,344,770	218,331,684	1,058,276	264,584,600	31,753	18,145	33,596	83,494	279,227	334,724,869
1987	1,379,613	204,859,482	1,056,318	252,413,213	37,071	17,794	33,384	88,249	345,116	324,845,842
1988	1,465,829	221,667,115	1,124,102	269,717,128	48,058	19,117	33,605	100,780	365,207	346,652,463
1989	1,505,481	230,328,278	1,232,379	280,439,324	61,184	20,809	37,188	119,181	422,329	361,560,805
1990	1,624,763	277,194,766	1,855,991	333,971,791	66,041	20,855	36,812	123,708	474,284	415,922,928
1991	1,720,878	221,887,061	1,549,955	269,797,573	180,212	22,526	42,200	244,938	214,683	340,037,465
1992	1,779,902	245,365,618	1,503,480	298,280,678	208,216	26,028	43,517	277,761	443,676	385,079,766
1993	1,943,336	219,238,180	1,551,253	274,430,733	209,613	26,203	47,588	283,404	599,571	371,051,632
1994	1,920,217	257,365,883	1,475,069	317,954,041	201,284	25,161	46,079	272,524	609,966	413,159,663
1995	1,982,808	225,863,369	1,568,401	287,160,773	216,945	27,118	50,022	294,085	534,971	395,611,506
1996	1,651,239	235,410,311	1,622,641	306,046,738	217,250	27,155	56,622	301,027	571,857	424,357,801
1997	1,758,607	245,453,567	1,777,266	315,232,652	236,300	29,847	59,915	326,062	428,638	439,269,599
1998	1,947,195	227,090,227	1,796,534	293,155,617	128,021	29,927	36,222	194,170	465,095	417,177,248
1999	2,267,918	256,513,586	1,879,946	328,316,476	254,675	31,834	40,585	327,094	584,116	465,621,176
2000	2,541,030	253,213,554	1,968,482	323,480,228	262,163	79,001	43,704	384,868	0	453,931,214
2001	3,485,204	444,601,904	2,265,770	544,020,637	261,699	93,471	45,056	400,226	0	692,554,459
2002	4,834,560	333,573,398	2,305,102	421,795,235	266,107	95,018	47,297	408,422	0	569,429,371
2003	6,118,812	361,639,827	2,321,875	453,613,325	262,547	93,638	68,989	425,174	0	600,516,996
2004	6,478,454	413,356,068	2,609,178	514,029,445	284,387	102,404	29,286	416,077	0	662,953,384
2005	6,758,865	384,539,517	2,082,380	500,543,799	280,033	727,066	28,810	1,035,909	0	661,384,322
2006	7,265,909	359,673,112	2,045,215	493,055,432	292,991	43,185	38,617	374,793	0	649,355,078
2007	7,901,530	438,644,454	2,532,011	587,767,933	291,100	40,957	46,072	378,129	0	743,868,759
2008	9,655,721	411,702,229	2,994,368	564,216,249	306,916	804,536	86,523	1,197,975	0	727,804,502
2009	9,836,623	382,590,766	2,870,301	528,072,343	328,896	855,850	90,625	1,275,371	0	686,896,400
2010	11,041,822	442,780,430	3,045,875	614,892,987	400,358	1,064,565	108,873	1,573,796	0	798,402,562
2011	11,886,479	493,296,264	3,129,128	669,069,413	451,483	1,197,315	121,981	1,770,779	0	880,864,262
2012	13,005,456	485,050,753	3,416,940	691,775,758	460,139	1,318,107	130,851	1,909,097	0	901,827,012
2013	13,636,298	478,234,488	3,415,973	661,953,015	483,119	1,383,934	141,269	2,008,322	0	878,801,751
2014	16,146,289	426,506,668	2,935,125	598,595,342	473,134	1,355,332	140,896	1,969,362	0	805,281,085
2015	18,304,096	474,474,338	3,345,784	666,910,810	614,794	1,761,128	185,769	2,561,691	0	903,383,974
2016	21,304,581	574,490,636	4,148,140	811,491,582	759,927	2,176,874	236,228	3,173,029	0	1,094,356,153
2017	23,675,472	602,151,989	4,274,944	863,268,657	781,362	2,238,278	230,414	3,250,054	0	1,148,482,830
2018	23,894,368	591,558,692	4,218,206	858,678,945	782,615	2,241,866	230,902	3,255,383	0	1,143,594,374
2019	24,173,490	598,814,761	4,227,337	867,961,396	790,040	2,263,138	231,180	3,284,358	0	1,158,970,351
2020	24,283,704	598,489,191	4,206,304	869,300,421	787,145	2,254,843	218,119	3,260,107	0	1,156,581,793
2021	24,175,296	591,213,919	4,154,967	859,085,660	787,171	2,254,919	217,304	3,259,394	0	1,148,917,345
2022	24,207,593	589,870,944	4,129,081	857,749,771	784,374	2,246,906	214,827	3,246,107	0	1,147,656,023
2023	24,183,951	588,315,467	4,141,369	854,653,644	785,260	2,249,443	215,173	3,249,876	0	1,143,850,232
2024	24,174,387	583,658,517	4,119,440	848,656,622	783,298	2,243,824	214,406	3,241,528	0	1,137,825,202
2025	24,228,270	586,070,881	4,118,736	852,324,448	779,093	2,231,778	212,761	3,223,632	0	1,140,590,676
2026	24,129,189	578,288,469	4,087,297	841,208,108	775,128	2,220,421	211,209	3,206,758	0	1,130,131,632
2027	24,267,208	587,775,048	4,138,257	854,673,492	779,483	2,232,895	212,912	3,225,290	0	1,145,339,953
2028	24,201,251	578,954,001	4,076,780	842,782,118	768,106	2,200,306	208,462	3,176,874	0	1,130,196,392
2029	24,306,112	585,356,573	4,109,038	851,970,471	771,160	2,209,053	209,656	3,189,869	0	1,141,396,151
2030	24,173,970	568,427,585	3,989,878	829,508,591	752,590	2,155,858	202,393	3,110,841	0	1,111,067,329
2031	24,421,637	587,076,607	4,032,805	856,886,552	752,619	2,155,940	202,404	3,110,963	0	1,143,285,332
2032	24,157,968	563,426,802	3,956,123	822,678,075	752,625	2,155,959	202,407	3,110,991	0	1,109,192,582
2033	24,449,792	583,611,068	4,023,281	852,589,405	752,628	2,155,965	202,409	3,111,002	0	1,136,663,221
2034	24,241,508	565,714,128	3,964,912	826,143,325	752,625	2,155,957	202,408	3,110,990	0	1,112,587,363
2035	24,845,929	618,214,600	4,138,377	902,152,485	752,618	2,155,938	202,405	3,110,961	0	1,200,520,150
TOTAL	667,439,055	23,075,495,582	156,282,334	31,774,107,255	23,290,996	55,756,980	6,659,927	85,707,903	8,748,370	42,133,856,457

<sup>a</sup> Capital charges repaid through bond debt service prior to 2015 exclude bond cover; capital charges for 2016 and after include both bond debt service and bond cover.

