



BULLETIN 132-15 | JULY 2016

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

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**Bulletin 132-15**

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

*Covers Calendar Year 2014 Activities*



*Published July 2016*

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

**John Laird** *Secretary for Natural Resources  
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## Foreword

*B*ulletin 132-15, Management of the California State Water Project, continues the Bulletin 132 annual series begun in 1963. Bulletin 132-15 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 2016. 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, 2014, through December 31, 2014.

Bulletin 132-15 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.



Mark W. Cowin  
*Director*



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**Appendix B**      Data and Computations Used to Determine 2016 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 Paula Landis, and the Commission members at the time of publication are:

Joseph Byrne (Chair)

Joe Del Bosque (Vice-Chair)

Carol Baker

Andrew Ball

Daniel Curtin

Paula Daniels

Maria Herrera

David Orth

Armando Quintero

# 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** San Francisco Bay/Sacramento-San Joaquin Delta

**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

**CAMAL Net** California Association of Mutual Aid Laboratories Network

**C.A.S.T.** Catch A Special Thrill

**CDPH** California Department of Public Health

**CEQA** California Environmental Quality Act

**CESA** California Endangered Species Act

**cfs** cubic feet per second

**CHRED** Crafton Hills Reservoir Enlargement Dam

**CIMIS** California Irrigation Management Information System

**CIWR** California Institute for Water Resources

**Corps** U.S. Army Corps of Engineers

**CSAMP** Collaborative Science and Adaptive Management Program

**CVC** Cross Valley Canal

**CVP** Central Valley Project

**CWC** California Water Code

**D**

**D-1641** State Water Resources Control Board, Water Right Decision 1641  
**DDA** Davis-Dolwig Act  
**DFW** Department of Fish and Wildlife  
**DHCCP** Delta Habitat Conservation and Conveyance Program  
**DMCP** Delta Mercury Control Program  
**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 or specific conductance  
**EIR** environmental impact report  
**EIS** environmental impact statement  
**EPA** U.S. Environmental Protection Agency  
**ESA** federal Endangered Species Act

**F**

**FBD** Fish Barrier Dam  
**FERC** Federal Energy Regulatory Commission  
**FRFH** Feather River Fish Hatchery  
**FRP** Fish Restoration Program

**G**

**GHG** greenhouse gas

**H**

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

**I**

**IEP** Interagency Ecological Program  
**IR** Interim Renewal  
**IRWM** Integrated Regional Water Management  
**ITP** incidental take permit

**J**

**JSATS** juvenile salmon acoustic telemetry system

**K**

**kV** kilovolt

**kWh** kilowatt hour

**L**

**LADWP** Los Angeles Department of Water and Power

**LTMS** Long-Term Management Strategy

**M**

**maf** million acre-feet

**MeHg** methylmercury

**MERP** Mercury Exposure Reduction Program

**mg/L** milligrams per liter

**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**

**OMP&R** operations, maintenance, power, and replacement

**OM&R** operations, maintenance, and replacement

**P**

**PAO** Public Affairs Office

**PFMA** Potential Failure Mode Analysis

**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

**R&FWE** Recreation and Fish and Wildlife Enhancement

**RIMPR** Renewable Integration Market and Product Review

**RM** River Mile

**RPA** reasonable and prudent alternative

**RRSDS** Roaring River Slough Distribution System

**RST** rotary screw trap

**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

**SBX7 7** Water Conservation Act of 2009

**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

**SRCD** Suisun Resource Conservation District

**SRR** Sacramento River Region

**SWP** State Water Project

**SWPAO** State Water Project Analysis Office

**SWRCB** State Water Resources Control Board

## T

**TLR** Tulare Lake Region

**TUCP** temporary urgency change petition

## U

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

**UWMP** Urban Water Management Plan

**W**

**WCD** water conservation district

**WD** water district

**WQCP** water quality control plan 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

*Lake Oroville's Bidwell Bar Bridge in September 2014.*



The annual Bulletin 132 series began in 1963 and reported the first deliveries of water by the new State Water Project (SWP). Bulletin 132-15, *Management of the California State Water Project*, continues this series as the fifty-third edition. It reports on SWP planning, construction, finance, management, and operations during calendar year 2014. 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

On January 17, 2014, the Governor declared a State of Emergency due to drought conditions. State and local officials were directed to take actions to conserve water; implement water shortage contingency plans; and monitor, evaluate, and manage drought impacts. The Governor called for a voluntary statewide 20 percent reduction in water use. The emergency proclamation also made allowances for streamlining water transfers and exchanges, taking action to protect water quality and supply in the Delta, providing assistance to communities threatened by drinking water shortages, and providing drought information and updates to the public.

In March, DWR was considering installation of emergency drought barriers in two locations to help preserve water quality in the Delta. In April, DWR determined that precipitation in February and March eliminated the immediate need for the barriers, and after continued monitoring and assessment, DWR concluded in late May that the barriers would not be needed in 2014.

Beginning in January 2014 and continuing throughout the year, in order to address the effects of the historic drought, 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) carried out the most coordinated and extensive series of water operations adjustments in the history of the Central Valley Project (CVP) and SWP. The adjustments to the existing water quality and federal Endangered Species Act requirements of SWRCB, Water Right Decision 1641 and the U.S. Fish and Wildlife Service and National Marine Fisheries Service biological opinions (BiOps) allowed the CVP and SWP to support water deliveries, transfers, and maximize upstream water storage while minimizing adverse effects on listed fish species and protecting water quality. In April 2014, DWR and Reclamation released the *Central Valley Project and State Water Project Drought Operations Plan and Operational Forecast, April 1, 2014 through November 15, 2014*. The plan served as a flexible framework to guide water management decisions and was implemented in close coordination with the fish and wildlife agencies and the SWRCB. In October 2014, DWR and Reclamation produced a drought contingency plan for CVP and SWP operations covering October 15, 2014, through January 15, 2015.

During 2014, DWR and Reclamation submitted a number of temporary urgency change petitions to the SWRCB, and, pursuant to the resulting water right

orders, produced water balance estimates, performed extensive water supply and salinity modeling, coordinated extensively with fish and wildlife agencies, and prepared operations forecasts and drought contingency plans for operations.

One of the temporary urgency change petitions the SWP and CVP submitted requested modification of requirements to meet several SWRCB, Water Right Decision 1641 objectives due to drought conditions. The SWRCB approved the temporary urgency change petition and issued an order 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.

A number of events centered around water issues were held, including the California State Board of Food and Agriculture's Drought Preparedness and Water Transfers Forum in January; the American Water Works Association's Drought Workshop in May; and DWR's drought briefing and panel discussion, Infocast's Golden State Water Summit, and the American Water Works Association's Whole Water Conference in June.

The 2014 low point for the Lake Oroville reservoir surface elevation was reached on November 21 at 647.7 feet. This was the second lowest the lake had been since it filled in 1968.

## SWP Allocations

On January 31, for the first time in the history of the SWP, DWR announced a "zero" allocation of water for the 29 public agencies (SWP water contractors). Snow in February and March allowed DWR, on April 18, to announce a final allocation of 5 percent. The 2014 final allocation was the lowest allocation in SWP history.

## California Water Action Plan

The California Natural Resources Agency, the California Environmental Protection Agency, and the California Department of Food and Agriculture released the *California Water Action Plan* in January 2014. The plan contains near- and long-term actions to guide State efforts to enhance water supply reliability, achieve the co-equal goals of the *Delta Plan* (see Chapter 2, Delta Resources), restore damaged ecosystems, improve infrastructure, and respond to drought.

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

## Yearly Activities Summary

### 2014 Precipitation and Water Storage

Water stored and delivered by the SWP conservation and transportation facilities originates from rainfall and snowmelt in Northern and Central California watersheds where most of the State's precipitation occurs. DWR monitors and records annual precipitation and runoff during each water year, which begins October 1 and ends September 30.

### *Precipitation and Mountain Snowpack in Water Year 2013–2014*

California experienced significantly below-average rainfall and mountain snowpack during water year 2013–2014. The State



received precipitation at 56 percent of average in 2013–2014, compared to 79 percent of average in water year 2012–2013. The Northern Sierra 8-Station Precipitation Index finished the water year with 31.34 inches of precipitation, which was 63 percent of average. For the San Joaquin 5-Station Precipitation Index, the total accumulated precipitation was 20.40 inches (50 percent of average). The Tulare Basin 6-Station Precipitation Index accumulated a total of 14.20 inches (49 percent of average). The statewide average snow water equivalent reported for April 1 was 9.4 inches or 33 percent of average.

### **River Runoff**

Statewide river runoff totaled 35 percent of average in the 2013–2014 water year. Runoff in the Sacramento River Region, the San Joaquin 4 Rivers, and the Tulare Lake Region was 41, 29, and 27 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 2013–2014.

### **Water Year 2013–2014 Statewide Storage Totals**

For water year 2013–2014, monthly storage totals for the major Sierra reservoirs began at 77 percent of average reservoir storage following a dry 2012–2013 water year. The percent of average storage dropped gradually through January, which ended at 65 percent of average. During the next 5 months, the average ranged from 60 to 69 percent of average. July, August, and September finished below 60 percent of average.

### **2014 Storage Totals in Major SWP Reservoirs**

End-of-year storage on December 31, 2014, in major SWP reservoirs and the State’s share of joint-use reservoirs was 2.3 million acre feet (maf) or 43 percent of maximum storage, compared to 2.2 maf or 41 percent of maximum storage at the end of 2013. The average end-of-month total storage in major SWP reservoirs for 2014 was 852,000 acre-feet (af).

### **Diversions from the Delta**

In 2014, the SWP diverted 1,008,238 af at Banks Pumping Plant. There was no pumping for the Cross Valley Canal, and 23,132 af of CVP water was wheeled at Banks Pumping Plant by DWR during 2014.

Maximum daily Delta exports occurred on December 14 at 21,577 af. Combined SWP and CVP monthly Delta exports in 2014 varied from a low of 58,430 af in June to a high of 398,626 af in December. Delta exports totaled approximately 2 maf in 2014.

For more information, see Chapter 8, Water Supply.

### **2014 Water Supplies, Contracts, and Deliveries**

#### **2014 Water Deliveries**

DWR approved delivery of 0.21 maf on November 19, 2013, resulting in initial Table A amounts of 5 percent of SWP water contractor requests. Although DWR revised the 2014 allocation to zero in January, a final allocation of 5 percent was made on April 18, 2014. For more information on changes in Table A amounts that were approved by DWR, see Chapter 9, Water Contracts and Deliveries.

In 2014, 1,992,157 af of SWP and non-SWP water was delivered to 29 long-term SWP water contractors and 20 other agencies.

The SWP portion totaled 1,061,146 af, and the non-SWP portion totaled 931,011 af.

The portion delivered to the SWP water contractors was 912,241 af, categorized as follows:

- 84,599 af of Table A water;
- 6,746 af of transfers and exchanges of Table A water;
- 750 af of Multiyear Water Pool Program water;
- 365,030 af of carryover water;
- 1,279 af of Article 21 water;
- 341,476 af of water bank recovery;
- 109,462 af of delivery of backup water; and
- 2,899 af of other water.

Other deliveries totaled 148,905 af and represent the following delivery classifications:

- 46 af of SWP water for parks and recreation;
- 40,866 af of 2014 Yuba Accord Dry Year Purchase Program water;
- 1,246 af of local water;
- 6,749 af of permit water; and
- 99,998 af of other non-SWP program water.

The remaining portion was delivered to 20 non-SWP agencies and totaled 931,011 af, which was categorized accordingly:

- 17,296 af of SWP contracted supply;
- 17,987 af of water bank recovery;
- 11,826 af of other non-SWP programs;
- 869,403 af of regulated delivery of local supply;
- 215 af for parks and recreation;
- 785 af for fish and wildlife;
- 12,799 af for Kern National Wildlife Refuge; and
- 700 af for annual contracts.

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

## Power Resources

SWP generation totaled 1,132,659 megawatt hours (MWh) of energy in 2014. The SWP received a total of 1,691,424 MWh of energy from other power resources and firm purchases under agreements and exchanges. DWR sold 33,000 MWh of energy, which resulted in \$1.71 million in revenues. For detailed information, see Chapter 10, Power Resources.

The sidebar, State Water Project Power Generation and Consumption in 2014, summarizes amounts of power generated and consumed by the SWP.

## Greenhouse Gas Management

In 2014, DWR reported its greenhouse gas emissions for the previous year to the California Air Resources Board and The Climate Registry. DWR also submitted its fossil fuel report for the previous year to the Governor's Office. Additionally, DWR continued participating in allowance auctions conducted by the California Air Resources Board to meet its contractual obligation for the Lodi Energy Center.

In December, the 45 megawatt RE Camelot solar photovoltaic project commenced commercial operation. It will supply DWR with approximately 124,000 megawatt hours of renewable or greenhouse gas emission-free energy per year. For more information, 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 BiOp.

A number of significant events associated with Oroville Facilities relicensing occurred in 2014. For details, see Chapter 3, Environmental Programs; Chapter 6, Legislation and Litigation; Chapter 10, Power Resources; and Chapter 13, Recreation.

### ***South SWP Hydropower***

On September 30, 2014, FERC issued orders approving a change in FERC's regulatory authorization vehicle for the 17 megawatt Alamo Powerplant and 32.4 megawatt Mojave Siphon Powerplant to conduit exemptions. FERC also issued an order amending the South SWP Hydropower (P-2426) license to remove these facilities and associated lands from the license. As Alamo Powerplant and Mojave Siphon Powerplant are no longer included in the P-2426 license, they will not be included in the upcoming P-2426 relicensing process.

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

### ***Financial Analysis***

In 2014, 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

## **State Water Project Power Generation and Consumption in 2014**

<b>Power Generation and Consumption</b>	<b>Megawatt Hours</b>
Energy generation by SWP facilities	1,132,659
Energy sources and firm purchases under agreements and exchanges	1,691,424
<b>Total Energy Available to the SWP</b>	<b>2,824,083</b>
Energy sales	(33,000)
<b>Net SWP Power Consumption</b>	<b>2,791,083</b>

by the project. Direct payment was through the 29 long-term water contractors. In 2014, the SWP handled approximately \$1.02 billion in revenues and \$1.02 billion in expenses. The 2014 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.

## Engineering, Construction, and Real Estate

In 2014, 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 63 construction contracts in 2014. Projects included pipeline repair, control systems upgrades, roadway and parking area repairs, seismic upgrades of bridges, and maintenance facility improvements at dam and reservoir sites.

DWR processed a net total of \$5.26 million in payments in 2014 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

### *Delta Science Plan*

The Interim Science Action Agenda, a key component of implementing the *Delta Science Plan*, was published by the Delta Stewardship Council on November 7, 2014. The Interim Science Action Agenda summarizes and synthesizes a range of science actions identified by multiple agencies and organizations. For more information, see Chapter 2, Delta Resources.

### *Bay Delta Conservation Plan*

The public comment period for the draft Bay Delta Conservation Plan and its associated environmental impact report/environmental impact statement concluded on July 29, 2014. Twelve public meetings were held throughout California in January and February 2014 to provide information about the draft plan and its environmental documents and to provide an opportunity for the public to submit comments.

In August, DWR and its federal partners representing the Bay Delta Conservation Plan announced a plan to publish a partially recirculated draft environmental impact report/environmental impact statement in early 2015. The recirculated document will include those portions of the document that warrant another public review prior to publication of the final document. Further information about the recirculated draft was released in December.

Also in December, DWR and its federal partners announced significant refinements to the proposed Bay Delta Conservation Plan water facilities in an effort to respond to the concerns of Delta landowners and others.

### *Fish Science Building*

The Fish Science Building at Skinner Fish Facility was completed in 2014. The new



## 2014 Income Statement for the State Water Project

Revenues	Thousands of Dollars
Water Contract Payments	1,081,121
Revenue Bond Cover Adjustments	(47,054)
Rate Management Adjustments	(40,470)
Other Revenues	30,122
<b>Total Operating Revenues</b>	<b>1,023,719</b>
<b>Expenses</b>	
Project Operations, Maintenance, Power, and Replacement	686,602
Deposits to Reserves	46,348
Water Bond Principal	175,213
Water Bond Interest	115,556
<b>Total Operating Expenses and Debt Service</b>	<b>1,023,719</b>
<b>Net System Revenues</b>	<b>0</b>

building includes a small laboratory, fish rearing tanks, an office, and an area to store study gear and equipment. The facility will be used for various fishery studies needed to meet regulatory requirements of the BiOps and incidental take permit for long-term operation of the SWP and CVP.

### ***BiOps for CVP/SWP Operations***

Appellate court decisions were issued on the December 2011 district court decisions related to the U.S. Fish and Wildlife Service and National Marine Fisheries Service BiOps. The appellate court opinions issued in March

and December of 2014 upheld both BiOps and rescinded the remand orders.

### ***Feather River Spawning Habitat Improvements***

During the summer, gravel was added to the Feather River adjacent to the Feather River Fish Hatchery to improve spawning habitat for salmon and steelhead. The project added 8,300 cubic yards of spawning gravel at key locations, contoured riffles, and reconnected a side channel along the Lower Feather River.

For more information about Delta resources and environmental issues, see Chapter 2, Delta Resources; Chapter 3, Environmental Programs; Chapter 4, Water Quality Programs; and Chapter 6, Legislation and Litigation.

## Recreation

In 2014, SWP facilities supported an estimated 3.9 million recreation days of use, down slightly more than 2 percent from 2013. Most SWP recreation use was concentrated at the major reservoirs, with 38 percent occurring in the Oroville Field Division and 43 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—1964

The Fish Barrier Dam on the Feather River was completed.

Antelope Dam and Lake were completed in the summer.

Dedication ceremonies for Frenchman Dam and Frenchman Lake were held on September 27.

During the flood of December 1964, the partially completed Oroville Dam averted

a recurrence of the disastrous 1955 flood on the Feather River. The unfinished dam impounded the flood peak and reduced the peak river flow of 250,000 cubic feet per second to 157,000 cubic feet per second.

### 40 Years Ago—1974

Elderberry Dam and Forebay; Castaic Dam, Lake and Lagoon; Devil Canyon Powerplant and Afterbay; and Perris Dam and Lake Perris were completed.

Bulletin Number 200, *The California State Water Project*, was published in November. The six volume set covers the history, planning, financing, design, construction, and operation of the SWP.

### 30 Years Ago—1984

DWR published the *Plan of Protection for Suisun Marsh*, prepared in cooperation with the Department of Fish and Wildlife, Suisun Resource Conservation District, and Reclamation in response to SWRCB, Water Right Decision 1485. The plan of protection was a proposal for staged implementation of a combination of activities including monitoring, a wetlands management program for Suisun Marsh landowners, physical facilities, and supplemental releases of water from CVP and SWP reservoirs.

### 20 Years Ago—1994

In December, DWR and representatives of certain SWP contractors adopted the Monterey Agreement, a comprehensive set of principles to serve as the basis for negotiating certain amendments to the water supply contracts. The Monterey Agreement principles were released to the public on December 16.

Two agreements signed in 1994 by federal and State resource managers advanced the water policy goal set forth by the Governor in 1992 to “fix the Delta.” The June 1994 Framework Agreement called for

a cooperative, coordinated process to solve long-term water quality and ecosystem problems in the Bay-Delta Estuary. The Bay-Delta Accord, signed December 15, 1994, aimed to fulfill the promise of the Framework Agreement by setting forth strategies and procedures for addressing major issues of concern in the Delta.

### **10 Years Ago—2004**

DWR initiated a Dry Year Water Purchase Program to reduce adverse economic impacts and hardship associated with water shortages.





# **Chapter 1**

## **The State Water Project**

*Sunset on Lake Perris.*

*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, 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 2014. At the end of the bulletin, Appendix B presents data and computations used to determine the SWP Contractors' Statements of Charges for 2016.

*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 38 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, 2014**

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	554	385	18,600	77,645
O'Neill Forebay	233	88	14,350	3,000
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 (feet)	Total Flow at Design Head (cfs)	Total Motor Rating (hp)
Robie Thermalito	3 (p-g) <sup>a</sup>	85-102	9,120	120,000
Hyatt	3 (p-g) <sup>a</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>a</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>b</sup>	6	521	134	10,500
Bluestone <sup>b</sup>	6	484	134	10,500
Polonio Pass <sup>b</sup>	6	533	134	10,500
Buena Vista <sup>b</sup>	10	205	5,405	144,500
Teerink <sup>b</sup>	9	233	5,445	150,000
Chrisman <sup>b</sup>	9	518	4,995	330,000
Edmonston <sup>b</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>The term p-g indicates pumping-generating units.<sup>b</sup>These plants have one unit in reserve.

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

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

<sup>a</sup> The term p-g indicates pumping-generating units.<sup>b</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

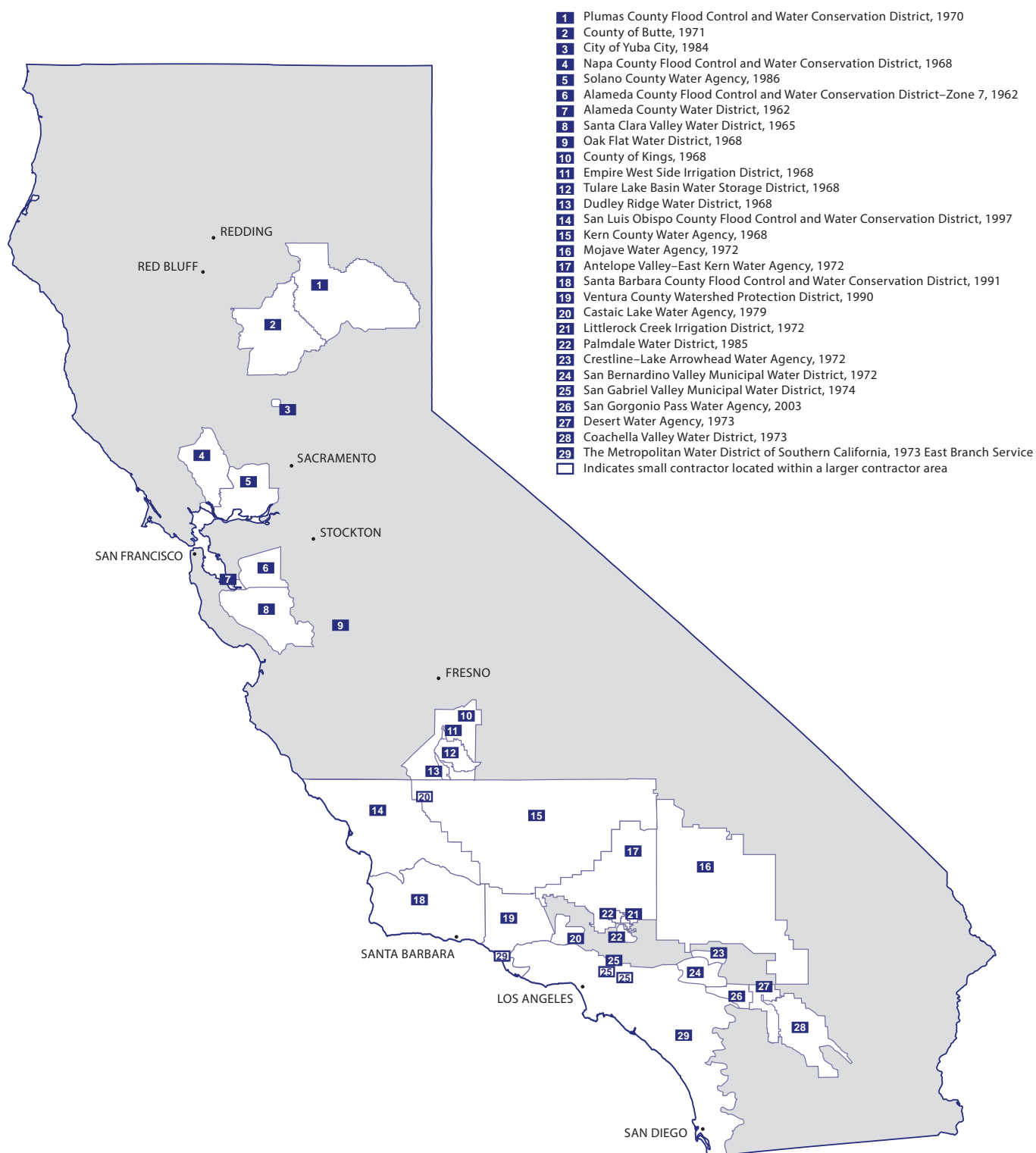
From 1963 through 1967, 32 agencies or districts signed long-term water supply contracts with DWR. However, in 1965, the City of West Covina was annexed to The Metropolitan Water District of Southern California, and in 1981, Hacienda Water District was assigned to Tulare Lake Basin

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, 2014.

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 Long-term Contracting Agencies, December 31, 2014**

**Table 1-6 Long-term Water Supply Contracting Agencies, by Area, as of December 31, 2014**

Contracting Agency	Cumulative Deliveries (af) <sup>a</sup>	Annual Table A (af)	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	45,274	9,600	7,277,121	9,377	4,471,569,746	65,841
County of Butte	65,461	27,500	7,343,069	1,049,280	18,070,400,000	204,000
Plumas County Flood Control and WCD	11,952	2,500	2,266,792	1,676,056 <sup>c</sup>	2,060,744,342	21,200
<i>Subtotal</i>	<i>122,687</i>	<i>39,600</i>	<i>16,886,982</i>	<i>2,734,713</i>	<i>24,602,714,088</i>	<i>291,041</i>
<b>North Bay Area</b>						
Napa County Flood Control and WCD	315,592	29,025	124,094,563	510,010	29,745,725,494	139,099
Solano County Water Agency	843,112	47,706	168,710,577	581,760	38,800,000	415,913
<i>Subtotal</i>	<i>1,158,704</i>	<i>76,731</i>	<i>292,805,140</i>	<i>1,091,770</i>	<i>29,784,525,494</i>	<i>555,012</i>
<b>South Bay Area</b>						
Alameda County Flood Control and WCD—Zone 7	1,591,500	80,619	308,046,592	275,900	45,926,347,132	234,000
Alameda County WD	1,300,948	42,000	139,010,557	67,200	52,665,888,864	343,499
Santa Clara Valley WD	4,163,221	100,000	414,971,593	849,000	308,808,219,666	1,853,677
<i>Subtotal</i>	<i>7,055,669</i>	<i>222,619</i>	<i>862,028,742</i>	<i>1,192,100</i>	<i>407,400,455,662</i>	<i>2,431,176</i>
<b>San Joaquin Valley Area</b>						
County of Kings	159,446	9,305	10,413,801	893,300	9,060,019,883	150,181
Castaic Lake Water Agency <sup>i</sup>	452,315	0		8,700 <sup>e</sup>	4,532,936	0
Dudley Ridge WD	2,376,397	48,350	99,462,617	37,600	49,630,000	36
Empire West Side Irrigation District	122,835	3,000	4,910,126	7,500	<sup>d</sup>	12
Kern County Water Agency	37,230,977	982,730	2,208,949,004	5,224,000	92,300,000,000	856,158
Oak Flat WD	213,088	5,700	8,057,647	4,500	<sup>d</sup>	10
Tulare Lake Basin Water Storage District	4,923,323	87,471	190,923,161	189,519	194,000,000	23
<i>Subtotal</i>	<i>45,478,381</i>	<i>1,136,556</i>	<i>2,522,716,356</i>	<i>6,365,119</i>	<i>101,608,182,819</i>	<i>1,006,420</i>
<b>Central Coastal Area</b>						
San Luis Obispo County Flood Control and WCD	78,532	25,000	98,905,732	2,122,240	39,392,490,935	274,804
Santa Barbara County Flood Control and WCD	378,517	45,486	664,585,430	193,391	26,935,170,063	381,562
<i>Subtotal</i>	<i>457,049</i>	<i>70,486</i>	<i>763,491,162</i>	<i>2,315,631</i>	<i>66,327,660,998</i>	<i>656,366</i>
<b>Southern California Area</b>						
Antelope Valley-East Kern Water Agency	2,065,769	144,844	577,598,152	1,525,120	25,111,454,148	312,383
Castaic Lake Water Agency	1,041,788	95,200	369,383,077	124,800	36,211,395,525	274,000
Coachella Valley WD	1,386,431	138,350	533,703,676	639,857	51,440,726,417	303,846
Crestline-Lake Arrowhead Water Agency	60,543	5,800	29,874,894	54,900	2,249,739,339	29,000
Desert Water Agency	1,270,953	55,750	318,926,748	209,760	9,131,339,000	72,000
Littlerock Creek Irrigation District	18,430	2,300	7,360,876	10,000	388,056,000	2,900
The Metropolitan WD of Southern California	36,112,320	1,911,500	11,422,540,857	3,315,164 <sup>f</sup>	2,298,733,780,976	18,605,839
Mojave Water Agency	395,158	82,800	318,447,745	3,136,000	27,400,114,225	464,058
Palmdale WD	278,370	21,300	92,289,576	119,680	1,414,494,581	114,533
San Bernardino Valley Municipal WD	956,390	102,600	679,259,601	225,577	42,950,247,633	661,546
San Gabriel Valley Municipal WD	427,896	28,800	175,981,446	18,297	16,850,589,307	197,636
San Geronio Pass Water Agency	63,206	17,300	169,102,499	140,800	5,708,130,719	78,268
Ventura County Watershed Protection District	68,905	20,000	70,219,731	308,252	25,483,476,833	464,600
<i>Subtotal</i>	<i>44,146,159</i>	<i>2,626,544</i>	<i>14,764,688,878</i>	<i>9,828,207</i>	<i>2,543,073,544,703</i>	<i>21,580,609</i>
<b>Total</b>	<b>98,418,649</b>	<b>4,172,536</b>	<b>19,222,617,260</b>	<b>23,527,540<sup>g</sup></b>	<b>3,172,797,083,764</b>	<b>26,520,624</b>

<sup>a</sup> All water delivered to long-term SWP 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% 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.





## Chapter 2

# Delta Resources

*Skinner Fish Facility and the new Fish Science Building.*

## Significant Events in 2014

*T*he new Fish Science Building at Skinner Fish Facility, which includes a small laboratory, fish rearing tanks, an office, and an area to store study gear and equipment, was completed.

The Interim Science Action Agenda, a key component of implementing the *Delta Science Plan*, was published by the Delta Stewardship Council (DSC) on November 7, 2014.

*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 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 Bay Delta Conservation Plan (BDCP) and the Delta Stewardship Council's (DSC) *Delta Plan*, many of DWR's proposed projects were suspended as staff was redirected to work on the State Water Project (SWP) Delta Compliance Program.

### BDCP

The BDCP is being developed in compliance with the federal Endangered Species Act (ESA) and the California Natural Community Conservation Planning Act. When complete, the BDCP will provide the basis for the issuance of endangered species permits for the operation of the State and federal water projects. The plan will be implemented over the next 50 years. The heart of the BDCP is a long-term conservation strategy that sets forth actions needed for a healthy Delta.

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

### Delta Plan

The Delta Reform Act of 2009 requires the DSC to adopt a comprehensive, long-term management plan for the Delta (*Delta Plan*).

(For more information, see the sidebar, Delta Stewardship Council.) Additionally, the Delta Reform Act provides that when the BDCP is completed and successfully permitted, it will be incorporated into the *Delta Plan*.

The *Delta Plan* was adopted by the DSC on May 16, 2013. It became effective with legally enforceable regulations on September 1, 2013.

### Delta Science Plan and Interim Science Action Agenda

The *Delta Science Plan* released by the DSC on December 30, 2013, provides a guide for organizing, conducting, and integrating science in the Delta. The Interim Science Action Agenda, a key component of implementing the *Delta Science Plan*, was published by the DSC on November 7, 2014. The Interim Science Action Agenda summarizes and synthesizes a range of science actions identified by multiple agencies and organizations. It identifies 17 priority science action areas organized into two main categories: Science Actions that Address Knowledge Gaps (organized by the policy areas/chapters in the *Delta Plan*), and Actions that Build Science Infrastructure and Capacity (organized by the chapters in the *Delta Science Plan*). It will be the basis for the full Science Action Agenda that will cover a 4-year time frame and for prioritization of science actions.

For more information about the *Delta Plan*, the *Delta Science Plan*, and the Interim Science Action Agenda, visit the DSC's website.



## 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, 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. Members of both are appointed by the DSC. 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 for 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 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.

## State Water Project Delta Compliance Program

The SWP and Central Valley Project (CVP) obtained take authorization for ESA 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 other requirements needed development of studies and projects before being implemented.

In 2014, 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, developing a fishing facility and 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 ESA-protected salmon and steelhead in Clifton Court Forebay to no more than 40 percent;
- 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. The previous 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.

### 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. Only minor construction issues remained at the end of the year. Design of the two new Sherman Island sites was completed in 2014, and all of the permit applications were submitted to the regulatory agencies. A cost-sharing agreement with DWR's Delta Levees Program for the levee work associated with these two sites was also completed.

## Fish Screen Evaluations

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

- a fish screen cleanliness evaluation;
- a fish screen hydraulic evaluation; and
- a fish entrainment evaluation.

These components were evaluated 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 2014, a number of evaluations were conducted for each facility and a draft first year report for the facilities was prepared. In addition, the 2013 and 2014 maintenance reports were drafted, and some screens were repaired or replaced based on the results of these evaluations.

## Ad Hoc Studies

In January 2012, a joint stipulation was filed in the litigation regarding the 2009 NOAA Fisheries BiOp. The 2012 Stipulation Study was undertaken to gain more information about the effects of CVP and SWP export operations on juvenile steelhead and fall-run Chinook Salmon, to gain a better understanding of the effect of Old River and Middle River reverse flows on steelhead route selection and survival in the South Delta, and to pilot an approach to manage water export risks to ESA-listed salmonids. This study was intended to comply with the requirements of a court settlement agreement that would support evaluation

of the BiOp's reasonable and prudent alternative Action IV.2.1, limiting south Sacramento-San Joaquin Delta exports during April and May, as a function of San Joaquin River flows. The study was successfully completed and utilized real-time data to inform in-season management and water operations in 2012.

During 2014, a final technical report was completed and released to the public subsequent to data analysis and receipt of comments on the draft report.

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

## 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 ESA-protected salmon and steelhead. (Pre-screen loss is the loss of fish as they move across the forebay that results from predation by fish and birds.) This strategy involved constructing a fishing pier to provide improved access to anglers.

During 2014, most permits were obtained for this project, and DWR was planning to initiate construction of the fishing pier. However, changes were made to Conservation Measure 1 of the BDCP that conflicted with the 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 staff, analyzed other predator reduction alternatives.

The predator study continued in 2014. 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 began 2014.

### ***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 2014, 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 designing and contracting for construction of new stainless steel fish transport buckets and initiating a contract with the University of California, Davis, to conduct studies relative to Green Sturgeon behavior near structures similar to the louvers.

## **Delta Knowledge Improvement Program**

In response to Assembly Bill 1200 (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, a vehicle to actively fund specific studies to fill the data gaps identified in the Delta Risk Management Strategy.

In 2014, 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;
- an investigation to determine how Delta levees on peat soils respond under seismic loading; and
- development of potential designs of setback levees in the Delta to meet stability requirements while also incorporating desired habitat features (concluded in 2014).

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

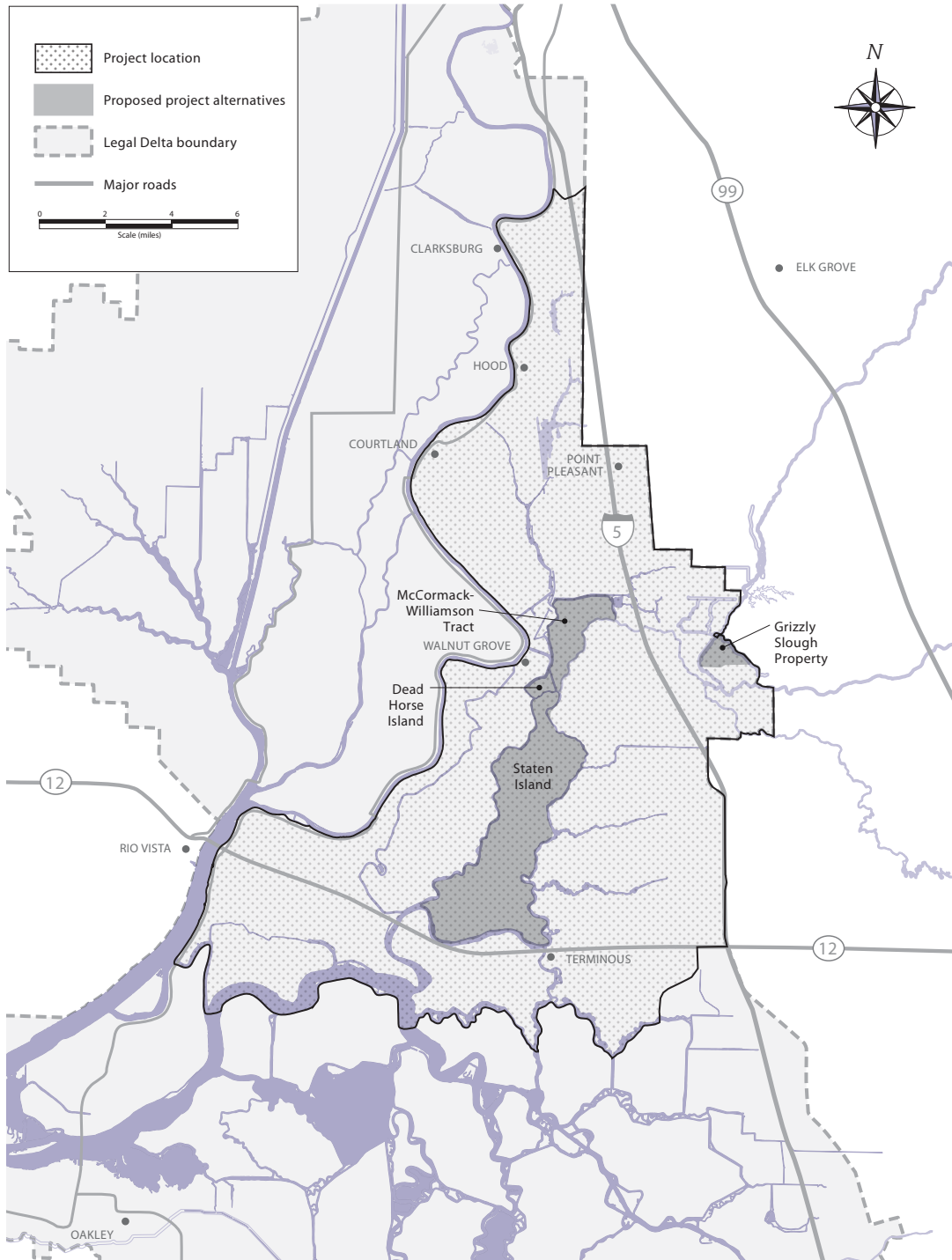
MWT project planning, permitting, and design work continued in 2014 on the reslope features of existing interior MWT levees to support a phased approach for implementing the project. DWR completed the MWT wetland delineation to support the U.S. Army Corps of Engineers (Corps) 404 permitting process, while Reclamation District 2110 began consulting with the Corps and other permitting entities on appropriate permitting strategies. Reclamation District 2110 circulated a request for proposals and selected a subcontractor to assist with project design and permitting work for the second phase of the MWT project, levee breaching and weir construction. A borrow site investigation lead to a cost-effective plan for MWT levee resloping using on-island borrow and enabled DWR to begin planning the Grizzly Slough Project element, which was linked to the MWT project as a potential location to obtain sediment.

## 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





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

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 2014. 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 2016. 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 Sacramento-San Joaquin 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:

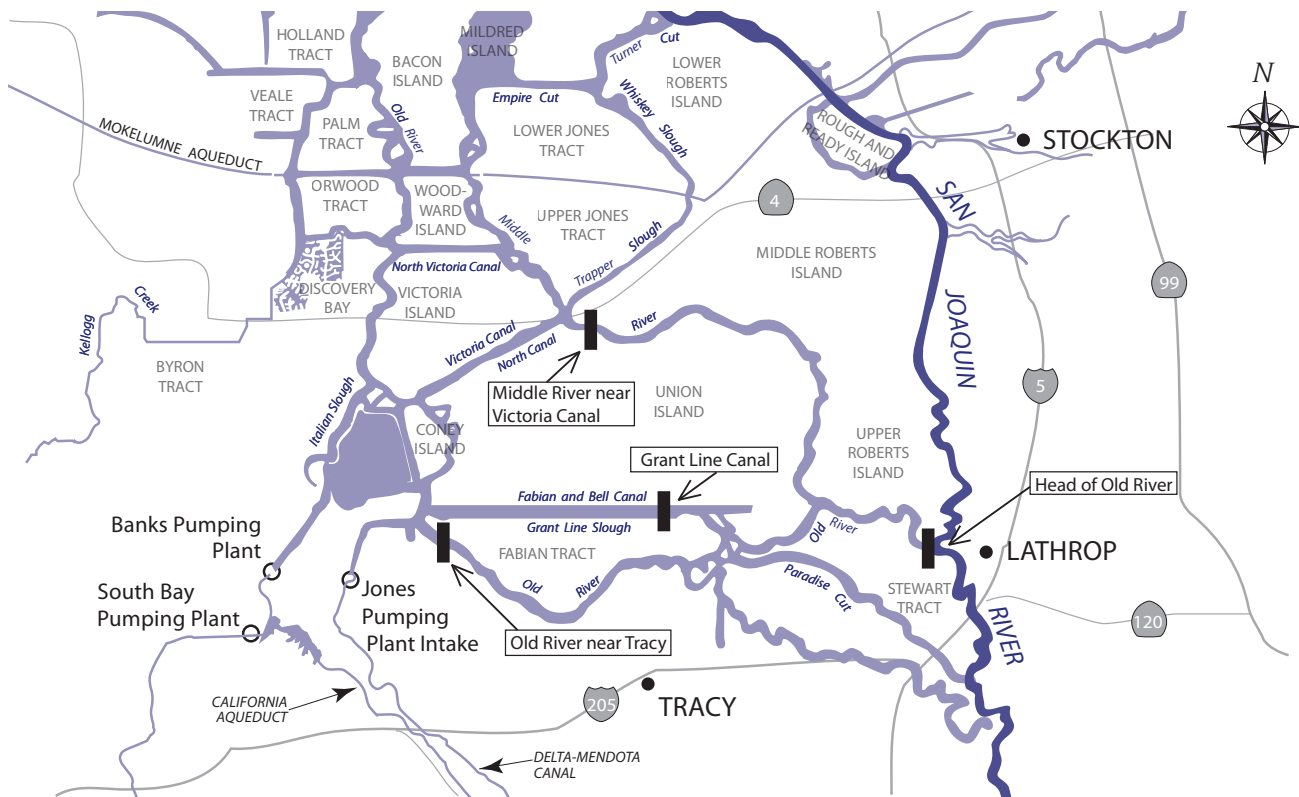
- (1) Head of Old River, in Old River where it splits from the San Joaquin River;

- (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 2014, 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. The installation started in March, and the barriers were removed in November. Additionally, the option of raising the Middle River barrier by 1 foot to increase water level and improve circulation was exercised on June 26, 2014.

The spring Head of Old River rock barrier was installed in 2014 with construction beginning in early March and full closure achieved by April 8, 2014. Eight culverts with slide gates remained in the open position for the duration of installation. The barrier was breached on June 9, 2014, and it was completely removed by June 26, 2014.



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

In 2014, the Head of Old River fish monitoring was implemented to study predatory fish distribution and abundance in the vicinity of the Head of Old River. The coordinated acoustic telemetry studies were conducted by Reclamation and the U.S. Fish and Wildlife Service to track the movements of salmon smolts, steelhead, and predatory fish to determine outmigrating salmon smolt survival and to learn more about predatory fish behavior.

In 2014, the fall Head of Old River rock barrier was installed and operated from October 1, 2014, until November 10, 2014, when the barrier was breached. Removal was completed on November 15, 2014.

Data collected in 2014 are being analyzed, and the findings of the studies will be published in a comprehensive report.

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

## Delta Flood Control

Levees in the Sacramento-San Joaquin 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” (Senate Bill 34 [California Water Code Sections 12300 et seq. and 12980 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, 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 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. An interdepartmental draft of the plan was released in April 2014.

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 Sacramento-San Joaquin Delta for the maintenance and rehabilitation of Delta 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 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 \$160 million of State funding to more than 70 islands in the Sacramento-San Joaquin Delta. In fiscal year 2014–2015, the program expects to reimburse approximately \$8 million to local agencies for eligible levee maintenance and rehabilitation activities (in fiscal year 2013–2014 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 Special Flood Control Projects Program

The Delta 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 a guide 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 to achieve net long-term habitat improvement for fish and wildlife.

While DWR seeks cost sharing for all projects, the actual reimbursement depends on each reclamation district’s ability to

pay. 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 2014–2015. Levee improvements and monitoring were conducted on Jersey and Bradford islands to support temporary emergency drought barriers as part of DWR’s drought response.

### Model Bulk Credits Program

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

Under the Bulk Credits Program, reclamation districts purchase mitigation credits 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 2014, the Bulk Credits Program continued to be the principal tool for participating reclamation districts to meet their habitat mitigation obligations resulting from levee maintenance and improvement work. The program also began preliminary planning for a 40-acre habitat mitigation site on Twitchell Island to support future mitigation obligations of the program. The site will be bordered by a 140-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 Sacramento-San Joaquin 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 Corps, 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 hired a technical review panel that will conduct an independent review in 2015 to assess the efficacy of the program and plan for the future. A draft report is expected in July 2015.

## West Delta Program

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

Since 2008, the West Delta Program has constructed approximately 1,700 acres of subsidence mitigation projects on Sherman and Twitchell islands and constructed approximately 6,000 linear feet of habitat "fish friendly" setback levees. The West Delta Program has also partnered with the University of California, Berkeley, to collect greenhouse gas (GHG) data on both newly constructed wetland sites, as well as typical Delta farmed crops (including corn, alfalfa, and irrigated pasture). Data collected since 2010 has shown that there is a net GHG benefit of approximately 10 metric tons of carbon dioxide equivalent by planting wetland crops on previously farmed Delta peatland soils.

Building upon ongoing subsidence mitigation work, DWR partnered with the Sherman Island Reclamation District to apply for 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. This grant will provide funding for another

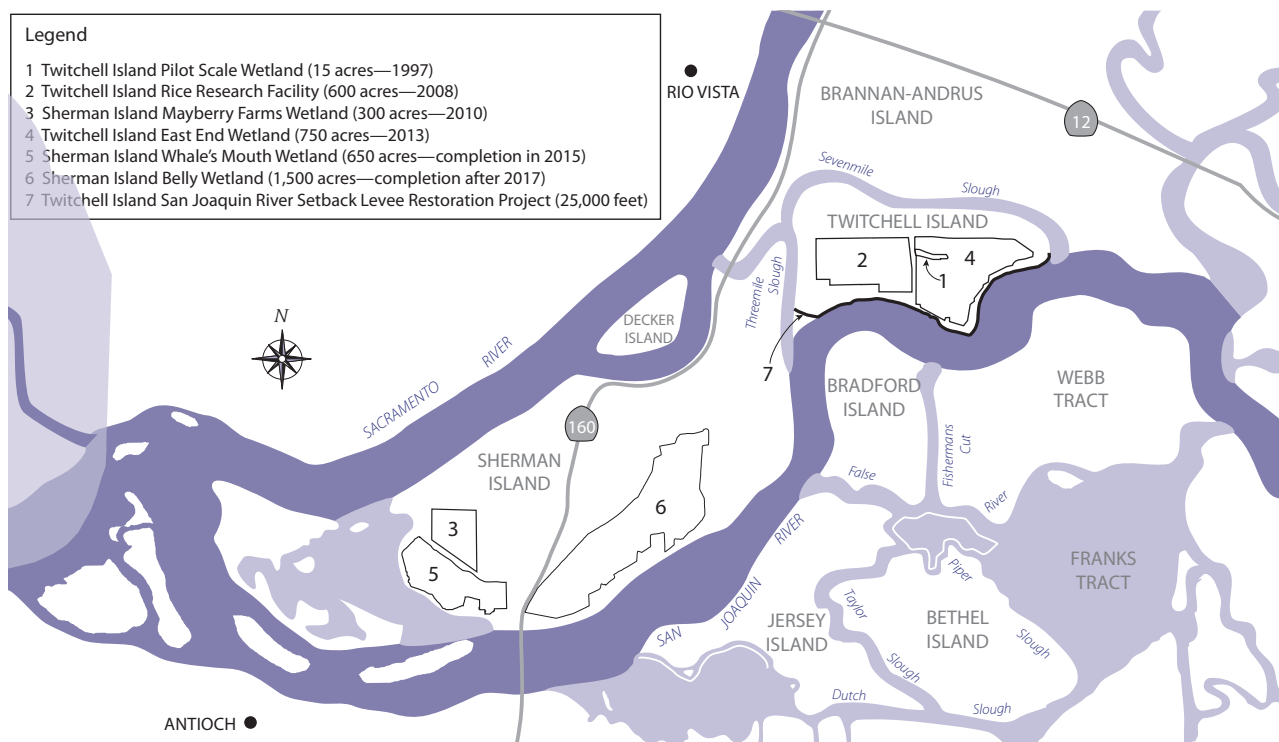


2,200 acres of wetlands on Sherman Island and will include funding to construct the Sherman Island Whale's Mouth Wetland (designed, permitted, and out for bid in 2014) and all planning, design, permitting, and construction for the Belly Wetland, both shown on Figure 2-3. Matching funds from both DWR and the University of California, Berkeley, will provide for additional GHG monitoring throughout the Delta, resulting in a data set from a more robust variation of conditions.

In 2013, the West Delta Program initiated a multiagency effort to develop a draft GHG protocol that will be considered for adoption by the California Air Resources Board in late 2015 or early 2016. This protocol will allow for quantification of a project's net increase in carbon sequestration and will consider GHG emissions from the converted agricultural land to calculate a project's net GHG benefit. The protocol was drafted in

2014 and utilizes a modular format providing flexibility for different types of wetland projects that have varying rates of carbon sequestration, different baseline conditions, and varying GHG emissions.

The West Delta Program has been 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 linear feet of setback levee along the San Joaquin River, allowing for habitat features to be developed on the water side. A draft environmental impact report has been developed and will likely be adopted in early 2015. All other environmental permits will be submitted shortly after California Environmental Quality Act document adoption.



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

## Delta Agricultural Water Agencies

In 1974, the Delta Water Agency was replaced by six Delta agricultural water agencies: North Delta Water Agency, South Delta Water Agency, Central Delta Water Agency, Contra Costa County Water Agency, East Contra Costa Irrigation District, and Byron Bethany Irrigation District. In 1981, North Delta Water Agency and East Contra Costa Irrigation District signed water rights management contracts with DWR. DWR negotiated contracts and requested negotiations with other agencies to provide water level, circulation, and quality needs in certain areas.

### South Delta Water Agency

In September 1990, DWR completed negotiations for a long-term agreement with South Delta Water Agency and Reclamation. Under the South Delta Water Agency contract, 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.

In June 2014, DWR raised the Middle River weir by 1 foot to increase the water level and improve circulation in certain areas upstream of the barrier.

## Western Delta Municipal Water Users

DWR signed contracts with Contra Costa Water District in 1967 and the City of Antioch in 1968. These contracts compensate Contra Costa Water District and the City of Antioch for purchasing water of usable quality when such water is not available from Mallard Slough and the San Joaquin River.

According to the contracts, DWR compensates each agency for the additional costs of purchasing a substitute water supply from the Contra Costa Canal. This water is purchased to replace water supplies of usable quality that are lost due to SWP operations. Credits for the number of days of above-average water supplies of usable quality, from Mallard Slough and the San Joaquin River, accrue to offset the number of below-average days in future years.





## **Chapter 3**

# **Environmental Programs**

*Tule Elk wander the Grizzly Island Wildlife Area in the Suisun Marsh.*

## Significant Events in 2014

**A**ppellate court decisions were issued on the December 2011 district court decisions related to the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NOAA Fisheries) biological opinions (BiOps). The appellate court opinions upheld both BiOps and rescinded the remand orders.

During the summer, gravel was added to the Feather River adjacent to the Feather River Fish Hatchery (FRFH) to improve spawning habitat for salmon and steelhead.

In the fall, the abundance indices for Longfin Smelt and Delta Smelt were the second lowest and lowest values, respectively, ever recorded.

The 2014 low point for the Lake Oroville reservoir surface elevation was reached on November 21 at 647.7 feet. This was the second lowest the lake has been since it filled in 1968.

In December, the Department of Water Resources (DWR) and its federal partners announced significant refinements to the proposed Bay Delta Conservation Plan (BDCP) water facilities. These refinements were intended to reduce impacts to Delta communities, minimize disturbances to or dislocation of Greater Sandhill Cranes, and improve the long-term reliability and operation of the proposed tunnels.

*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.

## 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 final environmental impact report (EIR) and notice of determination for the proposed Salmon Conservation and Research Facility were completed in 2014. Spring-run salmon broodstock efforts continued.

In April 2014, the Department of Fish and Wildlife (DFW) and the U.S. Fish and Wildlife Service (USFWS) released approximately 54,000 juvenile spring-run Chinook Salmon into the San Joaquin River near the confluence with the Merced River. The fish release is part of the program's fisheries studies and contributes to the long-term reintroduction of spring-run salmon to the San Joaquin River.

As part of the third trap and transport study, 510 adult fall-run Chinook Salmon were trapped upstream of the Hills Ferry Barrier (at the confluence of the San Joaquin and Merced rivers) beginning November 4, 2014, and relocated to spawning areas below Friant Dam. Fish passing the Hills Ferry Barrier would otherwise be lost in the system (upstream obstacles prevent passage or fish become lost/trapped in irrigation canals), so trapping and relocating these fish provides an opportunity to study their behavior and spawning site preference. Salmon released into Reach 1 (from Friant Dam to approximately 37 miles downstream at Gravelly Ford) naturally produced more than 80 redds (a redd is a shallow depression in a streambed, excavated by a salmonid and containing deposited fish eggs).

Approximately 2,393 juvenile fall-run Chinook Salmon were trapped and transported as part of the 2014 spring trap and transport effort. The fish were captured in Reach 1 and moved past impassable

barriers downstream to Reach 5 (from the confluence of the Eastside Bypass to approximately 18 miles downstream at the Merced River confluence) where they could continue migrating to the ocean.

Planning, environmental compliance, and design efforts for the Mendota Pool Bypass and Reach 2B Channel Improvements Project and the Reach 4B, Eastside Bypass, and Mariposa Bypass Channel and Structural Improvements Project continued to move forward.

Restoration flows were initiated in January 2014, but were decreased February 1, a month earlier than planned, due to severe drought conditions. Under the water management goal, approximately 300 acre-feet of previously recaptured and banked restoration flows were recirculated.

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 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 2014, Yuba County Water Agency delivered 60,000 acre-feet of Component 1 water provided to DWR under the 2007 DWR/Yuba County Water Agency Water Purchase

Agreement. Under an agreement signed in 2012, DWR and the Bureau of Reclamation (Reclamation) equally share Component 1 water made available from 2012 through 2015.

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

#### *Invasive Plant Management*

During 2014, DWR removed all the red sesbania (*Sesbania punicea*) along the Thermalito Power Canal, Thermalito Forebay, and Thermalito Diversion Pool as part of an annual maintenance effort 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. Another priority invasive plant species observed within the Oroville Facilities is stinkwort (*Dittrichia graveolens*). This species wasn't observed until 2011, but it's becoming much more widespread. Stinkwort was hand-pulled in several locations, and DWR is looking into other management options.