**TABLE B-24 Equivalent Unit Charge for Water Supply for Each Contractor<sup>a</sup> (in dollars per acre-foot)**

Project Service Area and Water Supply Contractor	Transportation Charge					Delta Water Charge	Water System Revenue Bond Surcharge	Total Equivalent Unit Charge
	Capital Cost Component	Minimum OMP&R Component	Off- Aqueduct Component	Variable OMP&R Component	Total			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
FEATHER RIVER AREA								
Yuba City	0.00	0.00	0.00	0.00	0.00	143.05	14.13	157.19
Butte	0.00	0.00	0.00	0.00	0.00	648.89	53.76	702.65
Plumas	38.63	4.25	0.00	0.00	42.88	76.71	10.23	129.82
Feather River Area	9.14	1.01	0.00	0.00	10.15	241.67	22.16	273.98
NORTH BAY AREA								
Napa	176.99	81.24	4.83	16.10	279.16	44.32	17.27	340.75
Solano	104.84	71.09	5.30	9.19	190.42	50.34	13.73	254.48
North Bay Area	131.70	74.87	5.12	11.76	223.45	48.10	15.05	286.59
SOUTH BAY AREA								
Alameda-Zone 7	51.47	63.24	9.11	21.74	145.56	46.21	10.14	201.91
Alameda County	30.64	36.94	7.44	12.59	87.61	31.85	5.14	124.60
Santa Clara	25.00	29.81	6.60	11.28	72.69	20.73	3.50	96.92
South Bay Area	30.29	36.49	7.15	13.22	87.16	26.75	4.86	118.77
SAN JOAQUIN VALLEY AREA								
Kings	6.41	9.77	3.80	8.35	28.33	37.75	4.08	70.16
Dudley Ridge	5.55	6.04	3.34	4.91	19.85	21.02	2.28	43.15
Empire	2.34	5.68	2.54	4.62	15.18	23.82	1.88	40.89
Kern	10.15	11.88	5.10	6.92	34.05	26.40	3.01	63.46
Oak Flat	2.28	3.24	2.04	3.13	10.68	22.52	1.90	35.10
Tulare	5.75	6.18	3.26	4.80	20.00	22.11	2.35	44.46
San Joaquin Valley Area	9.37	10.92	4.79	6.57	31.66	25.70	2.90	60.25
CENTRAL COASTAL AREA								
San Luis Obispo	420.93	278.36	13.49	125.80	838.58	208.55	51.41	1,098.54
Santa Barbara	1,157.58	282.60	21.01	103.68	1,564.87	108.89	83.20	1,756.95
Central Coastal Area	994.91	281.66	19.35	108.56	1,404.49	130.89	76.18	1,611.56
SOUTHERN CALIFORNIA AREA								
AVEK	58.07	59.18	33.14	68.91	219.29	56.27	10.19	285.75
Castaic Lake	62.35	65.94	25.86	46.35	200.50	49.59	13.13	263.22
Coachella	82.48	102.72	44.23	78.02	307.47	54.06	12.43	373.95
Crestline	161.81	157.16	34.80	83.20	436.97	82.65	21.27	540.88
Desert	53.64	58.60	52.95	44.50	209.69	33.78	7.68	251.15
Littlerock	132.81	134.85	41.08	24.18	332.91	124.78	22.35	480.04
Mojave	194.59	229.86	34.07	141.67	600.19	160.19	36.19	796.57
Palmdale	60.35	64.96	39.58	104.87	269.76	65.78	10.86	346.40
San Bernardino	299.74	221.43	31.41	79.80	632.39	96.72	26.56	755.67
San Gabriel	124.91	123.44	48.37	49.97	346.69	60.70	15.92	423.31
San Geronio	1,797.80	648.83	36.49	245.46	2,728.58	166.70	46.31	2,941.59
Metropolitan	92.08	80.66	39.75	43.05	255.54	50.07	12.27	317.88
Ventura	527.45	466.48	39.01	101.02	1,133.96	318.72	77.72	1,530.39
Southern California Area	97.26	85.56	39.30	48.17	270.30	52.86	12.79	335.95
ALL AREAS	56.09	48.40	20.61	26.34	151.45	38.92	7.97	198.33

<sup>a</sup> Hypothetical charges, which, if assessed on all Table A water delivered to date, all surplus water delivered prior to May 1, 1973, and all Table A water estimated to be delivered during the remainder of the project repayment period (Table B-5B), would provide a sum at the end of the period financially equivalent to all Transportation Charge and Delta Water Charge payments required under a water supply contract, considering interest at the Project Interest Rate, 4.610 percent per annum.



**TABLE B-25 Equivalent Unit Transportation Costs of Water Delivered from or through Each Aqueduct Reach<sup>a</sup>**  
(in dollars per acre-foot)

Aqueduct Reach	Unit Cost of Reach <sup>b</sup>						Cumulative Unit Costs from the Delta					
	Capital Costs	Water System Revenue Bond Surcharge <sup>c</sup>	Minimum OMP&R	Off-Aqueduct Costs	Variable OMP&R	Total	Capital Costs	Water System Revenue Bond Surcharge <sup>c</sup>	Minimum OMP&R	Off-Aqueduct Costs	Variable OMP&R	Total
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
<b>NBA</b>												
1	45.48	16.25	17.65	2.49	1.43	83.30	45.48	16.25	17.65	2.49	1.43	83.30
2	48.41	17.30	7.71	0.00	0.00	73.42	93.89	33.55	25.36	2.49	1.43	156.72
3A	8.63	3.08	15.34	5.35	2.32	34.72	102.52	36.63	40.70	7.84	3.75	191.44
3B	55.50	19.83	34.68	3.78	5.15	118.94	149.39	53.38	60.04	6.27	6.58	275.66
<b>SBA</b>												
1	7.95	2.84	20.69	5.62	5.37	42.47	10.17	3.63	24.76	8.35	7.88	54.79
2	0.75	0.27	2.34	0.00	0.00	3.36	10.92	3.90	27.10	8.35	7.88	58.15
4	2.50	0.89	3.99	0.00	0.00	7.38	13.42	4.79	31.09	8.35	7.88	65.53
5	5.25	1.88	3.13	0.00	0.00	10.26	18.67	6.67	34.22	8.35	7.88	75.79
6	0.30	0.11	0.33	0.00	0.00	0.74	18.97	6.78	34.55	8.35	7.88	76.53
7	2.33	0.83	0.60	0.00	0.00	3.76	21.30	7.61	35.15	8.35	7.88	80.29
8	3.16	1.13	1.00	0.00	0.00	5.29	24.46	8.74	36.15	8.35	7.88	85.58
9	6.52	2.33	3.76	0.00	0.00	12.61	30.98	11.07	39.91	8.35	7.88	98.19
<b>CA</b>												
1	2.22	0.79	4.07	2.73	2.51	12.32	2.22	0.79	4.07	2.73	2.51	12.32
2A	1.41	0.50	0.80	0.00	0.00	2.71	3.63	1.29	4.87	2.73	2.51	15.03
2B	0.72	0.26	0.40	0.00	0.00	1.38	4.35	1.55	5.27	2.73	2.51	16.41
3	0.63	0.23	0.30	0.00	0.00	1.16	4.98	1.78	5.57	2.73	2.51	17.57
4	1.01	0.36	2.02	1.30	1.13	5.82	5.99	2.14	7.59	4.03	3.64	23.39
5	0.77	0.28	0.40	0.00	0.00	1.45	6.76	2.42	7.99	4.03	3.64	24.84
6	0.20	0.07	0.20	0.00	0.00	0.47	6.96	2.49	8.19	4.03	3.64	25.31
7	1.16	0.41	0.49	0.00	0.00	2.06	8.12	2.90	8.68	4.03	3.64	27.37
8C	0.02	0.01	0.09	0.00	0.00	0.12	8.14	2.91	8.77	4.03	3.64	27.49
8D	0.44	0.16	0.39	0.00	0.00	0.99	8.58	3.07	9.16	4.03	3.64	28.48
9	0.37	0.13	0.36	0.00	0.00	0.86	8.95	3.20	9.52	4.03	3.64	29.34
10A	0.40	0.14	0.47	0.00	0.00	1.01	9.35	3.34	9.99	4.03	3.64	30.35
11B	0.58	0.21	0.30	0.00	0.00	1.09	9.93	3.55	10.29	4.03	3.64	31.44
12D	0.55	0.20	0.27	0.00	0.00	1.02	10.48	3.75	10.56	4.03	3.64	32.46
12E	0.39	0.14	0.46	0.00	0.00	0.99	10.87	3.89	11.02	4.03	3.64	33.45
13B	0.83	0.30	0.53	0.00	0.00	1.66	11.70	4.19	11.55	4.03	3.64	35.11
14A	3.20	1.14	4.09	2.32	2.14	12.89	14.90	5.33	15.64	6.35	5.78	48.00
14B	0.50	0.18	0.50	0.00	0.00	1.18	15.40	5.51	16.14	6.35	5.78	49.18
14C	0.42	0.15	0.37	0.00	0.00	0.94	15.82	5.66	16.51	6.35	5.78	50.12
15A	2.37	0.85	4.26	2.83	2.32	12.63	18.19	6.51	20.77	9.18	8.10	62.75
16A	3.93	1.40	6.59	6.14	5.42	23.48	22.12	7.91	27.36	15.32	13.52	86.23
17E	13.26	4.74	18.52	21.49	20.00	78.01	35.38	12.65	45.88	36.81	33.52	164.24
17F	3.44	1.23	0.23	0.00	0.00	4.90	38.82	13.88	46.11	36.81	33.52	169.14
18A	3.09	1.10	2.22	0.00	-2.10	4.31	41.91	14.98	48.33	36.81	31.42	173.45
19	2.28	0.81	1.35	0.00	0.00	4.44	44.19	15.79	49.68	36.81	31.42	177.89
19C	2.48	0.89	0.00	0.00	0.00	3.37	46.67	16.68	49.68	36.81	31.42	181.26
20A	1.81	0.65	2.22	0.00	0.00	4.68	48.48	17.33	51.90	36.81	31.42	185.94
20B	2.20	0.79	1.46	0.00	0.00	4.45	50.68	18.12	53.36	0.00	31.42	153.58
21	1.11	0.40	1.02	0.00	0.00	2.53	51.79	18.52	54.38	0.00	31.42	156.11
22A	1.16	0.41	0.53	0.00	0.00	2.10	52.95	18.93	54.91	0.00	31.42	158.21
22B	11.36	4.06	14.34	6.67	6.59	43.02	64.31	22.99	69.25	6.67	38.01	201.23
23	3.12	1.12	0.99	0.00	-2.68	2.55	67.43	24.11	70.24	6.67	35.33	203.78
24	6.06	2.17	2.78	0.00	0.00	11.01	73.49	26.28	73.02	6.67	35.33	214.79
25	4.42	1.58	0.16	0.00	0.00	6.16	77.91	27.86	73.18	6.67	35.33	220.95
26A	4.83	1.73	9.29	0.00	-18.28	(2.43)	82.74	29.59	82.47	6.67	17.05	218.52
28G	8.99	3.21	3.51	0.00	0.00	15.71	91.73	32.80	85.98	6.67	17.05	234.23
28H	8.65	3.09	3.68	0.00	0.00	15.42	100.38	35.89	89.66	6.67	17.05	249.65
28J	97.04	34.68	51.22	0.00	0.00	182.94	197.42	70.57	140.88	6.67	17.05	432.59
<b>EBX</b>												
1	N/A	0.00	0.18	0.00	0.00	0.18	N/A	29.59	82.65	6.67	17.05	135.96
2A	N/A	0.00	1.46	0.00	0.00	1.46	N/A	29.59	84.12	6.67	17.05	137.43
2B	N/A	0.00	65.87	7.80	30.51	104.19	N/A	29.59	149.99	14.47	47.56	241.62
2C	N/A	0.00	4.02	0.00	0.00	4.02	N/A	29.59	154.01	14.47	47.56	245.63
2D	N/A	0.00	0.00	0.00	0.00	0.00	N/A	29.59	154.01	14.47	47.56	245.63
2E	N/A	0.00	0.00	0.00	0.00	0.00	N/A	29.59	154.01	14.47	47.56	245.63
3A	N/A	0.00	142.50	9.35	41.01	192.86	N/A	29.59	296.51	23.82	88.57	438.49
3B	N/A	0.00	6.32	0.00	0.00	6.32	N/A	29.59	302.82	23.82	88.57	444.81
4A	N/A	0.00	5.22	0.00	0.00	5.22	N/A	29.59	308.04	23.82	88.57	450.03
4B	N/A	0.00	70.38	1.21	10.12	81.71	N/A	29.59	378.43	25.03	98.69	531.74
<b>WB</b>												
29A	4.50	1.61	10.64	2.75	2.35	21.85	43.32	15.49	56.75	39.56	35.87	190.99
29F	3.28	1.17	1.28	0.00	0.00	5.73	46.60	16.66	58.03	39.56	35.87	196.72
29G	10.91	3.90	6.05	0.00	-8.45	12.41	57.51	20.56	64.08	39.56	27.42	209.13
29H	6.79	2.43	5.73	0.00	0.00	14.95	64.30	22.99	69.81	39.56	27.42	224.08
29J	11.39	4.07	1.65	0.00	-15.81	1.30	75.69	27.06	71.46	39.56	11.61	225.38
30	18.27	6.53	5.15	0.00	0.00	29.95	93.96	33.59	76.61	39.56	11.61	255.33
<b>CB</b>												
31A	8.26	2.95	24.28	2.11	2.02	39.62	16.84	6.02	33.44	6.14	5.66	68.10
33A	308.82	110.36	45.80	14.62	26.41	506.01	325.66	116.38	79.24	20.76	32.07	574.11
34	220.64	78.85	1.28	0.00	0.00	300.77	546.30	195.23	80.52	20.76	32.07	874.88
35	0.00	0.00	0.00	0.00	0.00	0.00	546.30	195.23	80.52	20.76	32.07	874.88

<sup>a</sup> Representative of transportation unit costs only; does not include a unit cost of conservation. The Delta Water Rate should be added to these values in order to approximate unit costs at canalside. Includes surplus water prior to May 1, 1973.

<sup>b</sup> Hypothetical charges which, if assessed on all Table A water delivered to date, all surplus water delivered prior to May 1, 1973, and all Table A water estimated to be delivered during the remainder of the project repayment period (Table B-5B), would provide a sum at the end of the period financially equivalent to all Transportation Charges required under the water supply contract considering interest rate at the Project Interest Rate of 4.610 percent per annum.

<sup>c</sup> The Water System Revenue Bond (WSRB) Surcharge equivalent unit rate is calculated by multiplying Column 1 by the ratio of the 2017 WSRB surcharge to the sum of the Transportation Capital and the Capital component of the Delta Water Charge.