DWR also partnered with other agencies to remove several invasive plants within areas of joint management. The Butte County Agricultural Commissioner treated several stands of red sesbania that were 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. During National Invasive Species Awareness Week, the California Department of Parks and Recreation lead a group to the Thermalito Diversion Pool to hand pull French broom (*Genista monspessulana*).



### ***Feather River Fish Hatchery***

In 2014, a total of 5,951,734 juvenile fall-run Chinook Salmon were released into the Delta, Sacramento River, and San Francisco and San Pablo bays.

Also in 2014, 1,009,198 spring-run Chinook Salmon were released in San Pablo Bay and 1,227,476 were released in the Feather River for a total release of 2,236,674 spring-run fish. A total of 376,472 steelhead were also planted in the Feather River at Boyd's Pump Boat Launch.

The Feather River Fish Hatchery (FRFH) water supply pipeline was inspected, and a general maintenance outage of the FRFH was established by the Oroville Field Division to facilitate the inspections and subsequent pipeline repair work. For additional information, see Chapter 11, Facilities Maintenance.

### ***Lake Oroville and Thermalito Afterbay***

Since 2013, Chinook Salmon have been stocked in Lake Oroville. In May 2014, 139,671 fingerling fall-run Chinook Salmon were stocked in the lake. The salmon were stocked at the advanced fingerling size in May instead of growing them out to the yearling size for stocking in the fall. This was a result of the pipeline repair work at the hatchery, described above, which required the hatchery to be shut down from July through August 2014.

Also in 2014, 11,200 steelhead were stocked in the Thermalito Afterbay.

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

Habitat improvements continued in 2014 in the fluctuation zone of the lake. Approximately 2,000 Christmas trees were recycled with the help of the Boy Scouts and the California Conservation Corps. The trees

were used to construct structures for juvenile fish habitat near the Spillway Boat Launch.

### ***Oroville Wildlife Area***

Monitoring and weed removal activities continued during 2014 at the wetland ponds that were constructed in 2010 and 2011 in the Oroville Wildlife Area. These wetland ponds were created as a mitigation requirement in the 1995 U.S. Army Corps of Engineers Clean Water Act Section 404 permit for a project that constructed two waterfowl brood ponds at the 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 (FERC) September 22, 1994, order.

### ***Oroville State Recreation Area***

The Brad Freeman Access Spur Trail Realignment Project was completed in 2014. The project constructed a new trail between the Dan Beebe Trail and the Brad Freeman Trail to eliminate use of the current unsafe trail along the rail line. The new trail realignment was approximately 2,000 feet in length and located between the east bank of the Thermalito Diversion Pool and Lakeland Boulevard.

### ***Oroville Dam/Hyatt Powerplant***

The river valve outlet system is essential for Oroville Dam operations. It allows for discharge of cold water from the depths of Lake Oroville to control water temperature in the lower Feather River and the FRFH. It also serves as a low level water release point from the lake when the spillway and power plant are unavailable. In response to the 2014 drought conditions, the river valve outlet system was tested and made operational.

## 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 2014 low point for the Lake Oroville reservoir surface elevation was reached on November 21 at 647.7 feet. This was the second lowest the lake had been since it filled in 1968. In 1977, Lake Oroville was at a record low of 645.1 feet. The annual high point of 770.6 feet was reached on May 2. The full pool elevation of Lake Oroville is approximately 900 feet.

## FERC Relicensing Activities

### *Feather River Gravel Supplementation and Improvement Project*

During summer 2014, the Feather River Gravel Supplementation and Improvement Project was completed in the Feather River adjacent to the FRFH. This project was implemented in accordance with Appendix B, Section B105 of the *Settlement Agreement for Licensing of the Oroville Facilities*, March 2006. As specified in the settlement agreement, the measures in Appendix B are contractual agreements between DWR and the settlement agreement parties and are not to be included in the new project license. Section B105 specifies that upon execution of the settlement agreement, DWR shall proceed to obtain all necessary

permits for supplementation of the Feather River with at least 8,300 cubic yards of salmonid spawning gravel, and once the permits are obtained, implement the project.

The in-channel placement of gravel began on June 15 and ended on July 25. The project added 8,300 cubic yards of salmonid spawning gravel at key locations, contoured riffles, and reconnected a side channel along the Lower Feather River. Due to their close proximity to the Fish Barrier Dam (FBD), these areas receive the largest numbers of spawning salmon and steelhead. During fall 2014, the project area was heavily used by Chinook Salmon for spawning. (For more information, see the Spawning Surveys section later in this chapter.)

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

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 staff. 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 2014 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, locations in the SWP 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.

**Development of Control Methods.** DWR's consultant conducted bench-top chemical mussel control trials in mobile flow-through laboratories at San Justo Reservoir and at Davis Dam on the Colorado River.

The chemical trials determined that products based on sodium carbonate peroxyhydrate do not appear to affect adult quagga mussels, however copper-based algaecides were determined to be a viable tool for managing zebra and quagga mussel infestations. The results were summarized in the January 2014 report, *Efficacy of Copper Based Algaecides for Control of Quagga and Zebra Mussels*.

**Early Detection Monitoring.** DWR routinely monitors the California Aqueduct, SWP reservoirs, and the Sacramento-San Joaquin 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; settlement plates (see Bulletin 132-10); and bioboxes for adults (attached/settled stage).

In 2014, 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 2014.

#### Prevention and Response Planning

To protect and prepare the SWP against mussels, Aquatic Nuisance Species Program staff 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, 10,297 vessels were inspected during 2014. Of those vessels, 222 failed the inspection due to the presence of wet equipment or standing water and were not allowed to launch. At Castaic Lake, 8,217 vessels were inspected, and 311 failed the inspection. At Pyramid Lake, 6,588 vessels were inspected, with 327 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 to 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 and 2014. All additional samples were

negative for quagga mussels. In April 2014, DFW biologists and quagga dogs inspected Piru Creek (the stream flowing out of Pyramid Lake) from Pyramid Dam to 2 miles downstream for mussels; none were found. Continued increased sampling is planned for 2015 to ensure that Pyramid and Castaic lakes are not infested.

In the event 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

In 2014, State and federal agencies received and responded to comments on the draft



Bay Delta Conservation Plan (BDCP) and its associated EIR/environmental impact statement (EIS). The project was refined, and the plan for a recirculated draft EIR/EIS was announced.

## Public Comment Period

The draft BDCP and its associated EIR/EIS were released to the public on December 13, 2013. Originally, the public comment period was expected to be 120 days, but in February 2014, the comment period was extended by 60 days. At the end of May, the comment period was extended an additional 46 days to allow the public ample time to review and comment on the newly released draft implementing agreement. The public comment period concluded on July 29, 2014. DWR employees and BDCP consultants developed a strategy for responding to comments and began drafting comment responses as comments were received.

Twelve public meetings were held throughout California in January and February 2014 to provide information about the draft BDCP and draft EIR/EIS and to provide an opportunity for the public to submit comments. The meetings were held in Fresno, Bakersfield, Stockton, San Jose, Redding, Fairfield, Walnut Grove, Sacramento, Los Angeles, Ontario, San Diego, and Clarksburg and were staffed by DWR employees, BDCP consultants, and other agency representatives. The public meetings had an open house format; there were no formal presentations or panels to receive public comments. Informational exhibits and project team members were available throughout the meeting for one-on-one discussions, and verbal comments were taken by a court reporter.

## Job Impact Analysis Report

In June 2014, a University of California, Berkeley, economist working as a contractor on the BDCP released a job impact analysis report. The analysis found that the BDCP

would create and protect more than one million full-time equivalent (one person working full-time for 1 year) jobs over the project's 50-year implementation period. The analysis looked at four main categories of job impacts including impacts from the water facility, habitat restoration, increased water reliability, and increased water rates and taxes. Specifically, construction and operation of the proposed water facilities and habitat restoration projects would create an estimated 155,090 jobs in the Delta region.

## Recirculated Draft Announced

In August 2014, DWR and its federal partners representing the BDCP announced a plan to publish a partially recirculated draft EIR/EIS in early 2015. The recirculated document will include those portions of the document that warrant another public review prior to publication of the final document. The public will also have the opportunity to review the final document prior to its adoption and any decisions about the proposed actions. Further information about the recirculated draft was released in December 2014 and included a list of topic areas expected to include revisions or modifications in the recirculated document.

## Plan Refinements Announced

In December 2014, DWR and its federal partners announced significant refinements to the proposed BDCP water facilities in an effort to respond to the concerns of Delta landowners and others. These refinements are intended to reduce impacts to Delta communities, minimize disturbances to or dislocation of Greater Sandhill Cranes, and improve the long-term reliability and operation of the proposed tunnels. Specifically, some of the major changes include elimination of three pumping plants on the east bank of the Sacramento River between Hood and Walnut Grove, minimization of construction activity on Staten Island (important Greater Sandhill

Crane habitat), increased use of property owned by DWR, and allowance of water to flow from the Sacramento River entirely by gravity at certain river stages.

## Biological Opinions Issued on CVP/SWP Operations

The National Marine Fisheries Service (NOAA Fisheries) and USFWS have both issued BiOps on CVP and SWP operations that include reasonable and prudent alternatives (RPAs) to avoid jeopardy of federally listed species. Both BiOps were remanded by the federal court.

The remand process is allowing DWR, DFW, Reclamation, USFWS, and NOAA Fisheries to undertake a collaborative adaptive management approach to interim operations under the existing BiOps, enabling a more efficient and focused evaluation of RPAs.

The Collaborative Science and Adaptive Management Program (CSAMP) 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.

## 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).

The CSAMP is comprised of a Policy Group of State and federal agency directors, regional directors, general managers of water agencies, and executive directors of nongovernmental organizations; and a Collaborative Adaptive Management Team including managers and scientists working under the direction of the Policy Group. The CSAMP is proceeding in three phases. The first phase, developing a work plan, has been completed. The second phase, identifying scopes of work, staff, and resources necessary to implement the topic area work plans, is underway. The third phase will include ongoing collaborative science and adaptive management.

The appellate court opinion issued in March 2014 on the Delta Smelt court cases became effective in September 2014. The appellate court issued its opinion on the salmonid cases in December 2014 (see details below). While the remand schedule no longer applies to the USFWS Delta Smelt BiOp, USFWS is voluntarily continuing with the collaborative process.

The Delta Science Program conducted the 2014 Long-term Operations Biological Opinions Annual Science Review in November.

## USFWS Biological Opinion

The jeopardy conclusion of the 2008 USFWS BiOp was remanded in March 2011.

The December 2011 district court decision related to the USFWS BiOp was appealed in January 2012 to the U.S. Court of Appeals for the Ninth Circuit (appellate court). On March 13, 2014, the appellate court issued its opinion and upheld the BiOp. The remand order for the USFWS BiOp was rescinded, but the appellate court affirmed the district court's judgment with respect to the NEPA claims. On September 16, 2014, the appellate court issued a mandate for the March 13 opinion. Petitions for writ of certiorari were submitted to the U.S. Supreme Court in

September and October 2014. The district court issued an amended judgment (final order) on October 1, 2014, consistent with the appellate court's judgment. As a result of the litigation, Reclamation must complete an EIS for implementing the BiOp by December 1, 2015.

For additional information about litigation related to the BiOp, see Chapter 6, Legislation and Litigation.

## NOAA Fisheries Biological Opinion

The 2009 NOAA Fisheries BiOp was amended in 2011 with updates to the RPAs including improvements to real-time operations and data collection, as well as clarification of specific actions.

In September 2011, a federal court upheld the jeopardy conclusion of the 2009 NOAA Fisheries BiOp, but found that the RPAs were not adequately justified or supported by the record. The court directed a remand of the BiOp. A March 5, 2014, court order set a new deadline of February 1, 2015, for submittal of a new draft BiOp.

The December 2011 district court decision related to the NOAA Fisheries BiOp was appealed in January 2012 to the appellate court. On December 22, 2014, the appellate court issued its opinion and upheld the BiOp. The remand order for the NOAA Fisheries BiOp was rescinded.

For additional information about litigation related to the BiOp, see Chapter 6, Legislation and Litigation.

## 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 2013–2014 water year, the Smelt Working Group made no recommendations to alter export operations. Several factors throughout the time period indicated that additional restrictions to pumping operations were not necessary to protect Delta Smelt. These were: (1) the absence of a December pulse flow usually attractive to adult pre-spawning Delta Smelt, (2) low Delta Smelt salvage at the export facilities, and (3) larval smelt distributions that remained primarily in the Sacramento River system away from the SWP.

### **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) has continued to make progress towards fulfilling its restoration requirements.

### **Outreach**

The FRP continued its outreach efforts, primarily by sending out eNews updates and keeping its website updated with new documents. The FRP website provides a general overview of the program and serves as a publicly accessible depository for all 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 FRP staff.

### **Prospect Island**

Interim land management of Prospect Island continued in 2014. DWR's contractor repaired the broken culvert flap and screw gate on the southern Miner Slough portion of DWR's property. To facilitate inspection and monitoring of the priority levee repair sites, 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. Due to delays in obtaining permits, levee repairs were not done in 2014. DWR continues to pursue obtaining the necessary permits to complete this work.

DWR's North Central Region Office completed its site characterization and groundwater monitoring study, which began in January 2010. The purpose of this study is to better characterize the subsurface hydrogeological conditions in order to further evaluate the potential for seepage to occur on Ryer Island as a result of tidal restoration on Prospect Island. The final project report was completed in early 2014 and is available on the FRP website. Staff continues to monitor the 20 groundwater wells and one surface water station installed on Prospect Island, and nine groundwater wells and three surface water stations on Ryer Island.

Following a lengthy process of modeling and analysis, in March 2014 three restoration design alternatives were chosen to be analyzed in the Prospect Island EIR. All alternatives involve the use of wide breaches, the excavation of central dendritic channels, and the construction of an intertidal toe berm along the interior Miner Slough levee. The preferred alternative project description and conceptual restoration plan was developed in 2014. Work on the draft EIR began in earnest with the completion of the project description. Work continues on the administrative draft EIR and is expected to be complete some time in 2015. A public draft is scheduled to be released in 2016.

Concurrent with the Interagency Ecological Program (IEP) project work team process, the DFW FRP monitoring team drafted a preliminary monitoring plan for fish and food web resources for the planned Prospect Island Habitat Restoration Project.

### ***Tidal Wetland Monitoring Project Work Team***

DFW FRP monitoring staff leads an IEP Tidal Wetland Monitoring Project Work Team formed for the purpose of developing a standardized monitoring program for restored tidal wetlands in the Delta and Suisun Marsh. The project work team, comprised of experts in wetland ecology and geomorphology, first met in June 2014 and began the process of developing conceptual models of ecosystem function related to habitat and food supply for native fishes to guide the formation of hypotheses and the selection of metrics for the generalized tidal wetland monitoring plan. A draft of that plan is expected to be completed in spring 2015.

### ***Land Acquisition***

DWR purchased the 245-acre Overlook Club property in February 2013 for tidal habitat restoration. DWR is maintaining the property to continue the current waterfowl habitat and recreational hunting uses while taking actions to control invasive species in order

to prepare the property for restoration. Restoration of Property 322 was initially planned for 2016, but will be delayed 1 to 3 years to allow for ongoing real estate negotiations with the neighboring properties on Bradmoor Island. Bradmoor Island is a unique feature within the Suisun Marsh due to the presence of a hill in the central portion of the island and its proximity to Little Honker Bay, which may provide a local sediment source to the property once it is restored. Restoring the properties together would allow for greater connectivity and substantial cost savings and would reduce the need to fill wetlands to reinforce interior levees.

The FRP continued efforts to acquire more restoration properties. DWR's Real Estate Branch requested and received appraisals for three parcels in the Suisun Marsh (parcels 604, 329, and 330) as well as the Port of West Sacramento's portions of Decker and Prospect islands. Offers are anticipated to be made in early 2015.

## **Decisions on Endangered Species**

Table 3-1 lists fish species of concern found in the Delta. No status changes were made in 2014.

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

Common Name	Scientific Name	Date of 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

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.

## Trends in Fish Abundance

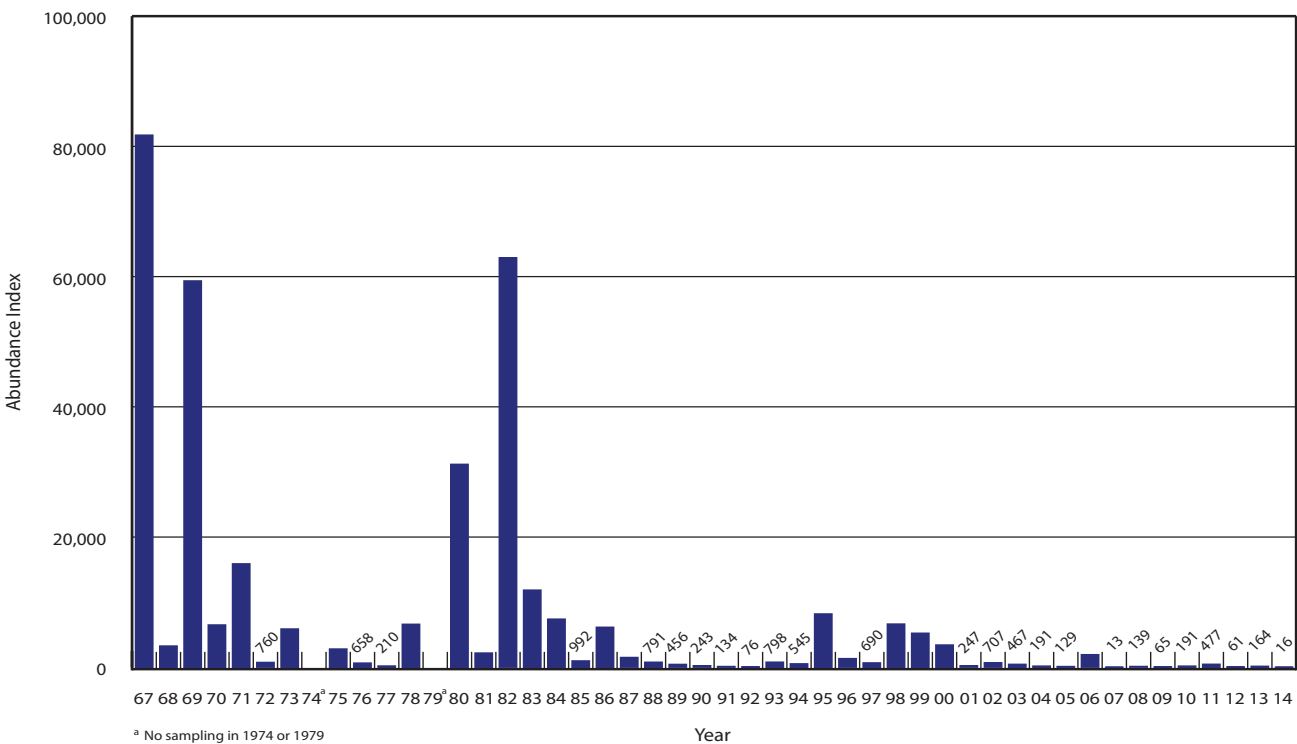
Abundance indices for Longfin Smelt and Delta Smelt are based on DFW fall midwater trawl sampling conducted every year from September through December. Index calculations are based on average catch per trawl for 100 core index stations, which are partitioned into 14 geographic areas. The average monthly 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 from 1967 through 2014 is shown on Figure 3-1. The index for 2014 declined from the previous year to the second lowest value on record.

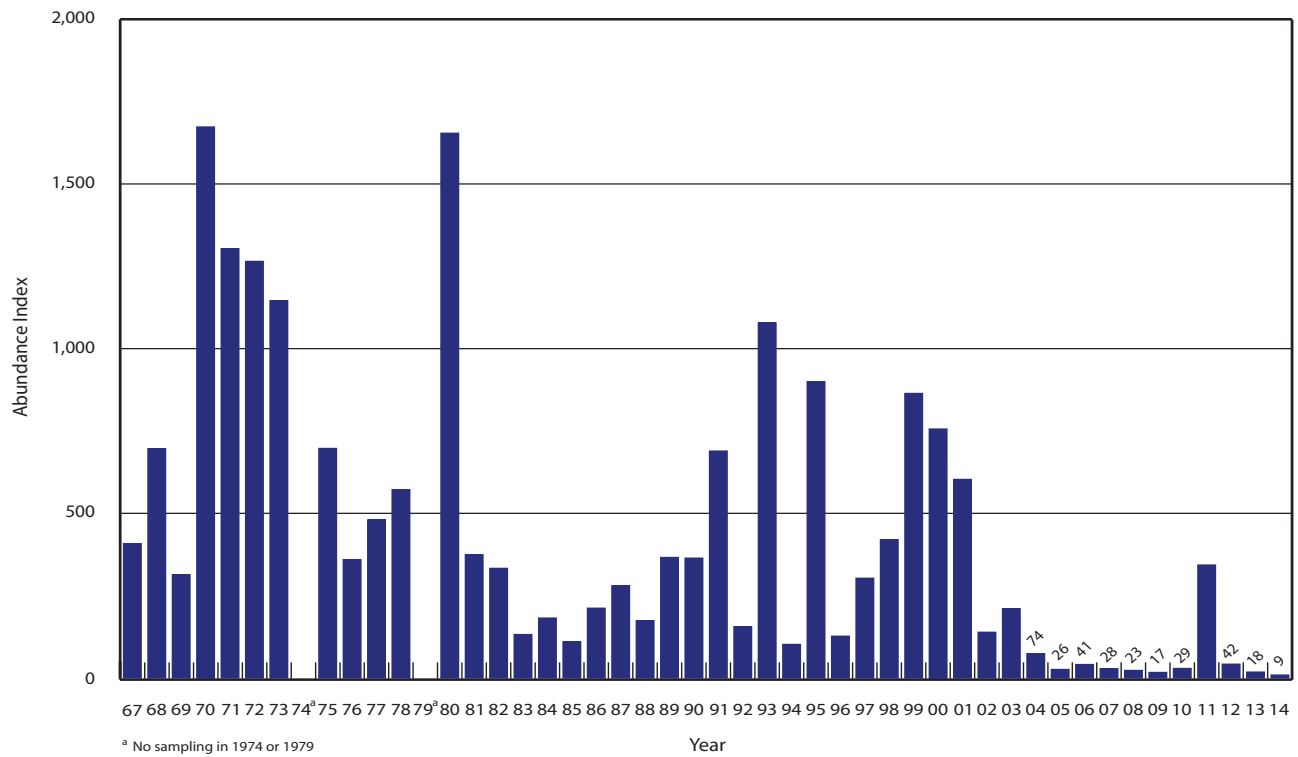
Figure 3-2 shows the abundance index for Delta Smelt from 1967 through 2014. In 2014, the index dropped to a value of 9, the lowest value observed since the inception of the survey.

For more about the declining abundance of Delta Smelt and other pelagic fish species in the Delta, see the Pelagic Organism Decline section in this chapter.

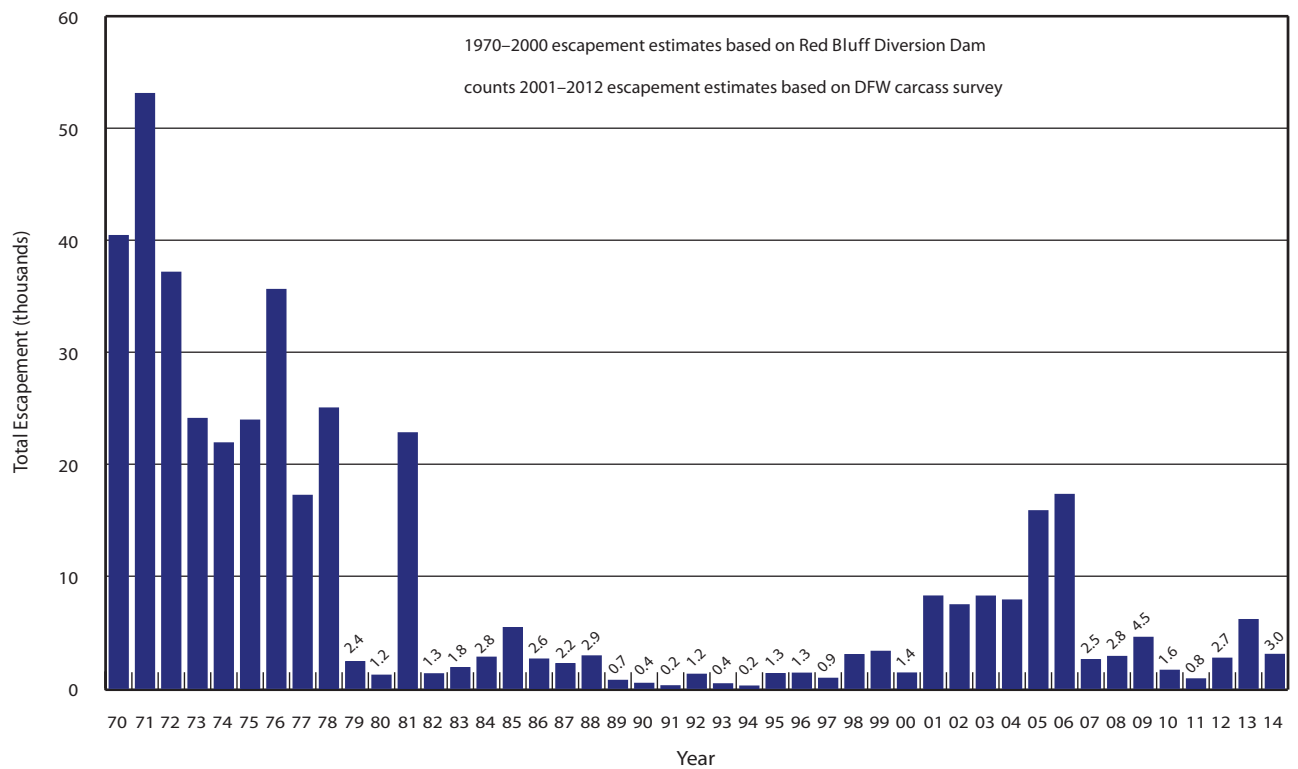
Figure 3-3 shows estimates of returning adult winter-run Chinook Salmon from 1970 through 2014. These estimates, referred to as escapement estimates, are the number of adults that escape mortality and return to spawn. The Sacramento River winter-run Chinook Salmon escapement estimates are generated from 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 2014



**Figure 3-1 Longfin Smelt Fall Midwater Trawl Abundance Index, 1967–2014**



**Figure 3-2 Delta Smelt Fall Midwater Trawl Abundance Index, 1967–2014**



**Figure 3-3 Estimated Total Adult Winter-run Chinook Salmon Escapement, 1970–2014**

was 3,015, which was approximately half of the 2013 escapement estimate.

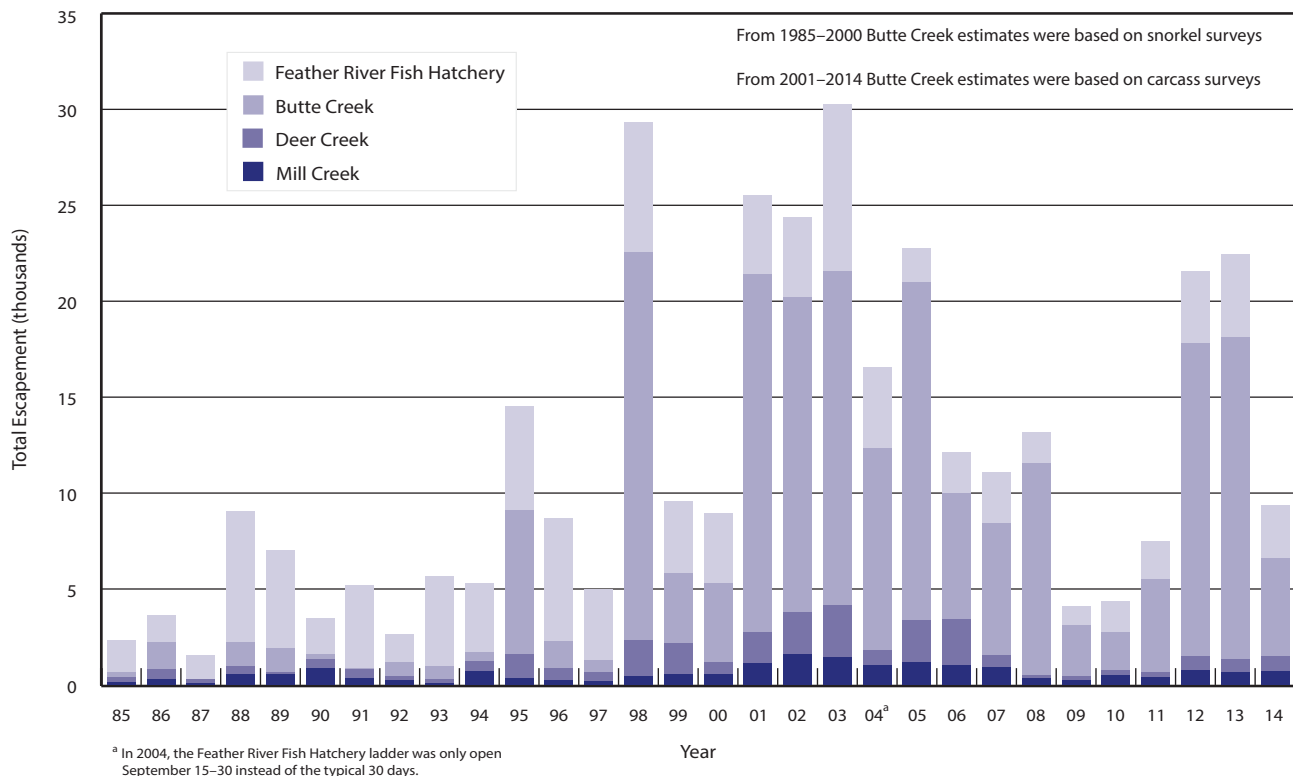
Figure 3-4 shows estimates of returning adult spring-run Chinook Salmon from 1985 through 2014. Individual estimates are shown for FRFH and the principal spring-run spawning streams: Mill Creek, Deer Creek, and Butte Creek. The escapement estimates are shown separately for each stream, because the Feather River estimate is based on returns to the FRFH, where the genetic integrity of spring-run Chinook Salmon is uncertain. The estimated escapement for 2014 was 2,776 for the FRFH and 9,368 for the other streams combined. The 2014 escapement estimate was 1.4 times higher than the 2011 parent stock estimate for the FRFH, and 1.2 times higher than the 2011 parent stock estimate for naturally spawned fish in 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 IEP 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



**Figure 3-4** Estimated Total Adult Spring-run Chinook Salmon Escapement, 1985–2014



endangered under CESA) and Longfin Smelt (listed as threatened under CESA).

Since 2005, IEP 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 (see the IEP *Pelagic Organism Decline Work Plan and Synthesis of Results*, available on DWR’s website). This conceptual model has served as a working hypothesis for continuing pelagic organism decline investigations since 2011. In early 2012, the IEP formed the Management, Analysis, and Synthesis Team to synthesize scientific datasets with the goal of addressing pressing management information needs.

In January 2014, the team completed a comprehensive synthesis of the latest data on the endangered Delta Smelt and presented a new conceptual model for the species. The report identifies environmental conditions that affect the Delta Smelt population at different life stages, notes key information gaps, and makes recommendations for future research, modelling, and synthesis work for improved management of the species. The full report can be obtained from DWR’s website.

## 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 in preparation for the FERC relicensing of the Oroville Facilities. Field program elements have expanded to include operation of

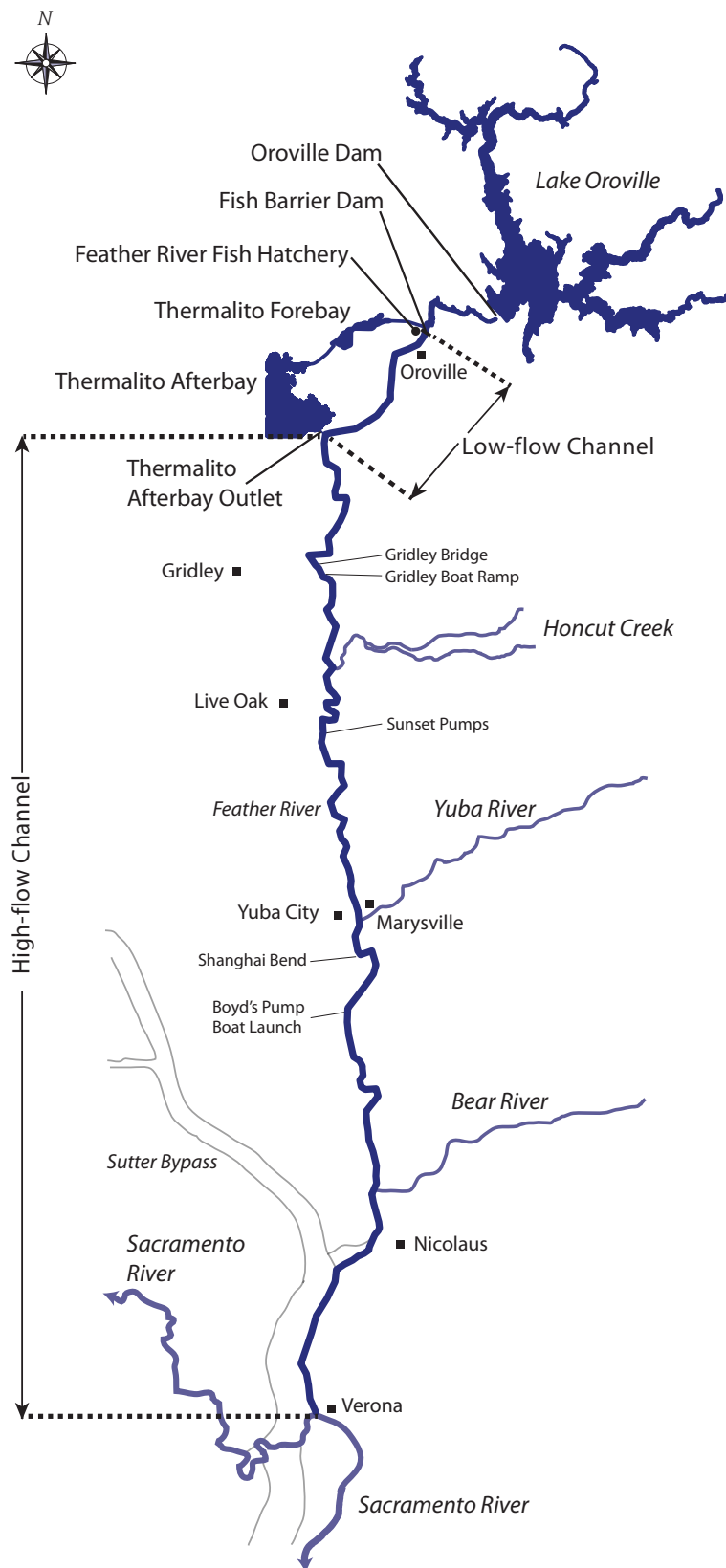
rotary screw traps (RSTs), acoustic and radio telemetry, salmon and steelhead spawning surveys, salmon escapement surveys, spring-run Chinook Salmon tagging, otolith thermal marking studies, snorkel surveys, Green Sturgeon studies, steelhead acoustic tagging, and hatchery juvenile Chinook Salmon movement and survival studies.

The study area is generally divided into the low-flow channel, from the Fish Barrier Dam (FBD) 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 17 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 in an effort to examine their return success. This long-term monitoring yields valuable baseline information about juvenile salmonid production in the lower Feather River and the effects of project operations and restoration activities on abundance and migration timing.

Emigration timing and travel times confirm that most wild juvenile Chinook Salmon move rapidly through the upper reaches of the lower Feather River. However, little information exists regarding rearing behavior in the lower Feather River downstream of the town of Live Oak. Consistent with select years of trapping data, increased turbidity is one factor that can stimulate the emigration timing of wild juvenile salmon. However, in the absence of turbid water, juvenile Chinook Salmon still emigrate in a fairly consistent pattern from year to year, with the majority of juveniles emigrating in January and



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



February. This consistent pattern is driven by the timing of adult spawning in the fall.

In 2014, the RSTs fished throughout the normal emigration period (December through May). Two RST locations were used to assess the timing and general abundance of juvenile Chinook Salmon, steelhead, and other fishes emigrating in the lower Feather River. Within the low-flow channel, one RST (Gateway) was stationed at River Mile (RM) 59.5, approximately 0.5 miles above Thermalito Afterbay Outlet. The Gateway RST was operated from December 10, 2013, to April 24, 2014. Within the high-flow channel, one RST was fished at Herringer Riffle at RM 46 from December 26, 2013, through May 21, 2014. The Gateway Riffle location provided a passage estimate of 27,599,594 fall-run Chinook Salmon juveniles, and the Herringer Riffle location estimate was 23,793,475 fall-run juveniles.

Although Chinook Salmon and steelhead were the primary targets of trapping efforts, records were kept on all fish species caught. Twenty-two species, including three races of Chinook (fall-run, spring-run, and late fall-run), were caught during the 2014 season. Chinook Salmon was the dominant species, comprising 99 percent of the catch. A total of 1,094,995 Chinook Salmon were caught in the RSTs with 727,481 (66 percent) of those captured in the low-flow channel and 367,514 (34 percent) caught in the high-flow channel.

A total of 4,941 Chinook Salmon at Herringer Riffle and 5,171 at Gateway were measured for fork length in 2014. Salmon emigration was observed from December through April at the Gateway location and December through May at the Herringer location with the greatest abundance occurring in January and February.

## Acoustic and Radio Telemetry

Acoustic and radio telemetry gathers baseline information on the migration and holding patterns of adult Chinook Salmon in the lower Feather River. A telemetry study was conducted to collect additional data to evaluate the relationship between water temperature and migration patterns of prespawning adult Chinook Salmon.

Chinook Salmon with a spring-run life history enter freshwater in early summer and hold in the river up to several months before spawning. In order to collect additional data to evaluate water temperature and migration patterns of prespawning adult Chinook Salmon, spring-run adult Chinook Salmon are captured and tagged with radio tags or acoustic tags to document their habitat use. Because the water temperature regime associated with the ongoing operation of the Oroville Facilities may expose prespawning adult Chinook Salmon to elevated water temperatures during the migration and holding period, radio and acoustic tagging was implemented to determine where fish are holding and how those holding patterns may affect future FERC license activities (such as weir placement or restoration actions).

Between May 14 and June 18, 2014, four adult Chinook Salmon designated as having spring-run life history traits were captured using hook-and-line sampling and implanted with acoustic tags at Shanghai Bend. These fish were monitored along the 67-mile stretch of river from the FBD 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 the fish passed the receivers. Fixed station receivers were checked at least once per month during the survey season. All of the tagged fish were subsequently detected.

All four salmon tagged at Shanghai Bend in 2014 swam to the upper most limit of the Feather River at the FBD near the FRFH. After tagging, three fish initially moved upstream to the FBD with little to no downstream movement. One of the four moved downstream immediately, proceeding downstream through the Sacramento River nearly to San Pablo Bay at the Carquinez Bridge before returning to the Feather River and migrating back upstream to the FBD. This fish moved farther downstream than any other fish in the 3-year period from 2012 to 2014. One of the three fish that moved upstream initially remained at the FBD for about 4 weeks, but later moved downstream and left the Feather River system 47 days after tagging. This fish was last detected in the American River near Fair Oaks, California.

## 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 FBD 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 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, respectively. (For additional information see the Feather River Gravel Supplementation Project section earlier in this chapter.)

Ground surveys for the 2014 Chinook Salmon redd survey began on September 9 and continued until November 21. The redd survey consisted of a total of 20 days over 9 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 on October 9 and November 7.

During the 9 weekly surveys, 1,932 mature redds were found within the spawning area between upper Hatchery Riffle and lower Auditorium Riffle (RM 66.4). Another 50 redds were discovered in the high-flow channel from the Thermalito Afterbay Outlet to the Gridley Bridge.

The week 3 survey (September 22, 25, and 26) covering the area between upper Hatchery Riffle and lower Auditorium Riffle revealed the highest number of redds with 335. The second highest total was 329 redds for the survey conducted October 14 and 17 in the same areas. The locations with the largest number of redds were the lower Auditorium Riffle area with 532 (28 percent) and Hatchery Riffle with 316 (16 percent). The average depth for all salmon redds was 0.51 meters (m) (1.67 feet [ft]), and the average water velocity was 0.6 m (1.97 ft) per second. The average redd length and width was 2.2 m (7.2 ft) by 1.3 m (4.3 ft).

## Steelhead

In 2014, a total of 32 steelhead redds were identified during 8 weekly surveys. Steelhead redds were first observed on January 8, with newly constructed redds continuously observed through April 26.

The average depth for all recorded redds was 0.38 m (1.2 ft) with an average water velocity of 0.42 m (1.38 ft) per second. The average redd length and width was 1.25 m (4.1 ft) by 0.9 m (3 ft). Small gravel was the dominant substrate type used by steelhead for redd construction, and overhead cover was present at 34 percent (11 of 32) of observed redds. Instream cover was present at 22 percent (7 of 32) of observed steelhead redds.

## Salmon Escapement Survey

The purpose of the salmon escapement survey is to evaluate the abundance, distribution, and timing of Chinook Salmon adults spawning in the river.

The survey provides information crucial to monitoring, managing, and conserving Feather River salmon populations. The data are used to identify trends in population and age structure, track patterns in spawning distribution, determine proportions of hatchery versus wild fish, and explore environmental effects on salmon survival rates. Estimating the number of salmon returning to spawn is the basic goal of the escapement survey.

The estimate is based on a weekly mark and recapture experiment in which salmon carcasses are tagged, chopped, and placed back into the river. The rate at which tagged carcasses are recovered (the recovery rate) relative to the number of carcasses checked for tags (chopped) provides the basis for an estimate of the total spawning population.

The Chinook Salmon spawning escapement survey began September 2 and continued

through December 17, 2014. 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 lower Feather River.

The carcass mark-recapture study resulted in a spawning population estimate of 60,721 Chinook Salmon for the lower Feather River. There were an estimated 4,725 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 94.2 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 81.3 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 25 (RM 58).

## 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. The program also investigates potential differences in spawning distribution and timing of the early arriving spring-run salmon in the river.

Early arriving spring-run salmon entering the hatchery 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, so spring-run could be spawned separately from fall-run. The tags also enabled the escapement survey crew to differentiate spring- and fall-run salmon, so that any potential differences or trends in the in-river spawning behavior of the two runs can be analyzed.

In 2014, 7,289 Central Valley spring-run Chinook Salmon were tagged at the FRFH. Tagging began on May 1 and ended on June 27. When spawning commenced in the fall, a total of 3,862 tagged fish were recaptured: 2,776 at the FRFH and 1,086 in the river escapement survey.

### Snorkel Surveys

From 1999 to 2001, DWR conducted a snorkel survey focused on juvenile steelhead, but included 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 Chinook Salmon and steelhead prior to habitat improvements;
- (2) identify habitat conditions (depth, substrate, velocity, and cover) where juvenile Chinook Salmon and steelhead occur;
- (3) identify potential sites for gravel supplementation, channel improvement, and structural habitat restoration; and
- (4) identify habitat deficiencies for juvenile Chinook Salmon and steelhead in the lower Feather River prior to habitat improvement implementation.

In 2014, the Feather River Program continued to collect data relative to the aforementioned goals. In future years, habitat availability

will be included to investigate habitat preferences by species and size classes.

### Green Sturgeon Studies

This project fulfills some terms and conditions listed in NOAA Fisheries' draft biological and conference opinion for the relicensing of the Oroville Facilities. The primary objectives of this sturgeon study are to:

- determine if there are adult migration barriers;
- evaluate migration patterns including residence times and factors affecting them;
- identify distribution and habitat preferences;
- evaluate the effect of Oroville Facilities operations on passage success and distribution;
- estimate the annual abundance of adult Green Sturgeon;
- determine potential spawning grounds that can be target areas for egg and larval surveys; and
- provide DWR, the FERC, NOAA Fisheries, and DFW with data to make management decisions concerning future monitoring programs, operational changes to the facilities, and/or habitat enhancement within the lower Feather River.

### Sturgeon Sonar Survey

In 2014, 35 sonar surveys were completed from March 4 to December 30. Surveys were conducted at three locations: Shanghai Bend (RM 24.7), Sunset Pumps (RM 38.5), and Thermalito Afterbay Outlet (RM 59). Shanghai Bend was surveyed the most with 19 surveys. Sunset Pumps was surveyed nine times and the Thermalito Afterbay Outlet was surveyed seven times.

A total of 17 sturgeon detections were made during the survey season (16 at Shanghai Bend and 1 at Sunset Pumps). At Shanghai

Bend, the sturgeon were detected at depths ranging from 0.51 m (1.67 ft) to 2.94 m (9.65 ft) with the mean depth of 1.76 m (5.77 ft). The sturgeon detected at Sunset Pumps was at a depth of 7.08 m (23.23 ft). At Shanghai Bend, observed sturgeon had a mean length of 2.08 m (6.82 ft). The sturgeon observed at Sunset Pumps had a length of 1.48 m (4.86 ft).

### ***Sturgeon Angling/Telemetry Studies***

Two of four Green Sturgeon tagged in 2013 (see Bulletin 132-14) continued to be tracked through February 14, 2014. One of the fish was internally tagged on November 12 and was last detected in the Bear River on February 9, 2014, but it's unclear as to whether it left the system or was caught and illegally retained. The other fish, internally tagged on November 13, 2013, emigrated from the lower Feather River on February 10, 2014.

On March 6, 2014, four White Sturgeon were captured in a fyke trap in the lower Feather River above Beer Can Beach (RM 9). These four sturgeon were tagged with an external acoustic telemetry tag and released. Tagged fish were detected on acoustic monitoring receivers.

The first individual tagged, Tag 33095 (a male), was first detected in the Feather River at Beer Can Beach (RM 7) on March 8. Tag 33095 was next detected in the Sacramento River above Verona on March 8, 9, and 11. Also on March 11, Tag 33095 was detected on a receiver located in the Sacramento River below Verona (Feather River RM 0), and again on March 16, which was the last detection of Tag 33095 within the study boundaries. Based on existing data, it appears Tag 33095 successfully left the Feather River system.

The second individual, Tag 33088 (a female with eggs), was first detected March 7 at Beer Can Beach and also in the Sacramento River above Verona later the same day. On

March 16, Tag 33088 was again detected in the Sacramento River above Verona and then in the Sacramento River below Verona. On March 29 and 31, Tag 33088 was detected again in the Sacramento River below Verona. On April 1 and 9, Tag 33088 was detected in the Sacramento River above Verona. The last detection of Tag 33088 was on April 9 in the Sacramento River just downstream of Verona. Based on these data, Tag 33088 successfully left the Feather River system.

The third individual, Tag 33089 (sex unknown), was first detected on the Beer Can Beach receiver on March 7. On March 7 and 8, Tag 33089 was detected in the Sacramento River just upstream of Verona, the last detection being March 8 on this same receiver. There have been no further detections of Tag 33089 within the project boundaries. Based on these data, Tag 33089 successfully emigrated from the lower Feather River into the Sacramento River.

The fourth individual, Tag 33085 (sex unknown), was first detected on a receiver located in the Bear River approximately one-half mile above the confluence with the Feather River (RM 12.5) on March 7. Tag 33085 was then detected at Star Bend (RM 19) on the same day. On March 8, Tag 33085 was detected on multiple receivers: the first just below Boyd's Pump (RM 22); it then swam downstream to Star Bend, further down river to the mouth of the Bear River, and finally into the Bear River where it was detected on the receiver approximately one-half mile above the mouth. Tag 33085 was next detected on March 11 at Beer Can Beach, and also on the receiver located in the Sacramento River below Verona the same day. Based on these data, it appears that Tag 33085 left the Feather River system.

No further detections within project boundaries have occurred to date on any of the tagged sturgeon.

### Sturgeon Egg and Larval Studies

Ten egg mats were deployed on the river bottom just downstream of Shanghai Bend from March 20 through June 13. The mats were hauled to the surface and checked for eggs every 3 to 4 days. Sampling locations were determined based on the presence of multiple sturgeon detected with sonar, observation of angler-caught Green Sturgeon, or field observations of breaching sturgeon. In 2014, egg mats were set in waters that ranged from 1.3 m (4.3 ft) to 6.8 m (22.3 ft) in depth. Flows ranged from 30 to 88.9 cubic meters per second (1,059 to 3,139 cubic feet per second), and water temperatures ranged from 11.08 to 24.73°C (51.94 to 76.51°F). No sturgeon eggs or larvae were sampled with egg mats during the 2014 sampling season. Other species sampled included 15 unidentified crayfish and 4 unidentified sculpins.

D-nets (mesh net on a D-shaped frame) were deployed in the lower Feather River in 2014. Nine separate locations in the vicinity just downstream of Shanghai Bend were sampled. D-nets were deployed weekly from sunset to sunrise and checked every 30–60 minutes. A total of 24,844,534 cubic meters of water was sampled during the nine surveys from April 4 to June 12. D-nets were set in waters that ranged from 1.2 m (3.9 ft) to 5 m (16.4 ft) in depth. Flows ranged from 30 to 88.9 cubic meters per second (1,059 to 3,139 cubic feet per second), and water temperatures ranged from 12.65 to 24.70°C. No sturgeon eggs or larvae were sampled with D-nets during the 2014 sampling season.

Other species sampled included 1 late fall-run Chinook Salmon, 89 Sacramento Suckers (*Catostomus occidentalis*), 62 Pikeminnows (*Ptychocheilus grandis*), 1 American Shad (*Alosa sapidissima*), 15 unidentified lampreys, 4,481 American Shad eggs, 3 unidentified catfish, 3 unidentified cyprinids, and 2 unidentified sculpins.

### Steelhead Acoustic Tagging

A broad range of actions will be initiated at the FRFH as part of federally mandated hatchery genetic management planning. To optimize the success of FRFH steelhead, while minimizing impacts to other listed steelhead stocks, more information on straying and the success of various release strategies is needed. To address this lack of information, DWR began a tagging program aimed at identifying behavior and survival upon release of FRFH smolts.

In 2014, the Feather River Program continued the steelhead acoustic tagging program that was developed in 2012 to determine the downstream migration success rate for FRFH steelhead released into the Feather River at the Boyd's Pump Boat Launch release site. Using fixed station and mobile acoustic telemetry, DWR tracked the migration of acoustically tagged fish as they left the system.

For this study, 100 hatchery-reared steelhead were surgically implanted with acoustic tags and divided into two separate release groups. Each release group was placed into a much larger group of untagged fish and then transferred by truck to the release site. All of the releases took place at Boyd's Pump Boat Launch in Yuba City. Each group of fish was held in a volitional release net pen for approximately 4 hours prior to release. The first group of fish was released at 1 p.m. on February 20, 2014. The second group was released later that day at 7 p.m.

An array of fixed acoustic receivers placed at 10 to 15 kilometer intervals downstream of the launch site detected all of the tagged steelhead. These receivers were downloaded monthly during mobile roving surveys conducted to locate fish in the reaches between receivers. Movement histories created for each detected fish provided an estimated outmigration success rate of 15 percent for fish leaving the lower Feather River.



## Juvenile Hatchery Spring-run Chinook Salmon Movement and Survival Studies

In 2013, DWR's Feather River Program partnered with NOAA Fisheries and the University of California, Davis, and designed a study to gain a better understanding of the movement patterns and survival of in-river released juvenile hatchery spring-run Chinook Salmon. The main objectives of the study were to: (1) compare the survival and movement of fish released at the normal in-river location at Boyd's Pump Boat Launch versus fish released further upstream at the Gridley Boat Ramp; (2) compare the survival and movement of fish released during the day versus those released at night; and (3) determine if mortality in the Feather River is constant or varies depending on the river reach.

This study used the juvenile salmon acoustic telemetry system (JSATS) to track the juvenile fish. The JSATS system was chosen over other acoustic telemetry systems because JSATS tags are the smallest (0.3 grams) currently available acoustic tag and have shown excellent performance in high-noise environments. The system is comprised of 98 acoustic receivers that were placed along the salmon's outmigration route from Cox Riffle in the Feather River, through the lower Sacramento River, and along the Delta and Carquinez Strait to the Golden Gate Bridge.

A total of 300 juvenile spring-run Chinook Salmon were surgically implanted with JSATS tags and divided into four release groups. Each release group was loaded into a transfer truck with 75,000 untagged fish and transported to the release site. The first group of fish were released into a floating volitional release net pen at the Gridley Boat Ramp and allowed to acclimate for approximately 4 hours before being released into the river in the early afternoon on April 10, 2014. The second release group was released in a similar manner later that

evening. On April 11, 2014, the third and fourth release groups were released at the Boyd's Pump Boat Launch, the normal release site for juvenile salmon produced by the FRFH.

Results from the study indicate that fish released at the Gridley Boat Ramp (RM 188.3) had a lower survival rate than those released at the Boyd's Pump Boat Launch (RM 160.9). Only 18 of the 150 fish (12 percent) released at the Gridley site survived the first 25.2 mile section to Shanghai Bend (RM 188.3 to 163.1). The lowest survival estimate (24 percent) for the entire 187.8-mile study area was recorded for the 14.2 mile reach from Sunset Pumps to Shanghai Bend. No fish from any of the release groups were detected beyond the exit of the Delta at the Benicia Bridge.

Fish released from both sites averaged between 5 and 7 days to reach each location along the study area. Movement rates for the Feather River were slower than those in the Sacramento River.

Overall, there was no significant difference between the night and day releases.

## 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 by 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. The agreement specifies that the \$15 million must be expended by December 29, 1996.

The Delta Fish Agreement has been amended four times:

- Amendment 1 (1996)—extended the period to expend the remaining \$9 million of the \$15 million to December 29, 2001.
- Amendment 2 (2001)—extended the period to expend the remaining \$5 million of the \$15 million to December 31, 2004.
- Amendment 3 (2004)—extended the period to expend the remaining \$3.6 million of the \$15 million to December 31, 2007.
- Amendment 4 (2011)—extended the period to expend the remaining \$1.6 million of the \$15 million to December 31, 2015.

Since 1986, DWR has spent \$66.2 million on mitigation projects developed under the Delta Fish Agreement. Mitigation fund expenditures through December 31, 2014, were \$52.6 million for the Annual Mitigation Account and \$13.6 million for the \$15 million Lump Sum Account. Funds approved but unexpended from each account were \$10.5 million and \$1.3 million, respectively.

For more information, see DWR's website.

## Climate Change

Climate change involves complex interactions and will have diverse impacts on California's natural resources. The SWP was designed based on historical hydrology and is therefore vulnerable to changes in climate that may shift the hydrology in challenging ways. Climate warming is expected to continue shifting rainfall and runoff patterns and diminishing the Sierra Nevada snowpack affecting DWR's ability to efficiently operate the SWP. In the future, sea-level rise, increased occurrence of extreme precipitation events, and prolonged droughts may also threaten operation of the SWP. Increased saline water flows and reduced

surface flows due to droughts may require increased fresh water storage releases to maintain water quality requirements. Climate change is likely to exacerbate existing ecological issues in Central Valley rivers and the Delta by raising water temperatures, increasing sediment loading (as a result of increased wildfires and more extreme precipitation events), and increasing water demands.

Extraordinary and prolonged dry conditions in 2014 posed challenges for meeting demands and moving water through the SWP. Dry conditions left California's forested lands, which serve as storage and headwaters for the SWP, vulnerable to catastrophic fires. Snow and rain falling on burn areas can lead to increased or accelerated run-off, erosion, and water quality issues.

At the other end of the spectrum, climate change projections also indicate periods of peak flows that will be higher than previously experienced. The wet extreme also poses challenges to SWP management as the SWP's major storage reservoir, Lake Oroville, is a multipurpose reservoir that serves a flood protection purpose during the winter and spring. Higher peak flows may necessitate modified operation of multipurpose reservoirs to allow more flood storage space to accommodate changing hydrology.