**TABLE B-26 Capital Costs of Each Aqueduct Reach to be Reimbursed through the Capital Cost Component of the East Branch Enlargement Transportation Charge Phase 1 and Phase 2 (in dollars)**

Calendar Year	CALIFORNIA AQUEDUCT							
	MOJAVE DIVISION							
	Reach 18A	Reach 19	Reach 20A	Reach 20B	Reach 21	Reach 22A	Reach 22B	Reach 23B
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
1952	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0
1954	0	0	0	0	0	0	0	0
1955	0	0	0	0	0	0	0	0
1956	0	0	0	0	0	0	0	0
1957	0	0	0	0	0	0	0	0
1958	0	0	0	0	0	0	0	0
1959	0	0	0	0	0	0	0	0
1960	0	0	0	0	0	0	0	0
1961	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	117,000	0	0	0	0	0	0	0
1980	200,000	0	0	0	0	0	0	74,000
1981	135,000	0	0	0	0	0	0	385,000
1982	1,503,000	0	0	0	0	0	0	1,586,000
1983	2,260,000	0	0	0	0	0	0	2,965,000
1984	735,000	0	0	0	0	0	796,000	1,380,000
1985	93,000	435,000	75,000	544,000	859,000	703,000	970,000	146,000
1986	784,000	4,477,000	3,144,000	2,234,000	1,569,000	1,203,000	1,808,000	34,000
1987	11,000	951,000	1,076,000	666,000	399,000	47,000	16,421,000	43,000
1988	1,000	125,000	1,681,000	1,730,000	2,024,000	40,000	13,326,000	70,000
1989	0	206,000	2,089,000	2,174,000	2,510,000	61,000	11,242,000	229,000
1990	1,000	577,000	903,000	735,000	928,000	194,000	20,131,000	887,000
1991	1,000	280,000	413,000	333,000	422,000	93,000	20,702,000	1,215,000
1992	0	40,000	41,000	39,000	35,000	13,000	9,599,000	3,719,000
1993	0	19,000	16,000	19,000	12,000	6,000	2,319,000	19,654,000
1994	0	2,000	3,000	2,000	4,000	3,000	803,000	3,173,000
1995	0	0	0	0	0	0	223,000	1,465,000
1996	0	0	0	0	0	0	6,014,000	478,000
1997	0	0	0	0	0	0	404,000	1,327,000
1998	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0	0
2006	0	4,366	0	22,095	37,971	0	67,871	0
2007	0	34,564	0	174,915	300,601	0	537,312	0
2008	0	67,077	0	339,450	583,367	0	1,042,743	0
2009	0	90,089	0	455,906	783,502	0	1,400,476	0
2010	0	21,120	0	106,881	183,682	0	328,324	0
2011	0	16,403	0	83,011	142,660	0	254,998	0
2012	0	26,143	0	132,299	227,364	0	406,404	0
2013	0	690	0	3,492	6,002	0	10,728	0
2014	0	4,290	0	21,708	37,307	0	66,685	0
2015	0	3,519	0	17,808	30,604	0	54,704	0
2016	0	0	0	0	0	0	0	0
2017	0	0	0	0	0	0	0	0
2018	0	0	0	0	0	0	0	0
2019	0	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0
<b>TOTAL</b>	<b>5,841,000</b>	<b>7,380,261</b>	<b>9,441,000</b>	<b>9,833,565</b>	<b>11,095,061</b>	<b>2,363,000</b>	<b>108,928,245</b>	<b>38,830,000</b>

**TABLE B-26 Capital Costs of Each Aqueduct Reach to be Reimbursed through the Capital Cost Component of the East Branch Enlargement Transportation Charge Phase 1 and Phase 2 (in dollars)**

Sheet 2 of 2

Calendar Year	CALIFORNIA AQUEDUCT (continued)							GRAND TOTAL
	MOJAVE DIVISION (continued)			SANTA ANA DIVISION				
	Reach 23C	Reach 24	Total	Reach 25	Reach 26A	Reach 26B	Total	
	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]
1952	0	0	0	0	0	0	0	0
1953	0	0	0	0	0	0	0	0
1954	0	0	0	0	0	0	0	0
1955	0	0	0	0	0	0	0	0
1956	0	0	0	0	0	0	0	0
1957	0	0	0	0	0	0	0	0
1958	0	0	0	0	0	0	0	0
1959	0	0	0	0	0	0	0	0
1960	0	0	0	0	0	0	0	0
1961	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	0	0	117,000	0	0	0	0	117,000
1980	0	0	274,000	0	0	0	0	274,000
1981	0	0	520,000	0	0	0	0	520,000
1982	0	0	3,089,000	0	0	0	0	3,089,000
1983	0	0	5,225,000	0	0	0	0	5,225,000
1984	0	0	2,911,000	0	0	0	0	2,911,000
1985	0	0	3,825,000	0	528,000	89,000	617,000	4,442,000
1986	25,000	0	15,278,000	0	1,926,000	154,000	2,080,000	17,358,000
1987	178,000	0	19,792,000	0	3,699,000	437,000	4,136,000	23,928,000
1988	632,000	0	19,629,000	0	5,667,000	3,329,000	8,996,000	28,625,000
1989	1,130,000	0	19,641,000	0	40,879,000	1,650,000	42,529,000	62,170,000
1990	2,066,000	0	26,422,000	0	29,853,000	1,650,000	31,503,000	57,925,000
1991	4,980,000	0	28,439,000	0	26,027,000	999,000	27,026,000	55,465,000
1992	11,920,000	0	25,406,000	0	15,317,000	299,000	15,616,000	41,022,000
1993	16,303,000	0	38,348,000	0	4,878,000	0	4,878,000	43,226,000
1994	7,081,000	0	11,071,000	0	3,151,000	0	3,151,000	14,222,000
1995	5,350,000	0	7,038,000	0	2,137,000	0	2,137,000	9,175,000
1996	1,706,000	0	8,198,000	0	9,181,000	0	9,181,000	17,379,000
1997	1,905,000	0	3,636,000	0	175,000	0	175,000	3,811,000
1998	28,000	0	28,000	0	0	0	0	28,000
1999	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0	0
2006	0	0	132,302	0	0	0	0	132,302
2007	0	0	1,047,392	0	0	0	0	1,047,392
2008	0	0	2,032,638	0	0	0	0	2,032,638
2009	0	0	2,729,973	0	0	0	0	2,729,973
2010	0	0	640,008	0	0	0	0	640,008
2011	0	0	497,072	0	0	0	0	497,072
2012	0	0	792,210	0	0	0	0	792,210
2013	0	0	20,913	0	0	0	0	20,913
2014	0	0	129,990	0	0	0	0	129,990
2015	0	0	106,635	0	0	0	0	106,635
2016	0	0	0	0	0	0	0	0
2017	0	0	0	0	0	0	0	0
2018	0	0	0	0	0	0	0	0
2019	0	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0
TOTAL	53,304,000	0	247,016,132	0	143,418,000	8,607,000	152,025,000	399,041,132

**TABLE B-27 Minimum OMP&R Costs of Each Aqueduct Reach to be Reimbursed through Minimum OMP&R Component of the East Branch Enlargement Transportation Charge Phase 1 and Phase 2 (in dollars)**

Sheet 1 of 2

Calendar Year	CALIFORNIA AQUEDUCT							
	MOJAVE DIVISION							
	Reach 18A	Reach 19	Reach 20A	Reach 20B	Reach 21	Reach 22A	Reach 22B	Reach 23B
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
1971	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	1,048,625	0
1995	0	0	0	0	0	0	953,814	0
1996	0	0	0	0	0	0	1,171,411	0
1997	0	0	0	0	0	0	1,110,038	0
1998	0	0	0	0	0	0	1,213,002	0
1999	1,229	517	646	409	383	169	668,466	0
2000	4,452	1,875	2,340	1,484	1,386	614	1,315,186	0
2001	347	146	183	116	108	48	1,028,420	0
2002	1,639	690	861	546	510	226	1,533,612	0
2003	0	0	0	0	0	0	1,817,744	0
2004	2,132	27,868	18,579	18,731	10,355	8,528	1,476,962	0
2005	1,243	16,250	10,833	10,922	6,038	4,973	1,028,465	0
2006	3,279	42,860	28,573	28,807	15,926	13,116	1,463,487	0
2007	0	0	0	0	0	0	1,408,475	0
2008	0	0	0	0	0	0	2,053,641	0
2009	(4)	(46)	(31)	(31)	(17)	(14)	1,718,899	0
2010	(1)	(8)	(5)	(5)	(3)	(2)	1,798,266	0
2011	0	0	0	0	0	0	1,900,038	0
2012	4	54	36	36	20	17	1,909,193	0
2013	0	0	0	0	0	0	2,014,115	0
2014	231	3,023	2,015	2,032	1,123	925	2,508,755	0
2015	(697)	(9,108)	(6,072)	(6,122)	(3,385)	(2,787)	2,693,324	0
2016	0	0	0	0	0	0	2,666,145	0
2017	0	0	0	0	0	0	3,136,517	0
2018	0	0	0	0	0	0	2,883,358	0
2019	0	0	0	0	0	0	2,883,358	0
2020	0	0	0	0	0	0	2,883,358	0
2021	0	0	0	0	0	0	2,883,358	0
2022	0	0	0	0	0	0	2,883,358	0
2023	0	0	0	0	0	0	2,883,358	0
2024	0	0	0	0	0	0	2,883,358	0
2025	0	0	0	0	0	0	2,883,358	0
2026	0	0	0	0	0	0	2,883,358	0
2027	0	0	0	0	0	0	2,883,358	0
2028	0	0	0	0	0	0	2,883,358	0
2029	0	0	0	0	0	0	2,883,358	0
2030	0	0	0	0	0	0	2,883,358	0
2031	0	0	0	0	0	0	2,883,358	0
2032	0	0	0	0	0	0	2,883,358	0
2033	0	0	0	0	0	0	2,883,358	0
2034	0	0	0	0	0	0	2,883,358	0
2035	0	0	0	0	0	0	2,883,358	0
<b>TOTAL</b>	<b>13,855</b>	<b>84,122</b>	<b>57,959</b>	<b>56,926</b>	<b>32,445</b>	<b>25,812</b>	<b>91,537,043</b>	<b>0</b>

**TABLE B-27 Minimum OMP&R Costs of Each Aqueduct Reach to be Reimbursed through Minimum OMP&R Component of the East Branch Enlargement Transportation Charge Phase 1 and Phase 2 (in dollars)**

Sheet 2 of 2

Calendar Year	CALIFORNIA AQUEDUCT (continued)							GRAND TOTAL
	MOJAVE DIVISION (continued)			SANTA ANA DIVISION				
	Reach 23C	Reach 24	Subtotal	Reach 25	Reach 26A <sup>a</sup>	Reach 26B	Subtotal	
	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]
1971	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0
1994	0	0	1,048,625	0	1,713,260	0	1,713,260	2,761,885
1995	0	0	953,814	0	1,452,549	0	1,452,549	2,406,363
1996	0	0	1,171,411	0	1,350,581	0	1,350,581	2,521,992
1997	679,826	0	1,789,864	0	1,528,509	0	1,528,509	3,318,373
1998	825,038	0	2,038,040	0	1,619,068	0	1,619,068	3,657,108
1999	382,178	0	1,053,997	0	956,229	0	956,229	2,010,227
2000	735,389	0	2,062,727	0	1,408,811	0	1,408,811	3,471,538
2001	812,038	0	1,841,406	0	789,894	0	789,894	2,631,301
2002	727,219	0	2,265,303	0	1,132,447	0	1,132,447	3,397,751
2003	899,528	0	2,717,272	0	1,235,686	0	1,235,686	3,952,958
2004	913,368	0	2,476,523	0	1,808,950	0	1,808,950	4,285,473
2005	1,036,431	0	2,115,156	0	1,850,269	0	1,850,269	3,965,425
2006	835,977	0	2,432,025	0	1,758,916	0	1,758,916	4,190,941
2007	1,305,526	0	2,714,001	0	2,794,987	0	2,794,987	5,508,988
2008	1,056,104	0	3,109,745	0	2,701,841	0	2,701,841	5,811,585
2009	1,531,068	0	3,249,824	0	2,834,596	0	2,834,596	6,084,420
2010	1,435,460	0	3,233,702	0	2,409,559	0	2,409,559	5,643,261
2011	1,818,536	0	3,718,574	0	2,106,592	0	2,106,592	5,825,166
2012	1,256,975	0	3,166,335	0	2,334,826	0	2,334,826	5,501,161
2013	1,525,748	0	3,539,862	0	2,789,110	0	2,789,110	6,328,972
2014	1,896,137	0	4,414,241	0	3,283,738	0	3,283,738	7,697,979
2015	1,968,399	0	4,633,551	0	4,447,708	0	4,447,708	9,081,260
2016	2,158,924	0	4,825,069	0	3,922,002	0	3,922,002	8,747,071
2017	2,243,028	0	5,379,545	0	4,497,056	0	4,497,056	9,876,601
2018	2,238,620	0	5,121,978	0	4,681,660	0	4,681,660	9,803,638
2019	2,238,620	0	5,121,978	0	4,681,660	0	4,681,660	9,803,638
2020	2,238,620	0	5,121,978	0	4,681,660	0	4,681,660	9,803,638
2021	2,238,620	0	5,121,978	0	4,681,660	0	4,681,660	9,803,638
2022	2,238,620	0	5,121,978	0	4,681,660	0	4,681,660	9,803,638
2023	2,238,620	0	5,121,978	0	4,681,660	0	4,681,660	9,803,638
2024	2,238,620	0	5,121,978	0	4,681,660	0	4,681,660	9,803,638
2025	2,238,620	0	5,121,978	0	4,681,660	0	4,681,660	9,803,638
2026	2,238,620	0	5,121,978	0	4,681,660	0	4,681,660	9,803,638
2027	2,238,620	0	5,121,978	0	4,681,660	0	4,681,660	9,803,638
2028	2,238,620	0	5,121,978	0	4,681,660	0	4,681,660	9,803,638
2029	2,238,620	0	5,121,978	0	4,681,660	0	4,681,660	9,803,638
2030	2,238,620	0	5,121,978	0	4,681,660	0	4,681,660	9,803,638
2031	2,238,620	0	5,121,978	0	4,681,660	0	4,681,660	9,803,638
2032	2,238,620	0	5,121,978	0	4,681,660	0	4,681,660	9,803,638
2033	2,238,620	0	5,121,978	0	4,681,660	0	4,681,660	9,803,638
2034	2,238,620	0	5,121,978	0	4,681,660	0	4,681,660	9,803,638
2035	2,238,620	0	5,121,978	0	4,681,660	0	4,681,660	9,803,638
TOTAL	66,338,056	0	158,146,217	0	136,997,065	0	136,997,065	295,143,283

<sup>a</sup> Units 3 and 4 at Devil Canyon Powerplant were operational in 1993.



**TABLE B-28 Capital Costs of East Branch Enlargement Transportation Facilities Allocated to Each Contractor Phase 1 and Phase 2 (in dollars)**