In addition to the size and distribution of storms, the timing of snowmelt runoff into reservoirs is also changing. The State has already experienced a shift in the spring runoff with peak runoff occurring, on average, approximately 10 days earlier than it did during the middle of the last century.

To address these challenges, DWR continued to contribute 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 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 and SWP facilities and operations; reviewing and consulting with outside experts; and developing and managing climate data.

## Completed in 2014

### *Research*

**Climate Change Impacts on California Water Rights Study.** This project was initiated in 2013 to evaluate future nonproject water rights reliability in the Sacramento, Feather, and American river watersheds. The final report, completed in 2014, 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 future curtailment actions. 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 project water that is released each year in excess of project deliveries and how this amount of water is likely to change in the future. This report will be published in 2015.

**Tree-ring Reconstruction of Paleostreamflows in the Sacramento, San Joaquin, and Klamath River Basins.** Under a contract DWR executed with the University of Arizona, tree-ring reconstructions of paleostreamflows were developed for the Sacramento, San Joaquin, and Klamath river basins (see Bulletin 132-14). The university presented DWR with the final draft report



of the study in 2014. Reconstructions of variable length were generated for the Klamath basin; reconstructions for the Sacramento and San Joaquin basins cover the years 900–2012 CE. The previous reconstruction of the Sacramento River Region, Four Rivers Index has been updated, and instead of ending in 1979, it now ends in 2012. A reconstruction of the San Joaquin Four Rivers Index has also been generated for the same time period. These paleorecords may be helpful in assessing future potential climate extremes that could impact management of the SWP. The report can be found on DWR's website.

**Estimating Historical California Precipitation Phase Trends Using Gridded Precipitation, Precipitation Phase, and Elevation Data Memorandum Report.** Climate change projections for California indicate a reduction in the percentage of precipitation that falls as snow, and an increase in the percentage that falls as rain, due to warmer temperatures in the future. Previous work has shown overall decreases in rainfall to snowfall ratios for the western United States over the last 60 years. Of interest in this study is the quantification of snow to rain ratios for smaller regions, specifically in California. Estimating cumulative precipitation phase ratios for specific regions is difficult due to large differences in local precipitation. In California, the high relief of the surface topography makes such estimates particularly difficult. The low spatial resolution of suitable precipitation and snow water equivalent monitoring stations contributes to the difficulty in quantifying the trends for sub-state-sized regions of interest in this study. Using this methodology, statistically significant increases in the ratio of annual liquid to total precipitation are seen for large areas in the northern part of the State and Northern Sierra over the water year. No significant annual trends are seen for regions in the central and southern portions of the Sierra. Further work extending the analysis to distinct elevation

ranges and seasonality may be completed in the future.

This study developed and described a methodology that uses readily available research data sets to produce gridded estimates of historical rainfall as a fraction of total precipitation for areas comprising the major water supply watersheds of California. The report can be found on DWR's website.

## Ongoing during 2014

### Research

#### **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.

Since its start in 2010, the project had seen progress (see Bulletin 132-14) including creation of an annotated bibliography of relevant scientific literature, an inventory of lands, and field assessments of degraded lands. However, due to operational and management difficulties, partially stemming from California's current unprecedented drought, this project is being reassessed for its feasibility.

**Reoperation of Water Supply and Flood Protection Systems.** DWR is conducting a system reoperation study in cooperation with other State and federal agencies, local water districts, groundwater managers, and other stakeholders to identify potential strategies for reoperation of the statewide flood protection and water supply systems.

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 (planned to be 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 in Bulletin 132-14 or on the System Reoperation Program webpage on DWR's website.

## Planning

**Data Collection and Climate Services.** Since 2011, DWR has been developing the Flood Emergency Response Information Exchange. Information in the exchange is now linked to the climate data in the California Climate Data Archive. The exchange will also house a new map-based server for precipitation depth, duration, and frequency curves and annual extremes data sets that make up Bulletin 195 (*Rainfall Analysis for Drainage Design*). Beta testing is currently underway at DWR, and in-house servers are being configured to enable wide release in 2014.

For observing data systems, DWR is continuing its partnership with the Earth Systems Research Lab 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, while efforts continue to get the data into the California Data Exchange Center. Other observing opportunities that are in their initial stages include elements of the Forecast-Coordinated Operations

program and the University of California, Merced, observing system in the American River watershed. A new remote sensing monitoring effort using airborne LIDAR (light detection and ranging) measurements of the snowpack is being developed under a joint project between DWR and the National Aeronautics and Space Administration's Jet Propulsion Laboratory. The National Oceanic and Atmospheric Administration has stopped funding for the new Regional Climate Reference Network and is considering streamlining the National Weather Service Cooperative Observer Network.

## Data Development and Curation

**DWR Climate Change Basic Data Group.** DWR's Climate Change Basic Data group is composed 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 final report on snow and rain trends in California was completed in 2014. A partnership with the Western Regional Climate Center continued for coordination of statewide climate data collection, storage, and dissemination.

During 2014, the basic data group focused on creating a framework for managing DWR's in-house historical climate data. New projects on research into snow and rain trends using DWR and other data sources will be conducted. DWR volunteer climate data collectors will continue to be encouraged to join the Community Collaborative Rain, Hail & Snow Network.

## Policy

**Development of Internal DWR Policies on Climate Change Mitigation, Analysis, and Adaptation.** In 2009, the California

Environmental Quality Act Climate Change Committee was established to review all climate change analyses in DWR environmental documents and exemption considerations prior to publication. In 2010, the 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 2013, 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.

**Climate Action Plan Phase II.** Phase II work began in 2012. It is a framework and guidance for consistent incorporation of climate change analysis in DWR project and program planning activities. Phase II will ensure that DWR planning activities meet standards for consistency, quality, and adequacy. The guidance may also assist local water managers. Phase II is expected to be completed in 2016.

**Climate Action Plan Phase III.** Phase III is DWR's Climate Change Resiliency and Adaptation Plan. This plan evaluates the vulnerability of DWR facilities and operations to climate change impacts and develops adaptation strategies to improve DWR's resiliency to these impacts. The vulnerability assessment portion of Phase III is expected to be completed in 2016 with the adaptation plan following in 2017. (For more information, see the DWR Vulnerability Assessment and Adaptation Plan section below.)

## 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. Between 2007 and 2009, DWR reported its estimated total direct and indirect GHG emissions to the California Climate Action Registry and earned Climate Action Leader Status each year. In 2010, emissions reporting transitioned to The Climate Registry, which is a North America-wide registry.

In May 2014, DWR reported its GHG emissions for the 2013 emission year to the California Air Resources Board under its obligation pursuant to California mandatory GHG emissions reporting regulations (Title 17, California Code of Regulations, Sections 95100–95158). The report included energy generated and consumed by the SWP, GHG emissions due to energy imported from Reid Gardner Unit No. 4, and sulfur hexafluoride emissions associated with the SWP's switchyard circuit breakers. 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.

## Initiated during 2014

### Data Development and Distribution

#### Formation of Regional Energy Intensity of Water Supplies Website.

As a follow up to the SWP energy intensity work completed in the *California Water Plan Update 2013*, an interactive website was created. Regionally based energy intensity data are listed by source, including the SWP, on the DWR climate change website. Energy intensity of water is a measure of the amount of energy required to extract one unit of water from its origin (such as a river or aquifer) and convey it to a particular turnout point. Within California, the energy intensity of water varies greatly depending on geography and water source. Energy intensity information helps inform the public and water utility managers about the relative energy



requirements major water suppliers, such as the SWP, use to meet demand. Because energy usage is closely related to GHG emissions, this information can support measures to reduce GHG, as mandated by the State.

## Planning

### DWR Vulnerability Assessment and Adaptation Plan.

The DWR Climate Change Vulnerability Assessment builds on studies of global and regional climate change impacts and will evaluate, describe, and where possible, quantify DWR facility and operational 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 affect DWR's infrastructure, maintenance activities, and operations. This highly analytical, comprehensive assessment uses an array of geographic information system and modeling tools. 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 developing 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 adaptation and resiliency efforts such as additional water storage projects, infrastructure improvements, enhanced maintenance and operation procedures, and improved habitat management. (For more information, see the Climate Action Plan Phase III section above.)

## Environmental Document Review

Some environmental documents handled by the State Clearinghouse 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 2014, 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. Significant climate change issues increased from 2 documents in 2010 (when the California Environmental Quality Act guidelines were amended to address GHG emissions pursuant to Senate Bill 97 [2007]) to 12 in 2011, 19 in 2012, and 26 in 2013. 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 in 2014.

DWR comments submitted through the California Environmental Quality Act and/or NEPA processes addressed a number of issues, including safety and water supply, fuel reduction activities near the Coastal Aqueduct, encroachment on physical facilities, impacts to crossdrainage facilities, inclusion of design standards related to storm drainage, potential damage to SWP pipelines, potential for seepage from SWP reservoirs caused by well-water extraction, and dams near jurisdictional size.

In 2014, the Environmental Document Review Section screened 2,818 State Clearinghouse documents. After screening, 1,042 documents were referred for information, including notices of preparation and various final documents. Additionally, 157 formal referrals were made for negative declarations, notices of preparation, EIRs, and NEPA documents.

Eighty formal referrals were sent to the Division of Operations and Maintenance and 16 to the State Water Project Analysis Office.

The total number of referrals to the Division of Operations and Maintenance and the State Water Project Analysis Office increased by about 25 percent in comparison to 2013.

In 2014, formal referrals to all other DWR reviewers, including the Central Valley Flood Protection Board and the Division of Safety of Dams, increased by about 17 percent from 2013. This increase is relatively insignificant since the total number of referrals was small when compared to the total number of documents (56 were referred in 2010, 48 in 2011, 45 in 2012, 34 in 2013, and 41 in 2014). 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

*O'Neill Forebay receives water from the California Aqueduct.*

## Significant Events in 2014

*The* Central Valley Regional Water Quality Control Board (RWQCB) produced the *2014 Delta Strategic Work Plan*, an update to the strategic work plan adopted in 2008.

In April, the Bureau of Reclamation (Reclamation) and the U.S. Fish and Wildlife Service (USFWS) signed the record of decision for the Suisun Marsh Habitat Management, Preservation, and Restoration Plan.

In July, the Drinking Water Program was transitioned from the California Department of Public Health (CDPH) to the State Water Resources Control Board (SWRCB).

*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 State Water Project (SWP) is the largest state-built, multipurpose water project in the United States. California's existence and continued prosperity depends on water. More than two-thirds of the people of California rely partly or wholly on the SWP for their daily water needs. 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 (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 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 WQCP 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.

## 2014 Drought Conditions

In January 2014, the Governor declared a state of emergency due to 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.

In March 2014, DWR was considering installation of emergency drought barriers in two locations to help preserve water quality in the Delta. In April, DWR determined that precipitation in February and March eliminated the immediate need for the barriers, and after continued monitoring and assessment, DWR concluded in late May that the barriers would not be needed in 2014. DWR planned to continue to prepare for the possible installation of emergency drought barriers in 2015.

Beginning in January 2014 and continuing throughout the year, in order to address the effects of the historic drought in 2014,

## 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.

The SWRCB amended Water Right Decision 1641 (D-1641) on March 15, 2000, which placed terms and conditions on a number of water rights, primarily those for the State Water Project (SWP) and Central Valley Project (CVP). D-1641 implemented the objectives in the 1995 Bay-Delta Plan. 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.

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.

Some 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.



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 carried out the most coordinated and extensive series of water operations adjustments in the history of the CVP and SWP. The adjustments to the existing water quality and federal Endangered Species Act requirements of D-1641 and the USFWS and NOAA Fisheries biological opinions (BiOps) allowed the CVP and SWP to support water deliveries, transfers, and maximize upstream water storage while minimizing adverse effects on listed fish species and protecting water quality. In April 2014, DWR and Reclamation released the *Central Valley Project and State Water Project Drought Operations Plan and Operational Forecast, April 1, 2014 through November 15, 2014*. The plan served as a flexible framework to guide water management decisions and was implemented in close coordination with the fish and wildlife agencies and SWRCB. The six agencies continued to build on the lessons learned and experiences of water year 2013–2014 as they developed a CVP and SWP drought contingency plan for water year 2014–2015. In October 2014, DWR and Reclamation produced a drought contingency plan for CVP and SWP operations covering October 15, 2014, through January 15, 2015, as required by the SWRCB's October 7, 2014, modified order approving the CVP and SWP temporary urgency change petition (TUCP) filed in January 2014.

## SWRCB Drought Year Actions

As the State was experiencing one of the driest periods on record, the SWRCB took a number of drought-related actions pertaining to emergency rulemaking, issuing new or modifying existing orders, consideration and/or approval of TUCPs and transfer requests, coordinated and cooperative efforts with State and federal agencies, information gathering, outreach, expanded monitoring,

and field investigations. Public workshops were held regarding the drought; water conservation, availability, diversion, and use; drought-related curtailment of water rights; and temporary modifications to SWP and CVP water rights.

During 2014, DWR and Reclamation filed a number of TUCPs, and, pursuant to the resulting water right orders, produced water balance estimates, performed extensive water supply and salinity modeling, coordinated extensively with fish and wildlife agencies, and prepared operations forecasts and drought contingency plans for operations.

## 2014 Delta Strategic Work Plan

In 2008, the SWRCB and the San Francisco Bay and Central Valley Regional Water Quality Control Boards jointly adopted the *Strategic Workplan for Activities in the San Francisco Bay/Sacramento-San Joaquin Delta Estuary* for activities in the Bay-Delta. The purpose of the strategic work plan was to coordinate and prioritize actions, establish key deliverables and time schedules, and identify existing and needed resources over a 5-year time period. Many of the activities have been accomplished, and new actions are being recommended by the Delta Stewardship Council and others. In 2014, the Central Valley Regional Water Quality Control Board produced an updated work plan. The *2014 Delta Strategic Work Plan* is restricted to actions that may significantly benefit Delta water quality and contains new projects in addition to projects that were started under the 2008 strategic work plan.

## 2006 Bay-Delta Plan Review

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.

Phase 1 began in 2009. Phase 2 began in 2012, and Phase 4 began in 2013.

Phase 1 continued in 2014 with ongoing work on the Bay-Delta Plan's draft substitute

environmental document. The substitute environmental document provides analysis of the potential environmental impacts of the proposed alternatives for revisions to the objectives for southern Delta salinity and San Joaquin River flows and the program of implementation for those objectives. In addition to preparation of responses to comments received on the draft substitute environmental document, SWRCB will prepare a final draft substitute environmental document for consideration by the board.

Phase 2 continued in 2014, with the Delta Stewardship Council convening two workshops. The workshops—one concerning Delta outflows and related stressors, and the other concerning interior Delta flows and related stressors—provided a forum for independent panels of science experts to receive information to evaluate and synthesize into reports. The Delta Stewardship Council and SWRCB will use these reports when reviewing and updating the 2006 Bay-Delta Plan. The workshop summary reports were released in May and August, respectively.

Phase 4 also continued in 2014 with a SWRCB workshop to receive information and public input on the Delta Science Program's recommendation on the method the SWRCB should use to develop flow criteria for priority tributaries in the Bay-Delta.

## Operations Under D-1641

In 2014, 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.

D-1641 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 Sacramento-San Joaquin Delta specified by D-1641.

In 2014, the SWP and CVP submitted a TUCP to the SWRCB requesting modification of requirements to meet several D-1641 objectives 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 2014 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 SWRCB D-1641. In 2014, the gates were open for 180 days to allow fresher Sacramento River water to flow into interior Delta channels toward the SWP and CVP export 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, the NOAA Fisheries, and the DFW.

## Water Quality Standards

Water quality objectives in D-1641 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 water quality and flow standards. D-1641 contains salinity standards (recorded as electrical conductivity [EC]) for three stations in the South Delta downstream of Vernalis. The stations are primarily influenced by San Joaquin River flows and in-Delta diversions. San Joaquin River flows are not influenced by SWP upstream reservoirs, but local water levels may be influenced by SWP exports, and circulation may be influenced by the annual placement of South Delta barriers.

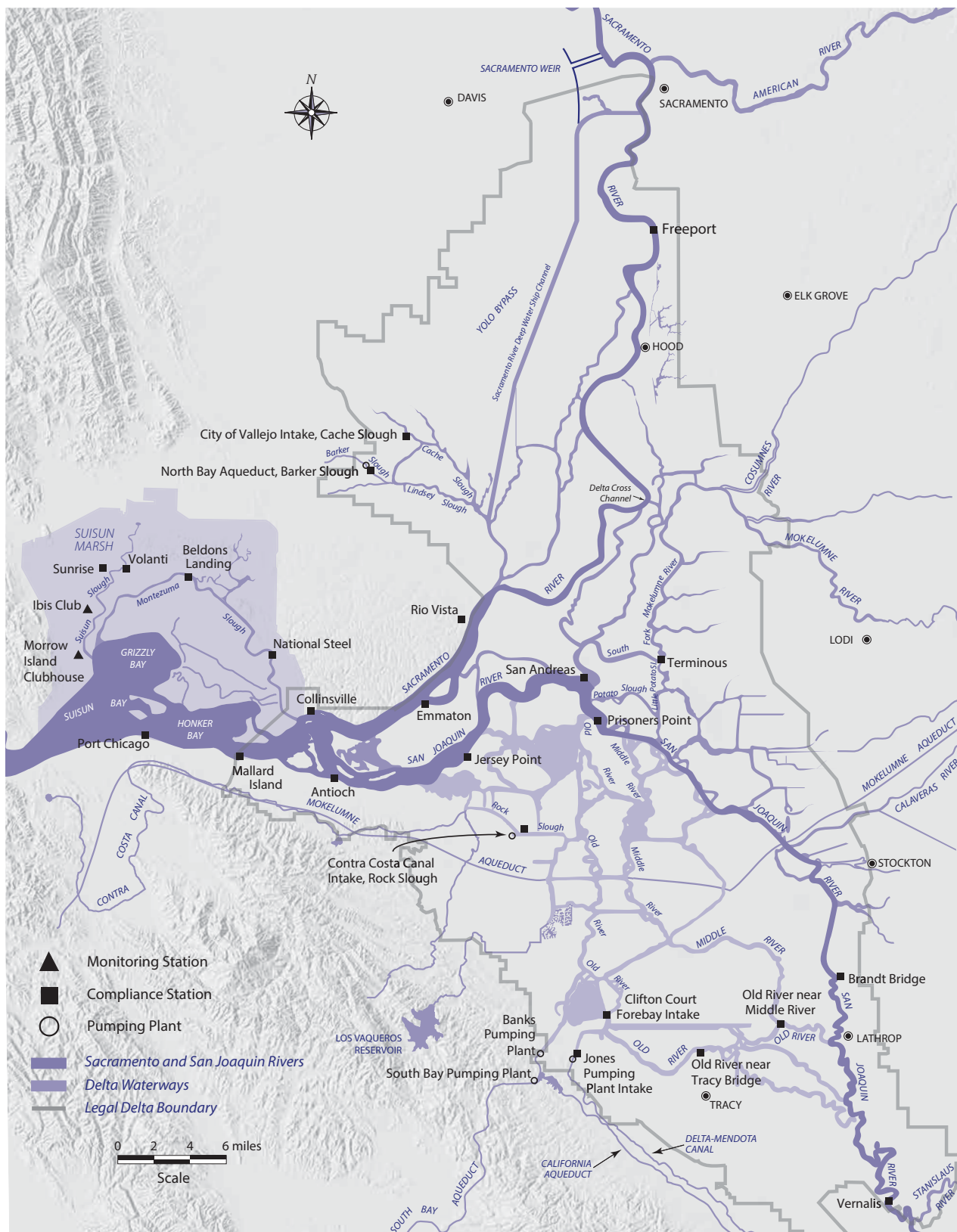
For more information about the South Delta barriers, see Chapter 2, Delta Resources, and Chapter 3, Environmental Programs.

## 2013–2014 Water Year Hydrologic Classifications

SWRCB's D-1641 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, snowmelt runoff, and groundwater accretion rates. 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





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

year determines the water year type for the implementation of flow and water quality criteria contained in D-1641. In 2014, the SWP and CVP were operated using water quality and flow criteria based on the May 1 forecast of a dry water year for the Sacramento River basin.

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 2013–2014.

For a detailed discussion of water year 2013–2014, see Chapter 8, Water Supply.

## **Municipal and Industrial Objectives**

D-1641 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, Cache Slough at the City of Vallejo Intake, and Barker Slough). Chloride levels remained below the objective for all days in 2014.

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 for a given number of days during the year, dependent upon the water year forecast. For calendar year 2014, the objective of 155 days was met.

## **Agricultural Salinity Objectives**

D-1641 contains agricultural salinity objectives, which vary by location. The salinity objectives, recorded as 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. Terminous, Jersey Point, and San Andreas critical water year objectives were met for calendar year 2014. 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 met at this location for calendar year 2014.

In the South Delta, the salinity objectives are based on a 30-day running average. The 1.0 mS/cm objective for the South Delta was met at Vernalis, Old River near Middle River, and Brandt Bridge. The objective was not met at Old River near Tracy Road Bridge for approximately 167 days. The 0.7 mS/cm objective for the South Delta was met at Vernalis and Brandt Bridge. The objective was not met at Old River near Tracy Road Bridge for approximately 124 days. The objective was also not met at Old River near Middle River for approximately 35 days. The SWP and CVP are jointly required by D-1641 to meet the agricultural EC objectives imposed at these South Delta compliance locations.

See also, Chapter 2, Delta Resources, and Chapter 7, Water Supply Development and Reliability.

## **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 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 January through May 2014, in million acre-feet, was 0.37, 1.22, 2.05, 1.71, and 1.18, respectively. The X2 habitat protection objective at Chipps Island was 0 days in February, 29 days in March, 25 days in April, and 0 days in May and June. The X2 habitat protection objective at Port Chicago was not in effect in 2014. Since the May estimate for the Sacramento River Index was 6.8 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 January 31, 2014, the SWRCB TUCP order allowed for a relaxation of the X2 objectives, where an NDOI of 3,000 cfs objective temporarily

replaced the X2 objectives for February, March, April, and May.

These objectives were met in calendar year 2014.

### 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 and is now part of D-1641. 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.

D-1641 sets specific minimum monthly NDOI standards for the protection of fish and wildlife based on water year type. The SWRCB TUCP order reduced the July NDOI objective from 4,000 cfs to 3,000 cfs. In 2014, the monthly mean NDOI was highest in December, averaging 32,053 cfs. The lowest monthly mean NDOI occurred in August, with 2,978 cfs, which was below the objective of 3,000 cfs. All other monthly NDOI objectives were met in 2014.

### River Flow Standards

D-1641 includes 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 2013–2014 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 2,000 cfs and a 7-day running average of 1,500 cfs for September, October, and through November 15. The actual mean monthly flows were 3,254 cfs in September; 2,166 cfs in October; 3,612 cfs in November; and 29,758 cfs in December.

D-1641 also specifies 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 2013–2014. 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.

D-1641 requires the San Joaquin River spring pulse flow (a short-term increase in stream flow) for 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 SWRCB TUCP order reduced the San Joaquin River base-flow to 700 cfs before the pulse and 500 cfs after the pulse. The pulse objective was equivalent to 16 days at 3,300 cfs and 15 days at 1,500 cfs.

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

## Export Standards

D-1641 includes 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 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 2014, the Delta was in excess conditions from February 10 to February 17, March 2 to March 17, April 1 to April 12, December 9 to December 14, and December 15 to December 31 for a total of 59 days. Within this period, combined SWP

and CVP exports averaged about 32 percent of Delta inflow, meeting the 65 percent limitation in January and from July to December, while also meeting the 35 percent limitation from February to May.

The Delta was in balanced conditions from January 1 to February 9, February 18 to March 1, March 18 to March 31, and April 13 to December 8, for a total of 306 days. Within this period, combined SWP and CVP exports averaged about 22 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 that DWR is meeting its Delta Mercury Control Program (DMCP) regulatory

compliance responsibilities. For more background information about the program, see Bulletin 132-14.

In 2014, MME Section staff continued to work in the four areas that require DWR DMCP compliance: wetlands, open water, dredging, and the Mercury Exposure Reduction Program (MERP), an educational outreach program. In addition staff continued to follow developments associated with the statewide mercury policy to control mercury in California's waters.

In 2014, staff began implementing control studies to characterize mercury dynamics in tidal wetlands and open water.

## Tidal Wetlands

In February 2014, the Central Valley RWQCB accepted DWR's revised tidal wetland workplan. With the acceptance of the workplan, MME Section staff began refining the experimental design and monitoring plan. As part of the study, three to five wetlands will be examined. The tidal wetland studies have the following objectives:

- determine whether these tidal wetlands are net sources or net sinks of methylmercury (MeHg) and total mercury by measuring and calculating imports and exports;
- measure and calculate monthly and/or bimonthly MeHg imports and exports to determine if seasonal differences occur;
- measure and calculate net yearly organic carbon, chlorophyll *a*, and total suspended solids imports and exports;
- determine if organic carbon and MeHg concentrations are correlated; and
- provide data to the RWQCB for a revision of the MeHg allocations.

The first wetland chosen for the tidal wetland studies was the Yolo Bypass Wildlife Area tidal wetland located in the Yolo Bypass. In April 2014, staff conducted a pilot study that

confirmed that the sampling equipment and methodology used to handle samples did not result in bias or additional mercury or MeHg contamination.

To calculate loads and determine if the wetland was a net source or sink of mercury or MeHg, an acoustic doppler current profiler was installed at the mouth of the wetland to collect flow data. Additionally, a water quality probe collected real-time turbidity, chlorophyll *a*, specific conductance, and temperature data. The water quality data and acoustic doppler current profiler data were telemetered and posted on Hydstra, a water quality, time series data visualization software program. Data was also uploaded to DWR's Water Data Library.

Between May and November 2014, MME staff collected monthly autosampler samples for particulate and dissolved total mercury and MeHg, total suspended solids, nutrients, total and dissolved organic carbon, and chlorophyll *a*. Bryte laboratory analyzed all samples except MeHg, which was analyzed by the Moss Landing Marine Lab. In December 2014, telemetry equipment was moved to a higher elevation to prevent its possible loss from winter flooding. Due to hunting restrictions and flooding concerns, it is anticipated that sampling frequency during the winter will be reduced to bimonthly sample collection. Lab data were uploaded to DWR's Water Data Library, and results are still being analyzed. A progress report is due to the Central Valley RWQCB in October 2015.

## Open Water

The open water allocations apply to the MeHg load that fluxes to the water column from sediments in open-water habitats within channels and floodplains in the Delta and Yolo Bypass. Regulated agencies are required to evaluate their activities to determine whether operational changes or other practices or strategies could be

implemented to reduce ambient MeHg concentrations in regulated open waters. However, it is difficult to conduct control studies to test how operational changes to the SWP could affect open water MeHg production. Operations of the water project cannot be artificially manipulated to determine if methylation would increase or decrease under certain operational conditions. Therefore, a modeling approach is being used to enhance the understanding of mercury processes within the open waters of the Delta and the Yolo Bypass, and if successful, evaluate the potential effects of operational changes on mercury cycling and MeHg supply.

In December 2013, the open water workgroup resubmitted the open water workplan and a technical memorandum to the RWQCB. This revised workplan was accepted by the RWQCB in February 2014. The objectives of the workplan are the following:

- provide working models for mercury and MeHg supply, transport, and fate in the open waters of the Delta and Yolo Bypass;
- apply the models to identify processes governing MeHg supply to the Delta and Yolo Bypass; and
- apply the models to examine the potential impacts of proposed operational changes in water management and flood conveyance in the Delta and Yolo Bypass on MeHg supply by examining if patterns associated with MeHg loading are increasing or decreasing under a proposed operational scenario.

While the original workplan used a combination of laboratory and field approaches to provide information for data gaps in the model, the finalized workplan replaced laboratory experiments with mesocosm experiments. Mesocosms consist of nine replicate, 75-foot by 300-foot experimental ponds, constructed by the DFW

in the Yolo Bypass Wildlife Area. The goal is to use mesocosms to examine mercury and MeHg processes in flood events. The approved workplan also includes field sampling at all inlet and outlet points of the Yolo Bypass to determine partitioning of mercury and MeHg between the solid and the dissolved phase and to provide loading information for validating or calibrating the Dynamic Mercury Cycling Model.

Following workplan acceptance, the open water technical team determined that the use of the DFW ponds was not feasible for examining erosional and diffusional MeHg dynamics. An updated sampling plan documenting new approaches will be submitted for Central Valley RWQCB approval in early 2015. The open water technical team has already begun preparing the proof of concept pilot experiments associated with the revised sampling plan. Pilot studies are scheduled for 2015.

In December 2014, a minor flood event (enough rainfall to cause the Yolo Bypass west-side tributaries to overtop their banks, but not enough water to overtop the Fremont Weir) occurred, and DWR staff collected samples at inlet and outlet sites to the Yolo Bypass. With the exception of MeHg samples, Bryte laboratory analyzed all samples. Results are expected in 2015.

Two models are being created to understand open water mercury dynamics: DWR's Delta Simulation Model 2 (DSM2) model coupled to a mercury module for the Delta and the Dynamic Mercury Cycling Model for the Yolo Bypass.

Modeling mercury in the Delta is tied to DWR's development of the General Transport Module, which will modernize certain aspects of DSM2. Mercury dynamics are often closely tied to sediment dynamics. In 2014, Bay-Delta Office staff began investigating approaches and equations required for a suspended sediment module.

In the Yolo Bypass, modeling activities have focused around assimilating all relevant Yolo Bypass data, assembling the base layers for the model to create the final modeling grid, and ensuring that hydrodynamics will be available for model runs. A draft Yolo Bypass base layer for the Dynamic Mercury Cycling Model was created in 2014.

The open water portion of the DMCP applies to the Yolo Bypass when it is flooded; therefore, all modeling work is being developed to understand mercury dynamics when the Yolo Bypass is flooded in the winter.

A progress report is due to the Central Valley RWQCB in October 2015.

## 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. DWR staff have continued to follow projects that could require dredging by DWR during the DMCP Phase I time period.

In 2014, MME Section staff met with DWR Fish Restoration Program staff regarding the levee breaches proposed for Prospect Island habitat restoration. MME Section staff also conferred with Central Valley RWQCB staff on how DMCP dredging requirements would be applied to this restoration project. Informal discussions suggest that levee breaches will be held to the DMCP's Clean Water Act Section 401 permitting requirements, but will not fall under the formal DMCP dredging requirements.



## Mercury Exposure Reduction Program

The objective of the MERP is to reduce mercury exposure of Delta fish consumers most likely affected by mercury. All entities regulated under the DMCP are required to fund MERP. DWR is providing up to \$20,000 per year through 2019 of in-kind support for brochure production, signage, and associated costs.

Brochures are required for the Sacramento River/Northern Delta, the Central/Southern Delta, and the San Joaquin River regions. In 2014, discussions about brochure language translation and graphics began between MME, the DWR Public Affairs Office, the CDPH, and the RWQCB. Brochures will require translation into eight languages: Cambodian, Hmong, Lao, Russian, Vietnamese, Spanish, Tagalog, and Chinese. In late 2014, CDPH provided the graphic materials to the DWR Public Affairs Office. The Department of General Services, Office of State Publishing has provided translation service estimates to the DWR Public Affairs Office. Translation and brochure production are slated for 2015.

## 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.

The policy will provide the framework for mercury control programs in California's inland waters. It will guide the adoption of water quality objectives, the development of general implementation requirements, and development of control plans for mercury-impaired water bodies.

Concurrent with the development of the policy, the SWRCB is developing a control program for mercury-impaired reservoirs and a statewide MeHg fish tissue objective.

The SWRCB has indicated that it will use a phased approach, similar to the DMCP, to implement the regulation. It is anticipated that the regulation will begin with control studies (pilot studies) conducted and paid for by reservoir owners over a period of approximately 10 years. Results from the pilot studies are expected to inform the SWRCB about which approaches work best to reduce fish tissue MeHg. Following the completion of pilot studies, reservoir operators will be required to implement best management practices developed from the pilot studies.

The SWRCB is proposing several different potential management practices to reduce MeHg production in reservoirs:

- source control (including sediment removal or capping of contaminated sediments);
- water chemistry (to reduce methylation); and
- fishery and food web management (to decrease bioaccumulation).

MME staff attended all reservoir owner/operator meetings convened by the SWRCB in 2014.

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, MME staff have also provided written feedback on the technical and economic feasibility of the SWRCB's suggested management approaches to reducing MeHg in DWR reservoirs.



Staff have begun analyzing DWR reservoir characteristics to determine the applicability of the SWRCB's proposed management practices to individual reservoirs. Where available, staff have assembled water quality data from DWR divisions and DWR's Water Data Library to create a table providing a rough assessment of the suitability of each SWP reservoir to the SWRCB's three main categories of management practices. This table also highlights the information and data gaps that need to be bridged before the suitability of a management practice can be assessed.

Finally, staff are collaborating with Reclamation, serving as technical advisors, on the development of a reservoir mercury model.

## Special Study 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 Sacramento-San Joaquin 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 2014, installation of the spring barrier began on March 25. Removal of the spring barrier was completed by June 26. Installation of the fall barrier began on September 22. Removal of the fall barrier was completed on November 15.

### Methods

Monitoring DO concentrations in the Stockton Deep Water Ship Channel was conducted by boat on 12 monitoring runs, from June 12 to November 25. 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 6.05 to 8.65 mg/L at the surface and 5.55 to 8.36 mg/L at the bottom. In the western portion of the channel, DO concentrations ranged from 6.75 to 8.55 mg/L at the surface and 6.51 to 8.36 mg/L at the bottom. In the central portion of the channel, DO concentrations were variable, ranging from 6.2 to 8.25 mg/L at the surface and 5.98 to 8.08 mg/L at the bottom. In the eastern portion of the channel, DO levels were similar to the other regions, ranging from 6.05 to 8.65 mg/L at the surface and 5.55 to 7.97 mg/L at the bottom. In 2014, bottom DO concentrations fell below the 6.0 mg/L objective twice on September 23 in the eastern channel.

Higher San Joaquin River inflows, as well as the absence of intermittent reverse flows near Stockton, coincided with improved DO conditions. Further monitoring operations for the fall 2014 special study were suspended after November 25.

## 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 2014. 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 188 species of benthic macrofauna were collected in 2014 at the 10 sampling sites. Of the 188 species, 10 represented 81.9 percent of all organisms collected:

- amphipods: *Ampelisca abdita*, *Americorophium spinicorne*, *Corophium alienense*, and *Gammarus daiberi*;
- Asian clams: *Potamocorbula amurensis* and *Corbicula fluminea*;

- sabellid polychaete: *Manayunkia speciosa*;
- tubificid worms: *Limnodrilus hoffmeisteri* and *Varichaetadrilus angustipenis*; and
- ostracod: *Cyprideis sp. A*.

Of the 10 dominant species, *Potamocorbula amurensis* 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* and *Americorophium spinicorne* tolerate a wider range of salinity. They were 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*, *Corbicula fluminea*, 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 2014 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 152 samples taken in 2014, 95.4 percent (145 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 7 samples with chlorophyll *a* concentrations above 10  $\mu\text{g/L}$ , all were from the San Joaquin River at Vernalis, from February through July and in November. The mean chlorophyll *a* concentration for all samples in 2014 was 3.41  $\mu\text{g/L}$ ; the median value was 2.03  $\mu\text{g/L}$ . In 2013, the mean was almost double (6.32  $\mu\text{g/L}$ ), but the median was similar (2.13  $\mu\text{g/L}$ ). The maximum chlorophyll *a* concentration in 2014 was 34.18  $\mu\text{g/L}$ , recorded in April and May on the San Joaquin River at Vernalis. It was much lower than the maximum in 2013 (184.76  $\mu\text{g/L}$ ). The minimum chlorophyll *a* concentration was 0.38  $\mu\text{g/L}$ , recorded in December in Disappointment Slough near Bishop Cut.

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 2014 was 1.28 µg/L, and the median value was 0.99 µg/L. The maximum pheophytin *a* concentration was 7.54 µg/L, recorded on the San Joaquin River at Vernalis in April. The minimum pheophytin *a* concentration was 0.14 µg/L, recorded in Suisun Bay off Middle Point near Nichols in July.

Cyanobacteria, centric diatoms, and pennate diatoms constituted 98.7 percent of the organisms collected in 2014. Cyanobacteria alone constituted 96.5 percent.

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 Zygnematophyceae);
- (6) chrysophyte flagellates (class Chrysophyceae);
- (7) euglenoid flagellates (class Euglenophyceae);
- (8) dinoflagellates (class Dinophyceae);
- (9) ciliates (class Ciliata);
- (10) raphidophyte flagellates (class Raphidophyceae); and
- (11) xanthophyte flagellates (class Xanthophyceae).

The 10 most common genera collected were:

- (1) *Chroococcus* (cyanobacterium);
- (2) *Synechococcus* (cyanobacterium);
- (3) *Rhabdoderma* (cyanobacterium);
- (4) *Synechocystis* (cyanobacterium);
- (5) *Cyclotella* (centric diatom);
- (6) *Synedra* (pennate diatom);
- (7) *Plagioselmis* (cryptomonad flagellate);
- (8) unknown cyanobacterium (cyanobacterium);
- (9) *Hemiselmis* (cryptomonad flagellate); and
- (10) *Monoraphidium* (green alga).

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 2014, and they 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, 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 EC), turbidity, 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 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 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. The findings are disseminated through a variety of media including memos, network postings, conference calls, and email distribution. 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 2014, water quality was assessed monthly at eight SWP facilities and at the CVP's Delta-Mendota Canal (see Table 4-1). Specific conductance averaged 100 microsiemens per centimeter ( $\mu S/cm$ ) at Thermalito Afterbay; 306  $\mu S/cm$  at the North Bay Aqueduct, Barker Slough Pumping Plant; 695  $\mu S/cm$  at the Delta-Mendota Canal; and 526 to 706  $\mu S/cm$  in the California Aqueduct. Dissolved organic carbon was highest at the North Bay Aqueduct (6.0 mg/L), while concentrations in the California Aqueduct ranged from 1.8 to 4.8 mg/L. The North Bay Aqueduct, Barker Slough Pumping Plant exhibited higher levels of turbidity (18 NTU [nephelometric turbidity units]) compared with other locations. Mean arsenic concentrations ranged from <0.001 mg/L at Thermalito Afterbay to 0.006 mg/L at Check 29 and Tehachapi Afterbay. Bromide ranged from <0.01 mg/L at Thermalito Afterbay to 0.37 mg/L at Banks Pumping Plant and O'Neill Forebay Outlet (Check 13). Water quality in the Oroville Facilities was very good with nondetectable to low levels of minerals, nutrients, and most minor elements. Alkalinity and total dissolved solid



**Table 4-1 Mean Water Quality at Selected SWP Grab Sample<sup>a</sup> Locations in 2014**

California Aqueduct														
Constituent	Units <sup>b</sup>	Reporting Limit	Thermalito Afterbay		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
			at Outlet	Pumping Plant	Slough	Barber	Upstream	Canal						
Alkalinity	mg/L as CaCO <sub>3</sub>	1	48	94	94	82	91	92	78	83	80			
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	0.006	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	0.05	<0.05	0.1	0.3	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2
Bromide	mg/L	0.01	<0.01	0.03	0.35	0.37	0.37	0.36	0.26	0.25	0.29			
Calcium	mg/L	0.1	9	15	27	21	25	26	30	30	26			
Chloride	mg/L	1	1	9	113	116	118	112	72	67	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	0.002	0.001	0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Hardness	mg/L as CaCO <sub>3</sub>	1	39	88	143	120	131	137	102	102	102			
Iron	mg/L	0.005	0.007	0.044	0.024	0.025	0.014	<0.005	<0.005	<0.005	0.002			
Lead	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001			
Magnesium	mg/L	1	4	13	19	17	17	18	7	7	9			
Manganese	mg/L	0.005	<0.005	0.025	<0.005	0.015	0.006	<0.005	<0.005	0.008	<0.005			
Nitrite + Nitrate	mg/L as N	0.01	0.01	0.16	0.75	0.36	0.44	0.14	0.85	1.04	0.46			
Organic Carbon, Dissolved	mg/L as C	0.5	NR	6.0	4.5	4.8	4.5	4.5	2.0	1.8	2.4			
Organic Carbon, Total	mg/L as C	0.5	NR	6.5	4.6	4.9	4.8	4.6	2.1	2.6	2.8			
Phosphate-Ortho	mg/L as P	0.01	<0.01	0.23	0.08	0.1	0.08	0.06	0.01	<0.01	0.02			
Phosphorus, Total	mg/L	0.01	<0.01	0.31	0.13	0.13	0.14	0.09	0.03	0.06	0.04			
Selenium	mg/L	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	24	80	73	78	85	66	66	71			
Specific Conductance	µS/cm	1	100	306	695	626	670	706	526	526	565			
Sulfate	mg/L	1	2	18	62	37	47	70	57	68	60			
Total Dissolved Solids	mg/L	1	63	173	396	357	372	395	310	306	379			
Turbidity	NTU	1	2	18	5	4	3	2	3	5	1			
Zinc	mg/L	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.

concentrations at Thermalito Afterbay were 48 mg/L and 63 mg/L, respectively.

In 2014, DWR sampled for pesticides, herbicides, and other organic compounds in March and June at seven SWP facilities and at the CVP's Delta-Mendota Canal (see Table 4-2). The concentrations of the detected herbicides ranged from 0.1 to 0.4 µg/L. Metolachlor was detected in June at the North Bay Aqueduct, Barker Slough Pumping Plant at a concentration of 0.4 µg/L and at Banks Pumping Plant at a concentration of 0.1 µg/L.

Additional SWP water quality data are available on DWR's 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 by the SWP 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 which has unused capacity 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.

**Table 4-2 Pesticides, Herbicides, and Other Organic Substances Detected in the SWP in 2014**

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	6/18/14	Metolachlor	0.4
Delta-Mendota Canal upstream of McCabe Road	DMC06716	3/18/14	None	—
		6/17/14	None	—
California Aqueduct at Banks Pumping Plant	KA000331	3/19/14	None	—
		6/18/14	Metolachlor	0.1
California Aqueduct at O'Neill Forebay Outlet (Check 13)	KA007089	3/18/14	None	—
		6/17/14	None	—
California Aqueduct near Kettleman City (Check 21)	KA017226	3/18/14	None	—
		6/17/14	None	—
California Aqueduct near Highway 119 (Check 29)	KA024454	3/18/14	None	—
		6/17/14	None	—
California Aqueduct at Tehachapi Afterbay (Check 41)	KA030341	3/20/14	None	—
		6/14/14	None	—
California Aqueduct at Devil Canyon Second Afterbay	KA041323	3/17/14	None	—
		6/17/14	None	—

<sup>a</sup> Water at these locations is normally sampled during March, June, and September, however, no samples were collected at North Bay Aqueduct, Barker Slough Pumping Plant in March 2014 or at any of the stations in September 2014.

<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.

Groundwater substitutions can also be 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 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 aqueduct provided that the comingled 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 established interim procedures and criteria to review turn-in proposals and determine their approval for acceptance into the 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. Programs meeting Tier 1 criteria are approved by DWR without referral to the State Water Contractor Facilitation Group for outside review. Proposals are classified as Tier 2 programs when turn-in water quality is generally lower than historical aqueduct conditions, and it 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 staff considers all factors before making a decision on any turn-in proposal.

A total of 518,062 acre-feet (af) of non-SWP turn-in water was admitted to the California Aqueduct during 2014. Most of it (95 percent) originated from groundwater pumping in the San Joaquin Field Division, and secondly, surface and/or groundwater inflows in the San Luis and Southern field divisions (see Table 4-3). Monitoring showed water quality in the aqueduct was affected, both positively and negatively, but the effects were sometimes inconsistent and depended on a variety of factors such as water quality parameters, turn-in source, and relative flows.

In the San Luis Field Division, 1,757 af of surface water from the San Joaquin Valley was pumped into the aqueduct. The inflows usually did not result in substantial changes in water quality due, in part, to low relative inflows.

A total of 21,235 af of groundwater was pumped into the aqueduct from Westlands

**Table 4-3 Turn-ins to the California Aqueduct in 2014**

Groundwater Source	Amount (acre-feet)
Westlands Water District	21,235
Central Valley Project via Westlands Water District	1,757
Arvin-Edison Water Storage District	47,358
Cross Valley Canal	125,503
Kern Water Bank Canal	197,351
Semitropic Water Storage District	91,302
West Kern Water District	8,877
Wheeler Ridge-Maricopa Water Storage District	23,633
Antelope Valley-East Kern Water Agency	1,046
<b>Total</b>	<b>518,062</b>

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 increasing or decreasing trends were observed for arsenic, chromium, and nitrate. Bromide declined in a majority of samples, which provided a net benefit to SWP contractors due to the potential for bromide to form unwanted trihalomethanes during the disinfection process. No drinking water maximum contaminant levels were exceeded in the San Luis Field Division.

In the San Joaquin Field Division, 494,024 af of groundwater was admitted to the aqueduct from Kern Water Bank Authority (40 percent), Kern County Water Agency (25 percent), Semitropic Water Storage District (18 percent), Arvin-Edison Water Storage District (10 percent), Wheeler Ridge-Maricopa Water Storage District (5 percent), and West Kern Water District (2 percent). These turn-ins comprised 46 percent of the total volume of water entering the aqueduct (turn-ins plus Check 21)—almost three times greater than in 2013 (16 percent).

Arsenic, chromium (total and hexavalent), 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 human health threat. Drinking water maximum contaminant levels were exceeded only once (arsenic in one sample) and this exceedance occurred because of an unusually extended check closure that pooled turn-in water with no upstream diluting flows. 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.

Bromide and dissolved 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 regulated trihalomethanes. Chloride and salinity also decreased downstream of the turn-ins, providing a benefit to aqueduct water quality due to the potential for these parameters 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 impact some crops, and it remains an ongoing concern for agricultural users of aqueduct water.

In the Southern Field Division, 1,046 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 Sacramento-San Joaquin 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, and it 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 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 thus providing advance notice to Delta water users of possible drinking water quality problems. Additionally, MWQI Program staff provide technical water quality expertise to other units within DWR, local

municipal water agencies, and the SWRCB and RWQCBs, and contribute water quality expertise while participating in regulatory, planning, and data sharing efforts.

### Real Time Data and Forecasting Comprehensive Program

The Real Time Data 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 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.



This is accomplished by encouraging monitoring programs 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.

The Quality Assurance Program organized and presented two statistics courses in 2014 for DWR: "Time Series Analysis of High Frequency Water Quality Data Using R Software" and "Applied Environmental Statistics." In addition, a "Quality Assurance in Water Quality Monitoring" class relating to data collection processes and project planning was offered in fall 2014.

Quality Assurance Program staff 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. Staff 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 or 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 the 2014 calendar year:

- 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 DSM2 model monitoring;
- DSM2 nutrient monitoring study; and
- Cache Slough Complex prerestoration baseline monitoring.

### Accomplishments for the 2013–2014 MWQI Work Plan

During the 2013–2014 work plan cycle, 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;
- publication of the report, “MWQI History and Studies 1983–2012”; 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), as well as for the Watershed Analysis Risk Management Framework model development.

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 2014, the laboratory upgraded its capability and capacity to detect and analyze ultratrace to low-level mercury with the purchase of a mercury analyzer. It is a fully automated and computer-controlled instrument that generates data that are highly stable, accurate, and reproducible. The instrument’s detection limit has been established at 0.5 part per trillion.

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 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, 2014, The Metropolitan Water District of Southern California was awarded the water analysis contract for taste and odor for 1 year.

SWP security and protection has continued to be a primary goal for DWR since September 11, 2001. To help protect the SWP from biochemical and chemical agents, the laboratory continues to be an active member in a group of laboratories called the California Association of Mutual Aid Laboratories Network (CAMAL Net) headed by CDPH. The laboratory network’s main objective is to voluntarily assist CDPH in 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 CAMAL Net 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 Sacramento-San Joaquin 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 mitigation for effects of the SWP and CVP. 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 (RRSDS), 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 (SRCD), USFWS, and other agencies on habitat management, preservation, and restoration of the Suisun Marsh.

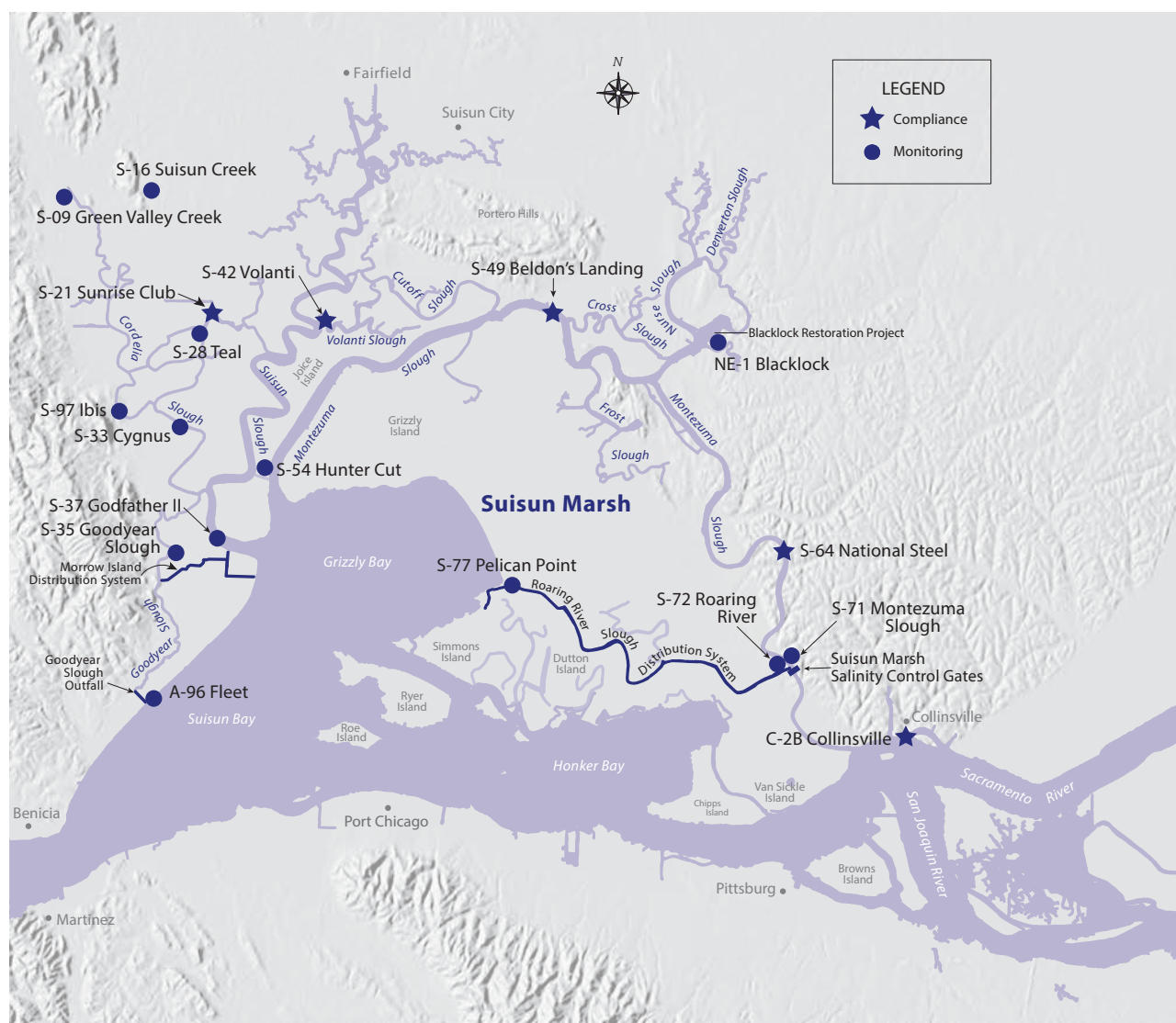
## Revised Suisun Marsh Preservation Agreement

In 1987, DWR, Reclamation, DFW, and SRCD signed the *Suisun Marsh Preservation Agreement* (SMPA). It required Reclamation and DWR to meet salinity standards as specified in the then-current SWRCB Water Right Decision 1485, 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 make channel water salinity requirements consistent with D-1641. These included management activities in lieu of 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 RRSDS. 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.

During 2014, DWR, DFW, Reclamation, and SRCD continued to implement these activities. Negotiations continued for updating the revised SMPA to include the remaining mitigation obligations.





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

## 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. 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.

**Fish Screen and Alternatives.** Based on previous study results, a fish screen 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 Sacramento-San Joaquin 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.

During 2013, 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 (in fiscal year 2015–2016).

### ***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 2013–2014.** The control season (October 2013 through May 2014) began with the installation of the flashboards on October 11, 2013. The SMSCG were tidally operated between October 18 and June 1, 2014, due to salinity concerns in the marsh. The boat lock was partially closed during the control season due to safety concerns. The NOAA Fisheries was briefed about the safety concerns and agreed to assess options with DWR to balance fish and safety needs. On start-up on October 18, a failure in the communication line between the physical gates and control room prevented the gates from being operated in automatic mode. The gates were operated manually until November 8. Salinity was lowered sufficiently, and the gate operations were suspended on November 25. Salinity levels increased in December, and radial gate operation began on December 2, 2013, and continued until June 1, 2014. The flashboards were removed, and the boat locks were set in an open position on June 2, 2014.

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

The RRSDS and Goodyear Slough Outfall are operated and maintained as needed to provide lower-salinity water to managed wetland properties. RRSDS 2014 maintenance activities included levee mowing and spraying and ditch clearing. Goodyear Slough Outfall 2014 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 for higher salinity standards at the western marsh compliance stations (S-21 Sunrise Club and S-42 Volanti) from December through May. Salinity levels for the 2013–2014 control season were below monthly standards for all five 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 SRCD, 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 2014, 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 staff and is expected to be completed in 2015.

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, the NOAA Fisheries, and SRCD. 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 plan is available on Reclamation's website.

## Suisun Marsh Expenditure History

Suisun Marsh expenditures and reimbursements administered by DWR

for calendar years 1968 through 2014 are summarized in Table 4-4. From 1968 through December 31, 2014, DWR disbursed more than \$155.6 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 \$54.7 million (35 percent), and the State's General Fund has reimbursed approximately \$9.5 million (6.1 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.

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

**Table 4-4 Suisun Marsh Expenditures and Reimbursements Administered by DWR (in dollars), Calendar Years 1968–2014**

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	3,940,875			(1,409,296)		2,531,579	130,049	2,401,530
2006	5,794,463			(868,449)		4,926,014	193,427	4,732,588
2007	4,097,009			(939,879)		3,157,130	135,208	3,021,921
2008	3,814,508			(1,670,278)		2,144,230	125,364	2,018,866
2009	4,638,636			(1,123,705)		3,514,931	153,077	3,361,855
2010	2,800,303			(1,663,530)		1,136,773	92,410	1,044,363
2011	3,706,742			(1,748,136)		1,958,606	122,323	1,836,283
2012	6,347,764			(1,860,585)		4,487,179	209,476	4,277,704
2013	5,542,320					5,542,320	182,896	5,359,424
2014	4,951,571					4,951,571	163,402	4,788,169
<b>Total</b>	<b>155,598,257</b>	<b>(9,478,000)</b>	<b>6,634,600</b>	<b>(54,700,241)</b>	<b>(2,323,609)</b>	<b>95,731,007</b>	<b>5,223,707</b>	<b>90,507,299</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 6.1 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.