Calendar Year	SOUTHERN CALIFORNIA AREA							Total
	AVEK	Coachella	Desert	Mojave	Palmdale	San Bernardino	Metropolitan	
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
1971	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	0	11,731	1,010	10,566	466	0	93,227	117,000
1980	0	28,241	4,708	27,495	797	0	212,759	274,000
1981	0	56,134	16,676	61,271	538	0	385,381	520,000
1982	0	326,180	76,872	337,913	5,988	0	2,342,047	3,089,000
1983	0	554,658	138,964	582,070	9,004	0	3,940,304	5,225,000
1984	0	306,514	68,842	314,468	2,928	0	2,218,248	2,911,000
1985	49,675	447,266	65,773	347,262	4,514	21,614	3,505,896	4,442,000
1986	185,353	1,757,633	236,324	1,363,586	41,900	78,842	13,694,362	17,358,000
1987	49,735	2,455,279	378,535	1,774,447	10,615	151,421	19,107,968	23,928,000
1988	124,534	2,689,959	500,466	1,712,431	13,783	231,982	23,351,845	28,625,000
1989	155,446	7,118,094	2,423,000	1,671,088	17,419	1,673,409	49,111,544	62,170,000
1990	62,786	6,459,229	1,943,918	2,234,452	8,680	1,222,053	45,993,882	57,925,000
1991	28,686	6,265,822	1,875,066	2,168,712	4,024	1,065,433	44,057,257	55,465,000
1992	2,911	4,826,764	1,610,921	1,359,335	471	627,012	32,594,586	41,022,000
1993	1,205	5,094,237	1,828,410	2,722,156	212	199,684	33,380,096	43,226,000
1994	273	1,726,376	631,816	478,543	27	128,988	11,255,977	14,222,000
1995	0	1,130,963	423,243	206,978	0	87,480	7,326,336	9,175,000
1996	0	2,025,987	645,296	606,205	0	375,830	13,725,682	17,379,000
1997	0	451,011	154,366	205,796	0	7,164	2,992,663	3,811,000
1998	0	3,551	1,293	0	0	0	23,156	28,000
1999	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0	0
2006	1,368	13,170	1,134	11,862	103	0	104,665	132,302
2007	10,827	104,265	8,976	93,908	819	0	828,597	1,047,392
2008	21,011	202,344	17,420	182,243	1,589	0	1,608,031	2,032,638
2009	28,220	271,762	23,397	244,765	2,134	0	2,159,695	2,729,973
2010	6,616	63,711	5,485	57,382	500	0	506,314	640,008
2011	5,138	49,482	4,260	44,567	389	0	393,236	497,072
2012	8,189	78,862	6,789	71,028	619	0	626,723	792,210
2013	216	2,082	179	1,875	16	0	16,545	20,913
2014	1,344	12,940	1,114	11,655	102	0	102,835	129,990
2015	1,102	10,615	914	9,561	83	0	84,360	106,635
2016	0	0	0	0	0	0	0	0
2017	0	0	0	0	0	0	0	0
2018	0	0	0	0	0	0	0	0
2019	0	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0
<b>TOTAL</b>	<b>744,635</b>	<b>44,544,862</b>	<b>13,095,167</b>	<b>18,913,620</b>	<b>127,720</b>	<b>5,870,912</b>	<b>315,744,217</b>	<b>399,041,133</b>

**TABLE B-29 Capital Cost Component of East Branch Enlargement Facilities Transportation Charge for Each Contractor<sup>a,b</sup> (in dollars)**

Calendar Year	SOUTHERN CALIFORNIA AREA							Total
	AVEK	Coachella	Desert	Mojave	Palmdale	San Bernardino <sup>c</sup>	Metropolitan	
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
1971	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0
1988	18,266	1,209,293	360,156	502,810	3,356	0	8,552,529	10,646,410
1989	19,176	1,269,524	378,094	527,854	3,523	0	8,978,504	11,176,675
1990	19,186	1,270,244	378,308	528,153	3,525	0	8,983,597	11,183,013
1991	19,187	1,270,261	378,314	528,160	3,525	0	8,983,717	11,183,164
1992	38,420	2,543,616	757,549	1,057,606	7,059	0	17,989,315	22,393,565
1993	40,029	2,650,139	789,274	1,101,897	7,354	0	18,742,682	23,331,375
1994	39,705	2,628,706	782,890	1,092,986	7,295	0	18,591,099	23,142,681
1995	39,632	2,623,828	781,438	1,090,958	7,281	0	18,556,603	23,099,740
1996	39,825	2,636,667	785,261	1,096,296	7,317	0	18,647,406	23,212,772
1997	41,743	2,763,629	823,074	1,149,085	7,669	0	19,545,322	24,330,522
1998	42,642	2,823,126	840,793	1,173,823	7,834	0	19,966,108	24,854,326
1999	44,738	2,961,887	882,120	1,231,519	8,219	0	20,947,475	26,075,958
2000	49,031	3,246,109	966,768	1,349,695	9,008	0	22,957,586	28,578,197
2001	49,048	3,247,263	967,111	1,350,175	9,011	0	22,965,748	28,588,356
2002	47,894	3,170,848	944,353	1,318,402	8,799	0	22,425,318	27,915,614
2003	40,765	2,698,871	803,787	1,122,160	7,489	0	19,087,337	23,760,409
2004	44,199	2,926,222	871,498	1,216,690	8,120	0	20,695,237	25,761,966
2005	33,144	2,194,299	653,514	912,364	6,089	0	15,518,826	19,318,236
2006	46,979	3,110,276	926,313	1,293,217	8,631	0	21,996,926	27,382,342
2007	45,289	2,998,370	892,985	1,246,688	8,321	0	21,205,488	26,397,141
2008	42,491	2,813,118	837,813	1,169,662	7,806	0	19,895,328	24,766,218
2009	43,670	2,891,182	861,062	1,202,121	8,023	0	20,447,424	25,453,482
2010	44,839	2,968,619	884,125	1,234,318	8,238	0	20,995,084	26,135,223
2011	43,190	2,859,419	851,602	1,188,914	7,935	0	20,222,785	25,173,845
2012	43,704	2,893,449	861,737	1,203,063	8,029	0	20,463,459	25,473,441
2013	37,663	2,493,469	742,614	1,036,756	6,919	0	17,634,660	21,952,081
2014	39,838	2,637,482	785,504	1,096,635	7,319	0	18,653,166	23,219,944
2015	44,619	2,954,015	879,775	1,228,246	8,197	0	20,891,796	26,006,648
2016	64,929	4,224,099	1,261,425	1,741,435	11,665	0	29,840,781	37,144,334
2017	67,986	4,387,080	1,309,263	1,809,965	12,137	0	30,994,029	38,580,460
2018	66,053	4,276,637	1,277,292	1,761,594	11,810	0	30,208,216	37,601,602
2019	66,388	4,286,916	1,280,236	1,765,768	11,843	0	30,280,398	37,691,549
2020	65,281	4,187,156	1,248,498	1,730,188	11,610	0	29,586,664	36,829,397
2021	66,335	4,280,656	1,278,006	1,764,317	11,834	0	30,238,485	37,639,633
2022	63,896	4,117,742	1,229,299	1,697,168	11,386	0	29,087,515	36,207,006
2023	52,917	3,377,916	1,007,245	1,394,955	9,369	0	23,866,311	29,708,713
2024	55,213	3,546,728	1,058,288	1,463,195	9,818	0	25,056,506	31,189,748
2025	63,019	4,034,693	1,202,714	1,667,993	11,196	0	28,510,862	35,490,477
2026	26,140	1,589,925	472,729	657,847	4,449	0	11,234,016	13,985,106
2027	26,537	1,618,059	481,352	668,776	4,522	0	11,431,404	14,230,650
2028	18,266	1,051,912	310,301	441,048	3,001	0	7,443,195	9,267,723
2029	18,775	1,104,420	326,949	460,179	3,125	0	7,809,305	9,722,753
2030	20,307	195,564	16,836	176,137	1,536	0	1,554,155	1,964,535
2031	20,236	194,875	16,778	175,516	1,530	0	1,548,678	1,957,613
2032	20,276	195,266	16,811	175,869	1,534	0	1,551,790	1,961,546
2033	20,251	195,026	16,790	175,652	1,531	0	1,549,876	1,959,126
2034	20,283	195,325	16,816	175,921	1,534	0	1,552,251	1,962,130
2035	20,293	195,420	16,825	176,008	1,535	0	1,553,008	1,963,089
<b>TOTAL</b>	<b>1,942,293</b>	<b>120,009,346</b>	<b>35,512,285</b>	<b>50,329,784</b>	<b>338,856</b>	<b>0</b>	<b>849,437,970</b>	<b>1,057,570,534</b>

<sup>a</sup>1988 through 2015 charges are debt service only and do not include bond cover; 2016 charges and after include both debt service and bond cover.

<sup>b</sup>East Branch Enlargement Phase 2 debt service schedule starts in 2016, and this table is the sum of East Branch Enlargement Phase 1 and Phase 2 capital charges for each contractor.

<sup>c</sup>Under Article 49(d)(4)(A) of its contract, San Bernardino Valley Municipal Water District elected to pay a portion of its allocated costs of East Branch Enlargement in advance rather than to participate in payment of Water System Revenue Bonds. This election was made via a letter of agreement signed June 1, 1987. As of June 1999, \$6,347,938 has been received from the San Bernardino Valley Municipal Water District.

**TABLE B-30 Minimum OMP&R Component of East Branch Enlargement Facilities Transportation Charge for Each Contractor (in dollars)**

Calendar Year	SOUTHERN CALIFORNIA AREA							Total
	AVEK	Coachella	Desert	Mojave	Palmdale	San Bernardino	Metropolitan	
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
1971	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0
1994	0	320,415	101,486	95,075	0	70,133	2,174,776	2,761,885
1995	0	278,176	86,604	86,479	0	59,461	1,895,643	2,406,363
1996	0	287,293	82,991	106,208	0	55,287	1,990,213	2,521,992
1997	0	389,636	123,446	100,643	0	62,571	2,642,077	3,318,373
1998	0	429,772	135,927	109,979	0	66,278	2,915,152	3,657,108
1999	37	236,006	75,040	60,907	11	39,144	1,599,082	2,010,227
2000	132	403,529	121,437	120,330	40	57,671	2,768,399	3,471,538
2001	10	305,653	89,017	93,328	3	32,335	2,110,955	2,631,301
2002	49	389,061	107,983	139,447	15	46,357	2,714,839	3,397,751
2003	0	452,017	123,931	164,809	0	50,584	3,161,617	3,952,958
2004	1,278	499,879	153,267	141,586	265	74,051	3,415,147	4,285,473
2005	745	471,965	156,985	97,723	154	75,742	3,162,111	3,965,425
2006	1,965	487,018	147,273	144,493	407	72,002	3,337,783	4,190,941
2007	0	657,848	223,226	127,702	0	114,415	4,385,797	5,508,988
2008	0	679,484	212,277	186,197	0	110,602	4,623,025	5,811,585
2009	(2)	722,651	238,466	155,834	0	116,036	4,851,435	6,084,420
2010	0	665,226	211,817	163,041	0	98,637	4,504,540	5,643,261
2011	0	686,057	214,049	172,270	0	86,235	4,666,555	5,825,166
2012	2	644,406	200,508	173,115	1	95,578	4,387,551	5,501,161
2013	0	746,004	238,327	182,613	0	114,174	5,047,854	6,328,972
2014	139	905,721	286,472	228,293	29	134,422	6,142,903	7,697,979
2015	(418)	1,075,723	353,863	241,686	(87)	182,070	7,228,423	9,081,260
2016	0	1,034,006	334,313	241,730	0	160,550	6,976,472	8,747,071
2017	0	<b>1,164,137</b>	<b>373,286</b>	<b>284,378</b>	<b>0</b>	<b>184,090</b>	<b>7,870,710</b>	<b>9,876,601</b>
2018	0	1,161,244	380,845	261,424	0	191,647	7,808,478	9,803,638
2019	0	1,161,244	380,845	261,424	0	191,647	7,808,478	9,803,638
2020	0	1,161,244	380,845	261,424	0	191,647	7,808,478	9,803,638
2021	0	1,161,244	380,845	261,424	0	191,647	7,808,478	9,803,638
2022	0	1,161,244	380,845	261,424	0	191,647	7,808,478	9,803,638
2023	0	1,161,244	380,845	261,424	0	191,647	7,808,478	9,803,638
2024	0	1,161,244	380,845	261,424	0	191,647	7,808,478	9,803,638
2025	0	1,161,244	380,845	261,424	0	191,647	7,808,478	9,803,638
2026	0	1,161,244	380,845	261,424	0	191,647	7,808,478	9,803,638
2027	0	1,161,244	380,845	261,424	0	191,647	7,808,478	9,803,638
2028	0	1,161,244	380,845	261,424	0	191,647	7,808,478	9,803,638
2029	0	1,161,244	380,845	261,424	0	191,647	7,808,478	9,803,638
2030	0	1,161,244	380,845	261,424	0	191,647	7,808,478	9,803,638
2031	0	1,161,244	380,845	261,424	0	191,647	7,808,478	9,803,638
2032	0	1,161,244	380,845	261,424	0	191,647	7,808,478	9,803,638
2033	0	1,161,244	380,845	261,424	0	191,647	7,808,478	9,803,638
2034	0	1,161,244	380,845	261,424	0	191,647	7,808,478	9,803,638
2035	0	1,161,244	380,845	261,424	0	191,647	7,808,478	9,803,638
<b>TOTAL</b>	<b>3,937</b>	<b>34,834,075</b>	<b>11,247,201</b>	<b>8,323,498</b>	<b>838</b>	<b>5,608,071</b>	<b>235,125,663</b>	<b>295,143,283</b>