## **Chapter 5**

### **Local Assistance**

*Strawberry fields.*



## Significant Events in 2014

*T*he California Irrigation Management Information System (CIMIS) CIMIS hardware and software were upgraded to accommodate an increase in demand for data.

The Department of Water Resources' (DWR) Division of Statewide Integrated Water Management (DSIWM) Water Use and Efficiency Branch continued to review of urban water management plans (UWMPs) submitted for the 2010 cycle, and 242 UWMP reviews were finalized.

The Agricultural Drainage Program measured groundwater levels quarterly for approximately 200 wells in Kern County.

DWR's Integrated Regional Water Management (IRWM) Grant Programs, managed within the Division of Integrated Regional Water Management (DIRWM) by the Financial Assistance Branch, awarded \$374 million through two solicitations of implementation grants funded by Proposition 84.

*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 32 recreation projects and contracts. Administration costs are recovered from revenues generated by repayment of Davis-Grunsky Act loans. Recreation grant contracts are being 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 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 2014, 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 52,000 in 2014.

Approximately 2.5 million reports were generated from the database using the CIMIS website in 2014. An additional 4 million reports were also retrieved from the CIMIS File Transfer Protocol site and CIMIS web services. Users can register online, access archived data, download data files, and peruse content about the CIMIS program and other helpful metadata and 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 the Water Conservation Act of 2009 (Senate Bill [SB]X7 7) and the Model Water Efficient Landscape Ordinance. SBX7 7 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 2014, CIMIS completed the multiple projects initiated in 2010 to upgrade CIMIS hardware and software to accommodate the anticipated increase in demand for data. A new, upgraded website was released to the public in June 2014. The Spatial CIMIS system was moved from the University of California, Davis, to DWR, and integrated into the newly designed CIMIS website. These upgrades created a mechanism that enabled CIMIS to deliver higher-quality data more frequently, using user-friendly features.

## Recycling and Water Desalination

The goal of the Division of Statewide Integrated Water Management's Recycling and Water Desalination Section is to improve water use efficiency by promoting 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.

The Recycling and Water Desalination Section serves as a technical, policy, and information resource to the public and government on recycled water, desalination, and on-site graywater use. It participates in many activities and collaborates with other organizations to enhance an understanding of the role that these water sources can have in regional and statewide water resources planning and policymaking.

A primary activity is to manage the Water Desalination Grant Program, funded by voter-approved bond issues: Proposition 50 in 2002 and Proposition 1 in 2014. Eight Proposition 50 grants were awarded in 2014 for research, planning, pilot studies, and construction of desalination projects. A total of 51 desalination projects have been completed or are ongoing. Proposition 50 funding has provided a total of \$47.7 million for those projects.

## Proposition 50 Water Use Efficiency Grant 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 2014, DWR finalized the development and execution of grant agreements for 39 agricultural water use efficiency grants awarded in 2013. The Water Use Efficiency Grant Program continued to manage close to 140 grant agreements from previous proposal solicitations.

In response to the Governor's Drought Proclamation on January 17, 2014, which declared a drought State of Emergency, DWR co-sponsored 10 workshops conducted by California Rural Water Association. The goal of the workshops was to educate small water system operators on issues relating to drought, water shortages, and water loss. Five of the workshops focused on drought preparedness, while the other five focused on leak detection and water loss accountability. The workshops were conducted in counties most affected by drought.

Also in response to the Governor's proclamation, DWR partnered with the California Institute for Water Resources (CIWR), a unit within the Division of Agriculture and Natural Resources of the University of California, to help the State's agricultural community prepare for a potential third consecutive year of drought and beyond. DWR co-sponsored a series of drought workshops that provided technical assistance on drought response and irrigation management to the agricultural community. The workshops—targeting critical crops and commodities in the State—provided expedited assistance to farm operators and farm advisors by reaching out to those members of the agricultural community with the potential to be the most adversely affected by limited water supplies.

In addition, DWR and CIWR updated an existing set of drought tip publications that address drought conditions and California agriculture.

A new set of drought tip publications on drought management and agriculture in California is being prepared. CIWR will prioritize the new publications based on the needs of growers most likely to be adversely impacted by continued drought conditions and whose challenges are not adequately covered in existing or updated publications. Completed publications are posted on CIWR's website.

## **Agricultural Water Management Plans**

SBX7 7, the Water Conservation Act of 2009, requires all water suppliers to increase water use efficiency. Agricultural water suppliers are responsible for preparing, implementing, and updating Agricultural Water Management Plans (AWMPs), measuring the volume of water delivered to customers, adopting a pricing structure, and implementing efficient water management practices. Agricultural water suppliers who fail to meet the specified water management planning requirements are not eligible for water grants or loans awarded or administered by the State.

SBX7 7 established the Agricultural Water Management Planning Act (California Water Code [CWC] Section 10800, et seq.) requiring an agricultural water supplier to prepare and adopt an AWMP on or before December 31, 2012. The agricultural water supplier is required to update its AWMP on December 31, 2015, and every 5 years thereafter.

"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 an AWMP unless sufficient funding has specifically been provided for that purpose.

In October 2012, DWR released the *Agricultural Water Management Plan Guidebook*. The guidebook is meant to help increase agricultural water suppliers' understanding of the SBX7 7 requirements and help them develop their AWMPs. The guidebook also provides information on how agricultural water suppliers may meet the requirements of the agricultural water measurement regulation and associated compliance documentation, as well as the aggregated farm-gate delivery reporting format. The guidebook is available on DWR's website.

By the end of 2014, DWR received 43 AWMPs representing 60 agricultural water suppliers. The AWMPs submitted consist of 19 SBX7 7 plans, 3 Agricultural Water Management Council plans, 18 Bureau of Reclamation Central Valley Project Improvement Act plans, one Bureau of Reclamation RRA (Reclamation Reform Act) plans, one Bureau of Reclamation Sacramento Valley Settlement Contract plan (a regional plan representing 10 water suppliers), and one Quantification Settlement Agreement (QSA) plan. In Addition to the Sacramento Valley regional plan, one of the SBX7 7 submitted plans was a regional plan (the Feather River Regional AWMP) representing 9 water suppliers.

## Urban Water Management Plans

California urban water suppliers are required to adopt and submit urban water management plans (UWMPs) to DWR every 5 years.

In 2014, DWR continued to review UWMPs submitted for the 2010 cycle, and 242 UWMP reviews were finalized.

DWR also collected the information reported in UWMPs 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 are posted online.

In 2014, DWR began updating the UWMP guidebook. The guidebook will help water suppliers write and prepare their 2015 UWMPs.

## 20 Percent Urban Water Use Reduction by 2020

SBX7 7 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.

The legislation also requires DWR 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.



## Assembly Bill 1420 Compliance

AB 1420 (Chapter 628, Statutes of 2007) amended the Urban Water Management Planning Act (CWC Section 10610 et seq.) and was effective January 1, 2009. AB 1420 requires conditioning any water management grant or loan made to an urban water supplier and awarded or administered by DWR, the State Water Resources Control Board, or the California Bay-Delta Authority on the implementation of the water demand management measures described in the UWMP, as determined by DWR.

AB 1420 requires DWR to consult with the State Water Resources Control Board and the California Bay-Delta Authority in the development of eligibility requirements that consider the California Urban Water Conservation Council's best management practices and alternative approaches that provide equal or greater water savings. In 2009, AB 1420 compliance criteria were released. (The Delta Stewardship Council is the successor to the California Bay-Delta Authority and assumes all of its administrative rights, abilities, obligations, and duties.)

## 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 2014, 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 biweekly 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.

## Water Conservation Bond Laws

To help local agencies obtain financing for their water management programs, California voters approved nine bond laws between 1984 and 2014 authorizing DWR to provide grants and low-interest loans to fund project feasibility studies or construction activities. The bond laws are summarized below.

- The Clean Water Bond Law of 1984 (Proposition 25) authorized \$10.5 million for water conservation projects.
- The Water Conservation and Water Quality Bond Law of 1986 (Proposition 44) authorized \$75 million for water conservation and groundwater recharge projects.
- The Water Conservation Bond Law of 1988 (Proposition 82) authorized \$60 million for water conservation, groundwater recharge, and new local water supply improvements.
- The Safe, Clean, Reliable Water Supply Act (Proposition 204), approved in 1996, authorized \$55 million for water conservation, groundwater recharge, and local water supply projects.
- The Safe Drinking Water, Clean Water, Watershed Protection, and Flood Protection Bond Act (Proposition 13), approved in 2000, authorized \$535 million for agricultural and urban water conservation, groundwater recharge, infrastructure rehabilitation, groundwater storage, and interim reliable water supply projects and studies.
- The Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002 (Proposition 50) authorized \$500 million for the Integrated Regional Water Management (IRWM) Grant Program to be implemented jointly by DWR and the State Water Resources Control Board.
- The Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006 (Proposition 84) 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 Disaster Preparedness and Flood Prevention Bond Act of 2006 (Proposition 1E) authorized \$300 million for IRWM Stormwater Flood Management.
- The Water Quality, Supply, and Infrastructure Improvement Act of 2014 (Proposition 1) authorized the appropriation of \$510 million in IRWM funding for Implementation and Planning efforts to each hydrologic region of the State and the Mountain County Overlay area, as identified in the California Water Plan (updated 2013), with some additional modifications.

### Propositions 25, 44, 82, and 204

All Proposition 25, 44, 82, and 204 funds have been obligated.

### Proposition 13

Agricultural water conservation loan funding is still available under Proposition 13.

All loan and grant funds for the Groundwater Recharge, Infrastructure Rehabilitation, Urban Water Conservation, Groundwater Storage, and Interim Reliable Water Supply programs have been obligated.

## **Integrated Regional Water Management Grant Program**

The IRWM Grant Program is funded by Propositions 50, 1E, and 84.

### ***Propositions 50 and 1E***

All Proposition 50 and Proposition 1E funds have been obligated.

### ***Proposition 84***

In 2014, DWR completed two solicitations of the Implementation Grant Program. In February, DWR awarded \$153 million to 21 IRWM Regions to help fund projects with total project costs in excess of \$705 million.

Consistent with the Governor's 2014 drought proclamation DWR ran an expedited second solicitation; in October, DWR awarded \$221 million to 27 IRWM Regions to help fund projects with total project costs in excess of \$790 million.





## Chapter 6

# Legislation and Litigation

*Water conservation resulted in dry lawns at the State Capitol during the third year of California's historic drought.*



## Significant Events in 2014

**L**egislation related to groundwater management; groundwater contamination; water use, quality, supply, and infrastructure; planning for sea level rise; urban water management plans; restoration of the Salton Sea; and the California Environmental Quality Act (CEQA) passed in 2014.

*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 52 (Gatto; Chapter 532, Statutes of 2014)—Native Americans: California Environmental Quality Act***

Assembly Bill (AB) 52 requires a lead agency, when undertaking a project that is subject to the California Environmental Quality Act (CEQA), to consult with California Native American tribes that are “traditionally and culturally” affiliated with the area in which the project is being undertaken. AB 52, for the purposes of determining alternatives and mitigation measures that may be undertaken for a project subject to CEQA, places impacts on Native American historic or cultural resources on par with a project’s impacts on the environment.

#### ***AB 148 (V. Manuel Pérez; Chapter 124, Statutes of 2014)—Salton Sea restoration***

AB 148 made technical changes to existing law that was enacted by AB 71 (V. M. Pérez, Chapter 402, Statutes of 2013) relating to the Salton Sea. AB 148 removed the provision declaring that the Secretary for the Natural Resources Agency and the Legislature both have final approval for any proposed restoration plan. This bill also states that provisions of law do not alter any State responsibility under the Quantification Settlement Agreement or the State’s authority to carry out responsibilities under that agreement; and it permits the Salton

Sea Authority, in coordination and under contract with the Secretary, to carry out a feasibility study.

#### ***AB 1249 (Salas; Chapter 717, Statutes of 2014)—Integrated regional water management plans: nitrate, arsenic, perchlorate, or hexavalent chromium contamination***

AB 1249 requires an integrated regional water management plan, if an area within the boundaries of the plan has been identified as having nitrate, arsenic, perchlorate, or hexavalent chromium contamination, to include specific information on how these contaminations are being addressed under the plan. AB 1249 also requires DWR to give funding preference to projects in a region that address these contaminants in its plan.

#### ***AB 1471 (Rendon; Chapter 188, Statutes of 2014)—Water Quality, Supply, and Infrastructure Improvement Act of 2014***

AB 1471 removed the prior legislatively enacted water bond from the November 2014 ballot and replaced it with a new bond totaling \$7.545 billion. The new bond, known as Proposition 1, authorized a change in the original purpose of \$425 million in unissued bonds as well as the issuance of \$7.120 billion in new general obligation bonds to fund water resources related programs and projects.

***AB 1739 (Dickinson; Chapter 347, Statutes of 2014)—Groundwater management***

AB 1739 is one of three pieces of legislation that make up the entire Sustainable Groundwater Management Act. This legislative package is a historic piece of water legislation establishing a framework for monitoring and oversight of statewide groundwater resources. (See also Senate Bill (SB) 1168 and SB 1319.)

***AB 1896 (V. Manuel Perez; Chapter 267, Statutes of 2014)—Coachella Valley Water District: nonpotable water use***

AB 1896 prohibits the use of potable water for landscaped common areas of residential developments maintained by a homeowner's association within the boundaries of the Coachella Valley Water District, if the board of directors determines that suitable nonpotable water resources are available.

***AB 2067 (Weber; Chapter 463, Statutes of 2014)—Urban water management plans***

AB 2067 requires an urban retail water supplier and an urban wholesale water supplier to provide narratives describing the supplier's water demand management measures. It also requires, for urban retail water suppliers, that the narrative address the nature and extent of each water demand management measure implemented over the past 5 years and describes the water demand management measures that the supplier plans to implement to achieve its water use targets.

***AB 2453 (Achadjian; Chapter 350, Statutes of 2014)—Paso Robles Basin Water District***

AB 2453 allows for the creation of the Paso Robles Basin Water District by January 1, 2019. A new section of the California Water Code covers general provisions of the district, as well as elections, definitions and

duties relating to groundwater management within the district.

***AB 2516 (Gordon; Chapter 522, Statutes of 2014)—Sea level rise planning: database***

AB 2516 requires, on or before January 1, 2016, the Natural Resources Agency, in collaboration with the Ocean Protection Council, to create, update biannually, and post on an Internet website, a Planning for Sea Level Rise Database describing steps being taken throughout the State to prepare for, and adapt to, sea level rise.

***SB 1036 (Pavley; Chapter 485, Statutes of 2014)—Urban water management plans***

SB 1036 authorizes an urban water supplier to include within an urban water management plan certain energy-related information, including, but not limited to, an estimate of the amount of energy used to extract or divert water supplies. This bill requires DWR to include in its guidance for the preparation of urban water management plans a methodology for the voluntary calculation or estimation of the energy intensity of urban water systems.

***SB 1168 (Pavley; Chapter 346, Statutes of 2014)—Groundwater management***

SB 1168 is one of three pieces of legislation that make up the Sustainable Groundwater Management Act. This historic legislative package establishes a framework for monitoring and oversight of statewide groundwater resources. (See also AB 1739 and SB 1319.)

***SB 1319 (Pavley; Chapter 348, Statutes of 2014)—Groundwater management***

SB 1319 is one of three pieces of legislation that make up the Sustainable Groundwater Management Act. This historic legislation establishes a framework for monitoring and oversight of statewide groundwater resources. (See also AB 1739 and SB 1168.)



### ***SB 1420 (Wolk; Chapter 490, Statutes of 2014)—Water management: urban water management plans***

SB 1420 updated the Urban Water Management Planning Act by requiring distribution system water loss to be reported and by requiring electronic filing of urban water management plans. This bill also authorizes water use projections to display and account for water savings estimated to result from adopted codes, standards, ordinances, or transportation and land use plans. It then requires the plan, or amendments to the plan, to be submitted electronically to DWR and to include any standardized forms, tables, or displays specified by DWR.

### **Federal Legislation**

There was no significant federal legislation in 2014 affecting management of the SWP.

### **Litigation**

As of December 31, 2014, 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 2014, see Bulletin 132-14 and earlier bulletins.)

On March 13, 2014, a three-judge panel for the Ninth Circuit Court of Appeals issued its decision upholding the 2008 BiOp. In a two to one ruling, the panel reversed the district court on all ESA issues, but affirmed the district court on NEPA. Concerning the scope of the record, the panel held that the district court overstepped its bounds in admitting additional declarations from the parties' experts. Concerning the merits, the panel held that neither the 2008 BiOp's reliance on raw salvage figures to set the upper and lower Old and Middle river flow limits nor the 2008 BiOp's determination of X2 (the point in the Bay-Delta at which the average salinity is two parts per thousand) was arbitrary and capricious. The panel further held that the BiOp's incidental take statement was not arbitrary and capricious because it included an adequate explanation and support for its determinations. The panel also held the record supported the BiOp's conclusions regarding the indirect effects of project operations. The panel disagreed with the district court's determination that regulations of the USFWS and the APA required the USFWS to explain that the reasonable and prudent alternatives satisfied the non-jeopardy factors of Title 50, Code of Federal Regulations, Section 402.02. The panel held that USFWS consideration of these factors could be reasonably discerned from the record to satisfy any explanation requirements.

Concerning the cross appeal, the panel held that the USFWS did not violate ESA by not separating the discretionary from nondiscretionary actions when it set the environmental baseline. The panel affirmed the district court's judgment with respect

to NEPA claims, and held that NEPA does not require the USFWS to prepare an Environmental Impact Statement (EIS) in conjunction with the issuance of the BiOp. The panel affirmed the district court's order remanding to the Bureau of Reclamation (Reclamation) so that it can complete an EIS evaluating the effects of its adoption and implementation of the BiOp.

On May 12, 2014, DWR, along with State and federal water contractors, filed a petition for rehearing, arguing that the Ninth Circuit decision did not apply the standard of review that has been established by the U.S. Supreme Court and Ninth Circuit precedent. The 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 United States Supreme Court. The Supreme Court had not ruled on the petitions by the end of 2014.

## 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 132-14 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.

Specifically, the panel found that: (1) NOAA Fisheries acted within its substantial discretion when it used raw salvage data instead of data scaled to fish population to set flows in Old and Middle rivers; (2) the NOAA Fisheries jeopardy opinion components were not arbitrary and capricious as they pertained to the winter-run Chinook Salmon, the Southern Resident Orca, the steelhead critical habitat, and the impact of indirect mortality factors on the listed species; and (3) the BiOp's challenged reasonable and prudent alternative actions were not arbitrary and capricious.



The panel affirmed on cross-appeal several components of the district court's opinion, holding that NOAA Fisheries did not need to distinguish between discretionary and non-discretionary actions; that the BiOp's indirect mortality factors were direct effects under the ESA; and that Reclamation was not independently liable under the ESA.

***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).** The conservation groups allege that permit approvals and enforcement failure by the State Water Resources Control Board (SWRCB) has allowed DWR to cause extensive damage to the Bay-Delta Estuary and the fish and wildlife that live there. The administrative record was prepared.

There was no new activity in this case in 2014.

### ***Longfin Smelt***

***State Water Contractors v. California Department of Fish and Game, Donald Koch, Director of the California Department of Fish and Game, California Department of Water Resources, Lester Snow, Director of the California Department of Water Resources* (Super. Ct. Sacramento County, No. 34-2009-80000203).** This case, which challenges Incidental Take Permit No. 2081-2009-001-03 issued by the Department of Fish and Wildlife, remains stayed pending completion of the federal litigation challenging the BiOps for Delta Smelt and salmonids. (For more information about this litigation, see Bulletin 132-14 and earlier bulletins.)

On February 20, 2014, the court entered the plaintiff's dismissal of the case.

### ***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 to grant 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 California Supreme Court.

### ***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 State Water Project 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.

### ***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 continues.

## **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.)

Oral argument on the appeal was pending through 2014.

## **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, 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. 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.

### ***Breach of Contract Arbitration***

#### ***Department of Water Resources v. Whitaker Contractors, Inc., a California corporation; Whitaker Contractors, Inc. (C069248).***

This contractual dispute arose out of the Tehachapi East Afterbay completion project. The contractor failed to perform work according to contract requirements and was terminated. Lengthy arbitration resulted in a ruling in DWR's favor. In August 2011, the superior court entered a final judgment upholding the termination of the contractor and awarding DWR \$16.4 million. In 2013, Whitaker appealed to the California appellate court. A final settlement was reached in October 2014, and the contractor's appeal has been dismissed.

### ***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 two 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 ((2014) F.3d 767).***

These nine claims, which have been coordinated into a single proceeding before the Sacramento County Superior Court, 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 from 2007 through 2013.)

On May 20, 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. In State litigation filed in Sacramento County Superior Court, and now on appeal in California's Third Appellate District Court, the lower court ruled in DWR's favor preserving the QSA's validity. The parties have filed their respective briefs and are awaiting a hearing date from the appellate court to appear for oral argument.



### **Area of Origin**

***Solano County Water Agency, Napa County Flood Control and Water Conservation District, City of Yuba City, and County of Butte v. California Department of Water Resources and Does 1–50 (Super. Ct. Sacramento County, No. 34-2008-00016338).*** In July 2008, four SWP water supply contractors—Solano County Water Agency, Napa County Flood Control and Water Conservation District, City of Yuba City, and County of Butte—sued DWR claiming priority to delivery of SWP water and protections from water shortages based on area and watershed of origin statutes, and because they signed SWP water supply contracts. Fourteen SWP contractors located south of the Delta and outside the area of origin have intervened. (For previous details about this litigation, see Bulletin 132-14 and earlier bulletins.)

For several years, the parties negotiated agreements in principle for settlement. On January 30, 2014, the court approved the parties' settlement agreement and dismissal of the case.

### **Perris Dam**

***Metropolitan Water District; Coachella Valley Water District; Desert Water Agency, Real Parties; Albert Thomas Paulek v. California Department of Water Resources ((2014) 231 Cal.App.4th 35, 179 Cal.Rptr.3d 775).*** On December 21, 2011, Paulek filed a writ petition challenging DWR's approval of the Perris Dam remediation program final EIR. The petition raises numerous challenges, including that the EIR does not adequately address and mitigate for impacts on the endangered Stephen's Kangaroo Rat or on various species covered by a multispecies habitat conservation plan.

On October 1, 2013, the superior court denied the writ, holding Paulek had standing to sue under CEQA, but that his substantive arguments lacked merit. The plaintiff appealed.

The Court of Appeal for the Fourth District rejected the petitioner's argument that removal of the emergency outlet extension from the final EIR left a significant environmental impact unmitigated. The danger from the current emergency outlet extension existed regardless of whether the seismic improvements were made to the other portions of the dam, and therefore did not fall within the mitigation requirements of CEQA. The court also found the emergency outlet was a distinct project. Therefore, removal of it from the EIR did not constitute improper segmentation. Finally, DWR's responses referencing portions of the EIR to address the petitioner's comments were adequate. The court noted that a general comment only requires a general response.

***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.

The outcome of the case will have a direct and material effect on the operations of the SWP, so 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.

***Oregon Natural Resources Council, Inc., et al. v. Bureau of Reclamation, et al. (D.Or., No. 1-97-cv-09090-CL, app. pending).*** 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 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.

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 were heard on November 21, 2014.



## Environmental Review Acts

The National Environmental Policy Act (NEPA) (Title 42 United States Code Sections 4321–4347 [1970]) and the California Environmental Quality Act (CEQA) (California Public Resources Code Sections 21000–21177 [1970]) 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**

*San Luis Reservoir.*



## Significant Events in 2014

**O**n January 17, 2014, the Governor issued a proclamation declaring a drought state of emergency. The proclamation directed a number of State agencies, including DWR, to take steps to mitigate the drought emergency. The proclamation also suspended the California Environmental Quality Act (CEQA) for certain actions taken by DWR and the State Water Resources Control Board (SWRCB) to carry out specific directives of the proclamation. The Governor issued additional proclamations and executive orders throughout the year to deal with critical conditions associated with the ongoing drought.

During one of the driest periods on record, the SWRCB approved a number of temporary urgency change petitions (TUCPs) from DWR and Reclamation to modify their water right permits under SWRCB Water Right Decision 1641 (D-1641).

Yuba County Water Agency (Yuba) transferred a total of 161,647 af of water to the Department of Water Resources (DWR) under the Lower Yuba River Accord (Yuba Accord) Water Purchase Agreement. A total of 60,000 af of Component 1 water was shared equally between DWR and the Bureau of Reclamation (Reclamation) to help offset Delta export reductions to benefit fish. The Component 2, 3, and 4 dry-year water deliveries were 30,000 af, 14,663 af, and 56,984 af, respectively, and were shared equally among some of the State Water Project (SWP) contractors and some of the Central Valley Project (CVP) contractors.

*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) supplies and the long-term water contract annual Table A water allocations delivered to SWP water contractors. Staff 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. 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 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;

- assisting with developing and implementing local and regional conjunctive use programs in the Sacramento Valley;
- constructing, operating, and maintaining a groundwater monitoring and subsidence monitoring network to detect potential impacts caused by groundwater substitution transfers and other groundwater management activities;
- managing the Feather River watershed above Lake Oroville to reduce sedimentation in the lake and preserve 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 determining 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 put 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 the jurisdiction of the SWRCB 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 (impact 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 program may potentially affect other groundwater users in the area, CWC Section 1745.10 requires that

the groundwater use to replace the surface water transferred: (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 water agency 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 stream depletion induced by increased pumping from wells for groundwater-based transfers. Consequently, to evaluate possible impacts from groundwater substitution transfers, DWR assesses a streamflow depletion factor, which represents an estimate of the 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 the 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 Reliability Report

*The State Water Project Final Delivery Reliability Report 2013* was released in December 2014. The next update of this report is expected in March 2015.

Delivery reliability 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 supplies, the report provides data on the SWP's ability to deliver water under 2013 conditions (existing) and for projected conditions in 2033 (future).

Information in the 2013 report accounts for the forecast effects of climate change. In addition, the analysis of the ability to convey water from the source to the point of delivery assumed only SWP facilities, regulations, and permits existing in 2013. In order to provide a conservative estimate of water delivery reliability, no planned facility improvements to the SWP were assumed. 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 results of existing and future condition studies for annual Table A water deliveries can be found in the final 2013 reliability report available on DWR's website.

## SWP Future Water Supply Program

The Future Water Supply Program provides technical support within DWR for the Lower Yuba River Accord (Yuba Accord) and monitors and assesses conditions of the

Sacramento Valley Groundwater Basin that may affect the yield of the SWP. 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 four primary objectives of the Future Water Supply Program are to: (1) collect, analyze, and report on data to determine the effects of groundwater substitution transfers on SWP conveyance; (2) analyze and evaluate groundwater substitution transfers using SWP conveyance; (3) monitor groundwater management planning efforts that may affect the yield of the SWP; and (4) further develop and implement analytical tools to support sustainable groundwater management in the Sacramento Valley.

The Upper Feather River watershed management 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 2014 to implement and enhance monitoring activities for assessing the immediate and long-term hydrologic effects of these actions.

### **Sacramento Valley Water Management Program**

The precursor to the current Future Water Supply Program was DWR's work to incorporate conjunctive-use projects in the Sacramento Valley into the SWP to increase SWP dry-year yield. Similar projects were proposed to be implemented by the Sacramento Valley Water Management Agreement, which was signed by stakeholders in early 2003.

For more information on issues surrounding the Sacramento Valley Water Management Agreement, see Bulletins 132-02, 132-03, and 132-04, available on DWR's website.

## **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, the beneficial use of water has not yet reached the maximum quantities anticipated for full development of the SWP.

Water supply conditions continued to be critically dry in 2014. These conditions created severe challenges for the operators of both the SWP and CVP in meeting the regulatory objectives both within the Delta and in upstream areas. On January 29, 2014, DWR and the Bureau of Reclamation (Reclamation) filed a joint temporary urgency change petition (TUCP) to modify some of the objectives in Water



Right Decision 1641 (D-1641). DWR and Reclamation requested modifications to the cross channel gates and Delta outflow requirements. In approving the petition, on January 31, 2014, the SWRCB also imposed pumping restrictions on both projects. DWR and Reclamation made additional requests throughout the year as conditions changed due to the dry hydrology, and the SWRCB issued subsequent orders modifying the January order approving the petition as conditions warranted.

Pursuant to CWC Section 1725, on July 1, 2013, the SWRCB approved a TUCP to temporarily change the authorized place of use in (1) the Reclamation license and permits to include the SWP authorized place of use downstream of Banks Pumping Plant; and (2) the DWR permit to include the CVP authorized place of use downstream of Jones Pumping Plant to facilitate several exchanges between SWP and CVP contractors. The majority of the water exchanged under the July 2013 TUCP was delivered in 2013; however, 167 acre-feet (af) was delivered in May and June of 2014. DWR also filed a TUCP to temporarily consolidate the SWP and CVP places of use downstream of the Banks and Jones pumping plants in 2014. The SWRCB order issued March 28, 2014, approved a maximum total exchange amount of 277,863 af from May 1, 2014, through April 30, 2015, for seven exchanges including (1) Santa Clara Valley Water District; (2) Oak Flat Water District/Del Puerto Water District; (3) Kern County Water Agency/Kern-Tulare Water District; (4) Arvin-Edison Water Storage District/The Metropolitan Water District of Southern California; (5) Kern County Water Agency/Westlands Water District; (6) the San Joaquin Valley National Cemetery; and (7) Musco Family Olive Company. The SWRCB order also provided for the approval of additional exchanges that met certain specific criteria and did not exceed the 277,863 af previously approved. DWR and Reclamation requested approval

of two additional exchanges under the March 2014 TUCP. On May 9, 2014, the SWRCB approved an additional transfer between Arvin-Edison Water Storage District and The Metropolitan Water District of Southern California. And on October 24, 2014, the SWRCB approved an additional exchange between Kern County Water Agency and Westlands Water District. A total of 17,091 af was exchanged under the order in 2014. Additional water may be exchanged under the order in 2015.

DWR also filed TUCPs in 2014 to facilitate transfers by two DWR water right settlement contractors. On July 11, the SWRCB approved DWR's petition to facilitate the transfer of up to 6,600 af between Garden Highway Mutual Water Company and San Luis & Delta-Mendota Water Authority. On June 9, the SWRCB approved DWR's petition to transfer up to 15,225 af to facilitate a transfer between Biggs-West Gridley Water District, a member agency of the Joint Water Districts Board, and Westlands Water District.

### **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 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 diversion and use 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.

### SWRCB Bay-Delta Proceedings—2014 Activities

In 2014, SWRCB proceedings examined a number of issues in the Bay-Delta Estuary

relating to water quality, protection of beneficial uses for agriculture and fish and wildlife, and salinity issues, among others, which have the potential to affect Delta water supply and reliability. The drought was the main issue of concern in 2014.

### Drought

As the State was experiencing one of the driest periods on record, the SWRCB convened several workshops and approved a number of TUCPs received from DWR and Reclamation to modify their water right permits under SWRCB D-1641.

DWR estimated water balances, performed extensive water supply and salinity modeling and coordinations with fish and wildlife agencies, and prepared drought contingency plans and operational forecasts, as required by the SWRCB.

### 2006 Bay-Delta Plan Review

Water Code 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. A workshop on October 8, 2008, formally began a review of the 2006 Bay-Delta Plan.

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 or revisions to 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. The Bay Delta Conservation Plan environmental review may provide some of the analyses needed for the comprehensive Bay-Delta Plan review.

In 2014, 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 involves other comprehensive changes to the Bay-Delta Plan to protect beneficial uses not addressed in Phase 1. 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.

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. Workshops gathered information and discussed the scientific and technical basis for considering potential changes to the 2006 Bay-Delta Plan.

Between February and July 2014, the SWRCB convened several Delta Science Program workshops and received evidence on interior Delta flows, Delta outflows, and related stressors.

For more information about water quality objectives and compliance monitoring in the South Delta, see Chapter 4, Water Quality Programs.

## 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.

## Los Vaqueros Reservoir Expansion Project

Contra Costa Water District owns and operates the 160,000 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.

With additional funding, local, State, and federal partners may choose to continue to study the feasibility of a 275,000 af expansion alternative in the context of other Delta initiatives to improve Delta conveyance and better protect Delta fisheries, including long-term programs being explored in the Bay Delta Conservation Plan.

### ***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.

### ***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 local water interests released planning documents, including preliminary administrative draft feasibility and environmental documents, for the North-of-the-Delta Offstream Storage Investigation in 2014. The agencies are discussing how to fund and complete public draft documents.

### **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.

Reclamation released a draft feasibility report in February 2014 and a draft environmental impact statement in September 2014. 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 Conveyance Program previously consisted of projects proposed in the North and South Delta. As a result of the efforts associated with Bay Delta Conservation Plan 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 U.S. Fish and Wildlife Service BiOp for Delta Smelt; the February 2009 Department of Fish and Wildlife incidental take permit (ITP) for Longfin Smelt; and the June 2009 National Marine Fisheries Service (NOAA Fisheries) BiOp for salmon, steelhead, and Green Sturgeon. Many of the regulatory requirements will require studies and projects, which are currently underway.

#### **Ad Hoc Studies**

In January 2012, a joint stipulation was filed in the consolidated salmonid cases litigation regarding the 2009 NOAA Fisheries BiOp. The 2012 Stipulation Study was undertaken to gain more information about the effects of SWP and CVP export operations on juvenile steelhead and fall-run Chinook salmon; gain a better understanding of Old River and Middle River reverse flows on steelhead route selection and survival in the South Delta; and pilot an approach to manage water export risks to Endangered Species Act listed salmonids. The study was successfully planned and completed and was the first of its kind to utilize real-time data to inform in-season management and water operations.

During 2014, subsequent to receiving comments on the 2013 draft technical report, a final technical report was completed and released to the public.

#### **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 the South Delta Improvements Program (SDIP), implementing flood control and ecosystem improvements in the lower San Joaquin River, completion of an intertie between the SWP California Aqueduct and CVP's Delta-Mendota Canal (done in 2012), 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 U.S. Fish and Wildlife Service BiOp, issued in December 2008, concluded that coordinated operations of the CVP and SWP would jeopardize Delta Smelt. The U.S. Fish and Wildlife Service 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 predation study. The study field data collection has been completed, data analysis is in progress, and the final predation study report is expected in 2016. Data from the study will be useful in considering permanent barrier design options and operation strategies to minimize predation.

Any action regarding SDIP Stage 2 will require further study and public input. Stage 2 planning continued to be suspended in 2014.

For additional information about the Temporary Barriers Project, see Chapter 2, Delta Resources.

## Lower Yuba River Accord

The Yuba Accord's 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 with DWR;
- conjunctive use agreements with Yuba County Water Agency (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.

In 2014, the parties followed the negotiation process provided for in Amendment 4 resulting in a letter agreement between DWR and Yuba, executed on May 1, 2014. The agreement set forth the negotiated price of \$475 per af for the 2014 groundwater substitution water accounted for as Component 4 water.

On December 5, 2014, DWR executed Amendment 5 between DWR and Yuba. All 22 participating contractors continued their participation from 2016 through 2020 by executing the conforming Amendment 5 to their participation agreements. The new terms provide for increased pricing, a \$20 million deposit to be paid to Yuba to lock in new pricing for 5 years, and other changes. The deposit will then be credited to surface water purchases under the agreements.

DWR will also execute a Participation Agreement, Amendment 1, and Amendment 5 with two new contractors, Mojave Water Agency and Santa Barbara County Flood Control and Water Conservation District, once their CEQA coverage for the Participation Agreement is complete.

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.

In January 2014, Yuba delivered 60,000 af of Component 1 water; 30,000 af of Component 2 water; 14,663 af of Component 3 water; and 56,984 af of Component 4 water for a total of 161,647 af provided to DWR and Reclamation under the Yuba Accord Water Purchase Agreement to help augment SWP and CVP water supply reliability. Half of the water was shared among DWR and some of the SWP contractors; the other half was shared among Reclamation and some of its CVP contractors.

The 2014 deliveries were comprised of 104,663 af of storage releases (surface flows) and 56,984 af of groundwater substitution water. Of the 161,647 af delivered in 2014, 17,518 af of 2013 Yuba releases had been backed into Lake Oroville during balanced conditions from October 1 through November 16, 2013, and were able to be released and exported in 2014.

For additional details about the Yuba Accord, see Chapter 9, Water Contracts and Deliveries.





## Chapter 8

# Water Supply

*Gianelli Pumping-Generating Plant is located alongside Sisk Dam and San Luis Reservoir.*

## Significant Events in 2014

Water year 2013–2014 proved to be another dry year, the third consecutive water year with less than average precipitation and mountain snowpack. The State received precipitation at 56 percent of average in water year 2013–2014 compared to 79 and 77 percent of average in water years 2012–2013 and 2011–2012, respectively. Though a below-average water year, the Northern Sierra 8-Station Precipitation Index had 20.91 inches of precipitation, which fell during February and March. This accounted for 67 percent of the water year total of 31.34 inches. The statewide mountain snowpack peaked at 35 percent of its April 1 average on April 3–6.

Statewide river runoff totaled 35 percent of average in the 2013–2014 water year. The Feather River runoff totaled 38 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 41, 29, and 27 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 2013–2014.

*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 2013–2014

### Precipitation

California experienced significantly below-average rainfall and mountain snowpack during water year 2013–2014. The State received precipitation at 56 percent of average in 2013–2014, compared to 79 percent of average in water year 2012–2013. Figure 8-1 presents water year precipitation for the various regions of the State.

Statewide, the wettest months were February, March, and April. More than two-thirds of the statewide total precipitation fell during those months. In contrast, October through January and May through August were quite dry. The greatest portion of precipitation for the north fell on three different multiday storm periods with the first ending on February 10, 2014, the second on March 7, 2014, and the third on April 2, 2014. Table 8-1 presents monthly precipitation totals for water year 2013–2014 at various gauges located throughout the State, listed north to south.





**Figure 8-1** Statewide Precipitation by Hydrologic Region, 2013–2014 Water Year, as Percent of Average

**Table 8-1 Monthly Precipitation Totals at Various Locations in California, Water Year<sup>a</sup> 2013–2014**

Station <sup>b</sup>	Monthly Precipitation (inches)															
	Water Year 2013–2014													Water Year 2014–2015		
	2013			2014												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	WY Total	Oct	Nov	Dec
Mount Shasta City	0.79	0.37	0.49	0.30	6.66	3.76	0.78	0.25	0.08	0.25	0.34	2.55	16.62	4.83	1.86	12.83
percent of average	34	8	8	5	119	85	28	15	8	100	110	323	46	206	41	218
Eureka Woodley Island	0.05	1.29	0.56	1.35	6.09	6.25	1.37	0.58	0.35	0.02	0.02	2.78	20.71	4.74	3.89	9.81
percent of average	2	23	9	21	118	120	48	32	57	18	8	366	54	159	70	153
Blue Canyon (DWR-2)	1.18	2.36	2.07	2.27	18.14	11.76	3.67	1.62	0.00	0.03	0.60	1.28	44.98	3.62	7.23	17.01
percent of average	31	30	20	18	186	138	73	60	0	14	171	173	72	97	92	163
Sacramento WB City	0.00	0.82	0.38	0.20	4.14	1.77	1.83	0.00	0.00	0.01	0.00	0.46	9.61	0.53	1.25	8.60
percent of average	0	40	12	5	127	74	124	0	0	33	0	219	54	58	62	270
San Francisco WB AP	0.00	0.91	0.35	0.01	3.76	1.93	1.61	0.00	0.01	0.00	0.00	0.42	9.00	0.31	1.99	10.66
percent of average	0	38	9	0	114	70	113	0	7	0	0	221	45	29	84	287
Yosemite Headquarters	0.65	0.73	1.53	1.01	5.47	3.89	2.75	0.61	0.20	0.28	0.15	0.54	17.81	0.00	2.98	4.81
percent of average	38	17	23	15	87	79	85	43	35	100	75	87	48	0	71	73
Fresno WB AP	0.03	0.54	0.15	0.57	2.11	0.62	0.74	0.04	0.00	0.01	0.00	0.18	4.99	0.50	0.40	2.29
percent of average	6	49	9	28	101	34	69	14	0	0	0	120	46	104	36	130
Grant Grove	1.82	0.29	0.92	1.42	3.99	5.62	5.13	1.43	0.00	0.39	0.00	0.89	21.90	0.00	3.34	6.25
percent of average	93	6	12	19	55	74	119	122	0	650	0	165	50	0	65	80
Los Angeles WSO AP	0.02	0.69	0.30	0.00	2.79	0.36	0.26	0.00	0.00	0.14	0.03	0.02	4.61	0.24	0.42	4.04
percent of average	5	49	14	0	96	19	28	0	0	1400	43	11	36	63	30	192
San Diego NWS Lindbergh Field	0.25	1.48	0.46	0.01	1.00	1.28	0.53	0.00	0.00	0.00	0.08	0.00	5.09	0.00	0.37	4.50
percent of average	60	131	24	0	52	80	70	0	0	0	89	0	49	0	33	236

<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

Eureka Woodley Island on the north coast of California received 20.71 inches of precipitation for a water year total that was 54 percent of average. For water year 2013–2014, precipitation for the station was above normal for February, March, and September. Totals for both February and March were slightly above 6 inches and about 120 percent of average.

Blue Canyon experienced precipitation above normal for 4 months of water year 2013–2014. The station totals for the water year were 44.98 inches and 72 percent of average. The month of February accumulated the largest precipitation and percent of normal for the water year—18.14 inches, which was 186 percent of average.

Areas of the Central Valley also received their largest amounts of precipitation in February. Precipitation totals were 4.14 inches (127 percent of average) for Sacramento and 2.11 inches (101 percent of average) for Fresno. For the water year, Sacramento received 54 percent of its annual precipitation average, while Fresno received 46 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 months of February, March, and April, which is similar to what transpired in Northern California. Approximately two-thirds of the water year precipitation fell during these months for

Yosemite Headquarters and Grant Grove. Water year precipitation totals at those two sites were 48 and 50 percent of their respective annual averages.

Further south, the cities of Los Angeles and San Diego were also below average, totaling 36 and 49 percent of their annual averages for the water year, respectively. San Diego received 1.48 inches of precipitation in November, which is 131 percent of the

## 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     |

monthly average. Los Angeles received 2.79 inches of precipitation in February, which is 96 percent of the monthly average.

The monthly totals for the water year for the three primary precipitation indices are presented in Table 8-2. Precipitation for the Northern Sierra 8-Station Precipitation Index, the San Joaquin 5-Station Precipitation Index, and the Tulare Basin 6-Station Precipitation Index, totaled 31.34 inches (63 percent of average), 20.40 inches (50 percent of average), and 14.20 inches (49 percent of average), respectively. For the Northern Sierra 8-Station Precipitation Index, February and March were wet, registering 10.7 and 10.2 inches, respectively, and 134 and 148 percent of the monthly average, respectively. The 3-month period of December through February, typically the wettest period in the Sierra Nevada, only accumulated 12.8 inches, just 50 percent of the average (25.4 inches) for those 3 months. December and January accumulated only 11 percent and 13 percent of the monthly averages, respectively.

For the San Joaquin 5-Station Precipitation Index, the total accumulated precipitation

from February through April was 13.7 inches, which represents 67 percent of the water year total for the index and 83 percent of the average that accumulates during those 3 months for the index.

The Tulare Basin 6-Station Precipitation Index accumulated a total of 9.5 inches from February through April, which also represents 67 percent of the water year total for the index and 76 percent of the average that accumulates during those 3 months for the index.

## Mountain Snowpack

The precipitation that fell during water year 2013–2014 resulted in a mountain snowpack well below average 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 9.4 inches or 33 percent of average. April 1 is typically the average annual date of peak snow accumulation. In 2014, the mountain snowpack peaked during the first

**Table 8-2 Monthly Precipitation Indices for Water Year 2013–2014**

	Month	Northern Sierra 8-Station		San Joaquin 5-Station		Tulare Basin 6-Station	
		Precipitation (inches)	Percent of Monthly Average	Precipitation (inches)	Percent of Monthly Average	Precipitation (inches)	Percent of Monthly Average
2013	October	0.70	23	0.90	43	0.70	58
	November	1.70	27	1.00	21	0.70	23
	December	0.90	11	1.10	18	0.90	20
2014	January	1.20	13	1.50	20	1.10	20
	February	10.70	134	5.80	84	4.00	77
	March	10.20	148	4.70	77	2.30	49
	April	2.60	67	3.20	89	3.20	123
	May	0.80	38	0.90	50	0.70	64
	June	0.10	10	0.10	17	0.00	0
	July	0.20	100	0.40	133	0.00	0
	August	0.60	200	0.00	0	0.20	100
	September	1.60	178	0.80	114	0.30	50
	<b>Total</b>	<b>31.34</b>	<b>63</b>	<b>20.40</b>	<b>50</b>	<b>14.20</b>	<b>49</b>

**Table 8-3 Statewide Mountain Snowpack for Water Year 2013–2014**

	Date	Snow Water Equivalent (inches)	Percent of Average	Percent of April 1 Average <sup>a</sup>
2013	October 1	0.0	0	0
	November 1	0.0	0	0
	December 1	0.6	12	2
	January 1	2.0	20	7
	February 1	2.7	14	9
	March 1	7.8	31	27
2014	April 1	9.4	33	33
	May 1	4.0	18	14
	June 1	0.1	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.

week of April at approximately 10.0 inches of snow water content or 35 percent of its April 1 average.

## River Runoff

Statewide river runoff totaled 35 percent of average in the 2013–2014 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.

From a water supply perspective, the most closely monitored period is April through July. By the end of July, the April–July runoff was 40, 32, and 28 percent of average, for the SRR, SJR, and TLR, respectively.

For more information, see the sidebar, Runoff Estimates.

## 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 2013–2014.

For more information, see the sidebar, Water Supply Indices.

**Table 8-4 Unimpaired Runoff for Water Year 2013–2014 (million acre-feet)**

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	WY
SRR runoff	0.34	0.34	0.35	0.34	1.10	1.81	1.24	0.67	0.37	0.31	0.30	0.28	7.46
percent of average	67	39	21	13	44	64	52	30	30	52	72	71	41
SJR runoff	0.02	0.02	0.03	0.03	0.12	0.24	0.47	0.51	0.17	0.06	0.03	0.02	1.72
percent of average	39	17	12	6	27	38	55	36	16	13	27	26	29
TLR runoff	0.02	0.02	0.03	0.02	0.04	0.08	0.18	0.26	0.11	0.04	0.03	0.01	0.83
percent of average	37	33	23	13	21	29	46	35	17	12	33	23	27
Feather River runoff	0.08	0.08	0.07	0.08	0.26	0.46	0.29	0.13	0.08	0.07	0.07	0.06	1.72
percent of average	67	39	19	14	45	64	45	20	24	48	68	64	38
Statewide runoff													
percent of average	60	27	12	8	38	66	51	30	21	29	54	60	35

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<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.

## Water Year 2014–2015 October through December Water Conditions

The last 3 months of calendar year 2014 mark the beginning of a new water year, 2014–2015. October was a warm, dry month.

Statewide, the October average precipitation for the month was 57 percent of average based on Western Regional Climate Center

information. November was warm with below normal precipitation. Statewide precipitation for November was 67 percent of average. December was warm and, contrary to October and November, wet with 180 percent of average statewide precipitation. Preliminary records, reported on the National Weather Service Record Event Report, show that statewide there were 107 temperature records tied or broken and 42 precipitation records set in December. Of the 107 temperature records set, 36 were

## 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.

for new high maximum temperatures and 66 were for new high minimum temperatures.

At the end of December, water year runoff totals were 114 percent of average for the SRR, 43 percent of average for the SJR, and 32 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 2013–2014 began at 77 percent

of average reservoir storage following a dry 2012–2013 water year. The percent of average storage dropped gradually through January, which ended at 65 percent of average. During the next 5 months, the average ranged from 60 to 69 percent of average. July, August, and September finished below 60 percent of average.

### 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

**Table 8-5 Monthly Reservoir Storage for Water Year 2013–2014 (thousand acre-feet)**

Reservoir	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Shasta	1,744	1,696	1,673	1,656	1,773	2,199	2,409	2,177	1,851	1,575	1,342	1,157
percent of average	65	63	59	54	53	60	61	56	51	49	47	42
Oroville	1,528	1,392	1,286	1,262	1,407	1,716	1,877	1,734	1,511	1,253	1,100	1,076
percent of average	72	65	59	54	57	64	65	58	52	49	47	49
Folsom	292	236	187	164	305	436	547	548	471	406	381	345
percent of average	59	50	39	32	56	69	75	67	58	59	62	62
San Luis	434	514	604	616	676	856	956	848	655	457	380	464
percent of average	40	42	43	38	39	46	52	52	51	46	44	49
Pardee	181	180	175	159	160	161	163	176	184	173	173	162
percent of average	104	103	99	89	89	88	89	93	95	91	94	90
New Melones	1,025	1,037	1,049	1,046	1,060	1,037	917	799	713	626	553	520
percent of average	77	77	76	73	72	69	61	53	47	43	40	39
Don Pedro	1,024	1,027	1,034	1,044	1,058	1,084	1,080	1,077	1,005	898	820	777
percent of average	78	78	77	75	73	73	73	69	62	58	57	57
Millerton	278	248	225	196	167	168	228	321	326	276	229	184
percent of average	142	113	83	59	49	46	62	80	78	84	97	88
Pine Flat	159	169	173	176	190	221	306	430	352	140	114	114
percent of average	46	45	42	37	36	39	50	60	51	28	30	34
Kaweah	10	10	11	12	18	29	54	83	46	27	20	17
percent of average	88	75	72	60	72	71	71	69	43	52	106	136
Success	4	4	5	6	7	9	13	14	12	11	5	4
percent of average	46	48	39	34	28	29	29	25	25	31	28	31
Isabella	53	54	60	58	60	60	66	80	73	59	54	50
percent of average	32	35	38	34	33	30	28	27	23	22	25	27
Statewide												
percent of average	77	74	70	65	65	68	69	65	60	58	57	57

of two primary SWP conservation facilities. Lake Oroville inflow comes from tributaries of the Feather River.

The 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 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.

### **2014 Storage Totals in Major SWP Reservoirs**

End-of-year storage on December 31, 2014, in major SWP reservoirs and the State's share of joint-use reservoirs was 2.3 million acre-feet (maf) or 43 percent of maximum storage, compared to 2.2 maf or 41 percent of maximum storage at the end of 2013. The average end-of-month total storage in major SWP reservoirs for 2014 was 852 taf.

### **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.

**2014 Inflow.** Lake Oroville inflow for 2014 totaled about 1.8 maf, which was 49 percent of the average (3.72 maf) over the last 30 years. Maximum daily inflow occurred on December 11 at 41,458 af. Minimum daily inflow occurred on August 5 at 97 af. Peak monthly total inflow occurred in December at 465,847 af, 26 percent of the 2014 total. The maximum total in the last 30 years (1985–2014) was in 1995 at 8,996,242 af. The minimum total for the same period was in 1994 at 1,566,352 af.

Figure 8-2 shows monthly Lake Oroville inflow for 2012, 2013, and 2014. Total Lake Oroville inflow for 2014 was 1,806,519 af.

Figure 8-3 shows historical (over the last 30 years) maximum and minimum

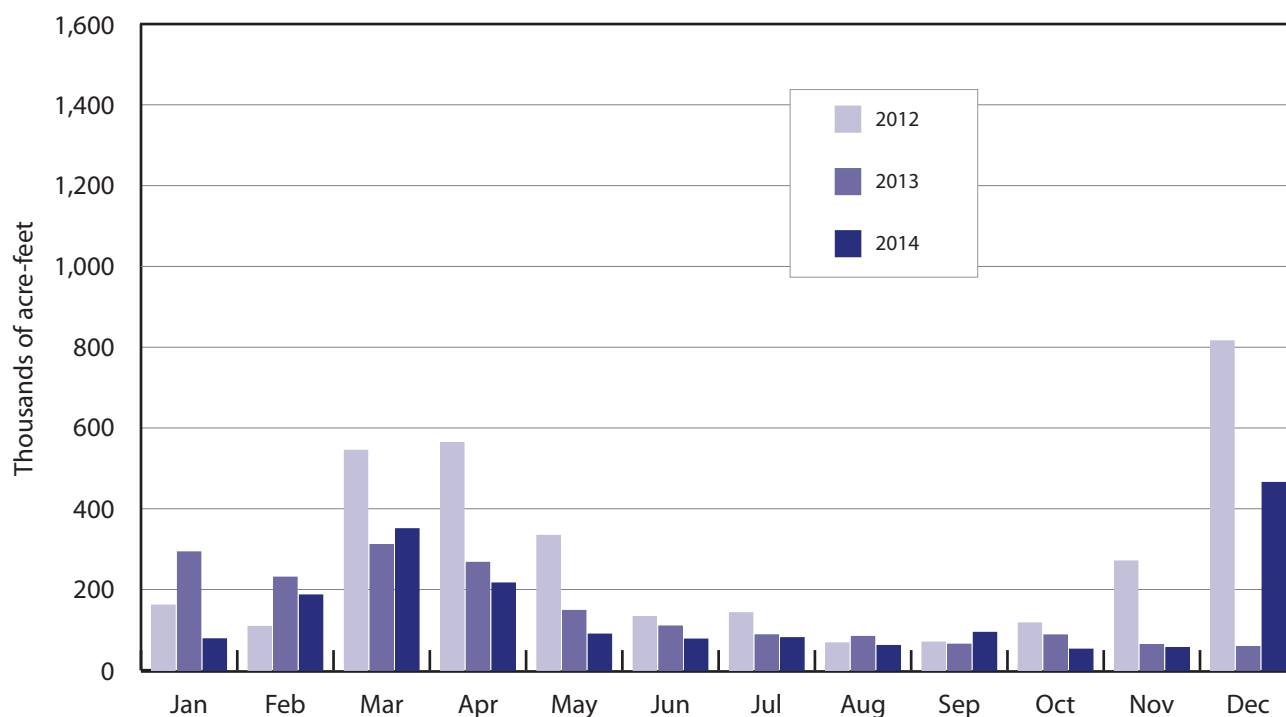
cumulative Lake Oroville inflow (1995 and 1994, respectively) and the current cumulative inflow for 2014.

**2014 Storage.** Minimum storage occurred on November 21 at 898,220 af, 25 percent of lake capacity. Maximum storage occurred on April 29 at 1,877,667 af, 53 percent of lake capacity. End-of-year Lake Oroville storage was 1,346,911 af. Figure 8-4 shows storage in Lake Oroville for 2013 and 2014.