**TABLE B-31 Total East Branch Enlargement Facilities Transportation Charge for Each Contractor (in dollars)**

Calendar Year	SOUTHERN CALIFORNIA AREA							Total
	AVEK	Coachella	Desert	Mojave	Palmdale	San Bernardino	Metropolitan	
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
1971	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0
1988	18,266	1,209,293	360,156	502,810	3,356	0	8,552,529	10,646,410
1989	19,176	1,269,524	378,094	527,854	3,523	0	8,978,504	11,176,675
1990	19,186	1,270,244	378,308	528,153	3,525	0	8,983,597	11,183,013
1991	19,187	1,270,261	378,314	528,160	3,525	0	8,983,717	11,183,164
1992	38,420	2,543,616	757,549	1,057,606	7,059	0	17,989,315	22,393,565
1993	40,029	2,650,139	789,274	1,101,897	7,354	0	18,742,682	23,331,375
1994	39,705	2,949,121	884,376	1,188,061	7,295	70,133	20,765,875	25,904,566
1995	39,632	2,902,004	868,042	1,177,437	7,281	59,461	20,452,246	25,506,103
1996	39,825	2,923,960	868,252	1,202,504	7,317	55,287	20,637,619	25,734,764
1997	41,743	3,153,265	946,520	1,249,728	7,669	62,571	22,187,399	27,648,895
1998	42,642	3,252,898	976,720	1,283,802	7,834	66,278	22,881,260	28,511,434
1999	44,775	3,197,893	957,160	1,292,426	8,230	39,144	22,546,557	28,086,185
2000	49,163	3,649,638	1,088,205	1,470,025	9,048	57,671	25,725,985	32,049,735
2001	49,058	3,552,916	1,056,128	1,443,503	9,014	32,335	25,076,703	31,219,657
2002	47,943	3,559,909	1,052,336	1,457,849	8,814	46,357	25,140,157	31,313,365
2003	40,765	3,150,888	927,718	1,286,969	7,489	50,584	22,248,954	27,713,367
2004	45,477	3,426,101	1,024,765	1,358,276	8,385	74,051	24,110,384	30,047,439
2005	33,889	2,666,264	810,499	1,010,087	6,243	75,742	18,680,937	23,283,661
2006	48,944	3,597,294	1,073,586	1,437,710	9,038	72,002	25,334,709	31,573,283
2007	45,289	3,656,218	1,116,211	1,374,390	8,321	114,415	25,591,285	31,906,129
2008	42,491	3,492,602	1,050,090	1,355,859	7,806	110,602	24,518,353	30,577,803
2009	43,668	3,613,833	1,099,528	1,357,955	8,023	116,036	25,298,859	31,537,902
2010	44,839	3,633,845	1,095,942	1,397,359	8,238	98,637	25,499,624	31,778,484
2011	43,190	3,545,476	1,065,651	1,361,184	7,935	86,235	24,889,340	30,999,011
2012	43,706	3,537,855	1,062,245	1,376,178	8,030	95,578	24,851,010	30,974,602
2013	37,663	3,239,473	980,941	1,219,369	6,919	114,174	22,682,514	28,281,053
2014	39,977	3,543,203	1,071,976	1,324,928	7,348	134,422	24,796,069	30,917,923
2015	44,201	4,029,738	1,233,638	1,469,932	8,110	182,070	28,120,219	35,087,908
2016	64,929	5,258,105	1,595,738	1,983,165	11,665	160,550	36,817,253	45,891,405
<b>2017</b>	<b>67,986</b>	<b>5,551,217</b>	<b>1,682,549</b>	<b>2,094,343</b>	<b>12,137</b>	<b>184,090</b>	<b>38,864,739</b>	<b>48,457,061</b>
2018	66,053	5,437,881	1,658,137	2,023,018	11,810	191,647	38,016,694	47,405,240
2019	66,388	5,448,160	1,661,081	2,027,192	11,843	191,647	38,088,876	47,495,187
2020	65,281	5,348,400	1,629,343	1,991,612	11,610	191,647	37,395,142	46,633,035
2021	66,335	5,441,900	1,658,851	2,025,741	11,834	191,647	38,046,963	47,443,271
2022	63,896	5,278,986	1,610,144	1,958,592	11,386	191,647	36,895,993	46,010,644
2023	52,917	4,539,160	1,388,090	1,656,379	9,369	191,647	31,674,789	39,512,351
2024	55,213	4,707,972	1,439,133	1,724,619	9,818	191,647	32,864,984	40,993,386
2025	63,019	5,195,937	1,583,559	1,929,417	11,196	191,647	36,319,340	45,294,115
2026	26,140	2,751,169	853,574	919,271	4,449	191,647	19,042,494	23,788,744
2027	26,537	2,779,303	862,197	930,200	4,522	191,647	19,239,882	24,034,288
2028	18,266	2,213,156	691,146	702,472	3,001	191,647	15,251,673	19,071,361
2029	18,775	2,265,664	707,794	721,603	3,125	191,647	15,617,783	19,526,391
2030	20,307	1,356,808	397,681	437,561	1,536	191,647	9,362,633	11,768,173
2031	20,236	1,356,119	397,623	436,940	1,530	191,647	9,357,156	11,761,251
2032	20,276	1,356,510	397,656	437,293	1,534	191,647	9,360,268	11,765,184
2033	20,251	1,356,270	397,635	437,076	1,531	191,647	9,358,354	11,762,764
2034	20,283	1,356,569	397,661	437,345	1,534	191,647	9,360,729	11,765,768
2035	20,293	1,356,664	397,670	437,432	1,535	191,647	9,361,486	11,766,727
<b>TOTAL</b>	<b>1,946,230</b>	<b>154,843,421</b>	<b>46,759,486</b>	<b>58,653,282</b>	<b>339,694</b>	<b>5,608,071</b>	<b>1,084,563,633</b>	<b>1,352,713,817</b>





CONVERSION FACTORS				
Quantity	To convert from customary unit	To metric units	Multiply customary unit by	To convert to customary unit, multiply metric unit by
Length	inches (in)	millimeters (mm)●	25.4	0.03937
	inches (in)	centimeters (cm)	2.54	0.3937
	feet (ft)	meters (m)	0.3048	3.2808
	miles (mi)	kilometers (km)	1.6093	0.62139
Area	square inches (in <sup>2</sup> )	square millimeters (mm <sup>2</sup> )	645.16	0.00155
	square feet (ft <sup>2</sup> )	square meters (m <sup>2</sup> )	0.092903	10.764
	acres (ac)	hectares (ha)	0.40469	2.4710
	square miles (mi <sup>2</sup> )	square kilometers (km <sup>2</sup> )	2.590	0.3861
Volume	gallons (gal)	liters (L)	3.7854	0.26417
	million gallons (10 <sup>6</sup> gal)	megaliters (ML)	3.7854	0.26417
	cubic feet (ft <sup>3</sup> )	cubic meters (m <sup>3</sup> )	0.028317	35.315
	cubic yards (yd <sup>3</sup> )	cubic meters (m <sup>3</sup> )	0.76455	1.308
	acre-feet (af)	thousand cubic meters (m <sup>3</sup> x 10 <sup>3</sup> )	1.2335	0.8107
	acre-feet (af)	hectare-meters (ha - m)■	0.1234	8.107
	thousand acre-feet (taf)	million cubic meters (m <sup>3</sup> x 10 <sup>6</sup> )	1.2335	0.8107
	thousand acre-feet (taf)	hectare-meters (ha - m)■	123.35	0.008107
	million acre-feet (maf)	billion cubic meters (m <sup>3</sup> x 10 <sup>9</sup> )◆	1.2335	0.8107
	million acre-feet (maf)	cubic kilometers (km <sup>3</sup> )	1.2335	0.8107
Flow	cubic feet per second (ft <sup>3</sup> /s)	cubic meters per second (m <sup>3</sup> /s)	0.028317	35.315
	gallons per minute (gal/min)	liters per minute (L/min)	3.7854	0.26417
	gallons per day (gal/day)	liters per day (L/day)	3.7854	0.26417
	million gallons per day (mgd)	megaliters per day (ML/day)	3.7854	0.26417
	acre-feet per day (af/day)	thousand cubic meters per day (m <sup>3</sup> x 10 <sup>3</sup> /day)	1.2335	0.8107
Mass	pounds (lb)	kilograms (kg)	0.45359	2.2046
	tons (short, 2,000 lb)	megagrams (Mg)	0.90718	1.1023
Velocity	feet per second (ft/s)	meters per second (m/s)	0.3048	3.2808
Power	horsepower (hp)	kilowatts (kW)	0.746	1.3405
Pressure	pounds per square inch (psi)	kilopascals (kPa)	6.8948	0.14505
	feet head of water	kilopascals (kPa)	2.989	0.32456
Specific capacity	gallons per minute per foot of drawdown	liters per minute per meter of drawdown	12.419	0.08052
Concentration	parts per million (ppm)	milligrams per liter (mg/L)	1.0	1.0
Electrical conductivity	micromhos per centimeter (μmhos/cm)	microsiemens per centimeter (μS/cm)	1.0	1.0
Temperature	degrees Fahrenheit (°F)	degrees Celsius (°C)	(°F - 32)/1.8	(1.8 x °C) + 32
<p>● When using "dual units," inches are normally converted to millimeters (rather than centimeters).</p> <p>■ Not used often in metric countries, but is offered as a conceptual equivalent of customary western U.S. practice (a standard depth of water over a given area of land).</p> <p>◆ ASTM Manual E380 discourages the use of billion cubic meters since that magnitude is represented by giga (a thousand million) in other countries. It is shown here for potential use for quantifying large reservoir volumes (similar to million acre-feet).</p>				
<p><b>OTHER COMMON CONVERSION FACTORS</b></p> <p>1 cubic foot=7.48 gallons=62.4 pounds of water  1 cubic foot per second (cfs)=450 gallons per minute (gpm)  1 cfs=646,320 gallons per day=1.98 af a day</p> <p>1 acre-foot=approximately 325,851 gallons=43,560 cubic feet  1 million gallons=3.07 acre-feet  1 million gallons per day (mgd)=1,120 af a year</p>				



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