### 2014 San Luis Reservoir Operations

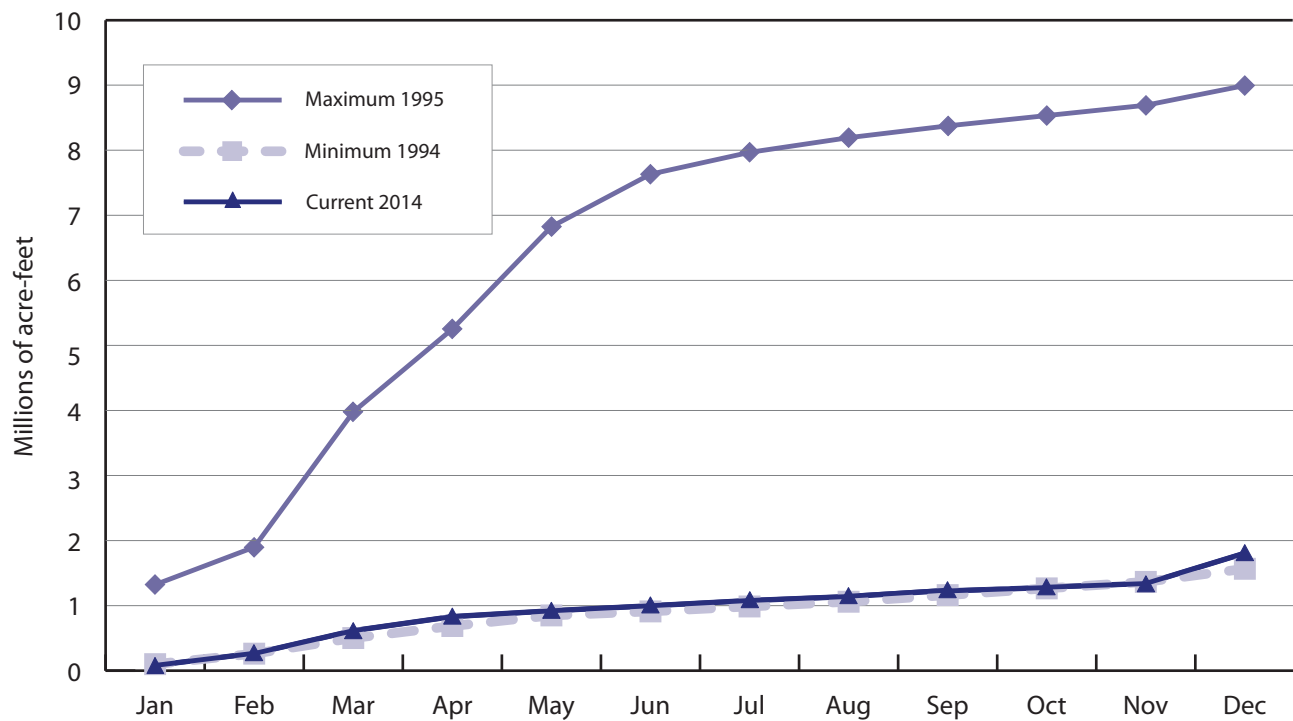
San Luis Reservoir is operated jointly by DWR and the Bureau of Reclamation pursuant to operating procedures adopted in June 1981. San Luis Reservoir has a normal operating capacity of 2,027,840 af. The SWP share of this capacity is 1,062,183 af.

San Luis Reservoir reached its maximum storage on May 5 at 956,744 af, 47 percent of its normal maximum operating capacity. At the beginning of 2014, San Luis Reservoir

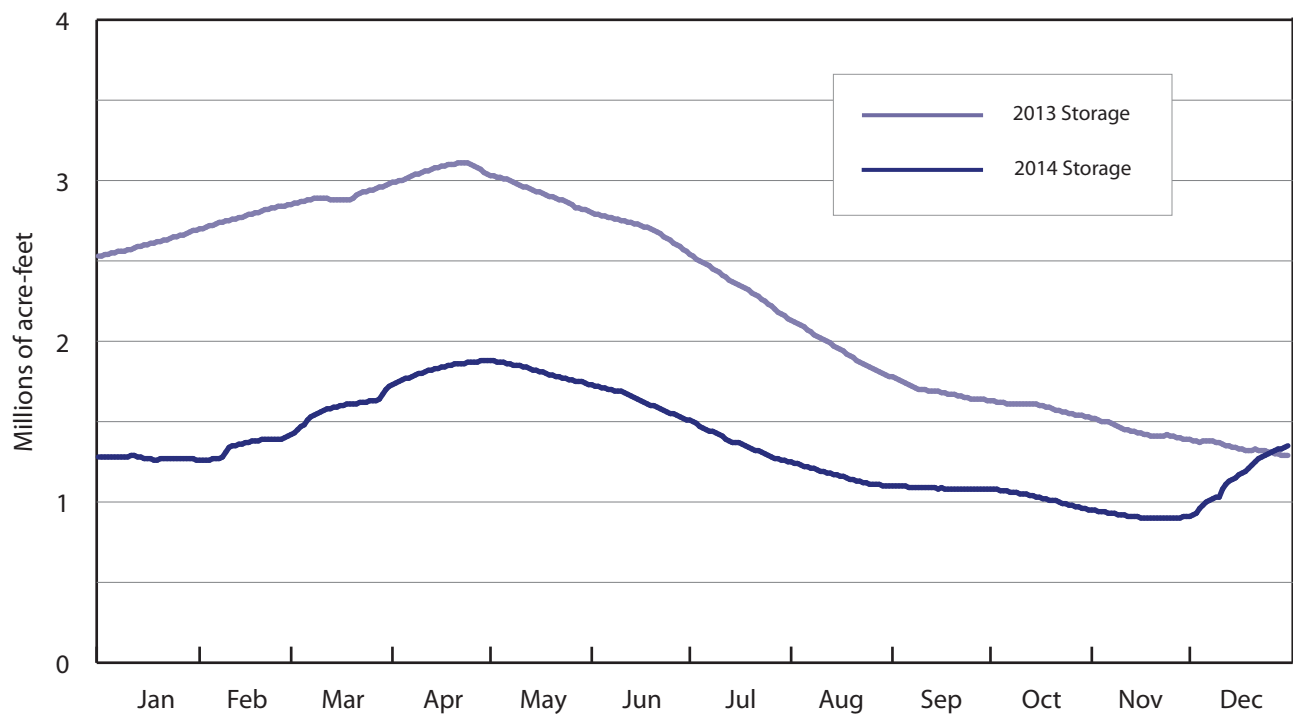


**Figure 8-2** Monthly Inflow into Lake Oroville from the Feather River, 2012–2014





**Figure 8-3 Lake Oroville Cumulative Inflow over the Last 30 Years—Current and Historical Maximum and Minimum**



**Figure 8-4 Daily Storage in Lake Oroville, 2013 and 2014**

contained 603,713 af, 30 percent of its capacity. The SWP storage share was 274,425 af. The highest end-of-month SWP share of water storage occurred on December 31 at 535,626 af. Figure 8-5 shows SWP shares of storage and total storage in San Luis Reservoir for 2013 and 2014.

### 2014 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 2014, Lake del Valle held 29,712 af, which was about 39 percent of its maximum capacity of 77,111 af. Its highest storage occurred on May 1 at 41,395 af. Its lowest storage occurred on January 30 at 29,556 af.

On December 31, storage in Lake del Valle was 34,663 af, 45 percent of its maximum capacity. There was 5,347 af of natural inflow into Lake del Valle, and 13,430 af of inflow from the South Bay Aqueduct. There were

no releases to Arroyo Valle, and releases for 2014 to the South Bay Aqueduct from Lake del Valle totaled 10,544 af.

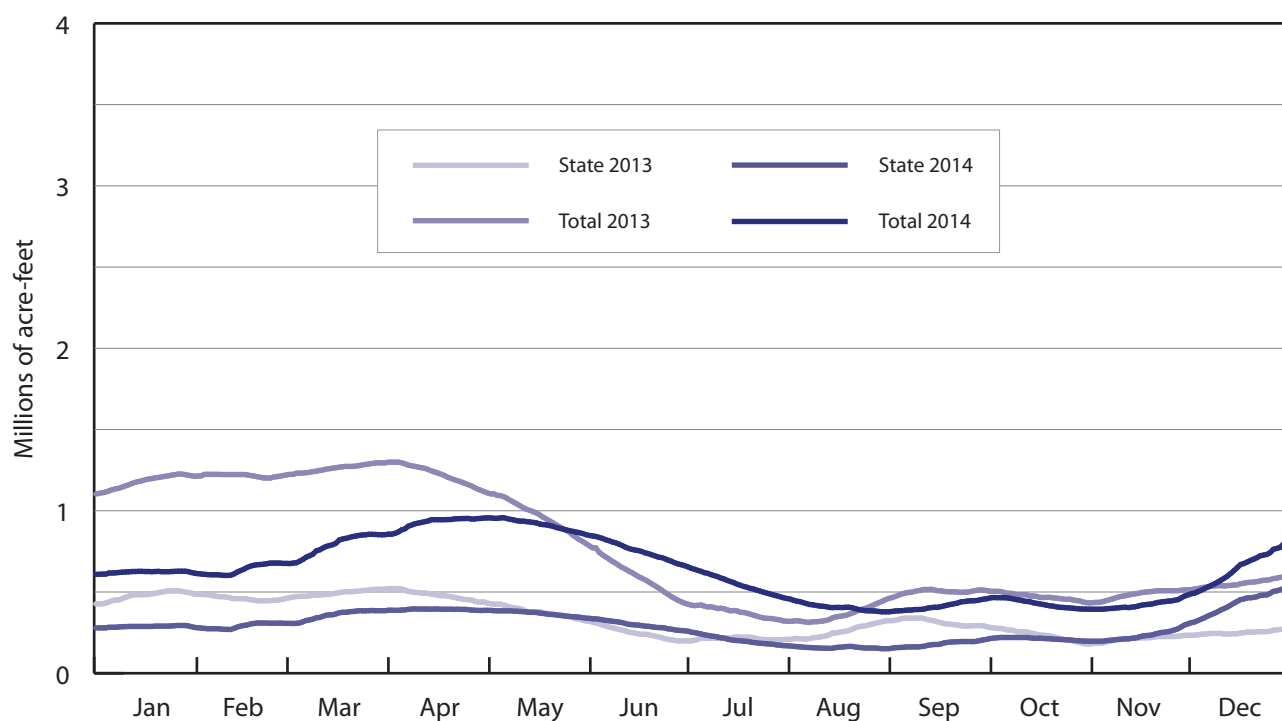
### 2014 Southern Reservoir Operations

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 2014, these reservoirs held 597,785 af, which is 87 percent of their combined normal maximum operating capacity of 689,021 af. At the end of 2014, the reservoirs held 406,879 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



**Figure 8-5** Daily Storage in San Luis Reservoir, 2013 and 2014

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 2014, the North Bay Aqueduct received 36,468 af of water from the Barker Slough Pumping Plant.

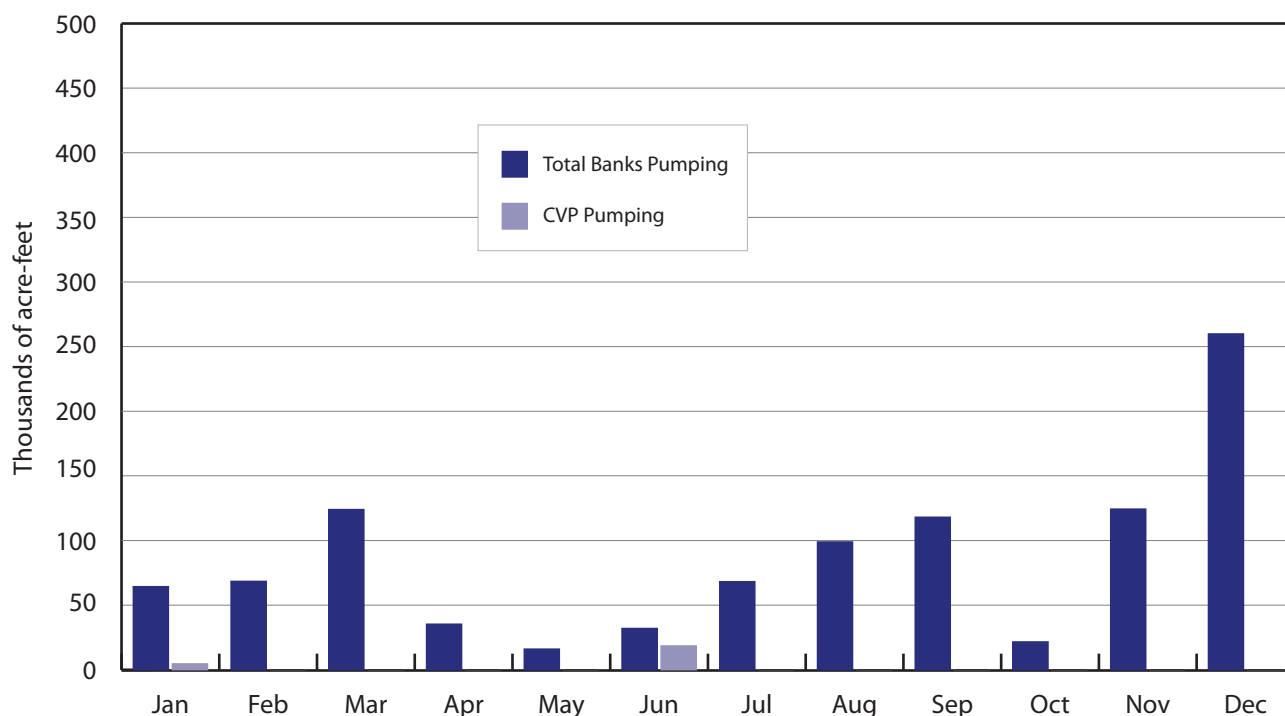
Figure 8-6 shows the amounts of water pumped each month for 2014 at Banks Pumping Plant, totaling 1,031,370 af. Of this amount, the SWP diverted 1,008,238 af. There was no pumping for the Cross Valley Canal, and 23,132 af was wheeled for the

CVP. All CVP pumping at Banks Pumping Plant occurred in January and June.

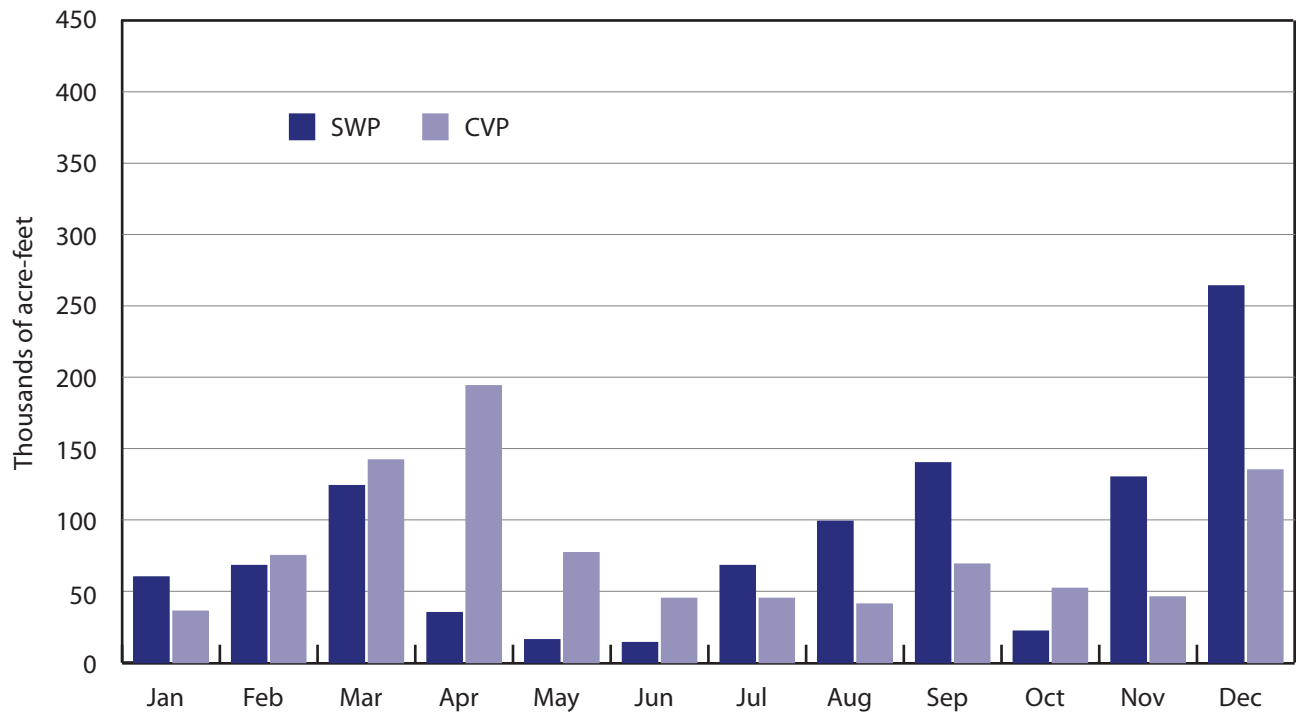
The CVP diverted 873,152 af at Jones Pumping Plant and 91,192 af at Contra Costa Pumping Plant in 2014.

The combined Delta exports include all of these plants. Figure 8-7 shows the monthly amounts of water diverted from the Delta in 2014 by the SWP and CVP. Maximum daily Delta exports occurred on December 14 at 21,577 af. Combined SWP and CVP monthly Delta exports in 2014 varied from a low of 58,430 af in June, to a high of 398,626 af in December. Delta exports totaled approximately 2 maf in 2014.

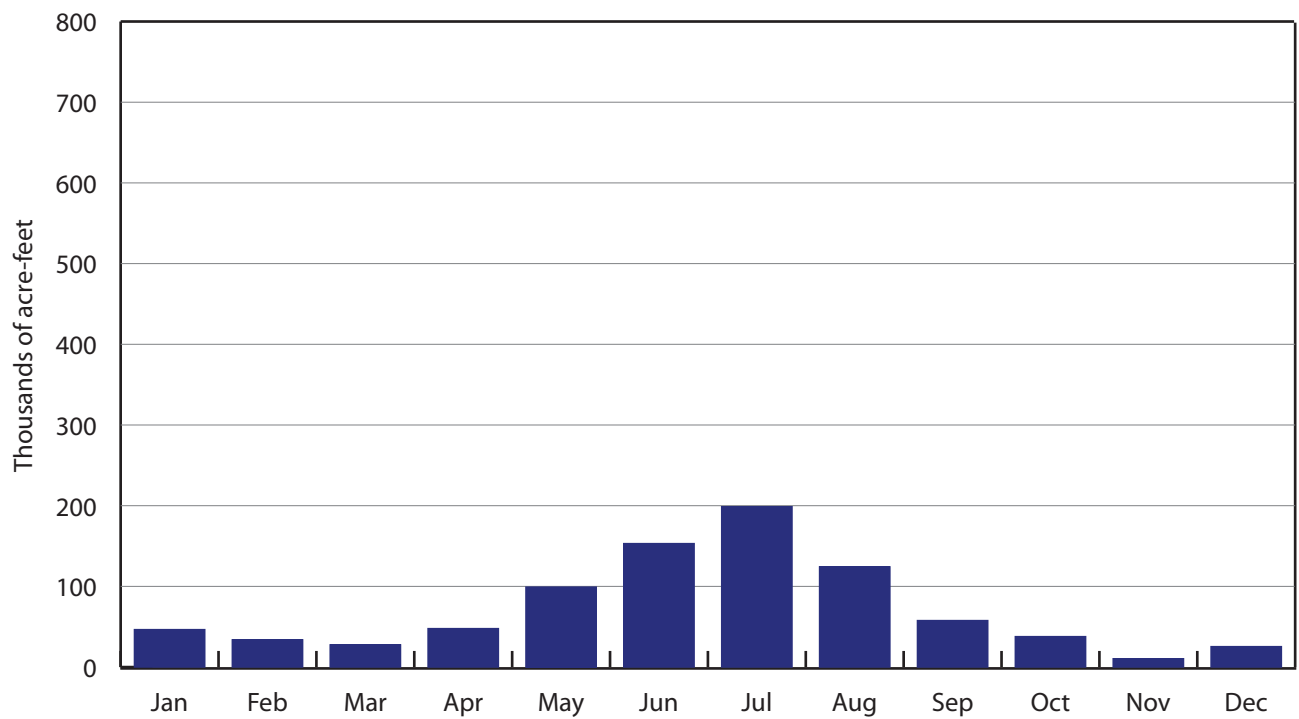
Figure 8-8 shows monthly total amounts pumped at Dos Amigos Pumping Plant for 2014. Dos Amigos Pumping Plant diverts water from O'Neill Forebay to the California Aqueduct. Dos Amigos pumped the largest amount in July 2014 at 198,836 af.



**Figure 8-6** Water Pumped at Banks Pumping Plant, 2014



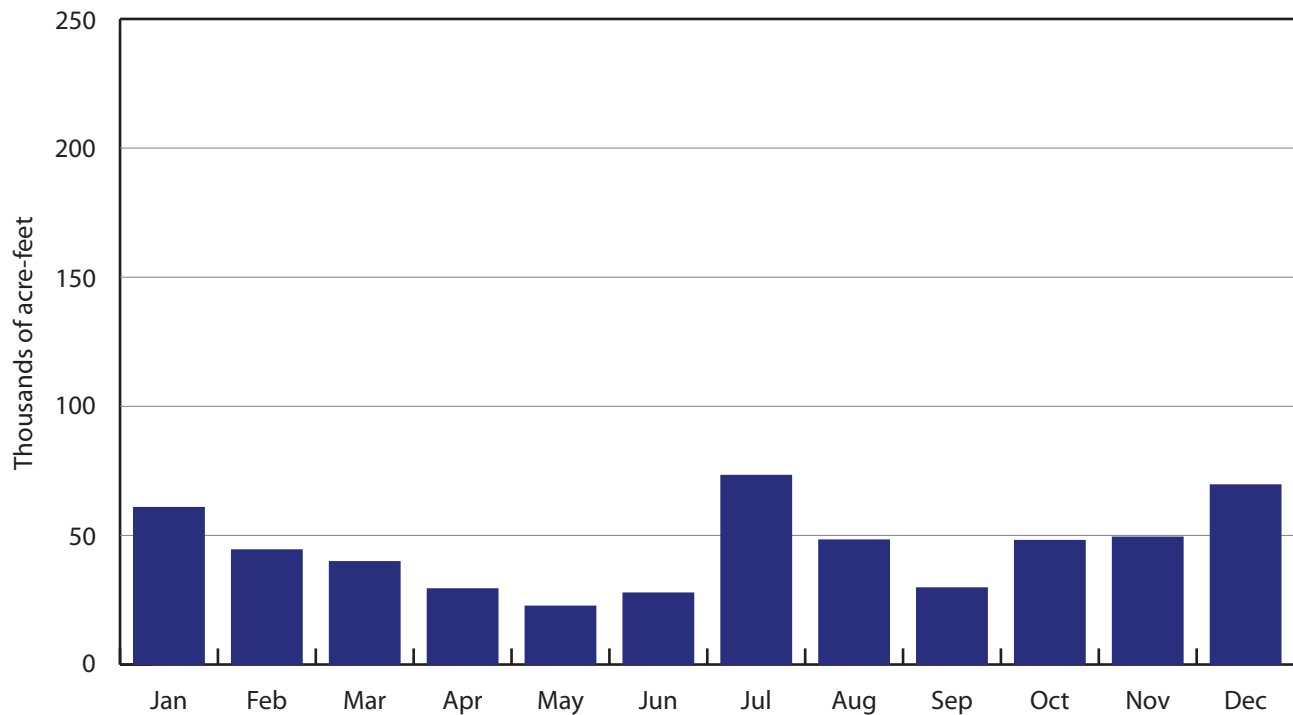
**Figure 8-7 Sacramento-San Joaquin Delta Exports by State Water Project and Central Valley Project, 2014**



**Figure 8-8 Water Pumped at Dos Amigos Pumping Plant, 2014**

Figure 8-9 shows the amount of water pumped each month in 2014 at Edmonston Pumping Plant. Water pumped through the Edmonston Pumping Plant for delivery to Southern California totaled 542,387 af.

Additional water supply information can be found on DWR's website.



**Figure 8-9** Water Pumped at Edmonston Pumping Plant, 2014





## **Chapter 9**

# **Water Contracts and Deliveries**

*View of Lake Perris.*

## Significant Events in 2014

A total of 1,992,157 acre-feet (af) of State Water Project (SWP) and non-SWP water was delivered to 29 long-term SWP water contractors and 20 other agencies. The portion delivered to SWP water contractors was 1,061,146 af; the portion delivered to non-SWP agencies was 931,011 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 5 percent of the SWP water contractors’ Table A allocation requests.

On May 1, DWR executed a letter agreement with Yuba County Water Agency (Yuba), approving the negotiated price of \$475 per af for the 2014 delivery of 56,984 af of groundwater substitution water.

On December 5, DWR executed Amendment 5 to the Lower Yuba River Accord Water Purchase Agreement with Yuba, and conforming amendments to the Participation Agreements of 22 participating contractors, extending delivery of Yuba water for 2016–2020 with new pricing and other changes to the agreement.

*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 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 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 conditions, DWR is not able to deliver the quantity of water requested by contractors. In these 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 supplies include current year Table A amounts, transfer and exchange of Table A water, carryover water, Turn-Back Pools A and B water, Multiyear Pool water, and Article 21 water. DWR enters into agreements with other agencies to provide water conveyance service. Using SWP facilities, DWR conveys non-SWP

water for various agencies according to the terms of water rights and water transfer and exchange agreements.

The long-term water supply contracts are amended as needed.

DWR also enters into agreements with SWP water contractors and other agencies, which may be amended periodically, to convey SWP and non-SWP water through the California Aqueduct and to approve the construction, operation, and maintenance of SWP facilities and turnouts/turn-ins. These agreements are also listed in this chapter.

The State Water Project Analysis Office (SWPAO) developed 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 after each contract, amendment, or agreement description. These numbers can be used as identifiers for anyone who contacts DWR staff for more detailed information on a particular document.

## Contract Extension Negotiations

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

## State Water Project Long-term Water Supply Contracts

The first 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 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 the district's 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 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 estimate of the date water would initially be delivered and a schedule of the amount of water the agency could expect to be delivered 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 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 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.

on principles for such an amendment (the "Agreement in Principle").

Currently, the water supply contracts remain in effect for 75 years, until December 31, 2035, or until all bonds issued to finance construction costs of SWP facilities are repaid, whichever period is longest. Each SWP water contractor may elect to receive continued service under its 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.

No bonds have been sold with a maturity date later than December 31, 2035. The 75-year water supply contract term results the water supply contracts having varying termination dates that range between



December 31, 2035, and December 31, 2042. Under the Agreement in Principle, each SWP 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 water supply contracts’ current provisions authorizing DWR to charge the SWP contractors annually for the full amount of required annual debt service and coverage on the bonds will continue in any extended contract.

The Agreement in Principle also provided for, among other things, the following:

- an increase in DWR’s operating reserves— a mechanism for financing capital projects with interest from the SWP contractors;
- the establishment of an account to pay for certain State Water Resources Development System expenses not chargeable to the SWP 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 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. DWR is currently preparing a draft environmental impact report (EIR) for the proposed contract extension amendment.

Any amendment that is ultimately adopted between DWR and the SWP water contractors will comply with DWR’s covenant.

## Amendments to Long-term SWP Water Supply Contracts

All the original long-term water supply contracts signed by DWR, public agencies, and local water districts have been previously 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.

## 2014 Amendments to Long-term Water Supply Contracts

There were two amendments to the long-term water supply contracts in 2014.

### *Dudley Ridge*

DWR executed Amendment No. 28 to the water supply contract between Dudley Ridge Water District (Dudley Ridge) and DWR on July 29, 2014. This amendment clarifies that the annual Dudley Ridge Table A amount reduction referenced in Article 53(i) of the Monterey Amendments and made effective by Amendment No. 22 to the water supply contract between Dudley Ridge and DWR, is permanent. (SWPAO #14007)



### **Kern**

DWR executed Amendment No. 39 to the water supply contract between Kern County Water Agency (Kern) and DWR on September 2, 2014. This amendment clarifies that the annual Kern Table A amount reduction referenced in Article 53(i) of the Monterey Amendments and made effective by Amendment No. 24 to the water supply contract between Kern and DWR, is permanent. (SWPAO #14006)

### **Monterey Amendments**

The Monterey Amendments increase the reliability of existing water supplies, and increase water management flexibility, providing more tools for local water agencies to maximize use of existing facilities.

The Monterey Amendments include 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, found on the DWR website.

Plumas County Flood Control and Water Conservation District (Plumas) and Empire West Side Irrigation District (Empire) remain the only long-term SWP water contractors who have not signed the Monterey Amendments.

In accordance with the terms of the May 5, 2003, Monterey Settlement Agreement, the SWP continued to operate pursuant to the Monterey Amendments while the new EIR was being prepared. The draft EIR was released in October 2007 and is available on DWR's website. The final EIR was released in February 2010, and a notice of determination to proceed with the project was filed in June 2010. DWR continues to operate the SWP under the existing Monterey Amendments pursuant to the SWP long-term water supply contracts,

including the Kern Water Bank transfer, and under the settlement agreement entered in the *Planning and Conservation League v. DWR* lawsuit. DWR was challenged by two groups of plaintiffs on issues relating to the adequacy of the EIR and the validity of the Monterey Amendments. The cases are currently being heard by the trial court. Final resolution of the issues is likely to take a number of years.

The settlement agreement is discussed in detail in Bulletin 132-04, Chapter 9, Water Contracts and Deliveries, available on DWR's website.

See Chapter 6, Legislation and Litigation, for the current status of the Monterey Amendment litigation.

## **Miscellaneous Agreements with Long-term SWP Water Contractors**

### **2014 Water Conveyance and Exchange Agreements**

Water conveyance and exchange agreements that were executed or pending execution with long-term SWP water contractors during 2014 are described below.

#### **AVEK/Littlerock**

A letter agreement among DWR, Antelope Valley-East Kern Water Agency (AVEK), and Littlerock Creek Irrigation District (Littlerock), dated December 23, 2014, approved the delivery of up to 115 acre-feet (af) of Littlerock's 2014 Table A water to AVEK. AVEK will return an equal amount, up to 115 af, of its future 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 2014, a total of 115 af of Littlerock's Table A water was delivered to AVEK under this agreement. (SWPAO #14021)

### **Plumas**

An agreement between DWR and Plumas County Flood Control and Water Conservation District (Plumas), executed November 4, 2014, addressed Plumas' need for additional water supplies in 2014. In 2014, Plumas' demand exceeded its 5 percent allocation of SWP Table A water of 125 af. Plumas' local supply was curtailed by the SWRCB. This agreement allowed DWR to allocate 2014 Table A water for Plumas based on the availability of water supply from Lake Davis through December 31, 2014. If drought conditions persist in 2015, this agreement may be extended to December 31, 2015. During 2014, a total of 251 af of Table A water was delivered to Plumas under this agreement. (SWPAO #14017)

### **Mojave/Santa Barbara**

A letter agreement among DWR, Mojave Water Agency (Mojave), and Santa Barbara County Flood Control and Water Conservation District (Santa Barbara), dated September 18, 2014, and executed September 24, 2014, approved the delivery of up to 500 af of Mojave's approved SWP water supplies to Santa Barbara by December 31, 2014. In exchange, Santa Barbara will return up to 1,125 af, based on an exchange ratio of 2.25:1, of its future SWP water supplies to Mojave by December 31, 2024. During 2014, a total of 500 af of Mojave's Table A water was delivered to Santa Barbara under this agreement. (SWPAO #14015)

### **Palmdale/San Bernardino**

A letter agreement among DWR, Palmdale Water District (Palmdale), and San Bernardino Valley Municipal Water District (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 exchange ratio of 2.25:1, of its future SWP water supplies to San Bernardino by December 31, 2018. During 2014, a total of

2,500 af of San Bernardino's Article 56(c) carryover water was delivered to Palmdale under this agreement. (SWPAO #14013)

### **Butte**

A letter agreement between DWR and County of Butte (Butte), dated July 7, 2014, and executed July 29, 2014, approved the conveyance of up to 3,000 af per year of nonproject water to California Water Service Company, a member agency of Butte, through December 31, 2017. This nonproject water is made available by Pacific Gas and 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 2014, no water was moved under this agreement. (SWPAO #14011)

### **Mojave/Santa Barbara**

A letter agreement among DWR, Mojave, and Santa Barbara, dated September 18, 2014, and executed September 24, 2014, approved the delivery of up to 500 af of Mojave's approved SWP water supplies to Santa Barbara by December 31, 2014. In exchange, Santa Barbara will return up to 500 af, based on an exchange ratio of 1:1, of its future approved SWP water supplies to Mojave by December 31, 2019. During 2014, a total of 500 af of Mojave's Table A water was delivered to Santa Barbara under this agreement. (SWPAO #14009)

### **Kern**

A letter agreement between DWR and Kern, dated June 10, 2014, and executed June 26, 2014, approved the conveyance of up to 1,024 af of Friant Recirculation Water associated with the San Joaquin River Restoration Program to Kern. Wheeler Ridge-Maricopa Water Storage District, a member unit of Kern, purchased this nonproject water from six Central Valley Project (CVP) Friant Division contractors to increase its future in-district supplies. The Bureau of Reclamation (Reclamation) made this nonproject water

available at O'Neill Forebay. DWR conveyed the nonproject water to Kern under Article 55 of Kern's long-term water supply contract. This agreement terminates on April 30, 2015. During 2014, a total of 1,024 af of water was conveyed to Kern under this agreement. (SWPAO #14005)

### ***Kern/Westlands***

A change in point of delivery agreement among DWR, Kern, and Westlands Water District (Westlands), executed September 8, 2014, provided for a same landowner transfer by Paramount Farming Company that owns lands in both Kern's and Westlands' service areas. This agreement approved the delivery of up to 3,000 af of Kern's approved 2013 and/or 2014 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 State Water Resources Control Board (SWRCB) and received a 1-year approval order effective May 1, 2014, for the consolidation of SWP and CVP places of use. During 2014, no water was delivered to Westlands under this agreement. (SWPAO #14004)

### ***Kern/Tulare***

A letter agreement among DWR, Kern, and Tulare Lake Basin Water Storage District (Tulare), dated May 20, 2014, and executed June 13, 2014, approved the transfer of up to 10,000 af of Tulare's 2014 Table A water to Kern on behalf of JG Boswell Company, a landowner with farms in both Tulare's and Kern's service areas. During 2014, no water was delivered to Kern under this agreement. (SWPAO #14003)

### ***Tulare/Westlands***

A letter agreement among DWR, Tulare, and Westlands, dated May 20, 2014, and executed June 18, 2014, approved the transfer of up to 4,000 af of Tulare's 2014 Table A water to Westlands on behalf of Westlake Farms Incorporated, which has

farms in both Tulare's and Westlands' service areas. During 2014, no water was delivered to Westlands under this agreement. (SWPAO #14002)

### ***AVEK/Littlerock***

A letter agreement among DWR, AVEK, and Littlerock, dated March 24, 2014, and executed March 25, 2014, approved the delivery of up to 805 af of Littlerock's 2013 SWP Article 56(c) carryover water to AVEK by December 31, 2014. AVEK will return an equal amount, up to 805 af, of its future 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 2014, no water was delivered to AVEK under this agreement. (SWPAO #13028)

### ***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 amount 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 2014, Butte requested, and DWR approved, three transfer agreements as described below.



**Butte/Kern.** A multiyear agreement among DWR, Butte, and Kern, executed August 5, 2014, approved the annual delivery of Butte's allocated Table A water plus a portion of Butte's Additional Water when it becomes available to Kern for four of its member units (Belridge Water Storage District, Berrenda Mesa Water District, Lost Hills Water District, and Wheeler Ridge-Maricopa Water Storage District) in years 2014 through 2021. During 2014, a total of 232 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 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 2014, a total of 101 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 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 2014, a total of 646 af of Butte's Table A water was delivered to Palmdale under this agreement. (SWPAO #13013)

### **Metropolitan/Santa Clara**

An amendment among DWR, The Metropolitan Water District of Southern California (Metropolitan), and Santa Clara Valley Water District (Santa Clara), dated October 21, 2014, and executed December 11, 2014, allowed Metropolitan's approved SWP water supplies as return water to Santa Clara. It also clarified the charges provision per a letter agreement (SWPAO #11007) executed April 5, 2011, among DWR, Metropolitan, and Santa Clara. This letter agreement approved the

delivery of up to 9,000 af of Santa Clara's Article 56(c) carryover water to Metropolitan in exchange for the return of an equal amount, up to 9,000 af, of Metropolitan's future Table A water to Santa Clara by December 31, 2014. During 2014, a total of 8,341 af of Metropolitan's Article 56(c) carryover water was delivered to Santa Clara, thereby completing this agreement. (SWPAO #11007-A and SWPAO #11007)

### **Kern**

An amendment between DWR and Kern, dated July 24, 2014, and executed September 8, 2014, approved the delivery of up to 5,280 af of Kern's Table A water to Westlands' service area outside of Kings County for 2014–2015. 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 SWRCB and received a 1-year approval order, effective May 1, 2014, for the consolidation of SWP and CVP places of use. During 2014, no water was delivered under this agreement. (SWPAO #06013-C and SWPAO #06013)

### **Kern/Metropolitan**

An amendment among DWR, Kern, and Metropolitan, pending execution, allows for the delivery of up to 20,000 af of Metropolitan's SWP water supplies to O'Neill Forebay to facilitate an exchange among the San Joaquin River Exchange Contractors (Exchange Contractors). Under this amendment, up to 20,000 af of Metropolitan's SWP water supplies is 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. During 2014, a total of 15,000 af of Metropolitan's Article 56(c) carryover water was made available at O'Neill Forebay. (SWPAO #01013-A and SWPAO #01013)

## **Water Conveyance and Exchange Agreements Prior to 2014**

### ***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 Delta carriage water losses, on a 50/50 equal basis of nonproject water to Dudley Ridge and Santa Clara through December 31, 2024. This nonproject water is made available by Browns Valley Irrigation District. During 2014, 1,240 af was delivered to Dudley Ridge and 1,240 af was delivered to Santa Clara under this agreement. (SWPAO #13020)

### ***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 SWP water supplies to Metropolitan by December 31, 2017. In exchange, Metropolitan will return up to 4,350 af, based on an exchange ratio of 2:1, of its future SWP water supplies to Dudley Ridge by December 31, 2022. This agreement allows for the delivery of a portion of Dudley Ridge's SWP water supplies to either Metropolitan's service area and/or Kern's turnouts for storage in Rosedale Rio-Bravo Water Storage District (Rosedale Rio-Bravo), a member unit of Kern, for later use by Metropolitan in its own

service area. During 2014, a total of 846 af of Dudley Ridge's Article 56(c) carryover 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 Valley Water District (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 ready to receive the water to which it was entitled under the original 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 2014, a total of 5,000 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 2014, a total of 488 af of Tulare's water was delivered to Dudley Ridge's turnouts, of which 259 af was Article 56(c) carryover water and 229 af was Table A water. (SWPAO #12011)

### ***AVEK/Kern/Metropolitan***

A letter agreement among DWR, AVEK, Kern, and Metropolitan, dated April 18, 2012, and executed June 28, 2012, approved the exchange of up to 5,000 af of AVEK'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 AVEK 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 AVEK's approved SWP water supplies to be delivered to Kern's turnouts for storage in Kern County, as described in Bulletin 132-13. During 2014, a total of 2,205 af of Metropolitan's water was delivered to AVEK, of which 1,477 af was Article 56(c) carryover water and 728 af was Table A water. (SWPAO #11023)

### ***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 2014, a total of 207 af of Metropolitan's Article 56(c) carryover water was delivered to Santa Barbara. (SWPAO #11021)

### ***AVEK/Palmdale***

A letter agreement among DWR, Palmdale, and AVEK, 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 of the total amount delivered to AVEK, up to 5,000 af, of its future SWP supplies to Palmdale by December 31, 2021. During 2014, a total of 132 af of AVEK's Article 56(c) carryover water was delivered to Palmdale. (SWPAO #11020)

### ***Dudley Ridge/Santa Barbara***

A letter agreement (SWPAO #11019) among DWR, Dudley Ridge, and Santa Barbara, dated November 10, 2011, and executed November 28, 2011; and an amendment (SWPAO #11019-A) dated April 6, 2012, and executed April 16, 2012, approved the delivery of up to 3,000 af of Santa Barbara's 2011 SWP water supplies to Dudley Ridge. In exchange, Dudley Ridge will return two-thirds, less losses, of its future approved SWP water supplies to Santa Barbara by December 31, 2021. The water was delivered to Dudley Ridge's turnouts in Reach 8D or to Kern's turnouts in Reaches 12E and 13B of the California Aqueduct for storage under a 2008 change in point of delivery agreement among DWR, Dudley Ridge, and Kern (SWPAO #08050). In 2014, a total of 710 af of Dudley Ridge's Article 56(c) carryover water was delivered to Santa Barbara. (SWPAO #11019-A and #11019)

### ***Castaic Lake/Kern***

A letter agreement among DWR, Castaic Lake Water Agency (Castaic Lake), and Kern, dated October 24, 2011, and executed January 23, 2012, approved the delivery of up to 5,000 af of Castaic Lake's approved

SWP water supplies to Kern. In exchange, Kern will return 50 percent of the total amount delivered to Kern, up to 2,500 af, of its future approved SWP water supplies to Castaic Lake. During 2014, a total of 2,000 af of Kern's Article 56(c) carryover water was delivered to Castaic Lake under this agreement. (SWPAO #11016)

### ***Dudley Ridge/Kern***

A multiyear same landowner transfer agreement among DWR, Dudley Ridge, and Kern, executed June 13, 2011, approved 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 2014, a total of 10,786 af of Dudley Ridge's water was delivered to Kern, of which 9,030 af was Article 56(c) carryover water and 1,756 af was Table A water. (SWPAO #10030)

### ***Crestline/San Gorgonio***

A letter agreement among DWR, Crestline-Lake Arrowhead Water Agency (Crestline), and San Gorgonio Pass Water Agency (San Gorgonio), dated July 21, 2010, and executed July 29, 2010, approved the delivery of up to 1,000 af of Crestline's 2010 Table A water to San Gorgonio by December 31, 2010. San Gorgonio will return an equal amount of its future SWP Table A water to Crestline by December 31, 2020. There will be no monetary payment between Crestline and San Gorgonio for this 1:1 exchange. During 2014, a total of 500 af of San Gorgonio's Article 56(c) carryover water was delivered to Crestline. (SWPAO #10020)

### ***Dudley Ridge/San Gabriel***

A multiyear exchange agreement among DWR, Dudley Ridge, and San Gabriel Valley Municipal Water District (San Gabriel), executed September 14, 2010, approved the conveyance of Dudley Ridge's approved SWP water supplies to San Gabriel effective January 1, 2010, through December 31, 2020. San Gabriel will provide for the return

of its approved SWP water supplies to Dudley Ridge through December 31, 2030. This agreement also covers Dudley Ridge's Table A water delivered to San Gabriel during 2008. During 2014, a total of 240 af of San Gabriel's Table A water was delivered to Dudley Ridge under this agreement. (SWPAO #10013)

### ***Empire/Westlands***

A long-term change in place of use agreement among DWR, Empire West Side Irrigation District (Empire), and Westlands, executed March 3, 2011, approved the annual delivery of up to 2,000 af of Empire's 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 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 2014, a total of 341 af of Empire's Article 12(e) 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 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 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 2014, a total of 936 af of Tulare's water was delivered to Westlands, of which 340 af was Table A water and 596 af was Article 56(c) carryover water. (SWPAO #10006)

### ***Napa/Solano***

A long-term change in point of delivery agreement among DWR, Napa County Flood Control and Water Conservation District (Napa), and Solano County Water Agency (Solano), executed October 11, 2010, approved the conveyance of up to 500 af per year of the City of Vallejo's nonproject water from Solano's service area to Napa's service area 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 nonproject 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 nonproject water through Reach 3B of the North Bay Aqueduct, located within Napa's service area. This agreement is effective through December 31, 2035. During 2014, a total of 500 af of nonproject water was conveyed under this agreement. (SWPAO #10005)

### ***Crestline/San Bernardino***

A point of delivery agreement among DWR, Crestline, and San Bernardino, executed April 17, 2008, provides for an emergency water supply totaling 7,600 af to Lake Arrowhead Community Services District, effective January 1, 2007, through December 31, 2020, or until all water has been delivered under this agreement, whichever comes first. During 2014, a total of 202 af was delivered to Crestline under this agreement. (SWPAO #07025)

### ***Castaic Lake/Kern***

A long-term agreement among DWR, Castaic Lake, and Kern, executed February 5, 2008, approved the annual conveyance of up to 11,000 af of non-SWP Kern River water from Buena Vista Water Storage District (Buena Vista), 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'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 2014, a total of 11,000 af was delivered to Castaic Lake under this agreement. (SWPAO #07008)

### ***Mojave/Solano***

A letter agreement among DWR, Mojave, and Solano, dated November 9, 2004, and executed November 30, 2004, approved the delivery of up to 2,000 af of Solano's 2004 approved SWP water supplies to Mojave, in exchange for the return of up to 1,000 af of Mojave's SWP water supplies to Solano by December 31, 2014. During 2014, a total of 1,000 af of Mojave's Article 56(c) carryover water was delivered to Solano, thereby completing this agreement. (SWPAO #04023)

### ***Kings/Westlands***

A long-term change in point of delivery agreement among DWR, County of Kings (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. In 2014, a total of 386 af of Kings' water was delivered to Westlands' turnouts under this agreement, of which 50 af was Table A water and 336 af was Article 56(c) carryover water. (SWPAO #04005)

### ***Solano/Cities of Fairfield, Vacaville, and Benicia***

A settlement agreement among DWR, Solano, and the cities of Fairfield, Vacaville, and Benicia (three cities), which includes conveyance service by Solano, was executed 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 2014, a total of 2,899 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 2014, a total of 24 af of Kings' Article 56(c) carryover 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 2014, a total of 609 af of Kern's Article 56(c) carryover water was delivered to Western Hills. (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 2014, a total of 41 af of Napa's Table A water was delivered to Solano's turnouts. (SWPAO #00029)

### ***Mojave/AVEK***

The 1997 agreement (SWPAO #97003) among DWR, Mojave, and AVEK, executed on November 13, 1997, and an amendment (SWPAO #97003-A) executed on January 12, 2012, approved the delivery of up to 4,800 af per year of Mojave's approved SWP water supplies to AVEK's turnouts through December 31, 2035. The agreement and the amendment provide for the delivery of up to 1,800 af per year for use by a solar power generating plant, operated by Luz Solar Partners, Ltd. III-VII, and provide for the delivery of up to 3,000 af to AVEK's groundwater basin as a backup water supply to the plant in the event of an SWP outage. During 2014, a total of 1,004 af was delivered to AVEK under this agreement, of which 265 af was Table A water and 739 af was Article 56(c) carryover water. (SWPAO #97003-A and SWPAO #97003)

## **Introduction of Local Water Agreement**

### ***AVEK***

An agreement between DWR and AVEK, pending execution, approves 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 2014, AVEK introduced 1,046 af of its local water into the California Aqueduct; DWR conveyed and delivered 1,046 af to AVEK's turnouts under this agreement. (SWPAO #14016)

## **Turnout Agreements**

### ***Alameda County Flood Control and Water Conservation District, Zone 7***

In December 2009, the Del Valle Branch Pipeline ruptured near the Del Valle Reservoir surge tank. The rupture resulted in major damage to SWP facilities, including the Wente No. 5 Turnout. Damage to the turnout was repaired and the turnout was upgraded. On March 28, 2014, DWR executed an

agreement with Alameda County Flood Control and Water Conservation District, Zone 7 (Alameda-Zone 7) for operation and maintenance of the turnout. The upgraded turnout, located at Milepost 1.08 of the South Bay Aqueduct's Del Valle Branch Pipeline, has a maximum capacity of 4 cubic feet per second (cfs).

### **AVEK**

In constructing the Tehachapi East Afterbay, DWR destroyed and removed an existing AVEK turnout at Milepost 304.9 of the California Aqueduct's East Branch. On December 2, 2014, DWR executed an agreement with AVEK for construction, operation and maintenance of the Tehachapi East Afterbay Relocated Turnout. The replacement turnout, located at Milepost 1.30 of the California Aqueduct's West Branch, has a maximum design capacity of 13 cfs.

On December 23, 2014, DWR executed an agreement with AVEK for modification, operation and maintenance of the 96th Street East Turnout. Turnout modifications included converting the structure to a dual-use facility allowing previously banked SWP water to be extracted from the Eastside Water Banking and Blending Project. The extracted SWP water should provide AVEK a supplemental supply for its nearby Eastside Water Treatment Plant. The delivery structure is located at Milepost 357.8 of the California Aqueduct's East Branch and has a maximum design capacity of 11 cfs.

### **Dudley Ridge/Kern**

On December 9, 2014, DWR executed an agreement with Dudley Ridge, Kern, Lost Hills Water District, Berrenda Mesa Water District, Semitropic Water Storage District, and Belridge Water Storage District for construction, operation and maintenance of the 2014-2015 California Aqueduct Pump-Back Program. Lost Hills Water District, Berrenda Mesa Water District, Semitropic Water Storage District, and Belridge Water Storage District are member

units of Kern County Water Agency. Due to drought conditions, uncertainty of the drought's duration, and extremely low water allocations, the water agencies proposed moving supplemental water supplies from existing water banks throughout the northern portions of Kern and Kings counties to meet critical needs. If needed, temporary pumps, each with a maximum capacity of 100 cfs, would be installed at Checks 22 and 25 of the California Aqueduct to pump water north to their districts and to landowners as far upstream as Pool 22.

### **Kern**

On September 18, 2014, DWR executed an agreement with Kern and Buena Vista Water Storage District for operation and maintenance of Buena Vista Water Storage District's Turnout No. 2. The existing turnout, located at Milepost 235.75 of the California Aqueduct, has a maximum design capacity of 250 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 2014, a total of 201,624 af was recovered from storage.

### **Turn-Back Water Pool Program**

Pursuant to Article 56(d) of the Monterey Amendments, SWP contractors who signed



**Table 9-1 Storage of Water Outside SWP Contractor Service Areas in 2014 (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	9,935	2035
SWPAO #00037 <sup>b</sup>	Continuing	Semitropic	0	0	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 Water District	0	4,971	2035
<b>Alameda County</b>					
SWPAO #99017	Continuing	Semitropic	0	10,389	2035
SWPAO #00030	Continuing	Semitropic	0	4,351	2035
SWPAO #07005	Continuing	Semitropic	0	0	2035
SWPAO #10009	Continuing	Semitropic	0	0	2035
<b>Castaic Lake</b>					
SWPAO #02015 <sup>b</sup>	Continuing	Semitropic	0	4,951	2022
SWPAO #03060 <sup>b</sup>	Continuing	Semitropic	0	0	2024
SWPAO #05016	Continuing	Rosedale-Rio Bravo	0	2,824	2035
<b>Dudley Ridge</b>					
<i>SWP Water</i>					
SWPAO #08050	Continuing	Kern Water Bank	0	6,725	2035
SWPAO #09002	Continuing	Semitropic	0	0	2035
<i>Non-SWP Water</i>					
SWPAO #09040 <sup>b</sup>	Continuing	Kern Water Bank	0	10,064	2020
SWPAO #03053	Continuing	Cawelo Water District	0	3,554	2035
<b>Metropolitan</b>					
SWPAO #95010	Continuing	Semitropic	0	43,639	2035
SWPAO #01013 <sup>b</sup>	Continuing	Arvin-Edison	0	34,507	2035
SWPAO #03019	Continuing	Kern Delta Water District	0	21,091	2035
SWPAO #03057	Continuing	Mojave	0	0	2015
SWPAO #11011	Continuing	Mojave	0	0	2035
SWPAO #11022	Continuing	Rosedale-Rio Bravo	0	5,236	2017
<b>San Bernardino</b>					
SWPAO #11015	Continuing	Kern Delta	0	5,000	2035
<b>Santa Clara</b>					
<i>SWP Water</i>					
SWPAO #99016	Continuing	Semitropic	0	0	2035
SWPAO #00031	Continuing	Semitropic	0	9,324	2035
SWPAO #06011	Continuing	Semitropic	0	23,763	2035
SWPAO #10012	Continuing	Semitropic	0	0	2035
<i>Non-SWP Water</i>					
SWPAO #06012 <sup>b</sup>	Continuing	Semitropic	0	1,300	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>201,624</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.

the Monterey Amendments are permitted to participate annually in the Turn-Back Water Pool Program. In 2014, 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.

**Area of Origin.** The Area of Origin Settlement Agreement in 2013 allowed County of Butte to reduce its 2010 Table A amount from 27,500 af to 1,731 af and its 2011 Table A amount from 27,500 af to 2,548 af. The Table A reductions were based on County of Butte's actual annual water demands and retroactively eliminated their ability to participate in 2010 and 2011 Turn-Back Water Pool Program activities.

A total of \$470,600 was returned to DWR resulting from County of Butte's retroactive elimination from the 2010 and 2011 Turn-Back Water Pool Program.

For more information, see Bulletin 132-14, Chapter 9, Water Contracts and Deliveries, available on DWR's website.

### **Multiyear Water Pool Program**

The experimental 2013–2014 Multiyear Water Pool Program was initiated through an informational letter sent to all SWP contractors dated May 23, 2013. The program's purpose was to demonstrate the feasibility of a multiyear water purchase program. All SWP water contractors were permitted to participate in the program as either buyers or sellers in either one or both 2013 and 2014 years. The program allowed SWP water contractors to offer portions of their approved 2013 Table A and Article 56(c) water for sale in a water pool for use by other interested SWP water contractors. Based on Table A supply and demand, the pool water was allocated among the purchasing contractors into one of the two buyer pools. The "69 Percent Pool" consisted of water purchased by Metropolitan and Kern, which together take

**Table 9-2 2014 Multiyear Water Pool Program (acre-feet)**

Contractor	Purchased
Antelope Valley-East Kern Water Agency	111
Dudley Ridge Water District	40
Kern County Water Agency - Agriculture	520
Santa Clara Valley Water District	79
<b>Total</b>	<b>750</b>

up 69.36 percent of the total SWP Table A amount. The remaining 30.64 percent of the SWP Table A amount was available for the other SWP water contractors to purchase in the "31 Percent Pool."

Multiyear Water Pool Program deliveries in 2014 were made from 2013 Multiyear Water Pool Program allocations. Initial offers for sales of water in the 2013 Multiyear Water Pool Program occurred in June 2013, with 94,925 af purchased under this program. Multiyear Water Pool Program water sold for \$253.00 per af, for a Table A allocation of 35 percent on June 1, 2013. The 2013 Multiyear Water Pool Program closed on June 24, 2013.

Table 9-2 lists SWP water contractors who participated in the 2014 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 quality, and Delta requirements are met. During 2014, 1,279 af of Article 21 water was delivered to Napa during Delta excess conditions.

### ***Flexible Storage Program***

Pursuant to Article 54 of the Monterey Amendments, the Flexible Storage Program provides SWP water contractors participating in the repayment of the capital costs of Castaic Lake and Lake Perris the option 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 County Watershed Protection District (Ventura), and Castaic Lake. 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 2014, Metropolitan withdrew a total of 218,940 af, leaving them with a balance of 218,940 af at the end of 2014.

In 2014, Castaic Lake withdrew a total of 8,085 af. They paid back 3,661 af using their water bank recovery water, leaving them with a balance of 4,424 af at the end of 2014.

### ***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 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-three SWP water contractors took delivery of Article 56(c) in the amount of 365,030 af of previously approved Table A water carried over into 2014, as extended carryover.

## **2014 Dry Year Water Transfers**

Due to the critically dry hydrologic conditions, in 2014, a number of water supply agencies experienced significant water supply shortages. Eight SWP contractors executed water transfer conveyance agreements with DWR and 10 agencies on the Feather, Yuba, Sacramento, and Merced rivers, and within the Delta.

San Luis & Delta-Mendota Water Authority (San Luis & Delta-Mendota) executed water transfer conveyance agreement with DWR and Garden Highway Mutual Water Company on the Feather River. The transfer water from Garden Highway was stored in Lake Oroville and released in October for export by Reclamation. Westlands executed a water transfer agreement with DWR and Biggs-West Gridley Water District on the Feather River.

A total of 133,271 af of water was made available to the SWP and CVP water transfer buyers in 2014 that was purchased from SWP Settlement Contractors or was exported through Banks. In addition to the transfers listed in Tables 9-3 and 9-4, Reclamation exported transfer water at Jones that was

purchased from CVP contractors upstream of the Delta. Transfer water was made available through crop idling, groundwater substitution, reservoir reoperation and a combination of reservoir release and groundwater substitution. See Table 9-3 for a list of sellers that provided water for transfer in 2014, and see Table 9-4 for a list of the SWP buyer activity.

Carriage water losses of 20 percent were assessed for all transfer water originating in the Sacramento River watershed, except for the transfer water exported at Banks for Westlands Water District, which was assessed a carriage water loss of 35 percent. A carriage water loss of 10 percent was applied to the transfer from the Merced River. All the transfer water was exported from the Delta from July through September, with the exception of the transfer water made available from Garden Highway to San Luis & Delta Mendota, which was exported by Reclamation at Jones in October.

## 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 Sacramento-San Joaquin Delta fisheries, and improvements in statewide water supply management, including dry year water supplies for participating SWP and CVP water contractors.

The Yuba Accord is based on three sets of agreements: a water purchase agreement between Yuba County Water Agency (Yuba) and DWR, including water to help offset Delta export reductions and dry year water for participating SWP and CVP water contractors; conjunctive use agreements with 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 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 the execution of 22 agreements for dry year supplies for participating SWP and CVP water contractors under the accord.

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, with conforming amendments 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.

**Table 9-3 Transfer Program Seller Activity, 2014 (acre-feet)**

Sellers <sup>a</sup>	Buyers	SWPAO #	Transfer Action	Transfer Water Available
Butte WD	Kern	14-700	Crop Idling	10,780
			Groundwater Substitution	4,708
Sutter Extension WD	Kern	14-704	Crop Idling	11,341
			Groundwater Substitution	3,612
Richvale ID	Kern	14-718	Crop Idling	21,033
Western Canal WD	Kings	14-719	Crop Idling	35,442
	Dudley Ridge			
	Kern			
	Oak Flat			
Biggs-West Gridley WD	Santa Barbara	14-721	Crop Idling	3,679
Biggs-West Gridley WD	Westlands	14-722	Crop Idling	15,225
Garden Highway Mutual WC	San Luis & Delta Mendota	14-702	Groundwater Substitution	3,494
Plumas Mutual WC	Dudley Ridge	14-724	Groundwater Substitution	2,000
South Sutter WD	Kern	14-725	Groundwater Substitution	9,400
Plumas Mutual WC	Napa	14-726	Groundwater	1,200
Cordura ID	County of Kings	14-701	Reservoir Release with Groundwater Substitution	1,857
	Dudley Ridge			
	Kern			
Merced ID	Santa Clara	14-717	Reservoir Release	4,500
Contra Costa WD	Alameda County	14-720	Reservoir Release	5,000
<b>Total</b>				<b>133,271</b>

<sup>a</sup> WD= Water District; ID= Irrigation District; WC= Water Company; WA= Water Agency

**Table 9-4 Transfer Program Buyer Activity, 2014 (acre-feet)**

Buyers	Water Available to Buyer	Actual Losses <sup>a, b</sup>	Net Water Delivered
Alameda County	5,000	-	5,000
Kings	875	175	700
Dudley Ridge	6,541	1,308	5,233
Kern	92,232	18,446	73,786
Napa	1,200	-	1,200
Oak Flat	525	105	420
San Luis & Delta-Mendota	3,494	783	2,711
Santa Barbara	3,679	736	2,943
Santa Clara	4,500	-	4,500
Westlands	15,225	5,626	9,599
<b>Total<sup>c</sup></b>	<b>133,271</b>	<b>27,179</b>	<b>106,092</b>

<sup>a</sup> Carriage water losses of 20 percent were applied to all transfers except the transfer to Westlands, which was assessed a 35 percent carriage water loss.

<sup>b</sup> Aqueduct conveyance losses of 3 percent were assessed on deliveries to non-SWP contractors based on the reach to which the water was delivered.

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



Under Amendment Number 4, all accrued groundwater substitution water is payable although it may not 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. When New Bullards Bar Reservoir is releasing extra water due to a wet winter, Yuba may not reduce releases or accrue groundwater substitution water during the following irrigation season.

A total of 166,086 af was transferred to DWR and participating SWP and CVP water contractors under the accord in 2008, 180,000 af was transferred in 2009, and 141,856 af was transferred in 2010. In 2011, excess conditions in the Delta prevented accounting of Yuba releases as transfer water for the entire summer transfer season.

In 2012, Yuba delivered 60,000 af of Component 1 water to DWR to help offset Delta export pumping reductions to benefit fish, and 21,681 af of dry year water was provided to participating contractors. The dry year water was all accounted as Component 3 water. No groundwater substitution water was provided in 2012.

In 2012, DWR and Reclamation signed an agreement (SWPAO #12300) to share, equally, Component 1 water made available from 2012 through 2015. The 2012 letter agreement between the respective project operations offices replaces a 2008 letter agreement that shared the water differently—namely that the project that experienced the greater export reductions at the Delta pumps would receive the initial share of Component 1 water until the reductions were equally offset; then the water would be shared equally. In the past, the SWP has experienced export reductions greater than

the CVP by more than 60,000 af. The SWP has therefore been the beneficiary of the Component 1 water.

The 2012 letter agreement provides that:

- Component 1 water is shared equally from 2012 through 2015;
- as per the Yuba Accord, Component 1 water provided to Reclamation will be delivered at the Marysville gauge on the Yuba River; and
- DWR will provide conveyance at Banks Pumping Plant pursuant to the Joint Point of Diversion (JPOD) Agreement with Reclamation.

On April 17, 2013, DWR executed an annual letter agreement with Yuba setting a per-acre-foot price for Component 4 groundwater substitution water of \$190.00 per af in 2013. Yuba subsequently offered, and DWR purchased, 64,730 af of Component 4 water as part of the total 2013 transfer quantity of 177,274 af.

In May 2013 and December 2014, DWR initiated negotiations with Yuba on Amendment Number 5 to address the required repricing of any transfer water that would be moved after September 30, 2015.

In 2013, 177,274 af was transferred to DWR and participating SWP and CVP water contractors under the Yuba Accord.

On May 1, 2014, a letter agreement between DWR and Yuba was executed, which set forth the negotiated price \$475.00 per af that the parties agreed on for the 2014 groundwater substitution water accounted for as Component 4 water.

In 2014, 161,647 af of Yuba water was transferred, with 60,000 af of Component 1 water shared equally between DWR and Reclamation to help offset Delta export reductions to benefit fish.

The Component 2, 3, and 4 dry year water made available were 30,000 af, 14,663 af, and 56,984 af, respectively, with half shared among 20 of the 21 participating SWP contractors and the other half shared among certain CVP contractors that are members of San Luis & Delta-Mendota. Half of the Component 4 water was shared among 12 of the SWP contractors and the other half among certain CVP contractors that are members of San Luis & Delta-Mendota.

Carriage water losses of 20 percent were assessed for all transfer water originating in the Sacramento River watershed. In addition, 5,403 af of Yuba releases was backed into Lake Oroville during balanced conditions from September 29 through October 14, 2014, and is being held for release in 2015, provided it can be exported.

On December 5, 2014, DWR executed Amendment Number 5 to the Yuba Accord Water Purchase Agreement with Yuba, extending delivery of Yuba water for 2016–2020 with new pricing and other changes to the agreements.

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. The new terms provide for, among other changes, the following:

- increased pricing;
- purchase of Component 1 water on an annual basis (Component 1 was prepaid in 2008 by DWR for the 2008 through 2015 period); and
- deposit of \$20 million to be paid to Yuba to lock in new pricing for 5 years.

The \$20 million deposit will be credited to surface water purchases under the agreements. The 10 participating contractors who contributed to the \$20 million will receive interest on the deposit until it is fully credited (paid by all contractors based on their rights to Yuba water).

Yuba now has the option to sell water to third parties under certain conditions. The annual negotiation of groundwater substitution pricing will continue under Amendment Number 5. The new pricing extends through 2020, and additional negotiations will be required to address the remaining term of the Water Purchase Agreement through 2025.

DWR expects to execute Amendment Number 1, and Amendment Number 5 with two new contractors, Mojave Water Agency and Santa Barbara County Flood Control and Water Conservation District. The amendments will be executed once their California Environmental Quality Act process for the Participation Agreement is complete.

Table 9-5 shows Lower Yuba River Accord water deliveries in 2014.

## Agreements with Non-SWP Agencies

In addition to negotiating agreements with long-term SWP water contractors to provide for specified water deliveries, DWR also enters into agreements with other agencies to provide water conveyance service.

## Reclamation—Joint Point of Diversion

In 2012, DWR renewed the JPOD with Reclamation. Under the JPOD, DWR makes excess SWP conveyance capacity available to Reclamation for the conveyance of water from the Delta at Banks Pumping Plant. This includes: (1) make 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) Reclamation's share of Component 1 water provided under the Yuba Accord. As part of the JPOD, the first 21,000 af conveyed through Banks Pumping

**Table 9-5 Lower Yuba River Accord Water Deliveries, 2014 (acre-feet)**

Participating Contractor			Purchased Water				Water Delivered			
	Portion of Table At	Percentage	Allocated Component 2 Water	Allocated Component 3 Water	Allocated Component 4 Water	Total	Component 2 Water Delivered	Component 3 Water Delivered	Component 4 Water Delivered	Total
<b>SWP Contractor</b>										
Yuba <sup>a</sup>	9,600	0.12	37	19	0	56	37	19	-	56
Napa <sup>a</sup>	29,025	0.37	112	58	578	748	112	58	578	748
Solano <sup>a</sup>	47,706	0.61	184	95	0	279	184	95	-	279
Alameda-Zone 7	80,619	1.03	311	160	0	471	249	128	-	377
Santa Clara	100,000	1.28	385	199	1,991	2,575	308	159	1,593	2,060
Oak Flat	5,700	0.07	22	11	113	146	18	9	90	117
Kings	9,305	0.12	36	19	185	240	29	15	148	192
Dudley Ridge	48,350	0.62	186	96	963	1,245	149	77	770	996
Empire	3,000	0.04	12	6	60	78	10	5	48	62
Kern	982,730	12.60	3,787	1,848	19,569	25,204	3,030	1,478	15,655	20,163
Tulare	87,471	1.12	337	174	1,742	2,253	270	139	1,394	1,802
AVEK	144,844	1.86	558	288	0	846	446	230	-	677
Castaic Lake	95,200	1.22	367	189	0	556	294	151	-	445
Coachella	138,350	1.77	532	177	480	1,189	426	142	384	951
Crestline	5,800	0.07	0	0	0	0	0	-	-	0
Desert	55,750	0.72	215	111	0	326	172	89	-	261
Littlerock	2,300	0.03	9	5	0	14	7	4	-	11
Metropolitan	1,911,500	24.52	7,366	3,596	0	10,962	5,893	2,877	-	8,770
Palmdale	21,300	0.27	82	42	424	548	66	34	339	438
San Bernardino	102,600	1.32	395	204	2,043	2,642	316	163	1,634	2,114
San Geronio	17,300	0.22	67	34	344	445	54	27	275	356
<b>SWP Contractor Total</b>	<b>3,898,450</b>	<b>50.00</b>	<b>15,000</b>	<b>7,331</b>	<b>28,492</b>	<b>50,823</b>	<b>12,067</b>	<b>5,899</b>	<b>22,909</b>	<b>40,875</b>
San Luis & Delta-Mendota <sup>b</sup>		50.00	15,000	7,332	28,492	50,824	NA	NA	NA	NA
<b>Grand Total</b>		<b>100.00</b>	<b>30,000</b>	<b>14,663</b>	<b>56,984</b>	<b>101,647</b>	<b>12,067</b>	<b>5,899</b>	<b>22,909</b>	<b>40,875</b>

<sup>a</sup> Carriage loss does not apply to Napa, Solano, and Yuba, due to the contractor being north of the Delta.<sup>b</sup> San Luis & Delta-Mendota's water was pumped through Jones Pumping Plant by CVP.

Plant for the months of July, August, and September of each year include a charge for the temporary barriers in the Delta. In, 2014, DWR conveyed 23,132 af of water for Reclamation in January and June under this agreement, which is effective March 1, 2012, through February 29, 2016. (SWPAO #12300)

### **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 458 af in 2014 under this pending agreement. (SWPAO #04300)

### **Reclamation and Cross Valley Canal Contractors**

Through eight, 3-party contracts and associated changes in points of delivery 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: County of Fresno (Fresno), County of Tulare, Hills Valley Irrigation District (Hills Valley), Kern-Tulare Water District (Kern-Tulare), Lower Tule River Irrigation District (Lower Tule), Pixley Irrigation District (Pixley), Rag Gulch Water District (Rag Gulch), and the Tri-Valley Water District (Tri-Valley). Effective January 1, 2009, Rag Gulch consolidated under Kern-Tulare. DWR approved assignment of Rag Gulch's Interim Renewal Contract to Kern-Tulare on April 7, 2009.

During 2014, DWR did not convey any water for the CVC water contractors because Reclamation did not allocate water to the CVC water contractors.

### **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 during the term of June 1, 2012, through September 30, 2028. Under this agreement, DWR conveys CVP water from the end of Reach 7 to Buena Vista's turnouts in Reaches 10A and 12E of the California Aqueduct. DWR conveyed a total of 12,799 af during 2014. (SWPAO #12309)

### **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 242 af to the national cemetery through Reach 2B of the California Aqueduct in 2014 under this pending agreement. (SWPAO #10310)

### **Westlands Water District**

An agreement between DWR and Westlands, executed July 15, 2014, allowed for the introduction of up to 30,000 af of Westlands' local groundwater into the California Aqueduct, and provided for the conveyance and delivery of the water by DWR to Westlands' turnouts in Reaches 4 through 7 of the California Aqueduct through October 31, 2014. Under this agreement, Westlands agreed to provide to DWR 13.3 percent of the total amount of its local groundwater pumped into the California Aqueduct as mitigation to the SWP. An amendment was executed October 31, 2014, to extend the term of



the agreement to December 31, 2014. In 2014, Westlands introduced 21,235 af of local water into the California Aqueduct; DWR conveyed and delivered a total of 17,987 af to Westlands to Reaches 4 through 7 of the California Aqueduct. (SWPAO #14010 and SWPAO #14010-A)

## Del Puerto Water District

An exchange agreement among DWR, Reclamation, Del Puerto Water District (Del Puerto), and Oak Flat Water District (Oak Flat), executed May 14, 2014, approved the exchange of up to 2,000 af of Del Puerto's CVP water supplies for an equivalent amount of SWP water supplies through April 30, 2015. This agreement provides for the delivery by DWR of up to 2,000 af of SWP water supplies to Del Puerto using Oak Flat's turnouts in the California Aqueduct. In exchange, Reclamation will make an equivalent amount of Del Puerto's CVP water available to DWR at O'Neill Forebay. DWR filed a petition with SWRCB, and received a 1-year approval order, effective May 1, 2014, for the consolidation of SWP and CVP places of use. During 2014, a total of 272 af was delivered to Del Puerto under this agreement. (SWPAO #13022)

## 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. They 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 exceeded by the historical 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, 2013, SWP water contractors submitted initial requests for 2014 totaling 4.17 million acre-feet (maf).

DWR approved delivery of 0.21 maf on November 19, 2013, resulting in initial Table A amounts of 5 percent of SWP water contractor requests. Although DWR revised the 2014 allocation to zero in January, a final allocation of 5 percent was made on April 18, 2014.

Table 9-6 lists the changes in Table A amounts that were approved by DWR based on updated hydrologic conditions.

### 2014 SWP Deliveries

The SWP delivers water for a variety of beneficial uses. In addition to delivering Table A water to SWP water contractors, the SWP:

- conveys water to other public and local agencies through special contracts and agreements;
- provides water for wildlife and recreational uses; and
- stores, releases, and delivers local runoff water from SWP facilities to agencies that hold local water rights.

**Table 9-6 2014 Allocated Table A Amounts**

Notice to SWP Contractors No.	Allocation Amount (maf)	Percentage of Requested Water
13-14	0.21	5
14-02	0	0
14-07	0.21	5



In 2014, 1,992,157 af of SWP and non-SWP water was delivered to 29 long-term SWP water contractors and 20 other agencies.

The SWP portion totaled 1,061,146 af, and the non-SWP portion totaled 931,011 af.

The portion delivered to the SWP water contractors was 912,241 af, categorized as follows:

- 84,599 af of Table A water;
- 6,746 af of transfers and exchanges of Table A water;
- 750 af of Multiyear Water Pool Program water;
- 365,030 af of carryover water;
- 1,279 af of Article 21 water;
- 341,476 af of water bank recovery;
- 109,462 af of delivery of backup water; and
- 2,899 af of other water.

Other deliveries totaled 148,905 af and represent the following delivery classifications:

- 46 af of SWP water for parks and recreation;
- 40,866 af of 2014 Yuba Accord Dry Year Purchase Program water;
- 1,246 af of local water;
- 6,749 af of permit water; and
- 99,998 af of other non-SWP program water.

The remaining portion was delivered to 20 non-SWP agencies and totaled 931,011 af, which was categorized accordingly:

- 17,296 af of SWP contracted supply;
- 17,987 af of water bank recovery;
- 11,826 af of other non-SWP programs;
- 869,403 af of regulated delivery of local supply;
- 215 af for parks and recreation;
- 785 af for fish and wildlife;

- 12,799 af for Kern National Wildlife Refuge; and
- 700 af for annual contracts.

Figure 9-1 shows amounts of water delivered to various locations during 2014.

Specific information about water deliveries made to SWP water contractors and other agencies during 2014, and historical deliveries from 1962 through 2014, is presented in the following three sections, each with a corresponding table located at the end of the chapter:

- Water Delivered to Long-term SWP Water Supply Contractors in 2014, by Service Area (Table 9-7);
- Total Amounts of Water Delivered in 2014, by Month (Table 9-8); and
- Total Amounts of Annual Table A Water and Water Conveyed, by Type, 1962–2014 (Table 9-9).

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.

## 2014 Water Deliveries to Long-term SWP Water Contractors

Table 9-7 shows amounts delivered in 2014 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 2014.



**Figure 9-1 Water Delivered in 2014 and Delivery Locations of Long-term SWP Water Supply Contractors and Feather River Area Districts with Water Rights Agreements with DWR**

### ***Multiyear Water Pool Program***

Column 3 shows 750 af of Multiyear Water Pool Program water delivered to SWP water contractors in 2014.

### ***Carryover Table A Water Delivered in 2014***

Column 4 shows a total of 381,936 af was carried over from previous years for delivery in 2014.

The carryover program was designed to encourage the most effective and beneficial use of water and to avoid obligating the contractors to use or lose water by December 31 of each year. The SWP water contractors' long-term 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 2014—a total of 474,421 af.

### ***Article 21***

Column 6 shows Article 21 water delivered to SWP water contractors. In 2014, 1,279 af of Article 21 water was delivered.

### ***Other SWP Water***

Column 7 shows 2,899 af of other SWP water. Other SWP water consists of settlement water delivered to Solano.

### ***Total SWP Water Delivered***

Column 8 shows 478,599 af of total SWP water was delivered in 2014. 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 109,462 af of delivery of backup water, Column 10 shows 341,476 af of water bank recovery. Column 11 shows 148,905 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 2014, the SWP delivered 1,078,442 af of water to the 29 long-term contractors.

### ***Water Delivered in 2014 by Month***

During 2014, the SWP provided water service to 49 agencies, including 29 long-term SWP water contractors. Those agencies and the amounts of water delivered to them by month 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, transfers and exchanges of Table A water, carryover water, Turn-Back Pools A and B water, Multiyear Water Pool Program water, and Article 21 water. Detailed information concerning those conveyances for 2014 is found under the "Miscellaneous Agreements with Long-term SWP Water Contractors" section in this chapter's preceding pages or listed below.

### ***Non-SWP Water***

In 2014, DWR used SWP facilities to convey non-SWP water for various agencies according to the terms of water rights and water transfer and exchange agreements. Detailed information concerning those

conveyances is in this chapter's preceding pages or 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 11 af was supplied from Frenchman Lake to Last Chance Creek Water District in 2014.

**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 2014, the following water was delivered to the Feather River, Delta, North Bay, South Bay, and Southern California areas, as summarized below.

**Feather River Area.** Seven non-SWP agencies received 833,116 af, under their water right settlement agreements, as follows:

- Western Canal Water District, 281,165 af;
- Joint Water Districts Board, 527,891 af;
- Oswald Water District, 965 af;
- Tudor Mutual Water Company, 3,779 af;
- Garden Highway Mutual Water Company, 13,349 af;
- Plumas Mutual Water Company, 5,913 af; and
- Valberde and Ramelli, 54 af.

DWR conveyed local water totaling 6,665 af through SWP facilities on behalf of two non-SWP agencies:

- Thermalito Water and Sewer District (formerly Thermalito Irrigation District), 1,992 af and
- South Feather Water and Power Agency (formerly Oroville-Wyandotte Irrigation District), 4,673 af.

**North Bay Area.** Deliveries in the North Bay area included 2,200 af of Vallejo permit

water delivered to Napa, and 2,899 af of 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 1,056 af of local water was delivered to Alameda-Zone 7 and Alameda County Water District. These two South Bay Aqueduct SWP water contractors hold water rights to runoff from the Lake del Valle watershed.

**Delta.** In the Delta, 29,611 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 21,201 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, 178 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 2014 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 Table A water by area for years 1962 through 2014 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 in 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 2014. In 2014, a total of 474,421 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 2014. 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 2014, 1,279 af of Article 21 or unscheduled water was delivered.

**Other Water.** Column 10 includes amounts of water classified as other water delivered in 2014, including non-SWP water conveyed through SWP facilities and regulated delivery of local supply. In 2014, a total of 675,968 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 2014, a total of 839,792 af in this category was delivered to agencies in the Feather River area.

**Recreation Water.** Column 12 shows water conveyed for recreational use or to improve water quality for fish and wildlife. In 2014, a total of 697 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 SBA, 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.



**Table 9-7 Water Delivered to Long-term SWP Contractors in 2014, by Service Area (acre-feet)<sup>a, b</sup>**

Service Area and SWP Contractor	Table A Water Deliveries					SWP Water			Non-SWP Water			Total Water Delivered [12]
	2014 Table A Not Transferred, Exchanged, or Stored [1]	2014 Table A Transferred or Exchanged [2]	2014 Multiyear Pool Program [3]	Carryover Water [4]	Total Table A [5]	2014 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]	
Feather River												
Butte	1,617	979	-	-	2,596	-	-	2,596	-	-	46	2,642
Plumas	251	-	-	-	251	-	-	251	-	-	-	251
Yuba City	96	-	-	4,085	4,181	-	-	4,181	-	-	56	4,237
North Bay												
Napa	-	41	-	9,453	9,494	1,279	-	10,773	-	-	1,948	12,721
Solano	450	-	-	9,231	9,681	-	2,899	12,580	-	-	7,028	19,608
South Bay												
Alameda-Zone 7	1,367	-	-	17,609	18,976	-	-	18,976	-	9,098	1,056	29,130
Alameda County	-	-	-	10,326	10,326	-	-	10,326	-	7,332	5,402	23,060
Santa Clara	-	-	79	12,150	12,229	-	-	12,229	-	12,811	7,800	32,840
San Joaquin Valley												
Oak Flat	-	-	-	983	983	-	-	983	-	-	537	1,520
Kings	62	50	-	360	472	-	-	472	-	-	784	1,256
Dudley	27	1,756	40	15,783	17,606	-	-	17,606	-	-	7,505	25,111
Empire	104	-	-	349	453	-	-	453	-	-	63	516
Kern	-	1,393	520	24,717	26,630	-	-	26,630	109,462	178,493	95,768	410,353
Tulare	3,373	569	-	3,181	7,123	-	-	7,123	-	-	1,811	8,934
Central Coastal												
San Luis Obispo	379	-	-	2,693	3,072	-	-	3,072	-	-	134	3,206
Santa Barbara	289	-	-	10,533	10,822	-	-	10,822	-	-	3,868	14,690
Southern California												
AVEK	2,186	-	111	12,213	14,510	-	-	14,510	-	994	708	16,212
Castaic Lake	451	-	-	7,743	8,194	-	-	8,194	-	18,275	479	26,948
Coachella	6,918	-	-	-	6,918	-	-	6,918	-	5,000	952	12,870
Crestline	83	-	-	658	741	-	-	741	-	-	170	911
Desert	2,788	-	-	-	2,788	-	-	2,788	-	-	261	3,049
Littlerock	-	115	-	-	115	-	-	115	-	-	-	115
Metropolitan	59,181	728	-	222,947	282,856	-	-	282,856	-	104,473	9,559	396,888
Mojave	2,082	1,265	-	2,228	5,575	-	-	5,575	-	-	6	5,581
Palmdale	1,005	-	-	3,670	4,675	-	-	4,675	-	-	453	5,128
San Bernardino	-	-	-	6,452	6,452	-	-	6,452	-	5,000	2,136	13,588
San Gabriel	1,194	240	-	-	1,434	-	-	1,434	-	-	6	1,440
San Gorgonio	603	-	-	4,572	5,175	-	-	5,175	-	-	369	5,544
Ventura	93	-	-	-	93	-	-	93	-	-	-	93
Total	84,599	7,136	750	381,936	474,421	1,279	2,899	478,599	109,462	341,476	148,905	1,078,442

<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 2014, by Month (acre-feet)**

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2014 Total Deliveries
<b>FEATHER RIVER AREA</b>													
SWP Agencies													
City of Yuba City													
Table A	0	0	0	0	0	96	0	0	0	0	0	0	96
Carryover Water	0	0	1	0	0	676	845	640	844	615	464	0	4,085
Non-SWP water	0	0	0	0	0	0	56	0	0	0	0	0	56
Yuba Total	0	0	1	0	0	772	901	640	844	615	464	0	4,237
County of Butte													
Table A	0	0	0	0	0	168	154	363	411	307	161	53	1,617
Table A Transferred to Others*	0	0	0	0	0	0	0	240	13	0	405	321	979
Butte Total (*excluded from total)	0	0	0	0	0	168	154	363	411	307	161	53	1,617
Recreation/Fish and Wildlife (SWP)													
Butte Recreation/Fish and Wildlife	11	2	2	15	15	0	0	0	0	1	0	0	46
Butte Total	11	2	2	15	15	0	0	0	0	1	0	0	46
Plumas County Flood Control and Water Conservation District													
Table A	0	0	0	1	22	48	55	55	49	21	0	0	251
Plumas Total	0	0	0	1	22	48	55	55	49	21	0	0	251
<i>Non-SWP Agencies</i>													
Garden Highway Mutual Water Company													
Regulated delivery of local supply	456	0	0	1,622	1,861	2,357	2,588	1,056	1,347	2,060	2	0	13,349
Joint Water Districts Board													
Regulated delivery of local supply	28,500	0	0	10,460	99,678	92,470	100,670	79,183	39,410	53,880	23,640	0	527,891
Last Chance Creek Water District													
Regulated delivery of local supply	0	0	0	11	0	0	0	0	0	0	0	0	11
Oswald Water District													
Regulated delivery of local supply	0	0	0	100	100	162	217	198	188	0	0	0	965
Plumas Mutual Water Company													
Regulated delivery of local supply	711	136	0	254	803	1,022	2,344	273	281	89	0	0	5,913
South Feather Water and Power Agency													
Regulated delivery of local supply	169	125	55	149	595	704	768	799	736	384	147	42	4,673
Thermalito Water and Sewer District													
Regulated delivery of local supply	121	52	82	142	205	272	298	253	254	159	109	45	1,992
Tudor Mutual Water Company													
Regulated delivery of local supply	384	0	0	111	585	655	865	697	344	138	0	0	3,779
Western Canal Water District													
Regulated delivery of local supply	12,072	0	0	4,160	52,320	48,920	53,607	32,630	8,608	37,025	28,573	3,250	281,165

**Table 9-8 Total Amounts of Water Delivered in 2014, by Month (acre-feet)**

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2014 Total Deliveries
Valberde and Ramelli													
Regulated delivery of local supply	0	0	0	54	0	0	0	0	0	0	0	0	54
SWP	11	2	3	16	37	988	1,054	1,058	1,304	944	625	53	6,095
Non-SWP	42,413	313	137	17,063	156,147	146,562	161,413	115,089	51,168	93,735	52,471	3,337	839,848
<b>Feather River Area Total</b>	42,424	315	140	17,079	156,184	147,550	162,467	116,147	52,472	94,679	53,096	3,390	845,943
<b>NORTH BAY AREA</b>													
<i>SWP Agencies</i>													
Napa County Flood Control and Water Conservation District													
Table A Transferred to Others*	0	0	0	6	1	5	6	22	0	1	0	0	41
Article 21	0	99	415	465	0	0	0	0	0	0	0	300	1,279
Carryover Water	1,104	333	240	535	1,292	1,698	1,248	627	394	1,282	540	160	9,453
Non-SWP Water	0	0	0	0	0	0	248	247	253	0	0	0	748
Non-SWP Water Transferred from Others	233	149	150	136	288	44	150	656	394	0	0	0	2,200
Napa Total (*excluded from total)	1,337	581	805	1,136	1,580	1,742	1,646	1,530	1,041	1,282	540	460	13,680
Solano County Water Agency													
Table A	0	0	0	0	0	0	0	0	450	0	0	0	450
Table A Transferred from Others	0	0	0	6	1	5	6	22	0	1	0	0	41
Carryover Water	582	0	0	0	1,029	1,835	1,608	1,823	921	1,433	0	0	9,231
Carryover Water Transferred from Others	0	0	0	0	0	350	350	300	0	0	0	0	1,000
Other SWP Water	0	195	190	941	1,422	0	0	0	0	0	0	151	2,899
Non-SWP Water	1,706	368	66	1,178	1,651	331	184	41	54	33	416	0	6,028
Non-SWP Water Transferred to Others*	233	149	150	136	288	44	0	0	0	0	0	0	1,000
Solano Total (*excluded from total)	2,288	563	256	2,125	4,103	2,521	2,148	2,186	1,425	1,467	416	151	19,649
SWP	1,686	627	845	1,947	3,744	3,888	3,212	2,772	1,765	2,716	540	611	24,353
Non-SWP	1,939	517	216	1,314	1,939	375	582	944	701	33	416	0	8,976
<b>North Bay Area Total</b>	3,625	1,144	1,061	3,261	5,683	4,263	3,794	3,716	2,466	2,749	956	611	33,329
<b>SOUTH BAY AREA</b>													
<i>SWP Agencies</i>													
Alameda County Flood Control and Water Conservation District, Zone 7													
Table A	0	0	0	0	0	570	0	0	0	797	0	0	1,367
Carryover Water	1,477	2,001	2,694	2,399	2,863	1,149	1,717	2,312	898	99	0	0	17,609
Water Bank Recovery	0	71	82	263	273	236	432	487	1,837	1,990	1,990	1,437	9,098
Non-SWP Water	303	32	0	0	67	0	397	51	146	0	0	60	1,056
Alameda-Zone 7 Total	1,780	2,104	2,776	2,662	3,203	1,955	2,546	2,850	2,881	2,886	1,990	1,497	29,130

**Table 9-8 Total Amounts of Water Delivered in 2014, by Month (acre-feet)**

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2014 Total Deliveries
Alameda County Water District													
Carryover Water	355	917	1,918	0	777	2,421	1,010	249	2,121	558	0	0	10,326
Water Bank Recovery	0	106	121	2	405	351	641	701	1,380	2,064	901	660	7,332
Non-SWP Water	116	0	0	0	68	0	21	50	147	0	0	0	402
Non-SWP Water Transferred from Others	0	0	0	0	0	0	1,809	3,133	58	0	0	0	5,000
Alameda County Total	471	1,023	2,039	2	1,250	2,772	3,481	4,133	3,706	2,622	901	660	23,060
Santa Clara Valley Water District													
Pool Program Water	0	0	0	0	0	0	0	0	0	0	79	0	79
Carryover Water	4,668	2,966	2,769	1,661	0	0	0	0	86	0	0	0	12,150
Carryover Water Transferred from Others	0	0	100	219	0	2,500	1,367	203	1,303	2,238	0	0	7,930
Water Bank Recovery	0	246	282	911	915	818	1,495	1,665	1,114	1,235	1,595	2,535	12,811
Non-SWP Water	0	0	0	0	0	0	870	595	595	0	0	0	2,060
Non-SWP Water Transferred from Others	0	0	0	0	2,848	341	0	1,246	1,305	0	0	0	5,740
Santa Clara Total	4,668	3,212	3,151	2,791	3,763	3,659	3,732	3,709	4,403	3,473	1,674	2,535	40,770
Non-SWP Agencies													
Byron Bethany Irrigation District													
Regulated delivery of local supply	2,054	898	1,989	2,750	4,169	4,796	4,135	2,559	2,783	2,668	633	177	29,611
Recreation/Fish and Wildlife (SWP)													
Lake del Valle	2	2	3	4	5	5	6	6	5	5	3	0	46
SWP	6,502	5,886	7,484	4,283	3,645	6,645	4,100	2,770	4,413	3,697	82	0	49,507
Non-SWP	2,473	1,353	2,474	3,926	8,745	6,542	9,800	10,487	9,365	7,957	5,119	4,869	73,110
<b>South Bay Area Total</b>	<b>8,975</b>	<b>7,239</b>	<b>9,958</b>	<b>8,209</b>	<b>12,390</b>	<b>13,187</b>	<b>13,900</b>	<b>13,257</b>	<b>13,778</b>	<b>11,654</b>	<b>5,201</b>	<b>4,869</b>	<b>122,617</b>
<b>SAN JOAQUIN VALLEY AREA</b>													
SWP Agencies													
County of Kings													
Table A	0	0	0	0	0	22	0	0	15	25	0	0	62
Table A Transferred to Others*	0	0	0	0	0	50	0	0	0	0	0	0	50
Carryover Water Transferred to Others*	92	93	77	76	0	0	5	9	3	3	1	1	360
Non-SWP Water	0	0	0	0	0	0	30	36	33	1	0	0	100
Non-SWP Water Transferred from Others	0	0	0	0	0	0	196	182	141	113	25	27	684
Kings Total (*excluded from total)	0	0	0	0	0	22	226	218	189	139	25	27	846
Dudley Ridge Water District													
Table A	0	0	0	0	0	0	0	0	0	27	0	0	27
Table A Transferred from Others	0	0	0	0	0	229	0	1,493	240	0	0	1	1,963
Table A Transferred to Others*	0	0	0	0	0	0	0	0	0	1,310	0	446	1,756
Pool Program Water	0	0	0	0	0	0	40	0	0	0	0	0	40

**Table 9-8 Total Amounts of Water Delivered in 2014, by Month (acre-feet)**

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2014 Total Deliveries
Carryover Water	40	86	110	180	304	3,730	252	345	0	0	0	0	5,047
Carryover Water Transferred from Others	0	0	0	0	0	259	2,054	0	0	107	0	0	2,420
Carryover Water Transferred to Others*	0	0	0	846	0	0	6,100	400	0	2,920	430	40	10,736
Non-SWP Water	0	0	0	0	0	0	504	58	403	31	0	36	1,032
Non-SWP Water Transferred from Others	0	0	0	0	0	0	3,250	2,527	696	0	0	0	6,473
Dudley Ridge Total (*excluded from total)	40	86	110	180	304	4,218	6,100	4,423	1,339	165	0	37	17,002
Empire West Side Irrigation District													
Table A	0	0	0	0	0	0	4	0	100	0	0	0	104
Carryover Water	0	8	0	0	0	0	0	0	0	0	0	0	8
Carryover Water Transferred to Others*	0	0	341	0	0	0	0	0	0	0	0	0	341
Non-SWP Water	0	0	0	0	0	0	63	0	0	0	0	0	63
Empire Total (*excluded from total)	0	8	0	0	0	0	67	0	100	0	0	0	175
Kern County Water Agency													
Table A Transferred from Others	0	0	0	0	0	0	0	0	0	1,310	232	446	1,988
Table A Transferred to Others*	0	0	0	0	0	0	0	1,393	0	0	0	0	1,393
Pool Program Water	0	0	0	0	0	0	0	0	0	0	0	520	520
Carryover Water	0	0	0	0	0	0	0	0	0	17,707	1,740	0	19,447
Carryover Water Transferred from Others	0	0	0	0	0	0	6,100	400	0	2,490	0	40	9,030
Carryover Water Transferred to Others*	47	10	1,025	1,031	64	82	2,133	86	72	168	280	272	5,270
Water Bank Recovery	5,218	14,158	12,940	30,127	32,515	20,096	18,317	18,855	18,351	0	3,637	4,279	178,493
Water Bank Recovery Water Transferred to Others*	21,812	5,915	6,406	6,703	4,413	7,302	7,359	10,338	13,144	21,622	25,953	24,350	155,317
Delivery of Backup Water	0	0	0	0	23,820	53,636	2,900	22,097	7,009	0	0	0	109,462
Non-SWP Water	0	0	0	0	0	0	8,675	5,744	5,744	0	793	0	20,956
Non-SWP Water Transferred from Others	0	0	0	0	0	0	46,042	18,757	10,013	0	0	0	74,812
Kern Total (*excluded from total)	5,218	14,158	12,940	30,127	56,335	73,732	82,034	65,853	41,117	21,507	6,402	5,285	414,708
Oak Flat Water District													
Carryover Water	74	36	92	160	258	247	20	0	23	73	0	0	983
Non-SWP Water	0	0	0	0	0	0	51	33	33	0	0	0	117
Non-SWP Water Transferred from Others	0	0	0	0	0	0	239	126	55	0	0	0	420
Oak Flat Total	74	36	92	160	258	247	310	159	111	73	0	0	1,520
Tulare Lake Basin Water Storage District													
Table A	3,373	0	0	0	0	0	0	0	0	0	0	0	3,373
Table A Transferred to Others*	0	0	0	0	0	229	0	0	340	0	0	0	569
Carryover Water	1,511	69	121	152	235	238	0	0	0	0	0	0	2,326
Carryover Water Transferred to Others*	0	0	300	296	0	259	0	0	0	0	0	0	855



**Table 9-8 Total Amounts of Water Delivered in 2014, by Month (acre-feet)**

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2014 Total Deliveries
Non-SWP Water	0	0	0	0	0	0	770	602	208	231	0	0	1,811
Tulare Total (*excluded from total)	4,884	69	121	152	235	238	770	602	208	231	0	0	7,510
Recreation/Fish and Wildlife (SWP)													
Department of Fish & Wildlife, O'Neill	47	10	0	14	59	29	49	65	27	51	33	0	384
Department of Fish & Wildlife, Lateral 4	0	0	0	0	0	20	20	1	1	0	0	0	42
Parks and Recreation, O'Neill	0	1	0	0	0	0	1	1	1	1	0	0	5
Parks and Recreation, San Luis	0	0	0	0	1	0	1	0	0	0	0	0	2
Recreation/Fish and Wildlife (SWP) Total	47	11	0	14	60	49	71	67	29	52	33	0	433
Non-SWP Agencies													
CVP Annual Contractors													
Musco Family Olive Company	37	33	38	36	42	46	46	42	44	48	31	15	458
San Joaquin Valley National Cemetery	8	6	9	14	27	35	41	43	28	19	9	3	242
CVP Annual Contractors Total	45	39	47	50	69	81	87	85	72	67	40	18	700
Western Hills Water District													
Carryover Point of Delivery from SWP	47	10	25	31	64	82	79	86	72	61	30	22	609
Western Hills Total	47	10	25	31	64	82	79	86	72	61	30	22	609
Westlands Water District													
Table A Transferred from Others	0	0	0	0	0	50	0	0	340	0	0	0	390
Carryover Transferred from Others	92	93	718	372	0	0	5	9	3	3	1	1	1,297
Water Bank Recovery	0	0	0	0	0	0	495	3,920	4,675	6,393	2,504	0	17,987
Non-SWP Water Transferred from Others	0	0	0	0	0	0	5,355	2,805	1,440	0	0	0	9,600
Non-SWP Water Transferred to Others*	0	0	0	0	0	0	108	0	0	32	884	0	1,024
Westlands Total (*excluded from total)	92	93	718	372	0	50	5,855	6,734	6,458	6,396	2,505	1	29,274
Bureau of Reclamation													
Non-SWP Water Transferred to Others*	0	0	0	0	0	15,000	0	1,024	0	0	0	0	16,024
Kern National Wildlife Refuge	1,620	285	0	0	0	0	0	1,201	2,719	2,957	2,445	1,572	12,799
Fish and Wildlife	40	8	0	11	48	40	57	54	22	39	26	0	345
Parks and Recreation	0	0	0	0	1	0	1	1	0	0	0	1	4
Reclamation Total (*excluded from total)	1,660	293	0	11	49	40	58	1,256	2,741	2,996	2,471	1,573	13,148
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	5,184	313	1,066	909	921	4,906	8,625	2,400	822	21,855	2,036	1,030	50,067
Non-SWP	6,923	14,490	12,987	30,188	56,453	73,853	87,032	77,083	53,840	9,832	9,470	5,933	438,084
<b>San Joaquin Valley Area Total</b>	<b>12,107</b>	<b>14,803</b>	<b>14,053</b>	<b>31,097</b>	<b>57,374</b>	<b>78,759</b>	<b>95,657</b>	<b>79,483</b>	<b>54,662</b>	<b>31,687</b>	<b>11,506</b>	<b>6,963</b>	<b>488,151</b>

**Table 9-8 Total Amounts of Water Delivered in 2014, by Month (acre-feet)**

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2014 Total Deliveries
<b>CENTRAL COASTAL AREA</b>													
<i>SWP Agencies</i>													
San Luis Obispo County Flood Control and Water Conservation District													
Table A	0	0	0	0	0	0	0	0	0	118	116	145	379
Carryover Water	290	411	481	354	249	262	289	210	147	0	0	0	2,693
Non-SWP Water	0	0	0	0	0	0	4	29	35	47	19	0	134
San Luis Obispo Total	290	411	481	354	249	262	293	239	182	165	135	145	3,206
Santa Barbara County Flood Control and Water Conservation District													
Table A	0	0	0	0	0	0	65	114	0	110	0	0	289
Table A Transferred from Others	0	0	0	0	0	0	0	0	172	500	328	0	1,000
Carryover Water	1,267	1,658	1,584	708	1,666	1,358	740	743	309	133	286	81	10,533
Carryover Water Transferred from Others	0	0	207	0	0	0	0	0	0	430	430	0	1,067
Non-SWP Water	0	0	0	0	0	0	25	202	241	329	129	0	926
Non-SWP Water Transferred from Others	0	0	0	0	0	0	797	797	797	0	183	368	2,942
Santa Barbara Total	1,267	1,658	1,791	708	1,666	1,358	1,627	1,856	1,519	1,502	1,356	449	16,757
<i>SWP</i>	1,557	2,069	2,272	1,062	1,915	1,620	1,094	1,067	628	1,291	1,160	226	15,961
<i>Non-SWP</i>	0	0	0	0	0	0	826	1,028	1,073	376	331	368	4,002
<b>Central Coastal Area Total</b>	1,557	2,069	2,272	1,062	1,915	1,620	1,920	2,095	1,701	1,667	1,491	594	19,963
<b>SOUTHERN CALIFORNIA AREA</b>													
<i>SWP Agencies</i>													
Antelope Valley-East Kern Water Agency													
Table A	0	0	0	0	0	0	533	648	419	585	0	1	2,186
Table A Transferred from Others	0	0	0	0	0	0	0	0	123	133	739	113	1,108
Pool Program Water	0	0	0	0	0	0	0	0	0	111	0	0	111
Carryover Water	1,560	836	81	895	1,262	2,480	2,496	1,104	1,101	398	0	0	12,213
Carryover Water Transferred from Others	0	0	657	238	831	184	138	168	0	0	0	0	2,216
Water Bank Recovery	0	0	0	0	0	0	89	186	181	178	179	181	994
Non-SWP Water	0	0	0	0	0	0	74	458	144	0	0	0	676
Non-SWP Water Transferred from Others	0	0	0	0	0	0	0	0	0	32	0	0	32
AVEK Total	1,560	836	738	1,133	2,093	2,664	3,330	2,564	1,968	1,437	918	295	19,536
Castaic Lake Water Agency													
Table A	0	0	0	0	0	0	0	0	451	0	0	0	451
Carryover Water	0	0	0	818	0	2,174	3,179	1,572	0	0	0	0	7,743
Carryover Water Transferred from Others	0	0	1,000	1,000	0	0	0	0	0	0	250	250	2,500
Water Bank Recovery	0	39	1,888	1,221	1,178	1,237	1,248	2,125	2,419	3,257	2,085	1,578	18,275

**Table 9-8 Total Amounts of Water Delivered in 2014, by Month (acre-feet)**

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2014 Total Deliveries
Non-SWP Water	0	0	0	0	0	0	0	56	389	0	0	0	445
Non-SWP Water Transferred from Others	0	0	0	0	0	0	0	0	0	0	34	0	34
Castaic Lake Total	0	39	2,888	3,039	1,178	3,411	4,427	3,753	3,259	3,257	2,369	1,828	29,448
Coachella Valley Water District													
Table A	0	0	0	0	0	0	0	0	0	0	2,201	4,717	6,918
Water Bank Recovery	2,500	0	0	0	0	0	0	0	0	0	0	2,500	5,000
Non-SWP Water	0	0	0	0	0	0	277	397	278	0	0	0	952
Coachella Total	2,500	0	0	0	0	0	277	397	278	0	2,201	7,217	12,870
Crestline-Lake Arrowhead Water Agency													
Table A	0	0	0	0	0	0	0	0	0	0	0	83	83
Carryover Water	116	80	0	0	22	70	63	62	24	125	96	0	658
Carryover Water Transferred from Others	0	0	0	0	108	144	169	163	118	0	0	0	702
Non-SWP Water	0	0	74	73	4	0	0	0	0	0	0	14	165
Non-SWP Water Transferred from Others	0	0	0	0	0	0	0	0	0	0	5	0	5
Crestline Total	116	80	74	73	134	214	232	225	142	125	101	97	1,613
Desert Water Agency													
Table A	0	0	0	0	0	0	0	0	0	0	0	2,788	2,788
Non-SWP Water	0	0	0	0	0	0	67	100	94	0	0	0	261
Desert Total	0	0	0	0	0	0	67	100	94	0	0	2,788	3,049
Littlerock Creek Irrigation District													
Table A Transferred to Others*	0	0	0	0	0	0	0	0	0	60	40	15	115
Littlerock Total (*excluded from total)	0	0	0	0	0	0	0	0	0	60	40	15	115
The Metropolitan Water District of Southern California													
Table A	0	0	0	0	0	0	0	0	0	25,700	17,917	15,564	59,181
Table A Transferred to Others*	0	0	0	0	0	0	0	0	0	0	650	78	728
Carryover Water	16,152	30,682	14,277	2,010	7,652	16,651	39,875	34,009	27,420	9,605	0	0	198,333
Carryover Water Transferred from Others	0	0	0	846	0	0	0	0	0	0	0	0	846
Carryover Water Transferred to Others*	0	0	898	368	737	17,500	1,367	203	1,303	2,238	0	0	24,614
Water Bank Recovery	19,312	5,559	4,154	4,308	2,047	3,865	3,058	4,427	6,680	15,140	20,283	15,640	104,473
Non-SWP Water	0	0	0	0	0	0	2,288	3,384	3,098	0	0	0	8,770
Non-SWP Water Transferred from Others	0	0	0	0	0	0	0	0	0	0	789	0	789
Metropolitan Total (*excluded from total)	35,464	36,241	18,431	7,164	9,699	20,516	45,221	41,820	37,198	50,445	38,989	31,204	372,392
Mojave Water Agency													
Table A	0	0	0	0	0	0	0	0	292	533	1,211	46	2,082
Table A Transferred to Others*	0	0	0	0	0	0	0	0	295	573	377	20	1,265
Carryover	344	78	11	1	42	3	3	7	0	0	0	0	489

**Table 9-8 Total Amounts of Water Delivered in 2014, by Month (acre-feet)**

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2014 Total Deliveries
Carryover Water Transferred to Others*	0	0	66	89	94	534	488	468	0	0	0	0	1,739
Non-SWP Water Transferred from Others	0	0	0	0	0	0	0	0	0	0	6	0	6
Mojave Total (*excluded from total)	344	78	11	1	42	3	3	7	292	533	1,217	46	2,577
Palmdale Water District													
Table A	0	0	0	0	0	295	483	227	0	0	0	0	1,005
Table A Transferred from Others	0	0	0	0	0	0	0	140	13	0	173	320	646
Carryover Water	1,351	182	0	323	1,004	810	0	0	0	0	0	0	3,670
Carryover Water Transferred from Others	0	0	0	0	0	0	0	867	1,105	574	0	86	2,632
Non-SWP Water	0	0	0	0	0	0	306	133	0	0	0	0	439
Non-SWP Water Transferred from Others	0	0	0	0	0	0	0	0	0	0	14	0	14
Palmdale Total	1,351	182	0	323	1,004	1,105	789	1,367	1,118	574	187	406	8,406
San Bernardino Valley Municipal Water District													
Carryover	1,448	0	11	14	926	26	0	0	0	747	325	121	3,618
Carryover Water Transferred to Others*	0	0	0	0	8	44	69	930	1,123	574	0	86	2,834
Water Bank Recovery	0	0	0	0	0	1,146	1,126	1,634	1,094	0	0	0	5,000
Non-SWP Water	0	0	0	0	0	0	693	358	671	391	0	0	2,113
Non-SWP Water Transferred from Others	0	0	0	0	0	0	0	0	0	0	23	0	23
San Bernardino Total (*excluded from total)	1,448	0	11	14	926	1,172	1,819	1,992	1,765	1,138	348	121	10,754
San Gabriel Valley Municipal Water District													
Table A	0	0	0	0	0	0	0	288	906	0	0	0	1,194
Table A Transferred to Others*	0	0	0	0	0	0	0	0	240	0	0	0	240
Non-SWP Water Transferred from Others	0	0	0	0	0	0	0	0	6	0	0	0	6
San Gabriel Total (*excluded from total)	0	0	0	0	0	0	0	288	912	0	0	0	1,200
San Geronio Pass Water Agency													
Table A	0	0	0	0	0	0	0	0	212	0	0	391	603
Carryover Water	340	0	0	648	417	659	667	422	173	403	343	0	4,072
Carryover Water Transferred to Others*	0	0	0	0	100	100	100	100	100	0	0	0	500
Non-SWP Water	0	0	0	0	0	0	0	199	157	0	0	0	356
Non-SWP Water Transferred from Others	0	0	0	0	0	0	0	0	0	0	13	0	13
San Geronio Total (*excluded from total)	340	0	0	648	417	659	667	621	542	403	356	391	5,044
Ventura County Watershed Protection District													
Table A	0	0	0	0	0	0	0	0	0	0	0	93	93
Ventura Total	0	0	0	0	0	0	0	0	0	0	0	93	93
Recreation/Fish and Wildlife (SWP)													
Castaic Lagoon	2	0	0	2	6	6	5	6	5	6	8	1	47
Lake Perris—Parks and Recreation	13	0	0	0	0	0	0	0	0	0	0	0	13

**Table 9-8 Total Amounts of Water Delivered in 2014, by Month (acre-feet)**

Contracting Agency and Type of Service	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total Deliveries
Lake Perris—Fish and Wildlife	12	1	1	0	0	0	0	0	0	0	0	0	14
Pyramid Lake	6	4	3	5	6	7	5	2	3	1	1	1	44
Silverwood Lake	2	1	1	4	7	8	10	6	6	5	2	2	54
Recreation/Fish and Wildlife (SWP) Total	35	6	5	11	19	21	20	14	14	12	11	4	172
SWP	21,346	31,864	16,042	6,804	12,283	23,517	47,626	39,691	32,371	38,926	23,266	24,577	318,313
Non-SWP	21,812	5,598	6,116	5,602	3,229	6,248	9,226	13,457	15,211	18,998	23,431	19,913	148,841
<b>Southern California Area Total</b>	<b>43,158</b>	<b>37,462</b>	<b>22,158</b>	<b>12,406</b>	<b>15,512</b>	<b>29,765</b>	<b>56,852</b>	<b>53,148</b>	<b>47,582</b>	<b>57,924</b>	<b>46,697</b>	<b>44,490</b>	<b>467,154</b>
<b>SWP WATER</b>													
<i>SWP Long-term Water Supply Contracts</i>													
Table A	3,373	0	0	1	22	1,199	1,294	1,695	3,305	28,223	21,606	23,881	84,599
Transfer Table A	0	0	0	6	1	234	6	1,655	548	1,944	1,472	880	6,746
Pool Water	0	0	0	0	0	0	40	0	0	111	79	520	750
Carryover Water	32,679	40,343	26,354	13,161	20,937	39,924	64,190	46,226	36,987	39,017	4,474	738	365,030
<i>Subtotal</i>	<i>36,052</i>	<i>40,343</i>	<i>26,354</i>	<i>13,168</i>	<i>20,960</i>	<i>41,357</i>	<i>65,530</i>	<i>49,576</i>	<i>40,840</i>	<i>69,295</i>	<i>27,631</i>	<i>26,019</i>	<i>457,125</i>
<i>Other Water Supply Contracts</i>													
Article 21	0	99	415	465	0	0	0	0	0	0	0	300	1,279
Water Bank Recovery	27,030	20,179	19,467	36,832	37,333	27,749	26,406	30,080	33,056	23,864	30,670	28,810	341,476
Delivery of Backup Water	0	0	0	0	23,820	53,636	2,900	22,097	7,009	0	0	0	109,462
Settlement Water	0	195	190	941	1,422	0	0	0	0	0	0	151	2,899
<i>Subtotal</i>	<i>27,030</i>	<i>20,473</i>	<i>20,072</i>	<i>38,238</i>	<i>62,575</i>	<i>81,385</i>	<i>29,306</i>	<i>52,177</i>	<i>40,065</i>	<i>23,864</i>	<i>30,670</i>	<i>29,261</i>	<i>455,116</i>
<i>Non-SWP Water Supply Contracts</i>													
Parks and Recreation	11	2	2	15	15	0	0	0	0	1	0	0	46
Dry Year Purchase Program	0	0	0	0	0	0	15,641	12,439	12,137	618	0	31	40,866
Local	419	32	74	73	139	0	41	101	293	0	0	74	1,246
Vallejo Permit	1,939	517	216	1,314	1,939	375	0	0	0	33	416	0	6,749
Other Non-SWP Programs	0	0	0	0	2,848	341	52,404	27,657	13,758	557	2,033	400	99,998
<i>Subtotal</i>	<i>2,369</i>	<i>551</i>	<i>292</i>	<i>1,402</i>	<i>4,941</i>	<i>716</i>	<i>68,086</i>	<i>40,197</i>	<i>26,188</i>	<i>1,209</i>	<i>2,449</i>	<i>505</i>	<i>148,905</i>
<b>SWP Total</b>	<b>65,451</b>	<b>61,367</b>	<b>46,718</b>	<b>52,808</b>	<b>88,476</b>	<b>123,458</b>	<b>162,922</b>	<b>141,950</b>	<b>107,093</b>	<b>94,368</b>	<b>60,750</b>	<b>55,785</b>	<b>1,061,146</b>
<b>NON-SWP WATER</b>													
<i>Non-SWP Agencies</i>													
SWP Contracted Supply delivered to Non-SWP Agencies	139	103	743	403	64	15,132	84	95	415	64	31	23	17,296
Water Bank Recovery	0	0	0	0	0	0	495	3,920	4,675	6,393	2,504	0	17,987
Other Non-SWP Programs	0	0	0	0	0	0	5,355	2,805	3,666	0	0	0	11,826
Regulated delivery of local supply	44,467	1,211	2,126	19,813	160,316	151,358	165,492	117,648	53,951	96,403	53,104	3,514	869,403
Parks and Recreation	25	8	7	15	26	26	29	22	20	18	14	5	215



**Table 9-8 Total Amounts of Water Delivered in 2014, by Month (acre-feet)**

<b>Contracting Agency and Type of Service</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>	<b>Aug</b>	<b>Sep</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>	<b>2014 Total Deliveries</b>
Fish and Wildlife	99	19	1	25	107	89	126	120	50	90	59	0	785
CVP/Reclamation													
Kern National Wildlife Refuge	1,620	285	0	0	0	0	0	1,201	2,719	2,957	2,445	1,572	12,799
Annual Contracts	45	39	47	50	69	81	87	85	72	67	40	18	700
<b>Non-SWP Total</b>	<b>46,395</b>	<b>1,665</b>	<b>2,924</b>	<b>20,306</b>	<b>160,582</b>	<b>166,686</b>	<b>171,668</b>	<b>125,896</b>	<b>65,568</b>	<b>105,992</b>	<b>58,197</b>	<b>5,132</b>	<b>931,011</b>
<b>Grand Total</b>	<b>111,846</b>	<b>63,032</b>	<b>49,642</b>	<b>73,114</b>	<b>249,058</b>	<b>290,144</b>	<b>334,590</b>	<b>267,846</b>	<b>172,661</b>	<b>200,360</b>	<b>118,947</b>	<b>60,917</b>	<b>1,992,157</b>

Table 9-9 Total Amounts of Annual Table A Water and Water Conveyed, by Type, 1962–2014 (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>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]	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]			
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	11,354	-	45,225	24,639	-	81,218	8,328	4,212	93,758
1968	550	-	109,900	77,350	-	3,700	191,500	171,709	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	72,397	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	131,848	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	294,581	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	422,322	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	294,916	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	412,453	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	620,685	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	551,685	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	16,215	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	646,830	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	402,217	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	908,428	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	215,134	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	13,019	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	262,917	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	301,844	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	24,350	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	114,907	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	90	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	3,521	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, 1962–2014 (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>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]	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]			
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	1,248,159	2,729	769,517	1,087,669	2,778	3,110,852	-	(758,813)	2,352,039
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	1,620,423	-	582,301	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	474,421	1,279	675,968	839,792	697	1,992,157	-	(222,460)	1,769,697
Total	496,233	1,518,420	8,015,847	45,731,932	1,927,718	88,369,603	146,059,753	81,189,729	9,017,441	14,053,063	43,852,426	154,778	148,267,437	1,834,310	(267,314)	149,834,433

<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, 1962–2014 (acre-feet)**

Year	Table A Water			Article 21/Unscheduled		Other SWP Water Deliveries			Total 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	
1962	0	0	0	0	0	9,704	7,499	0	17,203
1963	0	0	0	0	0	13,212	16,049	0	29,261
1964	0	0	0	0	0	21,743	17,891	0	39,634
1965	0	0	0	0	0	35,985	27,425	0	63,410
1966	0	0	0	0	0	59,599	33,361	0	92,960
1967	5,563	5,791	11,354	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	1,197,824
1969	63,956	129,064	193,020	0	72,397	8,692	832,454	0	1,106,563
1970	83,415	150,578	233,993	0	131,848	25,401	804,320	0	1,195,562
1971	93,776	263,564	357,340	0	294,581	35,438	825,886	8	1,513,253
1972	186,796	425,005	611,801	0	422,322	53,848	875,529	6,489	1,969,989
1973	297,497	395,391	692,888	0	294,916	29,540	851,285	1,155	1,869,784
1974	423,982	450,093	874,075	0	412,453	31,493	963,956	2,118	2,284,095
1975	670,492	553,498	1,223,990	356	620,329	46,995	924,696	3,377	2,819,743
1976	631,876	741,126	1,373,002	4,147	547,538	103,546	1,018,653	1,745	3,048,631
1977	354,930	218,966	573,896	0	0	410,991	624,497	1,111	1,610,495
1978	782,625	529,740	1,312,365	0	16,215	177,245	836,864	1,691	2,344,380
1979	692,888	711,404	1,404,292	0	646,830	431,693	933,067	1,766	3,417,648
1980	726,545	784,946	1,511,491	52,200	350,017	40,269	925,750	2,131	2,881,858
1981	1,053,273	835,852	1,889,125	18,920	889,508	283,310	993,785	4,688	4,079,336
1982	916,014	822,042	1,738,056	140	214,994	144,267	819,586	4,646	2,921,689
1983	482,749	701,370	1,184,119	0	13,019	172,030	633,778	7,849	2,010,795
1984	725,799	861,794	1,587,593	3,663	259,254	366,273	891,128	7,040	3,114,951
1985	983,341	929,424	1,912,765	9,638	292,206	474,417	924,049	4,033	3,617,108
1986	998,611	1,009,295	2,007,906	2,595	21,755	177,176	843,040	3,865	3,056,337
1987	1,079,983	1,033,932	2,113,915	6,949	107,958	375,810	882,301	7,672	3,494,605
1988	1,308,071	1,068,302	2,376,373	0	0	520,375	884,877	4,889	3,786,514
1989	1,602,543	1,251,204	2,853,747	0	0	474,559	830,500	8,135	4,166,941
1990	1,876,072	706,079	2,582,151	0	90	424,697	875,099	9,262	3,891,299
1991	536,669	12,444	549,113	3,521	0	543,582	565,395	4,879	1,666,490
1992	955,687	455,112	1,410,799	1,156	0	166,992	613,978	2,605	2,195,530
1993	1,069,258	1,243,978	2,313,236	0	0	256,853	822,589	2,609	3,395,287
1994	1,134,992	614,359	1,749,351	48,150	64,475	236,739	874,018	8,200	2,980,933
1995	801,570	1,165,523	1,967,093	17,984	46,346	85,560	860,077	2,575	2,979,635
1996	1,143,638	1,371,186	2,514,824	12,091	16,556	252,346	1,005,148	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	3,601,172
1998	865,795	860,724	1,726,519	9,982	10,306	127,405	872,738	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	4,095,281

**Table 9-10 SWP Water Delivered by Category, 1962–2014 (acre-feet)**

Year	Table A Water			Article 21/Unscheduled		Other SWP Water Deliveries			Total 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	
2000	1,949,922	1,222,485	3,172,407	170,302	138,483	353,584	1,085,886	4,096	4,924,758
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	404,703	69,718	474,421	1,279	0	675,968	839,792	697	1,992,157
<b>Total</b>	<b>48,973,597</b>	<b>32,216,132</b>	<b>81,189,729</b>	<b>1,483,632</b>	<b>7,533,809</b>	<b>14,053,063</b>	<b>43,852,426</b>	<b>154,778</b>	<b>148,267,437</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

*Edmonston Pumping Plant.*

## Significant Events in 2014

Energy used at the 29 State Water Project (SWP) pumping and generating plants totaled 2.79 million megawatt hours (MWh). To meet SWP energy needs, the Department of Water Resources (DWR) purchased 1.40 million MWh of energy at a cost of \$47.95 million. This included: (1) 1.27 million MWh of WSPP short-term energy from three marketers (referred to as bilaterals) and two renewable-energy electric utilities at a combined cost of \$44.71 million; and (2) 0.12 million MWh of long-term energy at a cost of \$3.24 million.

Pursuant to WSPP bilateral trades of 33,000 MWh with three power marketers, trades made under the Lodi Energy Center Power Sales Agreement, and transactions under the California Independent Energy Operator (CAISO), DWR received a total of \$93.91 million.

In December, the 45 megawatt (MW) RE Camelot solar photovoltaic project commenced commercial operation. It will supply DWR with approximately 124,000 MWh of renewable or greenhouse gas (GHG) emission-free energy per year. Achieving commercial operation was the culmination of a power purchase agreement entered into with RE Columbia, LLC in 2013.

*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 2014, CAISO continued to address the impact of increasing renewable energy generation and the need for greater ramping capability. Also, as a result of a 17 percent increase in natural gas prices, increased greenhouse gas (GHG) costs in California, and record low hydroelectric conditions, wholesale electric costs increased by 13 percent.

On May 1, 2014, CAISO implemented a new 15-minute market in compliance with FERC Order 764, which required CAISO to offer intra-hour transmission scheduling. This helped address market flaws that led to the November 2011 suspension of intertie convergence bidding and reduced market barriers for the integration of variable energy resources. Based on a successful implementation of Order 764, the reinstatement of intertie convergence bidding was set for May 2015.

To increase reliability and reduce the chance of blackouts, such as the September 8, 2011, blackout in the Southwest, CAISO expanded its full network model on October 15, 2014. This enhancement added other balancing areas topology and doubled the number of inputs used to project power flows in the market models.



After a fast-track initiative process that began in April 2013, CAISO implemented an Energy Imbalance Market (EIM) on November 1, 2014. Through the EIM, CAISO's real-time market is available to non-CAISO balancing authorities, which provides efficiency by allowing other regions to share resources that are economically and automatically dispatched in real time to provide balancing energy.

Also in 2014, CAISO continued the Flexible Resource Adequacy Criteria and Must Offer Obligation stakeholder process that was initiated in January 2012. This stakeholder process was intended to address the need for flexible capacity arising from the increase in renewable energy resources. It also addressed retiring flexible thermal resources subject to regulatory limits set on once-through cooling power plants. Several revisions of the CAISO proposal led to a final draft version for FERC filing.

In February 2014, CAISO kicked off its Reliability Services Initiative to enhance resource adequacy provisions including Capacity Procurement Mechanism Replacement to allow CAISO procurement authority for backstop capacity needs.

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 2014, significant events included the completion of required regional planning processes by the four regional entities, a FERC order addressing the planning regions' joint interregional filing, and ongoing dialog among the planning regions to develop a process for coordinating transmission planning information.

CAISO continued to refine policy for the Renewable Integration Market and Product Review (RIMPR) initiative Phase 2, which focused on mid- to long-term solutions.

## 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 2014:

- Market Initiatives Roadmap;
- Stakeholder Initiatives Catalog;
- RIMPR Phase 2;
- Bid Cost Recovery mitigation;
- Cost Allocation Guiding Principles;
- Grid Management Charge rate structure for 2015;
- Pay for Performance Accuracy;
- Multi-stage Generation Enhancements;
- Load Granularity Refinements;
- Full Network Model Expansion;
- Barriers to demand response;
- FERC Order 764 compliance;
- Commitment Cost Enhancements Phases 1 and 2;
- Pricing Enhancements;
- Flexible Ramping Product;
- EIM;
- Generator Interconnection Procedures;
- Transmission planning;
- FERC Order 1000 compliance;
- Local capacity procurement for 2015 requirements;
- Annual Resource Adequacy processes including the Path 26 allocation, import allocation, and net qualifying capacity; and
- Flexible Capacity Procurement process for 2016.



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 Pay for Performance regulation (ER13-995, ER13-1055, ER14-971, ER15-554);
- CAISO's Multi-stage Generation (MSG) enhancements (ER14-93, ER14-1004);
- CAISO's Imbalance Energy Charges (ER14-59);
- CAISO's Demand Response Report (ER06-615);
- CAISO's Energy Imbalance Market (ER13-1372, ER14-1729);
- CAISO's Price Correction Requirements (ER14-1216);
- CAISO's Participating Intermittent Resource Program Protective Measures (ER14-480);
- CAISO's 2-tier Real-time Bid Cost Recovery (ER06-615);
- CAISO's Commitment Cost Enhancements (ER15-15);
- CAISO's Grid Management Charge (ER15-66);
- CAISO's Full Network Model Expansion (ER14-2017);
- North American Electric Reliability Corporation (NERC) 2015 Business Plan and Budget (RR14-6);
- Pacific Gas & Electric Company's (PG&E) TO16 proposal to increase transmission revenue requirement rates for retail and wholesale customers of CAISO (ER14-2529);

- San Diego Gas & Electric's (SDG&E) TO4-Cycle 2 proposal to increase transmission revenue requirement rates for retail and wholesale customers of CAISO (ER14-2748);
- Southern California Edison's (SCE) third annual update to its approved formula rate (ER11-3697);
- SCE's proposed annual update to its Transmission Revenue Balancing Account (ER15-259) and Reliability Services tariff (ER15-216);
- SDG&E's proposed annual update to its Transmission Revenue Balancing Account Adjustment and Transmission Access Charge Balancing Account Adjustment (ER15-679); and
- PG&E's proposed annual update to its Transmission Revenue Balancing Account (ER15-34).

## 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***

DWR improved its Internal Compliance Program to satisfy the 2013 settlement agreement with WECC regarding possible violations of NERC's reliability standards. In 2014, DWR finalized and began implementing its plan to develop improved Internal Compliance Program business processes. The plan details each compliance activity end-to-end and defines each DWR organization's roles and responsibilities by function.

Additionally, DWR developed new policies and processes to incorporate internal controls into its Internal Compliance Program to improve training, communication, and collaboration to ensure prompt detection, reporting, and mitigation of possible violations. These internal controls enhance DWR's commitment to a proactive approach that includes continuous education to ensure understanding of and adherence to NERC's mandatory reliability standards.

In 2014, NERC completed a 9-month study with a representative sample of six responsible entities focused on implementing Version 5 of the Critical Infrastructure Protection Reliability Standards (CIP Version 5), which includes new cybersecurity controls and extends the scope of systems to which the CIP Reliability Standards apply. Because of issues identified during the study, NERC is developing lessons learned and frequently asked questions documents, and a transition guidance document, to improve the industry's understanding of the technical security requirements for CIP Version 5 and clarify the expectations for compliance and enforcement. DWR will review these documents and participate in related stakeholder activities to develop a deeper understanding of CIP Version 5. Because CIP Version 5 enforcement is scheduled to be phased in beginning April 2016 and continue to April 2017, DWR will develop its implementation plan in 2015.

NERC also continued to develop its Reliability Assurance Initiative program to transition compliance and enforcement away from zero tolerance to a focus on reliability, and began to implement it at the end of 2014 through the auditing aspect of its Risk-Based Compliance Monitoring and Enforcement Program. Prior to DWR's next audit that is scheduled for 2018, DWR will have the opportunity to demonstrate compliance through effective internal controls and self-monitoring of possible violations, such that NERC and WECC may alter audit frequency and the scope and disposition methods for noncompliance, including a reduction of monetary penalties.

On November 20, 2014, FERC approved Reliability Standard CIP-014-1 with an October 1, 2015, enforcement date. As a transmission owner, DWR will be required to develop and implement security plans for its critical transmission stations and substations and their associated primary control centers to prevent them from being rendered inoperable or damaged, which could have a critical impact on the operation of the interconnection.

DWR has continued the work required to meet the compliance requirements of the reliability standards. DWR submitted its annual self-certification to WECC in February 2014, involving operations, maintenance, engineering functions, and work on critical cyber assets. This required DWR to certify that it was currently in compliance with the requirements of a WECC-determined subset of standards or provide a violation report supported by a mitigation plan to resolve outstanding items. Violations can lead to financial penalties or reduced operating flexibility.

Every year, NERC creates a 3-year plan to address reliability standards development and revision. The Division of Operations and Maintenance aggressively pursues compliance with standards as they change.

## Greenhouse Gas Management

In 2014, DWR reported its GHG emissions for the previous year to the California Air Resources Board and The Climate Registry. DWR's sulfur hexafluoride (SF<sub>6</sub>) emissions were below the maximum limit permitted by the California Air Resources Board for the previous year. As the permissible SF<sub>6</sub> emission limits will be lower in future years, DWR is working on strategies to reduce its SF<sub>6</sub> emissions. DWR also submitted its fossil fuel report for the previous year to the Governor's Office.

DWR continued participating in allowance auctions conducted by the California Air Resources Board to meet its contractual obligation for the Lodi Energy Center.

## 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. A trial date to hear arguments on the latest court filings 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 (HEP, 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 HEP would not fulfill the fish enhancement goals of the HEA.



On August 21, 2014, DWR submitted an annual report describing the activities of the previous 12 months toward implementing the HEA.

The State Water Resources Control Board (SWRCB) issued an order on February 3, 2014, denying DWR's request for reconsideration of the annual Clean Water Act Section 401 water quality certification fee for the Oroville Facilities Relicensing. The SWRCB issued a water quality certification in 2010 for the relicensing effort, but FERC has not yet issued the new license. The SWRCB's regulations provide for a process through which applicants can petition the board to reconsider the annual fee. DWR does not currently plan to submit additional fee reconsideration requests of this type.

### ***South SWP Hydropower***

On September 30, 2014, FERC issued orders approving a change in FERC's regulatory authorization vehicle for the 17 MW Alamo Powerplant and 32.4 MW Mojave Siphon Powerplant to conduit exemptions. FERC also issued an order amending the South SWP Hydropower (P-2426) license to remove these facilities and associated lands from the license. DWR had filed final conduit exemption and license amendment applications with FERC on January 15, 2014, following a process initiated in the summer of 2013 that included consultation with agencies, Native American tribes, and the public. As Alamo Powerplant and Mojave Siphon Powerplant are no longer included in the P-2426 license, they will not be included in the upcoming P-2426 relicensing process.

On August 18, 2014, DWR's Director signed the Relicensing Process Agreement between DWR and the Los Angeles Department of Water and Power (LADWP) and an associated amendment to the existing agreement between DWR and LADWP that governs LADWP's operation of Castaic Pumping-Generating Plant, completing

execution of both. The Relicensing Process Agreement outlines the terms through which DWR and LADWP will cooperatively manage and cost-share the P-2426 relicensing. The Relicensing Process Agreement and Castaic operation agreement amendment were signed earlier in the year by LADWP's General Manager following approval from the LADWP Board of Commissioners and the Los Angeles City Council.

On October 30, 2014, DWR awarded a consulting contract to provide support for the P-2426 relicensing effort following a public solicitation process initiated on May 8, 2014. The existing license expires on January 31, 2022, and a Pre-Application Document and the notice of intent for relicensing is due to FERC by January 31, 2017.

### **Existing SWP Power Facilities**

Figure 10-1 shows the names, locations, and nameplate capacities of DWR's primary power facilities.

#### ***Hydroelectric***

Economic 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 MW from the Thermalito Diversion Dam Powerplant adds another 24 million kWh per year.

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



**Figure 10-1 Names, Locations, and Nameplate Capacities of Primary Long-term Power Facilities**



commercial operation on December 23, 2014, and began delivering renewable or 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 through the sky to maximize the panels' efficiency.

### **DWR Power Planning Activities**

DWR does long-term power planning for the SWP through periodic development of an Integrated Resource Plan. The Integrated Resource Plan 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. Integrated Resource Plan 13 findings and recommendations were approved in 2014, and implementation of recommended actions was initiated.

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 2014, 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 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 new 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. Construction of the Lodi Energy Center began in July 2010 and continued on schedule through 2011. 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 starting 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. 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 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. This facility commenced commercial operation on December 23, 2014. Under a 20-year power purchase agreement through 2034, the 45 MW plant is expected to deliver approximately 124,000 MWh of annual generation.

The renewable energy procured under this agreement 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 2014, 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.

Under the Comprehensive Agreement with PG&E, DWR interconnects SWP power resources and pumping loads and receives 1,300 MW of firm network transmission service over the PG&E transmission system to serve SWP pump loads and power resources in Northern and Central California. Upon implementation of CAISO's MRTU on April 1, 2009, transmission service to serve the SWP under the Comprehensive Agreement was redefined as point-to-point service. The remaining transmission service

in Northern and Central California, which cannot be provided through the point-to-point service under the Comprehensive Agreement, is received from CAISO. Through the Comprehensive Agreement, DWR also provides a Remedial Action System (RAS) to PG&E whereby certain SWP pumping and generating plants can be instantaneously curtailed under certain predefined emergency events.

In anticipation of the termination of the Comprehensive Agreement on December 31, 2014, DWR initiated negotiations with PG&E and CAISO on successor arrangements. The negotiations resulted in a series of nine replacement agreements that become effective on January 1, 2015. The new agreements consist of two Large Generator Interconnection Agreements between CAISO, PG&E, and DWR that cover the Oroville Facilities and the San Luis Pumping-Generating Facility. A new Load Interconnection Agreement between PG&E and DWR covers interconnected operation of the DWR pumping plants. In addition there are six new Transmission Facilities Agreements that account for cost of ownership and maintenance of the interconnection facilities for DWR pumping plants.

With the termination of the Comprehensive Agreement, the RAS that DWR provided to PG&E will also terminate on December 31, 2014. DWR had proposed to continue participation in the RAS. However, DWR was not able to reach an agreement with any party to continue to provide this service. Under the new Load Interconnection Agreement, beginning in 2015, DWR has agreed to continue using the direct load trip equipment (previously used to facilitate SWP participation in PG&E's RAS program) for an interim period and at a limited group of facilities. It will be used to provide load shed of its facilities only in the event of a triple line outage of the California-Oregon Intertie

500 kV transmission lines. This continued use of the direct load trip equipment is in exchange for PG&E meeting any Underfrequency Load Shedding requirements associated with SWP load.

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 2014, DWR and SCE coordinated the engineering design of the new interconnection facilities for Citrus Pump Station, to be located in San Bernardino County, which is expected to achieve commercial operation in 2016.

## SWP Power Operations in 2014

Tables 10-1 through 10-4 present historical information about SWP power operations for calendar year 2014, including energy consumed, generated, purchased, and sold.

Please note that, in some instances, the tables in this chapter may not sum as expected due to rounding.

### Energy Consumed

In 2014, energy used at the 29 SWP pumping and generating plants totaled 2.79 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 2014, excluding transmission losses.

### Energy Generated and Purchased

Table 10-2 shows the amounts of energy generated at SWP facilities in 2014, as well as energy purchased for SWP operations.

#### Hydroelectric and Coal

The Hyatt-Thermalito power complex in Oroville generated 663,054 MWh of energy in 2014.

Energy generated at SWP aqueduct recovery plants—Gianelli, Alamo, Devil Canyon, Mojave Siphon, and Warne—totaled 469,605 MWh.

The SWP did not receive generation from Reid Gardner Unit No. 4 in 2014 because DWR's 67.8 percent ownership share ended in July 2013.

### Contractual Resource Arrangements

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 2014, LADWP provided 293,193 MWh for DWR's share of energy generated at Castaic Powerplant.

DWR's share of Gianelli Pumping-Generating Plant used 136,678 MWh and generated 48,999 MWh of energy.



**Table 10-1 Energy Used at Pumping Plants and Power Plants in 2014, 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)	29	4	3	0	14	1	0	0	1	3	33	8	97
North Bay Interim Pumping Plant	0	0	0	0	0	0	0	0	0	0	0	0	0
Cordelia Pumping Plant	1,214	473	434	1,034	1,403	1,266	1,158	1,101	839	1,088	483	411	10,905
Barker Slough Pumping Plant	677	209	199	624	1,187	851	709	715	453	532	226	166	6,549
South Bay Pumping Plant	5,721	8,254	10,559	6,158	6,015	7,736	7,722	8,108	4,350	3,749	3,605	3,637	75,615
Del Valle Pumping Plant	27	299	489	223	19	90	7	7	7	9	12	15	1,205
Banks Pumping Plant	17,112	19,408	35,162	10,503	4,804	4,043	19,667	28,302	33,537	6,632	35,606	73,416	288,191
Gianelli Pumping-Generating Plant (SWP share)	5,124	9,672	22,565	2,702	113	180	167	3,409	12,937	1,284	23,713	54,811	136,678
Dos Amigos Pumping Plant (SWP share)	6,751	4,958	3,549	3,323	7,278	11,625	17,519	13,374	8,289	5,370	1,710	3,750	87,496
Buena Vista Pumping Plant	13,986	10,564	10,643	9,081	10,319	11,592	22,683	14,725	9,777	13,113	10,979	14,961	152,425
Teerink Pumping Plant	17,214	12,547	11,468	8,733	7,817	9,409	21,501	14,074	8,893	13,539	13,962	19,329	158,485
Chrisman Pumping Plant	37,905	28,025	25,334	19,087	15,888	19,185	46,735	31,049	19,614	30,443	31,134	42,696	347,095
Edmonston Pumping Plant	136,832	99,783	89,653	66,173	51,037	62,264	163,141	107,406	66,593	107,667	110,912	155,748	1,217,209
Alamo Powerplant (station service)	26	26	49	35	29	22	19	10	26	8	0	0	251
Pearblossom Pumping Plant	12,249	10,200	3,709	7,840	11,324	14,328	15,303	16,413	11,484	12,025	7,131	9,626	131,633
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)	54	53	83	65	57	47	49	10	41	62	81	62	664
Devil Canyon Powerplant (station service)	128	164	346	181	52	10	51	111	192	198	137	124	1,693
Oso Pumping Plant	10,945	7,575	9,465	4,452	720	455	12,155	5,121	2,340	7,440	10,614	15,081	86,363
Warne Powerplant (station service)	393	458	408	360	609	224	212	476	551	221	102	94	4,107
Las Perillas Pumping Plant	210	418	319	513	978	1,243	1,429	1,429	768	379	144	88	7,918
Badger Hill Pumping Plant	511	1,059	826	1,371	2,533	3,105	3,484	3,555	1,902	948	352	202	19,849
Devil's Den Pumping Plant	1,110	1,465	1,601	780	1,360	1,151	1,343	1,519	1,210	1,190	1,068	436	14,232
Bluestone Pumping Plant	1,032	1,358	1,490	720	1,266	1,068	1,246	1,424	1,132	1,104	986	407	13,232
Polonio Pass Pumping Plant	1,121	1,473	1,613	779	1,360	1,152	1,354	1,531	1,224	1,197	1,072	439	14,316
Greenspot Pump Station	632	49	61	408	648	762	891	810	885	575	282	321	6,322
Crafton Hills Pump Station	757	19	25	549	893	1,054	1,093	1,051	1,231	740	332	408	8,151
Cherry Valley Pump Station	24	8	9	51	29	39	41	41	34	41	40	43	401
<b>Total Energy Required for SWP<sup>b</sup></b>	<b>271,786</b>	<b>218,520</b>	<b>230,062</b>	<b>145,748</b>	<b>127,749</b>	<b>152,902</b>	<b>339,678</b>	<b>255,772</b>	<b>188,311</b>	<b>209,558</b>	<b>254,716</b>	<b>396,279</b>	<b>2,791,083</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 2014, 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	43,073	16,529	18,927	26,827	113,503	143,866	154,032	92,138	17,773	21,019	13,355	2,012	663,054
Gianelli Pumping-Generating Plant (SWP share)	2,002	2,378	0	865	8,969	13,946	14,236	3,687	1	2,915	0	0	48,999
Alamo Powerplant	2,231	1,678	507	1,385	2,165	2,871	2,924	3,027	2,069	560	0	0	19,414
Mojave Siphon Powerplant	1,153	1,028	209	643	1,095	1,498	1,599	1,328	997	641	0	277	10,469
Devil Canyon Powerplant	18,609	16,131	8,694	8,937	20,847	23,706	27,119	26,984	18,101	17,261	11,462	17,813	215,664
Reid Gardner Unit 4 <sup>a</sup>	0	0	0	0	0	0	0	0	0	0	0	0	0
Warne Powerplant	22,068	14,480	20,111	8,445	107	338	26,140	9,889	4,049	17,332	23,298	28,802	175,058
<i>Subtotal</i>	<i>89,136</i>	<i>52,223</i>	<i>48,448</i>	<i>47,101</i>	<i>146,686</i>	<i>186,225</i>	<i>226,050</i>	<i>137,053</i>	<i>42,989</i>	<i>59,728</i>	<i>48,115</i>	<i>48,904</i>	<i>1,132,659</i>
<b>Energy Sources from Long-term Agreements</b>													
Castaic Powerplant	36,938	27,002	35,337	16,734	856	1,569	41,739	14,927	6,465	28,143	34,593	48,889	293,193
Metropolitan Small Hydro Generation	8,909	8,059	8,545	7,679	6,252	2,345	1,700	1,699	0	265	738	110	46,301
Pine Flat Powerplant (Kings River Conservation District)	0	0	0	0	2,065	34,898	37,665	2,243	0	0	0	0	76,871
Energy to Metropolitan for CRA <sup>b</sup> Pumping	0	0	0	0	0	0	0	0	0	0	0	0	0
Energy from Metropolitan for CRA <sup>b</sup>	0	0	0	0	0	0	0	0	0	0	0	0	0
Lodi Energy Center	45,762	52,290	40,364	18,552	23,856	17,097	39,688	23,117	59,908	66,235	17,298	35,623	439,790
<b>Purchases</b>													
Purchases (Firm and WSPP Contracts)	106,647	92,935	106,192	98,965	106,594	103,995	114,782	113,841	109,862	102,211	108,417	108,247	1,272,688
CAISO Energy <sup>c</sup>	(15,605)	(13,589)	(8,824)	(43,284)	(158,559)	(193,227)	(111,547)	(26,709)	(19,114)	(47,024)	45,555	154,506	(437,419)
<i>Subtotal</i>	<i>182,651</i>	<i>166,697</i>	<i>181,615</i>	<i>98,646</i>	<i>(18,937)</i>	<i>(33,323)</i>	<i>124,028</i>	<i>129,119</i>	<i>157,122</i>	<i>149,830</i>	<i>206,601</i>	<i>347,375</i>	<i>1,691,424</i>
Total Resources	271,786	218,920	230,062	145,748	127,749	152,902	350,078	266,172	200,111	209,558	254,716	396,279	2,824,083
Less Energy Sales	0	(400)	0	0	0	0	(10,400)	(10,400)	(11,800)	0	0	0	(33,000)
<b>Total Energy Provided to the SWP<sup>d</sup></b>	<b>271,786</b>	<b>218,520</b>	<b>230,062</b>	<b>145,748</b>	<b>127,749</b>	<b>152,902</b>	<b>339,678</b>	<b>255,772</b>	<b>188,311</b>	<b>209,558</b>	<b>254,716</b>	<b>396,279</b>	<b>2,791,083</b>

<sup>a</sup> DWR's 67.8 percent ownership share ended in July 2013.<sup>b</sup> Contractual Resource Arrangement.<sup>c</sup> Energy provided by CAISO for balancing the total SWP loads and resources.<sup>d</sup> Totals may not sum as expected due to rounding.

**Table 10-3 Energy, Transmission, and Related Costs in 2014**

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 <sup>a</sup>		24			24
CAISO–Other <sup>b</sup>				86,666,092	86,666,092
Energy Marketers–Bilaterals (WSPP)	1,080,400	38,313,093		638,300	38,951,393
Long-term Contracts <sup>c</sup>	123,172	3,239,143	6,137,663	43,076,686	52,453,492
Renewable Energy <sup>d</sup>	192,288	6,401,795			6,401,795
<b>Total</b>	<b>1,395,860</b>	<b>47,954,054</b>	<b>6,137,663</b>	<b>130,381,078</b>	<b>184,472,795</b>

<sup>a</sup> As invoiced.<sup>b</sup> Transmission, capacity, imbalance energy, etc.<sup>c</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>d</sup> Alameda Municipal Power and RE Camelot, LLC.**Table 10-4 Energy and Energy-related Revenue in 2014 per Contract Agreements**

Category	Energy Trades (MWh)	Energy Revenues (in dollars)	Other Energy-related Revenue (in dollars)	Total Sales (in dollars)
CAISO–Bilateral Trades <sup>a</sup>		41,750,249		41,750,249
CAISO–Other <sup>b</sup>			25,911,188	25,911,188
Energy Marketers–Bilaterals (WSPP)	33,000	1,708,523		1,708,523
Long-term Contracts <sup>c</sup>			24,535,735	24,535,735
<b>Total</b>	<b>33,000</b>	<b>43,458,772</b>	<b>50,446,923</b>	<b>93,905,695</b>

<sup>a</sup> As invoiced.<sup>b</sup> Transmission, capacity, imbalance energy, etc.<sup>c</sup> Los Angeles Department of Water and Power, Northern California Power Agency (Lodi Energy Center), and Western Area Power Administration.

## Purchases and Costs

Table 10-3 shows the amounts of energy, transmission, and other services purchased in 2014, and the corresponding purchase costs. Amounts include contractual short-term and long-term purchases and associated transactions of energy, transmission, capacity, and ancillary services with CAISO, and miscellaneous energy-related costs.

DWR purchased 1.40 million MWh of energy at a cost of \$47.95 million. Other SWP-related costs include \$6.14 million for transmission service outside CAISO and \$130.38 million for operation, maintenance, and miscellaneous CAISO charges, among other things. Other key costs associated with the latter amount are (1) \$4.34 million for debt service and \$4.21 million for

operations and maintenance, both related to Pine Flat Powerplant; (2) \$9.41 million for debt service and \$25.10 million for capital improvement, fuel, management, operations, and maintenance, connected to the Lodi Energy Center Project. The \$6.14 million for transmission service outside CAISO includes \$2.25 million for PG&E; \$2.69 million for SCE; and a total of \$1.20 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 2014, the power plant provided 76,871 MWh of energy to the SWP at an energy component cost of \$595,305.

Under the Metropolitan Small Hydro contract, DWR purchased 46,301 MWh of

energy in 2014 from three small hydroelectric power plants on the Metropolitan system at a cost of \$2.64 million.

Also, under the Lodi Energy Center Power Sales Agreement with NCPA, DWR received a purchase credit of \$23.68 million based on 439,790 MWh generated at the Lodi Energy Center plant during 2014. For reporting purposes, these amounts are part of the total revenues listed in Table 10-4.

Lastly, under renewable energy long-term contracts with Alameda Municipal Power and RE Camelot, LLC, DWR received a total of 192,288 MWh at a cost of \$6.4 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 2014, the SWP purchased 1.08 million MWh of short-term energy under the WSPP agreement from three WSPP marketers at a cost of \$38.31 million.

#### **Contractual Sales of Excess Power**

In 2014, DWR sold 33,000 MWh of energy for a total of \$1.71 million through WSPP to 3 marketers. Also, DWR received energy credits of \$23.68 million associated with the Lodi Energy Center Power Sales Agreement and \$41.75 million connected to bilateral trades with CAISO. DWR also received \$26.77 million in revenues from other energy-related services. This value includes, among other things, \$25.91 million for ancillary services transactions made through CAISO. It also includes \$272,404 for CAISO pass-through costs collected from the U.S. Department of Energy, Western Area Power Administration, associated with the June 27, 2012, contract 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.





## Chapter 11

### Facilities Maintenance

*Crafton Hills Reservoir was enlarged to increase its operating storage capacity.*



## Significant Events in 2014

The 5-year Director's Safety Review Board (DSRB) reviews for Castaic Dam and Crafton Hills Dam occurred in March. The Potential Failure Mode Analyses (PFMAs) were conducted for Castaic Dam and Crafton Hills Dam in June.

In July, the Oroville Dam river valve outlet system became operational.

The Perris Dam seismic remediation project began in September.

The DSRB and the Federal Energy Regulatory Commission's (FERC) Part 12D Independent Safety Review were jointly convened for all Oroville Field Division dams in June and for Pyramid, Quail, Cedar Springs, and Devil Canyon Second Afterbay dams in November.

PFMA workshops were also conducted for all Oroville dams in August and for Pyramid, Quail, Cedar Springs, and Devil Canyon Second Afterbay dams in December.

*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 the California Code of Regulations (Title 23, Division 2, Chapter 1, Article 5), DSOD has regulatory authority over dams owned and operated by DWR.

DSOD is responsible for overseeing all design modifications and construction activities related to existing SWP dams. DSOD also works to prepare and coordinate the Director's Safety Review Board (DSRB) events that include a periodic evaluation of SWP dam conditions with regard to safety and performance.

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 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 2014, O&M, along with DSOD and FERC staff, conducted the 5-year Part 12D and DSRB inspections for Oroville, Thermalito Forebay, Thermalito Afterbay, Thermalito Diversion, Bidwell Canyon Saddle, Parish Camp Saddle, and Feather River Fish Barrier dams in the Oroville Field Division; and for Castaic, Crafton Hills, Pyramid, Quail, Cedar Springs, and Devil Canyon Second Afterbay dams in the Southern Field Division.

In addition, annual dam safety and DSOD inspections occurred for Antelope, Frenchman, and Grizzly Valley dams in the upper Feather River area; Bethany, Clifton Court, Del Valle, Dyer, and Patterson dams in the Delta Field Division; and Perris Dam in the Southern Field Division. Table 11-1 shows dam inspections conducted in 2014.

## 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 2009.

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 October 2014.

## Independent Reviews

### *Director's Safety Review Board*

Under California Water Code, Division 3, Chapter 3, 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.

In 2014, DSRB inspections were conducted for Oroville, Thermalito Forebay, Thermalito Afterbay, Thermalito Diversion, Bidwell Canyon Saddle, Parish Camp Saddle, and Feather River Fish Barrier dams in the Oroville Field Division; and for Pyramid, Quail, Cedar Springs, Crafton Hills, Castaic, and Devil Canyon Second Afterbay dams in the Southern Field Division. The independent consultants also participated in a Potential Failure Mode Analysis (PFMA) workshop for these dams.

## FERC Reviews

FERC reviews and the FERC Part 12D safety inspections, which may be conducted by one or more consultants, are scheduled every 5 years. 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. In 2014, Part 12D inspections were conducted for the P-2100 and P-2426 dams.

**Table 11-1 Dam Inspections in 2014**

		Type of Inspection					
		Operations & Maintenance-Dam Safety Branch	Division of Safety of Dams	Federal Energy Regulatory Commission	Bureau of Reclamation	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	-	X	X
	Bidwell Canyon Saddle Dam	X	X	X	-	X	X
	Parrish Camp Saddle Dam	X	X	X	-	X	X
	Thermalito Afterbay Dam	X	X	X	-	X	X
	Thermalito Diversion Dam	X	X	X	-	X	X
	Feather River Fish Barrier Dam	X	X	X	-	X	X
	Thermalito Forebay Dam	X	X	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 Dam	X	-	-	X	-	-
	Los Banos Dam	X	-	-	X	-	-
	O'Neill Forebay Dam	X	-	-	X	-	-
	Sisk Dam	X	-	-	X	-	-
Southern							
	West Branch						
	Castaic Dam	X	X	-	-	X	-
	Pyramid Dam	X	X	X	-	X	X
	Quail Canal and Dam	X	X	X	-	X	X
	East Branch						
	Cedar Springs Dam	X	X	X	-	X	X
	Devil Canyon Second Afterbay Dam	X	X	X	-	X	X
	Perris Dam	X	X	-	-	-	-
	Crafton Hills Dam	X	X	-	-	X	-
	Crafton Hills Reservoir Enlargement Dam <sup>a</sup>	-	-	-	-	-	-

<sup>a</sup> Crafton Hills Reservoir Enlargement Dam was completed in 2014, and annual inspection is due in 2015.



As a supplement to the FERC Part 12D safety inspection, FERC's Dam Safety Performance Monitoring Program requires that a 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.

### 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 2014, the basin's flood control features continued to function as expected.

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. In 2011, the transfer documents were completed and submitted to Reclamation for acceptance. In 2012, DWR worked with Reclamation staff to address issues with the transfer documents. The biggest issue was the State's use of Director's deeds to transfer the titles verses warranty deeds that are required by Reclamation. Work to address the transfer documents continued in 2014.

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 2014, 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 2014, DWR worked with Caltrans to ensure the designs will accommodate heavy equipment passage underneath the proposed bridge to allow DWR to continue its operations and maintenance activities to properly maintain the channel.

## 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. It is widely understood that 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 2014, DWR hosted a public outreach meeting for affected property owners. Later in the year, the California Environmental Quality Act initial study/mitigated negative declaration and the notice of determination for the project were filed. No comments were

received during the public review period, and by December, the notice of determination was signed. By the end of 2014, DWR's Division of Engineering received comments from Reclamation and distributed 95 percent complete, design plans for review. The project is planned for construction in the summer of 2016.

## 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

In 2014, Condition Assessment Program inspections were performed on 27 different reaches of the SWP along more than 130 miles of canals and pipelines. To aid in maintenance efforts, check structures, control buildings, compound grounds, roads, culverts, drain inlets, overchutes, penstocks, tunnels, turn-ins, turnouts, and utility crossings along the canal were inspected and rated.

### Oroville Field Division

In the Oroville Field Division, a portion of the Feather River Fish Hatchery's water supply pipeline was inspected and repaired.

Significant work activities performed during the outage related to the fresh water supply pipeline and included:

- modifying and installing manhole accesses at high point vents along intake pipeline;
- removing and replacing deteriorated grout at approximately 90 percent of the reinforced concrete pipe end joints; and
- cleaning and replacing some of the fish screens in the aeration tower.

The Oroville Dam river valve outlet system was tested and became operational to allow low-level releases. The revamped river valve outlet system controls now allow for remote operation of the valves from Hyatt Powerplant and remote video monitoring of the valve releases and river valve chamber.

### Delta Field Division

In the Delta Field Division, features along 2 miles of the South Bay Aqueduct were inspected. One hundred twenty-one California Aqueduct features were inspected spanning three repayment reaches and 5 aqueduct pools.

The Suisun Marsh facilities were also inspected, including the Suisun Marsh Salinity Control Gates, the Morrow Island and Roaring River Slough distribution systems and outfalls, the Goodyear Slough Outfall, and numerous turnouts and water quality stations.

DSB submitted an Application for Approval or Plans and Specifications for Repair or Alteration of a Dam and Reservoir to DSOD on behalf of the Bay-Delta Office, for construction work in support of the Clifton Court Forebay Fishing Facility Project. The project involves construction on the Clifton Court Forebay Dam, which is owned by DWR and under DSOD jurisdiction and therefore, an alteration or repair permit is required. The Bay-Delta Office is managing the planning and permitting process for the project.

Clifton Court Forebay intake structure radial gate No. 2 was successfully reinstalled following emergency repairs from the July 8, 2013, failure. Gate No. 2 was returned to operational status on July 31, 2014. However, the telemetry equipment that notifies the Area Control Center of the gate position was not installed. As a result, a special condition was placed on the operation of Gate No. 2 on July 31, 2014. The special condition restricts Gate No. 2 to local operation only and is expected to last until February 2015. The installation of

the telemetry equipment is anticipated to be completed in 2015.

### ***San Luis Field Division***

In the San Luis Field Division, 85 California Aqueduct features were inspected, spanning 5 repayment reaches and 9 aqueduct pools.

### ***San Joaquin Field Division***

In the San Joaquin Field Division, features along 85 miles of the California Aqueduct were inspected, including portions of the Coastal Branch. Two hundred sixty-eight California Aqueduct features were inspected, spanning 8 repayment reaches and 12 aqueduct pools.

### ***Southern Field Division***

In the Southern Field Division, features along 43 miles of the West and East branches of the California Aqueduct were inspected, including Tejon Ranch/Beartrap Road culverts, Devil Canyon penstocks, the Perris Dam outlet works tower, and the Perris Dam outlet works tunnel. Two hundred ninety-three California Aqueduct features were inspected, spanning 10 repayment reaches and 19 aqueduct pools.

In fall 2014, lead abatement and refurbishment was completed on the 96-inch stream release valves at the Castaic Dam outlet works. In addition, work commenced to refurbish the bolts on the high intake tower.

Work on the Crafton Hills Reservoir enlargement dam is scheduled to be completed in 2015. The Crafton Hills Reservoir now consists of one reservoir and two dams. The completion of the new dam allows for an impoundment increase from 120 to 294 acre-feet.

The Perris Dam seismic remediation of dam embankment project began in September 2014. This work was

implemented to upgrade the seismic safety of Perris Dam.

Perris Dam outlet tower and penstock were inspected in July 2014. The outlet tower and penstock are on a 10-year inspection cycle.

## **Other Inspections**

In addition to the conveyance facilities, 57 bridges, along with 150 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.

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.

## **Repairs**

### ***Milepost 62***

In 2014, the relocation of the Phillips 66 oil pipeline crossing over the California Aqueduct at Mileposts 62 and 64 was completed. The oil pipeline at both milepost locations was eliminated, and the pipeline is now routed along the right of way down slope of the California Aqueduct. The removal of the oil pipeline opens the way for repair of the slope and the liner at Milepost 62 that failed during a rapid drawdown in 1997.

## **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 2014. 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 2014, by Month**

1 of 6

Month	Facility	Unit	Outage Description
January	Banks Pumping Plant	8	January 1 to April 24 for megger rotor and continuity test; continued from December 12, 2013
	Banks Pumping Plant	9	January 3 to March 11 for KYD transformer maintenance work and Doble test
	Barker Slough Pumping Plant	6	January 1 to September 17 for excessive vibration
	South Bay Pumping Plant	1	January 1 to December 16 for discharge valve stuck open—discharge line drained; continued from March 26, 2013
	South Bay Pumping Plant	3	January 1 to December 31 for motor installation; continued from November 26, 2012
	South Bay Pumping Plant	9	January 21 to February 12 for discharge valve hydraulic problem
	South Bay Pumping Plant	11	January 1 to February 26 for pump and motor realignment and vibration testing
	Hyatt Powerplant	5	January 1 to June 16 for thrust bearing high temperature alarm
	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
	Devil Canyon Powerplant	3	January 6 to March 20 for annual Condition Assessment Program inspection and relay upgrade
	Mojave Siphon Powerplant	1	January 27 to March 3 for Condition Assessment Program inspection and annual maintenance
	Oso Pumping Plant	3	January 1 to December 31 for refurbishment, overhaul, rewind, and discharge valve work
	Oso Pumping Plant	4	January 1 to December 31 for refurbishment, overhaul, rewind, and discharge valve work
	Oso Pumping Plant	5	January 1 to February 5 for discharge valve refurbishment
	Oso Pumping Plant	6	January 1 to February 5 for discharge valve refurbishment
	Pearblossom Pumping Plant	7	January 6 to January 31 for Condition Assessment Program inspection
	Badger Hill Pumping Plant	1	January 1 to May 7 for discharge line 1 blast and recoat
	Badger Hill Pumping Plant	2	January 1 to May 7 for discharge line 1 blast and recoat
	Badger Hill Pumping Plant	3	January 1 to May 7 for discharge line 1 blast and recoat

**Table 11-2 Outages for Maintenance and Repair of Facilities in 2014, by Month**

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Month	Facility	Unit	Outage Description
	Badger Hill Pumping Plant	4	January 1 to May 7 for discharge line 1 blast and recoat
	Bluestone Pumping Plant	1	January 1 to August 6 for discharge valve installation
	Buena Vista Pumping Plant	4	January 1 to October 9 for pump and motor refurbishment
	Buena Vista Pumping Plant	5	January 1 to March 4 for stator rewind and rotor refurbishment
	Edmonston Pumping Plant	1	January 2 to May 23 for east wing discharge valve repairs
	Edmonston Pumping Plant	3	January 2 to May 22 for east wing discharge valve repairs
	Edmonston Pumping Plant	5	January 2 to May 21 for east wing discharge valve repairs
	Edmonston Pumping Plant	7	January 2 to May 20 for east wing discharge valve repairs
	Edmonston Pumping Plant	9	January 2 to May 20 for east wing discharge valve repairs
	Edmonston Pumping Plant	11	January 2 to May 20 for east wing discharge valve repairs
	Edmonston Pumping Plant	13	January 2 to May 21 for east wing discharge valve repairs
	Polonio Pass Pumping Plant	1	January 1 to August 20 for pump rebuild/excitation trouble
	Polonio Pass Pumping Plant	6	January 6 to January 31 for incomplete motor start
	Chrisman Pumping Plant	2	January 1 to December 24 for pump and motor refurbishment
	Chrisman Pumping Plant	9	January 1 to June 25 for pump packing inspection, replacement, and repair/unit rewind
	Teerink Pumping Plant	1	January 1 to December 17 for pump and motor refurbishment; continued from September 6, 2011
	Teerink Pumping Plant	7	January 8 to March 21 for brush preventive maintenance and station service breaker work
	Dos Amigos Pumping Plant	6	January 1 to April 22 for biannual replace dresser coupling packing/lead abatement on discharge line; continued from September 3, 2013
	Giannelli Pumping-Generating Plant	1	January 1 to December 31 for generator refurbishment
	Giannelli Pumping-Generating Plant	7	January 1 to February 28 for packing leakage; continued from December 3, 2012
	Giannelli Pumping-Generating Plant	8	January 10 to February 28 for exciter preventive maintenance
February	Banks Pumping Plant	1	February 5 to February 19 for air release valve failure to open during start
	Banks Pumping Plant	2	February 5 to February 25 for discharge valve failure to open during start
	Hyatt Powerplant	1	February 3 to February 19 for down thrust issues
	Pearblossom Pumping Plant	8	February 3 to February 28 for Condition Assessment Program inspection
	Chrisman Pumping Plant	8	February 3 to February 19 for pump and motor refurbishment



**Table 11-2 Outages for Maintenance and Repair of Facilities in 2014, by Month**

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Month	Facility	Unit	Outage Description
March	Banks Pumping Plant	3	March 18 to April 2 for hydraulic air compressor motor failure
	South Bay Pumping Plant	6	March 12 to April 18 for forced out of service on start up; motor lock out
	South Bay Pumping Plant	7	March 4 to December 31 for excessive vibration
	South Bay Pumping Plant	8	March 6 to April 18 for excitation problem
	South Bay Pumping Plant	9	March 14 to April 25 for start-up failure
	Devil Canyon Powerplant	4	March 31 to May 23 for annual Condition Assessment Program inspection and relay upgrade
	Mojave Siphon Powerplant	2	March 21 to April 7 for siphon barrels #2 and #3 pipe joint replacement
	Mojave Siphon Powerplant	3	March 21 to April 7 for siphon barrels #2 and #3 pipe joint replacement
	Pearblossom Pumping Plant	2	March 3 to March 27 for Condition Assessment Program inspection
	Giannelli Pumping-Generating Plant	2	March 3 to March 20 for protective relay testing
April	Banks Pumping Plant	5	April 9 to June 13 for failure to depress
	Cordelia Pumping Plant	2	April 1 to August 6 for vibration testing
	Mojave Siphon Powerplant	2	April 28 to May 23 for Condition Assessment Program inspection, annual preventive maintenance, and relay and trip testing
	Pearblossom Pumping Plant	3	April 7 to April 24 for Condition Assessment Program inspection
	Buena Vista Pumping Plant	7	April 18 to May 9 for KYB transformer Doble test and annual preventive maintenance
	Buena Vista Pumping Plant	8	April 3 to May 9 for KYB transformer Doble test and annual preventive maintenance
	Buena Vista Pumping Plant	9	April 18 to May 9 for KYB transformer Doble test and annual preventive maintenance
	Buena Vista Pumping Plant	10	April 3 to May 9 for KYB transformer Doble test and annual preventive maintenance
May	Teerink Pumping Plant	5	April 7 to May 23 for station service transformer preventive maintenance
	Cordelia Pumping Plant	4	May 16 to August 14 for unit fail to shut down
	Pearblossom Pumping Plant	9	May 5 to June 13 for mechanical seal, upstream seat, and Condition Assessment Program inspection
	Buena Vista Pumping Plant	1	May 20 to July 7 for excitation problems

**Table 11-2 Outages for Maintenance and Repair of Facilities in 2014, by Month**

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Month	Facility	Unit	Outage Description
June	Dos Amigos Pumping Plant	3	May 12 to July 18 for discharge line #3 measurement and inspection, exciter preventive maintenance, vane control oil replacement
	Banks Pumping Plant	10	June 30 to July 21 for replacement of thermal detectors and testing of CO <sub>2</sub> system
	Banks Pumping Plant	11	June 9 to July 2 for bench testing protective relays/trip
	South Bay Pumping Plant	6	June 2 to December 31 for motor vibration testing and balancing
	Devil Canyon Powerplant	1	June 6 to June 30 for control power failure and Condition Assessment Program inspection
	Mojave Siphon Powerplant	3	June 30 to July 25 for Condition Assessment Program inspection, relay and trip testing
	Badger Hill Pumping Plant	6	June 2 to June 20 for packing box line leak
	Badger Hill Pumping Plant	6	June 20 to July 7 for packing box line leak
	Edmonston Pumping Plant	11	June 10 to June 26 for failure of break to release
	Edmonston Pumping Plant	13	June 2 to June 23 for repair of upper seal leakage
July	Dos Amigos Pumping Plant	1	June 21 to July 21 for field breaker replacement and biennial relay testing
	Dos Amigos Pumping Plant	4	June 23 to July 22 for discharge line #4 inspection and measurements
	Banks Pumping Plant	4	July 9 to July 30 for high amortisseur winding temperature
	Barker Slough Pumping Plant	7	July 30 to December 31 for excessive vibration
	Cordelia Pumping Plant	3	July 30 to November 18 for excessive vibration
	Cordelia Pumping Plant	3	July 30 to December 31 for vibration testing
	Hyatt Powerplant	5	July 28 to August 16 for thrust bearing inspection
	Buena Vista Pumping Plant	1	July 7 to December 18 for excitation problems and motor rewind
	Polonio Pass Pumping Plant	6	July 4 to July 23 for failure to synchronize
	Dos Amigos Pumping Plant	1	July 21 to December 31 for field breaker replacement and biennial relay testing
August	Banks Pumping Plant	2	August 18 to September 22 for Condition Assessment Program inspection and preventive maintenance
	Hyatt Powerplant	1	August 26 to December 31 for river outlet valve work
	Hyatt Powerplant	2	August 26 to December 31 for river outlet valve work
	Devil Canyon Powerplant	2	August 11 to September 19 for Condition Assessment Program inspection

**Table 11-2 Outages for Maintenance and Repair of Facilities in 2014, by Month**

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Month	Facility	Unit	Outage Description
September	Pearblossom Pumping Plant	4	August 4 to December 16 for discharge line #2 and Condition Assessment Program work
	Pearblossom Pumping Plant	5	August 4 to December 16 for discharge line #2 and Condition Assessment Program work
	Pearblossom Pumping Plant	6	August 4 to December 12 for discharge line #2 and Condition Assessment Program work
	Banks Pumping Plant	1	September 29 to December 3 for Condition Assessment Program inspection and preventive maintenance
	Del Valle Pumping Plant	2	September 9 to October 6 for breaker trip
	Chrisman Pumping Plant	1	September 23 to December 4 for blind flange removal and discharge valve
	Chrisman Pumping Plant	3	September 23 to December 4 for blind flange removal and discharge valve
	Pine Flat Powerplant	1	September 2 to December 31 for facility outage for annual maintenance
	Pine Flat Powerplant	2	September 2 to December 31 for facility outage for annual maintenance
October	Pine Flat Powerplant	3	September 2 to December 31 for facility outage for annual maintenance
	Banks Pumping Plant	5	October 29 to November 13 for unit trip testing
	Del Valle Pumping Plant	1	October 31 to November 25 for repair of dam tier valves (dives required)
	Del Valle Pumping Plant	2	October 31 to November 25 for repair of dam tier valves (dives required)
	Del Valle Pumping Plant	3	October 31 to November 25 for repair of dam tier valves (dives required)
	Del Valle Pumping Plant	4	October 31 to November 25 for repair of dam tier valves (dives required)
	Hyatt Powerplant	6	October 13 to December 31 for lack of water
	Alamo Powerplant	1	October 13 to December 31 for Condition Assessment Program inspection, current transformer replacement, and relay upgrade
	Mojave Siphon Powerplant	3	October 20 to December 10 for lack of water
	Warne Powerplant	1	October 13 to October 31 for Condition Assessment Program inspection
	Edmonston Pumping Plant	2	October 2 to October 17 for West discharge line inspection

**Table 11-2 Outages for Maintenance and Repair of Facilities in 2014, by Month**

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Month	Facility	Unit	Outage Description
October	Edmonston Pumping Plant	4	October 2 to October 17 for West discharge line inspection
	Edmonston Pumping Plant	6	October 2 to October 17 for West discharge line inspection
	Edmonston Pumping Plant	8	October 2 to October 17 for West discharge line inspection
	Edmonston Pumping Plant	10	October 2 to October 17 for West discharge line inspection
	Edmonston Pumping Plant	12	October 2 to October 17 for West discharge line inspection
	Edmonston Pumping Plant	14	October 2 to October 17 for West discharge line inspection
	Chrisman Pumping Plant	8	October 18 to November 13 for leak in discharge line #4 coupling
	Chrisman Pumping Plant	9	October 18 to November 13 for leak in discharge line #4 coupling
	Teerink Pumping Plant	2	October 17 to November 9 for discharge valve installation
	Teerink Pumping Plant	3	October 17 to November 8 for discharge valve installation
	Giannelli Pumping-Generating Plant	2	October 24 to December 31 for butterfly valve installation
November	Banks Pumping Plant	7	November 2 to November 27 for Condition Assessment Program inspection and preventive maintenance
	Cordelia Pumping Plant	3	November 18 to December 31 for excessive vibration
	South Bay Pumping Plant	2	November 4 to December 5 for discharge valve installation and 1st stage exciter preventive maintenance
	South Bay Pumping Plant	4	November 4 to December 5 for discharge valve installation and 1st stage exciter preventive maintenance
	Hyatt Powerplant	4	November 14 to December 12 for lack of water
	Warne Powerplant	2	November 14 to December 11 for Condition Assessment Program inspection, relay and trip testing
	Edmonston Pumping Plant	5	November 14 to November 28 for high potential testing
	Edmonston Pumping Plant	7	November 13 to December 4 for east wing discharge valve repairs
December	Dos Amigos Pumping Plant	5	November 3 to November 20 for equalizing line repair
	Banks Pumping Plant	5	December 3 to December 31 for high thrust bearing temperature
	Pearblossom Pumping Plant	11	December 1 to December 16 for load test and Condition Assessment Program inspection







## **Chapter 12**

# **Engineering, Construction, and Real Estate**

*The East Branch Extension Phase II includes construction of Citrus Reservoir.*

## Significant Events in 2014

**I**n 2014, engineering, construction, and real estate work to enhance, expand, repair, and protect the State Water Project (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.

The Delta Habitat Conservation and Conveyance Program (DHCCP) continued with studies in 2014 to assess potential habitat restoration and water conveyance options.

*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 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 2013, 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, enlarging the SBA, remediating earthquake safety issues at Perris Dam, and assessing potential habitat restoration and water conveyance options in the Delta.

## Design Activities

In 2014, 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 2014.

The Department of Water Resources (DWR), Division of Engineering (DOE) continued to design projects for development into the construction phase, including awarding



construction contracts. Staff worked with many DWR divisions and offices, as well as local, State, and federal agencies. Staff 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 2014, included the following:

- Oroville, Thermalito, and Pyramid dams radial gate structural reevaluation—design;
- Oroville Field Division fire systems modernization—design review;
- Oroville Dam river outlet modification—preliminary design;
- North Bay Aqueduct alternate intake—study;
- Sisk Dam seismic reevaluation—study;
- East Branch Enlargement, Phase II—preliminary design and environmental documents;
- Perris Dam emergency release facility—design and environmental documents; and
- Los Robles Bridge seismic analysis—design.

In 2014, DOE staff completed the following projects:

- Feather River Fish Hatchery pipeline repair—design;
- Feather River spawning gravel supplementation—design;
- Bidwell Bar Bridge access road erosion repair—design;
- Oroville Dam radial gates 6, 7, and 8 seal replacement—design;
- Thermalito Afterbay Dam well replacement, Phase 2—design;

- Thermalito Afterbay Dam outlet structures seismic stability reevaluation—study;
- Sherman and Twitchell islands new fish screens at existing siphons (10 sites)—final design;
- Curtis Landing fish release site improvements—design;
- Suisun Marsh and Prospect Island levee maintenance, 2014–2017—design;
- Del Valle Dam tier valve intake repairs—design;
- Byron Highway bridge replacement—preliminary design and environmental documents;
- Delta Field Division water treatment plant modifications—design;
- San Luis Field Division bridge seismic retrofit, Phase 2—design;
- San Joaquin Field Division replacement of emergency generators—design;
- San Joaquin Field Division seal and pave roads and parking areas—design;
- East Branch Extension, Phase II—Citrus, Crafton Hills, and Cherry Valley pump stations completion contract—design;
- Perris Dam Oak Valley mitigation—design;
- Perris Dam outlet tower nonlinear time-history seismic response—study;
- San Luis and San Joaquin field divisions bridge seismic retrofit, Phase 3—design;
- Southern Field Division bridge seismic retrofit, Phase 1—design; and
- Southern Field Division seal and pave roads and parking areas—design.

## Environmental Activities

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 environmental compliance requirements and sensitive resource protection needs considered. Ongoing construction activities are monitored to ensure compliance with requirements outlined in environmental permits for each contract.

## Delta Habitat Conservation and Conveyance Program

In 2008, as a result of calls by the Governor and Legislature to protect the Delta, the Delta Habitat Conservation and Conveyance Program (DHCCP) was established, prompting studies to assess potential habitat restoration and water conveyance options. The DHCCP is currently conducting an environmental review of the Bay Delta Conservation Plan (BDCP). The lead agencies preparing the joint draft environmental impact report/environmental impact statement (EIR/EIS) for the BDCP are DWR, the Department of Fish and Wildlife, the Bureau of Reclamation, the U.S. Fish and Wildlife Service, and the National Marine Fisheries Service.

During 2014, the DHCCP continued to:

- support processes and alternative analyses needed to obtain permits required under Clean Water Act Sections 401(b)(1) and 404 and Title 33 U.S.C. 408 Navigation and Navigable Waters;
- maintain, update, and manage a database of questions, comments, and information requests related to the DHCCP and BDCP EIR/EIS;
- update the BDCP website and coordinate with other Delta-related programs regarding the DHCCP environmental and engineering process;

- develop a strategy to communicate DHCCP activities to others; and
- respond to comments received from State and federal agencies and the public on the draft EIR/EIS and BDCP.

The environmental component of the DHCCP includes environmental impact analysis, California Environmental Quality Act and National Environmental Policy Act document preparation, environmental surveys, mitigation, and all associated permitting requirements. Approval of the BDCP, its EIR/EIS, and associated documents is essential to obtaining required permits.

In 2014, the DHCCP accomplished the following:

- held statewide public meetings and prepared responses to public comments on the draft BDCP EIR/EIS;
- completed a draft conceptual engineering report for the Dual Conveyance Facility Modified Pipeline/Tunnel Option—Clifton Court Forebay Pumping Plant;
- completed a reusable tunnel material testing study and released a report;
- held meetings with key stakeholders, elected officials, and local residents, to discuss the proposed engineering changes to Conservation Measure 1 and present visual simulations of the new intake design and Clifton Court Forebay pumping facility;
- participated on Delta tours with elected officials and other stakeholders; and
- coordinated the completion of a preliminary system impact study by Sacramento Municipal Utility District.

More information can be found on the BDCP website.

## Construction Activities

DOE worked on 63 construction contracts in 2014. Projects included pipeline repair,



control systems upgrades, roadway and parking area repairs, seismic upgrades of bridges, and maintenance facility improvements at dam and reservoir sites. Table 12-2 (at the end of the chapter) provides a list of completed and ongoing construction contracts undertaken in 2014. Resolution of contract claims may extend the actual contract closeout beyond the completion or acceptance date.

## **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 will furnish and install 176 controller assemblies for the replacement of remote terminal units located throughout the SWP and will furnish 16 controller assemblies for Devil Canyon Powerplant and DWR's development lab at the Joint Operations Center. The controller assemblies are being built from components furnished by the contractor (programmable logic controllers, sequence-of-event recorders, fiber patch panels, modems, and other equipment). Work is scheduled to be completed in January 2015. Acceptance is expected in May 2015.

### ***California Aqueduct Copper Communications Cable and Voice and Data Equipment***

Work began on approximately 450 miles of California Aqueduct communications cable and appurtenances 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 2015. Acceptance is expected in July 2015.

## **Oroville Division**

### ***Brad B. Freeman Bike Trail***

Realignment of the bike trail (Specification No. 13-03) in the Lake Oroville State Recreation Area began in May 2013. The work included rock-fill delivered by barges, installation of corrugated metal pipe, chain-link fencing with gates, and aggregate base for the bike path. Work was completed in July 2013 and was accepted in March 2014.

### ***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 June 2015. Acceptance is expected in January 2016.

### ***Oroville Operations and Maintenance Center***

A new garage shop was constructed and site work was performed for a temporary building under a contract (Specification No. 11-03) that began in August 2011. This work is part of the Oroville Facilities Relicensing project. Work was completed in September 2013 and was accepted in March 2014.

### ***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 includes:

- furnishing and installing hydraulics and electronic controls to allow backup operation of 72-inch spherical valve plugs 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.

This contract is expected to be completed in mid-2015. Acceptance is expected in September 2015.

### ***Feather River Fish Hatchery***

Repair of the raw water supply pipeline (Specification No. 14-01) involved 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 began in April 2014 and was completed in September 2014. Acceptance is expected 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 channel and constructing an access road in the river channel; and
- (3) 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. Acceptance is expected 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 April 2012. Acceptance is expected in February 2015.

**Transmission Line and Modifications to Banks Switchyard.** Construction of a new 69 kilovolt (kV) transmission line from the South Bay Pumping Plant to Banks Pumping Plant and modifications to the Banks Switchyard began in October 2009 (Specification No. 09-06). The new transmission line increased the South Bay Pumping Plant power supply capacity and reliability while decreasing the unit cost of power. The Banks Switchyard modifications allow a power step-down from 230 kV to 69 kV. Project work also included installing DWR-furnished transformers and equipment; furnishing and installing prefabricated control buildings, 13.8 kV distribution line poles and equipment, a new substation, and switchgear and equipment; and removing and disposing of existing 13.8 kV and 5 kV power distribution lines. Work was completed in November 2012 and accepted in April 2014.

**South Bay Pumping Plant.** The following contracts for the SBA Enlargement project at South Bay Pumping Plant continued throughout 2014.

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 and was completed in 2014. 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 is scheduled to be completed in October 2015. Acceptance is expected in January 2016.

Specification No. 05-10: furnishing switchyard equipment. Work began in September 2005 and was completed in 2012. Additional work added by a contract change order furnished equipment for the Banks Switchyard expansion to accommodate the new 69 kV transmission line from Banks Pumping Plant to South Bay Pumping Plant in 2013. Acceptance occurred in February 2014.

Specification No. 05-05: furnishing 5 kV switchgear. Work began in October 2005, was completed in February 2011, and was accepted in December 2014.

Specification No. 06-04: enlarging pumping plant initial facilities. Work began in August 2006 and is expected to be completed in August 2015. Acceptance is expected in December 2015.

Specification No. 07-18: enlarging the pumping plant. Work began in 2007. Added work included repairs to a water system pipeline adjacent to Banks Pumping Plant. Work is scheduled to be completed in October 2015. Acceptance is expected in December 2015.

**Del Valle Dam.** Bulkhead installation and removal (Specification No. 12-14) 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 a leak 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 December 2012. Acceptance is expected in July 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 September 2013. Acceptance is expected in September 2015.

### ***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 Gate Nos. 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 radial Gate No. 2 and to identify and correct conditions to a level of acceptable operational risk on the four remaining gates. The contract also includes removing, cleaning, and repairing five loading gates. Work is scheduled to be completed in March 2015. Acceptance is expected 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. This minor contract is expected to be completed in June 2015. Acceptance is expected in August 2015.

**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. DOE issued and awarded Specification No. 14-20 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. Work is scheduled to be completed in May 2015, and acceptance is expected in September 2015.

### ***Curtis Landing Fish Release Site***

Work for this project (Specification No. 14-02) began in March 2014. It involves two tasks related to the Curtis Landing fish release site.



The first includes 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 includes 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 is scheduled to be completed in February 2015. Acceptance is expected in July 2015.

## **San Luis Division**

### ***Los Banos Creek Detention Dam***

Work began in July 2013 (Specification No. 13-04) at the Los Banos Creek Detention Dam to recoat 525 feet of the discharge pipe. The work involved stripping and recoating the interior and exterior of the pipe, the release and discharge slide gates, and the ladder, handrail, bulkhead gate, and various other piping. The work was completed in February 2014 and accepted in October 2014.

### ***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. Acceptance is expected 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 is expected 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 June 2013. Acceptance is expected in December 2015.

### ***Gorman Creek Improvement Channel***

Work on the Gorman Creek Improvement Channel, south of Orin Way (Specification No. 13-05), began in June 2013. The work involved removing 1,300 feet of the existing concrete channel and replacing it with 96-inch reinforced concrete pipe. The work also included a subsurface drainage system that will divert groundwater away from the channel. Work was completed in November 2013 and was accepted in April 2014.



### ***East Branch Canal***

The canal lining repair at Milepost 342.65 (Specification No. 13-10) included dewatering Pool 52, removing and repairing concrete panels, repairing and cleaning concrete, replacing bolt anchors and ladders, and repairing the access road. Work began in July 2013, was completed in January 2014, and was accepted in September 2014.

### ***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. Acceptance is expected in May 2015.

### ***Mojave Division***

#### ***Cedar Springs Dam***

A contract to replace conduits and perform miscellaneous work at Cedar Springs Dam began in March 2011 (Specification No. 10-06). Work was completed in July 2012 and accepted in January 2014.

#### ***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 was designed and will be operated to attain the Leadership in Energy and Environmental Design gold rating, is occupied by Southern Field Division staff and Lancaster Project Headquarters personnel. Work was completed in February 2013. Acceptance is expected in August 2015.

### ***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 includes 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 is scheduled to be completed in January 2015. Acceptance is expected 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 Geronimo 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 2014. Acceptance is expected in February 2015.

**Mentone Pipeline.** Construction of Mentone Pipeline (Specification No. 12-03) began in July 2012. The work to construct the pipeline includes 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 2015.

**Valves.** Manufacturing, testing, and delivering three energy dissipating valve assemblies (including electric actuators) for Citrus Reservoir began in September 2010 (Specification No. 10-10). 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 June 2015.

Manufacturing, testing, and delivering 14 ANSI (American National Standards Institute) butterfly valve assemblies with actuators for Citrus Pump Station, Crafton Hills Pump Station, and Cherry Valley Pump Station began in January 2011 (Specification No. 10-16). Spare parts and special tools were included in the contract work. Work was completed in mid-2013. Acceptance is expected in August 2015.

Manufacturing, testing, and delivering 12 AWWA (American Water Works Association) butterfly valve assemblies with actuators for Crafton Hills Pump Station, Cherry Valley Pump Station, and Mentone Pipeline began in February 2011 (Specification No. 10-17). Spare parts and special tools were included in the contract work. Work was completed in mid-2013. Acceptance is expected in August 2015.

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 began in January 2011 (Specification No. 10-18). 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 July 2013. Acceptance is expected in August 2015.

**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 has been manufactured and kept in storage ready to be delivered to the completion contractor in August 2015. Acceptance is expected in July 2017.

**5 kV 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 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 July 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 includes 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 is scheduled

to be completed in February 2015, and acceptance is expected in December 2015.

### ***Citrus, Crafton Hills, and Cherry Valley Pump Stations***

Work began in June 2013 (Specification No. 13-01) to provide pumps, motors, variable frequency drives, and excitation system equipment, and associated hardware for the pump stations. Units are scheduled to be delivered by October 2015. Acceptance is expected in July 2017.

### **West Branch**

#### ***Oso Pumping Plant***

Work began in December 2007 to construct a 14,400 square-foot civil maintenance and mobile equipment building at Oso Pumping Plant (Specification No. 07-22). Work was completed in July 2012. Acceptance is expected in October 2015.

#### ***Perris Dam***

The seismic remediation of Perris Dam (Specification No. 14-03) started in September 2014. The work involves construction of a new compacted berm, extension of the existing blanket drain, construction of new drain line, construction of a new toe drain and 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.

### **Construction Activities in Multiple Divisions**

#### ***Temporary Rock Barriers 2013, 2014, and 2015***

This project (Specification No. 12-18) began in January 2013. Work includes two tasks

related to the Temporary Barriers Project. The first task involves removing temporary rock barriers and appurtenances at Middle River, Old River, and Grant Line Canal. Other work includes dredging in the South Delta, removing aquatic weeds in Clifton Court Forebay, installing stone slope protection in the South Delta, and structural maintenance and repair at the Curtis Landing and Horseshoe Bend fish release sites. The second task includes furnishing, installing, and removing a nonphysical barrier at the head of Georgiana Slough and possibly other Delta divergence locations. Work is scheduled to be completed in December 2015. Acceptance is expected in March 2016.

#### ***San Joaquin and Southern Field Divisions***

Construction to seal and pave roads within the San Joaquin and Southern field divisions (Specification No. 12-08) began in August 2012. Work was completed in December 2013 and accepted in February 2014.

#### ***Delta, San Luis, San Joaquin, and Southern Field Divisions***

Construction of the copper communications cable (Specification No. 12-04) began in June 2012. Work was completed in January 2014 and accepted in March 2014.

#### ***San Luis, San Joaquin, and Southern Field Divisions***

The seismic retrofit of bridges will address existing seismic deficiencies in 23 bridges 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 supports the aqueduct operational road over a local county road. The work includes constructing 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 is 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.** This contract (Specification No. 14-09) covers the Duncan Road Bridge, Goss Road (Goodwin Drive) Bridge, Maple Avenue Bridge, Mesquite Street Bridge, and the Ranchero Road Bridge in the Southern Field Division. The Maple Avenue and the Ranchero Road bridges will have the bridge decks replaced. Work began in August 2014. Completion is expected in May 2015, and acceptance is expected in August 2015.

**Phase II.** This contract (Specification No. 14-14) covers the Butts Road Bridge, McCabe Road Bridge, and Mervel Avenue Bridge in the San Luis Field Division. Work began in September 2014. It is scheduled to be completed in February 2015, and acceptance is expected in April 2015.

**Phase III.** This contract (Specification No. 14-13) involves 15 bridges located in Fresno, Kings, and Kern counties in the San Luis and San Joaquin field divisions. Work began in September 2014. Completion is scheduled in March 2015, and acceptance is expected in April 2015.

### ***Edmonston, Chrisman, Teerink, and Buena Vista Pumping Plants***

Work (Specification No. 13-09) began in November 2013, consisting of replacing 57 annunciator panels and the associated hardware for the equipment. Work is scheduled to be completed and accepted in August 2015.

### ***Coastal Branch***

Work began on the cathodic protection rehabilitation project in Kern and San Luis Obispo counties in September 2013 (Specification No. 13-13) to remove

encasement at insulating coupling flanges and install 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 will be completed under Specification No. 15-05 beginning in November 2015.

### ***Badger Hill Pipeline***

Work began in the San Joaquin and Southern field divisions in November 2013 (Specification No. 13-14) to remove and replace the existing lining in manifolds and pipeline, construct a flow metering vault, remove and replace a joint at Check 66, and remove and reinstall pipe spool pieces. Work is scheduled to be completed in March 2015. Acceptance is expected in June 2015.

### ***Edmonston Pumping Plant, Teerink Pumping Plant, and Control Buildings at Various Sites***

Roofing replacement (Specification No. 12-06) began in October 2012 and required the removal and replacement of the existing roof assemblies. The work occurred in multiple field divisions including Edmonston and Teerink pumping plants in the San Joaquin Field Division, 15 control buildings in the San Luis Field Division, the Devil Canyon Penstock Control Building, and 28 other control buildings in the Southern Field Division. Additional repairs were made at Devil Canyon Power Plant. Work was completed in January 2014 and was accepted in August 2014.

### ***Southern Field Division—Roads and Parking Areas***

This project (Specification No. 14-05) began in July 2014 and covers areas in Los Angeles and San Bernardino counties.

The work includes:

- 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 is expected to be completed in September 2015 and accepted in November 2015.

## **Miscellaneous Construction Activities**

The following non-SWP construction activities are categorized as miscellaneous.

### ***San Joaquin River—Erosion Repair and Bank Protection***

Work began in September 2011 (Specification No. 11-06) to repair erosion along the San Joaquin River (River Mile 71.5R). The work included:

- fencing;
- protection of native trees;
- removal of trees, brush, and debris;
- earthwork;
- rock slope protection;
- installation of erosion control fabric;
- asphalt, concrete, and pavement repairs;
- planting, seeding, and irrigation;
- placement of in-stream woody materials; and
- plant establishment.

Work was completed in December 2013 and accepted in March 2014.

### ***Cache Creek—North Levee Setback***

Construction began in July 2013 (Specification No. 13-02) on Cache Creek at Levee Miles 3.9 and 4.2. Work included removing trees and vegetation, demolishing the existing patrol road, constructing a new levee and ramp, realigning and constructing a new county road, and seeding the area.

Work was completed in December 2014. Acceptance is expected in February 2015.

### ***San Joaquin River Parkway—North Channel Crossing Replacement***

Work began in July 2013 (Specification No. 13-08) to remove vegetation, rubbish, and an existing corrugated metal pipe culvert; construct a structural steel multiplate culvert with concrete footings; and complete earthwork on the existing channel and embankment and install new guard railing and erosion protection. Work was completed in November 2013 and accepted in March 2014.

### ***Sycamore Creek—Habitat Restoration and Sediment Removal***

Work began in October 2010 on a contract (Specification No. 10-14) to restore the Sycamore Creek habitat as a condition of the nationwide permit for the Sycamore Creek sediment removal project (Specification No. 10-13). The work includes seeding, plantings, installing an irrigation system and signage, and monitoring vegetation until the plants are established. Work is scheduled to be completed in October 2016. Acceptance is expected in January 2017.

### ***Sutter Bypass Pumping Plants—Control System Rehabilitation***

Replacement of the motor control centers and the control systems at Sutter Bypass Pumping Plants Nos. 1 through 3 was performed under a contract that began in December 2010 (Specification No. 10-09). The contractor removed and disposed of the existing control structures and furnished and installed new control structures, switchgear, nonsegregated busses, relays, supervisory control and data acquisition systems, ground grids, and generators. Work was completed in May 2014. Acceptance is expected in October 2015.



### ***Sutter Bypass—Weir No. 2 Replacement***

A project to replace Weir No. 2 in the East Borrow Canal in the Sutter Bypass began in April 2011 (Specification No. 10-08). The work included a new weir structure and fish ladder approximately 100 feet downstream from the existing weir and a control building on the levee. Work was completed in May 2014. Acceptance is expected in February 2015.

## **Real Estate Activities**

DWR processed a net total of \$5.26 million in payments in 2014 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, 2014.

### **SWP Acquisitions**

Activities related to acquisitions were as follows:

- executed five agreements for the California Irrigation Management Information System program;
- coordinated a landowner information meeting for property owners potentially impacted by the Cantua Creek Stream Improvement Project;
- requested Phase I site assessments for 19 flood easements and 3 fee acquisitions;
- obtained three fee acquisition appraisals for DWR parcel numbers APFC-44, Units A and B; APFC-46, Units A; and APFC, Units A and B; and 19 flood easements as required for the Cantua Creek Stream Group Improvements Project;
- executed a power usage agreement to power the fish monitoring equipment required for the 2014 Georgiana Slough Fish Barrier Project;
- presented a first written offer to Winter Island Farms, LLC, for the purchase of 589.09 acres to be used for tidal restoration;
- secured an access permit from San Bernardino Valley Water Conservation District to conduct vegetation transects for an East Branch Extension Phase I mitigation project;
- requested Phase I site assessments and appraisal reports for DWR parcel numbers SGP-83, -84, and -85 as required for the East Branch Extension Phase I improvements mitigation project;
- recorded an easement relocation agreement for DWR parcel numbers DLV-15-A, Unit A, and DLV-106, Unit A, as required for the SBA Improvement and Enlargement Project;
- recorded a Director's quitclaim deed relinquishing an access road, and an easement deed to document the relocated access road known as DWR parcel number DLV-138, as required for the SBA Enlargement and Improvement Project;
- executed a conservation easement deed for approximately 47 acres of real property to fulfill a mitigation requirement for the SBA Enhancement and Enlargement Project;
- attended a job site visit with potential contractors for the Curtis Landing fish release site;
- notarized and recorded a certificate of trust from a private property owner as required for the Curtis Landing fish release site project;
- processed a memorandum of settlement for an assignment deed to Pacific Gas & Electric as required for the Curtis Landing fish release site project;
- processed payment to Union Pacific Railroad for construction inspection costs

- related to the Brad B. Freeman Bike Trail project;
- executed a land use covenant with the Department of Toxic Substances Control to restrict future use of DWR parcel number EDF-41 to commercial/industrial use as required for the Delta Flood Emergency, Preparedness, Response, and Recovery Program;
- met with Tejon Mountain Village representatives to discuss a proposal to use portions of DWR's fee land for access;
- processed payment to Yamada Brothers Inc. for rental payments to access portions of assessor parcel numbers 189-170-03 and -07, as required for installation of the Grantline Canal Barrier, as part of the Temporary Barriers Project;
- secured an encroachment permit from Reclamation District 799 and a right-of-entry from the Department of Parks and Recreation to access and maintain an existing water information monitoring station, as part of the North Central Region Office Coordinated Temporary Entry Permits Project;
- coordinated meetings with representatives from Reclamation District 830 and 2059 and Ironhouse Sanitary District to discuss potential need of the West False River temporary barrier to prevent salinity intrusion, as part of the 2014 Emergency Drought Barriers Project;
- processed lease renewal for the use of Port of Stockton property for two rock stockpiles, as part of the Delta emergency operations project;
- secured a right-of-entry agreement from Western Riverside County Regional Conservation Authority to implement habitat mitigation for the Lake Perris Dam Remediation Project;
- executed an access easement deed from The Metropolitan Water District of Southern California for mitigation for the Lake Perris Dam Remediation Project;
- executed a license agreement between the East Bay Regional Park District, the Department of Fish and Wildlife, the Bureau of Reclamation, and DWR to allow for access to the Antioch fish release site, as required by the 2009 National Marine Fisheries Service biological opinion;
- processed payment to Phillips 66 for work completed as part of the Milepost 62 Pipeline Relocation Project;
- partially executed the second amendment to Utility Agreement No. 1765.5 between DWR and the California Department of Transportation to cover increased costs incurred by DWR associated with the widening of Highway 12 in Napa and Solano counties;
- conducted site visits with Bay Delta Office, Division of Environmental Services, and South Delta Water Agency staff to determine site suitability and accessibility for the installation of multiple water quality monitoring stations as required for the South Delta salinity study;
- partially executed a lease with the State Lands Commission to repair 15 small erosion sites per year for Phase I of the Division of Flood Management's Small Erosion Repair Program; and
- processed payment to the County of Sacramento for encroachment permit and inspection service costs as needed for the Curtis Landing fish release site project.

## Temporary Entry Permits

In 2014, DWR obtained 52 temporary entry permits including:

- Georgiana Slough fish barrier project, 9;
- Bay-Delta Office hydrodynamic studies, 4;
- Borrego Valley water level project, 1;
- Clifton Court Forebay predation studies, 1;

- East Branch Extension Phase II project mitigation, 1;
- Emergency Drought Barriers Project, 3;
- FloodSAFE Environmental Stewardship and Statewide Resources Office, Delta ecosystem enhancement projects, 3;
- Lake Perris Dam Remediation Project mitigation, 1;
- Morrow Island monitoring project, 1;
- North Central Region Office, coordinated temporary entry permits, 4;
- North/South Delta seepage monitoring project, 2;
- Prospect Island restoration project, 1;
- San Joaquin River restoration project, 4;
- South Delta Improvements Program—Temporary Barriers Project, 5;
- SWP Curtis Landing fish release site, 1;
- Suisun Marsh monitoring stations, 2;
- Suisun Marsh tidal restoration project, 7;
- Middle River temporary barrier, 1; and
- Yolo Bypass Salmonid Habitat Restoration and Fish Passage Program, 1.

### SWP Property Management

Property management activities during 2014 were as follows:

- managed leasing activities of SWP nonoperating properties, which produced \$845,276;
- processed 32 and executed 10 encroachment permit applications;
- collected fees of \$72,501 for review and inspection costs related to encroachment permit applications; and
- coordinated review of 34 tentative tract map developments within 1 mile of the California Aqueduct.

### SWP Appraisals

In 2014, 33 percent of total appraisal assignments (36 of 109) completed by

DWR were exclusively for the SWP. These assignments included the following:

- East Branch Extension Phase I, Crafton Hills Reservoir Expansion Project—completed three appraisal reviews;
- Cantua Creek Stream Group Improvements Project—completed one appraisal contract for 22 appraisals and completed 22 reviews;
- Fish Restoration Program—completed four appraisals;
- West Sacramento Corporate Yard Agreement—completed one appraisal;
- emergency temporary barriers—completed two appraisals;
- Lake Perris Remediation Project—completed one appraisal;
- Decker Island Acquisition Project—completed one appraisal;
- SWP Property Management—reviewed one appraisal submitted by Tejon Mountain Village, LLC for potential property exchange; and
- Sacramento County's proposed emergency communications radio tower on Twitchell Island—completed one appraisal.

**Table 12-1 Design Activities, 2014**

Construction Division and Facility	Design Activity	Date Design Began	Design Actual/ Estimated Completion Date
<b>Oroville Division</b>			
Oroville Field Division	Fire systems modernization	September 2014	March 2016
Oroville Dam	River outlet modification	December 2013	December 2015
	Radial gate seal replacement	July 2011	March 2015
Feather River Fish Hatchery	Pipeline repair	April 2014	December 2014
Feather River	Spawning gravel supplementation	February 2013	June 2014
Bidwell Bar Bridge	Access road erosion repair	November 2011	March 2014
Thermalito Afterbay Dam	Well replacement	January 2013	November 2014
	Outlet structures seismic stability reevaluation	July 2012	November 2014
<b>Delta Facilities</b>			
Sherman and Twitchell islands	New fish screens at existing siphons—10 sites	September 2007	June 2014
Curtis Landing	Fish release site improvements	July 2012	June 2014
Suisun Marsh and Prospect Island	Levee maintenance	April 2014	August 2014
<b>North Bay Aqueduct</b>			
North Bay Aqueduct	Alternate intake study	October 2008	June 2016
<b>South Bay Aqueduct</b>			
Del Valle Dam	Dam tier valve intake repairs	July 2013	July 2014
<b>North San Joaquin Division</b>			
Byron Highway	Bridge replacement	July 2013	July 2014
Delta Field Division	Water treatment plant modifications	July 2013	June 2014
<b>San Luis Division</b>			
Sisk Dam	Seismic reevaluation	July 2007	September 2016
San Luis Field Division	Bridge seismic retrofit Phase 2	July 2011	August 2014
<b>South San Joaquin Division</b>			
San Joaquin Field Division	Emergency generator replacement	October 2012	February 2014
	Seal and pave roads and parking areas	June 2012	January 2014
<b>East Branch Enlargement</b>			
East Branch Enlargement Phase II	Preliminary design and environmental documents	March 2007	June 2015
<b>Santa Ana Division</b>			
East Branch Extension Phase II	Crafton, Citrus, and Cherry Valley pump stations—completion contract	July 2008	March 2015
Perris Dam	Emergency release extension	October 2006	July 2017
	Oak Valley mitigation	March 2012	December 2014
	Outlet tower nonlinear time-history seismic response	May 2014	November 2014

**Table 12-1 Design Activities, 2014***(continued)*

Construction Division and Facility	Design Activity	Date Design Began	Design Actual/ Estimated Completion Date
<b>Miscellaneous</b>			
Oroville, Thermalito, and Pyramid dams	Radial gate structural reevaluation	July 2011	March 2015
San Luis and San Joaquin field divisions	Bridge seismic retrofit Phase 3	July 2011	August 2014
Southern Field Division	Bridge seismic retrofit Phase 1	July 2011	August 2014
	Seal and pave roads and parking areas	July 2011	August 2014
Los Robles Bridge (not part of seismic program)	Seismic analysis	August 2005	June 2015



**Table 12-2 Construction Activities, 2014**

Sheet 1 of 4

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	May 2015	12,112
California Aqueduct	Copper communications cable and voice and data equipment—monitoring, testing, and repair (13-17)	March 2014	July 2015	877
<b>Oroville Division</b>				
Brad B. Freeman Bike Trail	Realignment in the Lake Oroville State Recreation Area (13-03)	May 2013	March 2014	473
Robie Thermalito Pumping-Generating Plant	Cleanup and restoration Phase1—clean and repair fire-impacted equipment (13-16)	October 2013	January 2016	1,218
Oroville Operations and Maintenance Center	Build new garage shop and perform site work (11-03)	August 2011	March 2014	1,427
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	6,173
Feather River Fish Hatchery	Repair existing raw water supply pipeline and associated structures (14-01)	April 2014	February 2015	486
Feather River	Spawning gravel supplementation for fish habitat enhancement (14-04)	May 2014	February 2015	813
<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 2015	26,302
Transmission Line and Modifications to Banks Switchyard	Construct 69 kV transmission line and modify Banks Switchyard (09-06)	October 2009	April 2014	8,143
South Bay Pumping Plant	Furnish four 45 cfs pump and motor units and one spare pump and motor (04-05)	November 2004	January 2016	7,370
	Furnish valves, actuators, and hydraulic power unit (04-20)	May 2005	January 2016	2,258
	Furnish switchyard equipment (05-10)	September 2005	February 2014	1,303
	Furnish 5 kV switchgear (05-05)	October 2005	December 2014	3,608
	Construct pumping plant enlargement—initial facilities (06-04)	August 2006	December 2015	16,704
	Complete pumping plant enlargement (07-18)	December 2007	December 2015	22,401
	Del Valle Dam Bulkhead installation and removal (12-14)	October 2012	July 2015	76,658
<b>North San Joaquin Division</b>				
Skinner Fish Science Building	Delta Fish Survival Improvements Program (12-15)	December 2012	September 2015	5,498

**Table 12-2 Construction Activities, 2014**

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)				
Clifton Court Forebay Dam	Emergency radial gate repairs (13-15)	July 2013	July 2015	827
Skinner Fish Facility	Fish count and transport buckets (14-08)	June 2014	August 2015	146
	Emergency fish louver repair (14-20)	November 2014	September 2015	750
Curtis Landing Fish Release Site	Site improvements (14-02)	March 2014	July 2015	1,179
<b>San Luis Division</b>				
Los Banos Creek Detention Dam	Recoat 525 feet of outlet works discharge pipe (13-04)	July 2013	October 2014	889
Various counties	Seal and pave roads and parking areas (13-06)	July 2013	February 2015	7,732
<b>Tehachapi Division</b>				
Edmonston Pumping Plant	Replace pumps, Units W2, W4, W6, and W8 (02-10)	June 2003	November 2015	35,000
Chrisman Pumping Plant and Devil's Den Pumping Plant	Site improvements (12-12)	December 2012	December 2015	4,359
Gorman Creek Improvement Channel	Pipeline installation and channel repairs south of Orin Way (13-05)	June 2013	April 2014	2,554
East Branch, Milepost 342.65	Repair canal lining (13-10)	July 2013	January 2015	1,071
Antelope Valley-East Kern Water Agency Turnout	Construct turnout (13-11)	August 2013	May 2015	911
<b>Mojave Division</b>				
Pearblossom Pumping Plant	Construct 20,000 square-foot Leadership in Energy and Environmental Design gold-rated administration building (10-23)	February 2011	August 2015	13,586
<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	8,377
East Branch Extension Phase II				
Citrus Reservoir	Construct new reservoir (12-02)	June 2012	February 2015	19,654
Mentone Pipeline	Construct pipeline from Foothill Pump Station to Citrus Reservoir and from Citrus Pump Station to Crafton Hills Pump Station (12-03)	July 2012	December 2015	42,729
Valves	Manufacture, test, and deliver 3 energy dissipating valves for Citrus Reservoir (10-10)	September 2010	June 2015	700
	Manufacture, test, and deliver 14 ANSI butterfly valves for Citrus, Crafton Hills, and Cherry Valley pump stations (10-16)	January 2011	August 2015	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	August 2015	550

**Table 12-2 Construction Activities, 2014**

Sheet 3 of 4

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)
Valves (continued)	Manufacture, test, and deliver 12 ANSI ball valves for Citrus, Crafton Hills, and Cherry Valley pump stations (10-18)	January 2011	August 2015	3,300
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	February 2017	5,001
Crafton Hills and Citrus pump stations	Pump station expansion and initial construction (12-10)	October 2012	December 2015	25,566
Citrus, Crafton Hills, and Cherry Valley pump stations	Furnish equipment and hardware—pumps, motors, variable frequency drives, excitation systems (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 2015	4,048
Perris Dam	Seismic remediation of dam embankment (14-03)	September 2014	March 2018	75,539
<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
San Joaquin and Southern field divisions	Seal and pave roads (12-08)	August 2012	February 2014	4,918
California Aqueduct (in Delta, San Luis, San Joaquin, and Southern field divisions)	Copper communications cable and voice and data equipment—monitor, test, and repair (12-04)	June 2012	March 2014	953
San Luis, San Joaquin, Southern field divisions	Phase 1 seismic retrofit of bridges (14-09)	August 2014	August 2015	1,678
	Phase 2 seismic retrofit of bridges (14-14)	September 2014	April 2015	436
	Phase 3 seismic retrofit of bridges (14-13)	September 2014	April 2015	2,794
Edmonston, Chrisman, Teerink, and Buena Vista pumping plants	Replace annunciator panels and hardware (13-09)	November 2013	August 2015	815
Coastal Branch	Cathodic protection rehabilitation—remove encasement at insulating coupling flanges/ install new insulating sleeve couplings (13-13)	September 2013	September 2014	743
Badger Hill Pipeline	Pipeline repair (13-14)	November 2013	June 2015	3,325
Edmonston Pumping Plant, Teerink Pumping Plant, and control buildings, various sites	Roofing replacement (12-06)	October 2012	August 2014	1,979
Southern Field Division	Seal and pave roads and parking areas (14-05)	July 2014	November 2015	2,715
<b>Miscellaneous Activities (Non-SWP)</b>				
San Joaquin River Mile 71.5R	Repair levee erosion and protect banks (11-06)	September 2011	March 2014	3,571
Cache Creek Levee Miles 3.9 and 4.2	North channel setback levee construction (13-02)	July 2013	February 2015	676

**Table 12-2 Construction Activities, 2014**

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>Miscellaneous Activities (Non-SWP)</b> (continued)				
San Joaquin River Parkway	North channel crossing replacement (13-08)	July 2013	March 2014	170
Sycamore Creek	Restore habitat as a condition of permit for sediment removal project (10-14)	October 2010	January 2017	428
Sutter Bypass Pumping Plant Nos. 1, 2, and 3	Control system rehabilitation (10-09)	December 2010	October 2015	6,830
Sutter Bypass	Replace Weir No. 2 (10-08)	April 2011	February 2015	6,570



## **Chapter 13**

### **Recreation**

*Recreation on Lake Oroville.*



## Significant Events in 2014

*T*he third year of drought in California continued to negatively impact recreation at many State Water Project (SWP) facilities.

The Department of Water Resources (DWR) hosted the second annual Catch A Special Thrill (C.A.S.T.) for Kids event at Brannan Island State Recreation Area near Rio Vista. Thirty-seven children with special needs were taught how to fish by the area's top competitive bass fishermen, followed by a barbecue lunch and an awards ceremony. Each child was given a new rod, reel, and tackle box.

Lake del Valle's Coastal Cleanup 2014 was the most successful ever, with 144 volunteers contributing 576 hours cleaning up the lake shoreline while removing 1,220 pounds of trash and 100 pounds of recyclable materials.

Romero Overlook Visitors Center at San Luis Reservoir State Recreation Area received significant upgrades.

*Information for this chapter was provided by the Division of Integrated Regional Water Management, Public Affairs Office, Division of Environmental Services, all five SWP field divisions, 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. They are financed by Department of Water Resources' (DWR) existing authorities under the Burns-Porter Act and appropriations from the Legislature specifically for these purposes.

## 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, nearly 239 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 one-day period.

In 2014, most SWP recreation use was concentrated at the major reservoirs, with 38 percent occurring in the Oroville Field Division and 43 percent occurring in the Southern Field Division.

California experienced a third year of significant drought in 2014, negatively impacting recreation throughout the SWP. Low water levels at Lake Oroville impacted the lake's 2014 total use. Lower use was observed at developed boat ramps and marinas when compared to 2011 and 2012's high-water years. And use of Lake Oroville's car-top boat ramps was also significantly lower. Conversely, the attraction of full

Thermalito reservoir access points over the 2014 recreation season led to higher use of all three Thermalito reservoirs (the Diversion Pool, Forebay, and Afterbay) compared to recent years, based on traffic data.

Two of the three visitors centers saw an increase in attendance in 2014. The Lake Oroville Visitors Center and the Vista del Lago Visitors Center had a 10 percent and 19 percent increase in annual attendance, respectively. The Romero Overlook Visitors Center at San Luis Reservoir experienced an 18 percent decrease in visitation that may have been due to closure for 3 weeks in February and 1 week in May for remodeling.

Visitation at DWR's three SWP educational visitors centers, in recreation days, totaled 359,300. This included:

- 95,900 at Lake Oroville Visitors Center;
- 138,500 at Romero Overlook Visitors Center, San Luis Reservoir; and
- 124,900 at Vista del Lago Visitors Center, Pyramid Lake.

Overall, recreation usage of more than 3.9 million recreation days at the SWP reservoirs listed in Table 13-1 contributed significantly to the total day-use visitors reported at the 279 units of the California State Park System.



**Figure 13-1** Names and Locations of SWP Recreation Areas



**Table 13-1 Estimated Recreation Days in 2014, by Field Division and Facility**

Field Division and Facility	Recreation Days (rounded)	
<b>Oroville Field Division</b>		
Frenchman Lake	42,900	e
Antelope Lake	30,000	e
Lake Davis	41,000	e
Lake Oroville, Thermalito Diversion Pool, and Thermalito Forebay	706,400	
Thermalito Afterbay and Oroville Wildlife Area	324,900	
Feather River Fish Hatchery	226,700	
Lake Oroville Visitors Center	95,900	
<b>Subtotal</b>	<b>1,467,800</b>	
<b>Delta Field Division</b>		
Lake del Valle	407,500	
Bethany Reservoir	3,600	e(1)
Fishing Access Site:		
Niels Hansen	100	e(1)
California Aqueduct:		
Walk-in Fishing	100	e(1)
Bikeway	100	e(1)
White Slough Wildlife Area	13,000	e(1)
<b>Subtotal</b>	<b>424,400</b>	
<b>San Luis Field Division</b>		
San Luis Reservoir SRA: San Luis Reservoir, O'Neill Forebay, and Los Banos Reservoir	174,400	
Romero Overlook Visitors Center	138,500	
<b>Subtotal</b>	<b>312,900</b>	
<b>San Joaquin Field Division</b>		
Fishing Access Sites: Kettleman City, Lost Hills, Buttonwillow, and California Aqueduct Walk-in Fishing	28,400	e(1)
<b>Subtotal</b>	<b>28,400</b>	
<b>Southern Field Division</b>		
Silverwood Lake	383,700	
Lake Perris	649,400	
Vista del Lago Visitors Center	124,900	
Pyramid Lake	124,700	
Castaic Lake and Castaic Lagoon	386,100	
Fishing Access Sites:		
Quail Lake	1,200	e(1)
Longview Road	100	e(1)
California Aqueduct:		
Walk-in Fishing	1,800	e(1)
Bikeway	6,200	e(1)
<b>Subtotal</b>	<b>1,678,100</b>	
<b>Total for Recreational Sites</b>	<b>3,552,300</b>	
<b>Total for Visitors Centers</b>	<b>359,300</b>	
<b>Grand Total</b>	<b>3,911,600</b>	

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 visually monitored only; 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.

## Facilities

### Planning

#### Lake Oroville State Recreation Area

In 2014, DWR and the California Department of Parks and Recreation (California State Parks) planned a number of future improvements to the facilities at Lake Oroville State Recreation Area. For a third year, marina staff worked with DWR and California State Parks on the Exposed Polystyrene Inspection and Replacement Program. This program is scheduled to continue.

California State Parks continued to work on a Kelly Ridge fuel break. The purpose of the project is to maintain the shaded fuel break on the wildland-urban interface of the Kelly Ridge subdivision and Lake Oroville State Recreation Area. California State Parks based this project on the general guidelines for creating defensible space developed by the State Board of Forestry and Fire Protection. It is designed to reduce the chance that wildland fires on State land could spread to residential structures on adjacent private land. The work involves the removal and thinning of trees, shrubs, and grasses. Debris is cut up and piled for burning within cleared areas in the fuel break, or chipped and scattered as mulch. California State Parks will continue to annually maintain the approximately 100-foot-wide by 2.6-mile-long fuel break.

#### Silverwood Lake State Recreation Area

The California State Parks Planning Section began the planning process with the local District Superintendent to remodel the Old Mesa Campground restrooms and picnic area and improve trail access by removing overgrowth. Some of this planning includes providing access for visitors with special needs. These planned improvements are scheduled to begin in 2015.

## New Facilities

### *Lake Oroville State Recreation Area*

California State Parks constructed an outdoor wash station and shade ramada for park visitors to clean their camp dishes at the Lime Saddle Group Campground. This facility was designed for park visitors with limited mobility.

Automated pay machines, which now allow park visitors to pay with credit cards, were installed at the entrances to Lake Oroville's three major boat ramps: Bidwell Canyon, Lime Saddle, and Spillway.

The rerouting of the Brad Freeman Bicycle Trail that occurred in 2013 highlighted the need to realign a connector trail between the Dan Beebe Trail and the Brad Freeman Trail at a nearby location. The previous alignment directed trail users to pass through Union Pacific Railroad property, along the railway tracks, and back onto DWR property where the Brad Freeman realignment project ends. The new 2,000-foot-long connector, built in 2014, keeps trail users on DWR property and safely away from the railroad tracks.

## Improvements to Facilities

### *Lake Oroville State Recreation Area*

DWR improved existing access at the north Diversion Pool day-use area along Burma Road. The dirt car-top boat access point was regraded, and an articulated concrete mat was placed along with rock slope protection to prevent future erosion.

DWR coordinated improvements to the Thermalito Afterbay Outlet area with assistance from the California Highway Patrol and the Department of Fish and Wildlife. Improvements were made to help delineate campsites and reduce misuse of the facilities by installing bollards, gravel, and new paint striping.

The amphitheater located on Wyk Island, adjacent to the Bidwell Canyon Boat Ramp, was reconstructed by California State Parks.

California State Park crews also continued ongoing maintenance to help reduce the spread of wildland fires in the Kelly Ridge fuel break area by trimming and chipping branches and brush in the fuel break.

In addition to California State Parks' Kelly Ridge fuel break, DWR also continued to implement the Fuel Load Management Plan for FERC Project No. 2100. This plan identifies fuel load reduction treatments to provide land and resource managers with a strategic approach to minimizing the potential for wildfire within the project boundary. The plan identifies 10 treatment zones, which encompass 2,925 acres to be treated by 2027. Only 5.5 acres of land was treated in 2014 due to drought-related restrictions on prescribed burns (one of the primary treatment methods).

### *Lake del Valle State Recreation Area*

In 2014, a number of improvements were made at Lake del Valle State Recreation Area. East Bay Regional Park District:

- completed a project started in late 2013, which included restriping parking area stalls and replacing signs to make the parking area around Wild Turkey Campground more accessible for visitors with special needs;
- installed new hand dryers in the day-use restrooms;
- replaced three water fountains—located at the Westside middle stairway, the Eastside Kayak Center, and the Wild Turkey ADA Group Site—with high/low fountains to accommodate users with limited mobility;
- paved and seal-coated three areas of the East Shore parking lot to accommodate users with limited mobility; and



- performed three emergency tree removals, as large trees were found to be creating hazardous conditions in the campgrounds.

### ***San Luis Reservoir State Recreation Area***

The Romero Overlook Visitors Center had significant upgrades in 2014. In late 2013, the exterior walls were removed, allowing insulation and a new moisture barrier to be installed. In February 2014, the center was closed for 3 weeks for remodeling. A second 1-week closure occurred in May to completely remodel the restrooms. Other upgrades included replacing a theater screen with a flat-screen television; turning an office into a kitchen extension for staff; and replacing the lobby counter, two exit signs, and carpeting throughout the center.

### ***Silverwood Lake State Recreation Area***

During 2014, California State Parks completed trail improvements to the Rio and Baranca group camp areas, which included cleaning up overgrowth around the areas.

### ***Lake Perris State Recreation Area***

In 2014, California State Parks converted the Moreno Beach snack bar to a group picnic site, installed new entrance signs at both entrances, and resurfaced 1.5 miles of the main park road.

## **Recreation Activities**

The SWP, with its many reservoirs and hundreds of miles of aqueducts, offers Californians many 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 these facilities can swim, water ski, picnic, and enjoy many other activities. See Figure 13-2 for the various types of recreation available along the SWP.

### **Lake Davis**

Despite an early ice thaw, there was a Winter Fishing Derby in support of the American Cancer Society in late January.

The communities around Lake Davis celebrated California Free Fishing Days on July 5 and September 6, 2014.

The Lake Davis Spring Fishing Derby was held on Father's Day weekend (June 14 and 15) to support the Eastern Plumas Rural Fire Department.

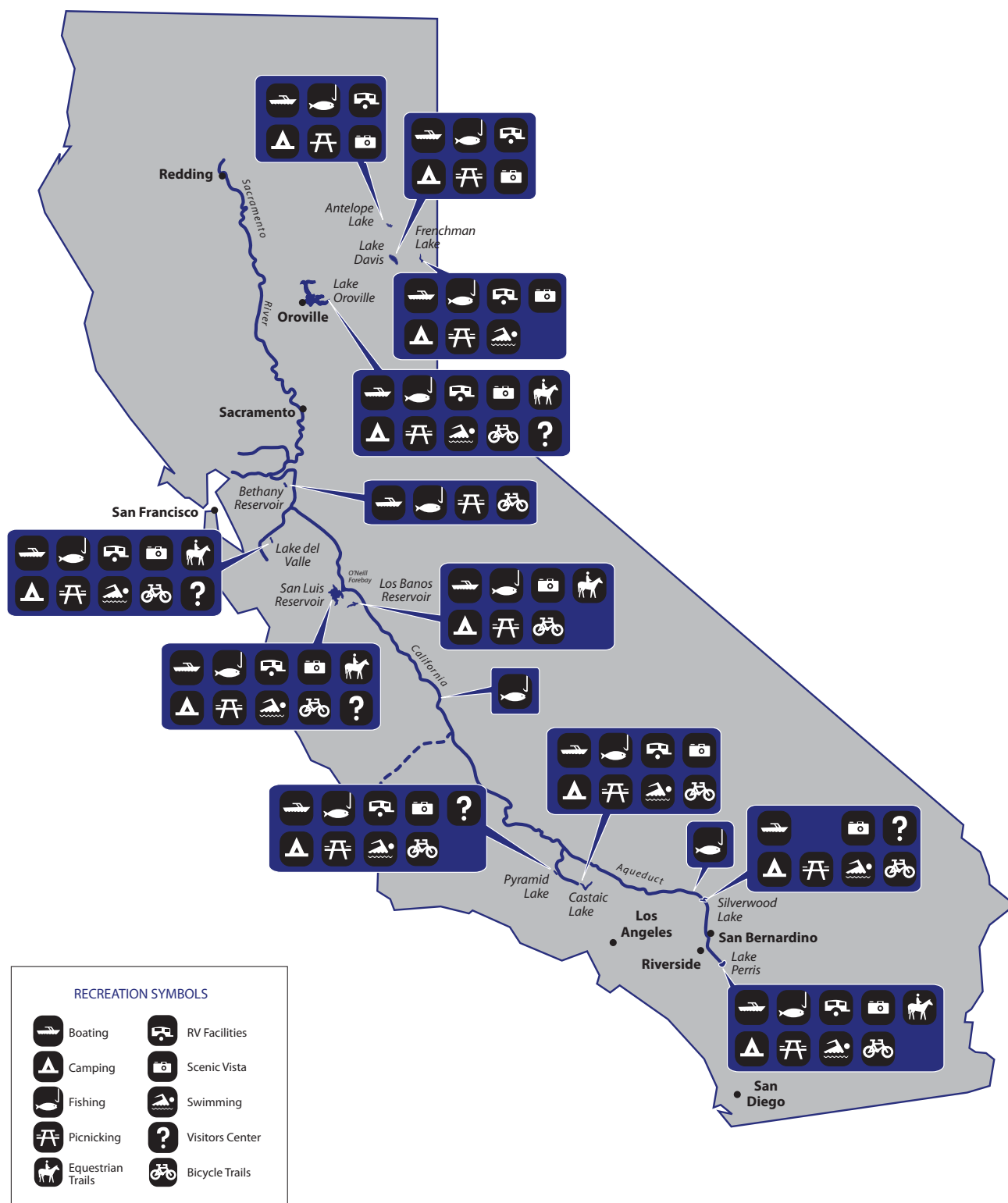
### **Lake Oroville State Recreation Area**

DWR, California State Parks, and other agencies sponsored a number of activities at Lake Oroville State Recreation Area in 2014.

DWR co-hosted a Jack Splash Fit-N-Fun Day with the Oroville YMCA and the Feather River Rowing Club at the North Forebay Aquatic Center. Two-hundred-fifty children learned the value of exercise and healthy eating habits through various activities with staff.

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, and was attended by an estimated 20,000 participants. About 800 visitors toured the Feather River Fish Hatchery during the event.

A Native Ways Celebration, attended by 400 visitors, was held by California State Parks at the Lake Oroville Visitors Center.



**Figure 13-2** Types of Recreation along the SWP

California State Parks also 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. More than 1,200 people attended the half-day event.

DWR staffed a booth to support Feather Fiesta Days. An estimated 18,000 visitors attended.

The annual 24 Hours of Gold Bicycle Race was held on the Lake Oroville trail system and was based out of the Loafer Creek Campground.

California State Parks hosted 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 Department of Forestry and Fire Protection hosted a C.A.S.T. (Catch A Special Thrill) for Kids fishing event for 40 children with special needs. The event, which treated the children to a day of fishing on the lake, was supported by 34 experienced fishermen and 147 volunteers.

## Lake del Valle State Recreation Area

East Bay Regional Park District sponsored or co-sponsored the following activities in 2014:

- with DWR and the Richmond Police Athletic League, co-sponsored an Aquatic Adventure Camp that served 25 children;
- Coastal Cleanup 2014, where 144 volunteers cleaned up the lake shoreline by contributing 576 hours removing 1,220 pounds of trash and 100 pounds of recyclable materials;

- 33 Regional in Nature (RIN) programs led by naturalists serving 363 individuals, and 36 non-RIN programs, which served 1,820 individuals;
- 15 campfire programs, which served 2,672 attendees; and
- 28 school programs, which served 944 children.

## San Luis Reservoir State Recreation Area

California State Parks sponsored the "Path of the Padres," a bi-weekly 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 State and local fairs. In 2014, park employees volunteered at the Merced County Fair and the Los Banos 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 Bureau of Reclamation, hosted 31 special needs children at a C.A.S.T. for Kids fishing event at O'Neill Forebay. The children were treated to a day of fishing with the area's top Delta tournament fishermen.

## 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 2014:

- 10 “Splash in the Water” events with 800 children ages 7 to 14 who learned about water safety, kayaking, canoeing, standup paddleboarding, and sailing;
- with co-sponsorship from the Friends of Castaic Lake and Teague Custom Marine, two Junior Lifeguard Programs for 487 participants ages 9 to 17 who learned lifeguarding, first aid, CPR skills, and water safety;
- with co-sponsorship from the Friends of Castaic Lake, 14 FamCamp sessions for 461 participants ages 17 and under;
- with co-sponsorship from the Friends of Castaic Lake, five moonlight kayak classes in which 115 participants ages eight and older learned about the environment at Castaic Lake, the SWP, water safety, and boating safety; and
- with co-sponsorship from the Friends of Castaic Lake, 56 standup paddleboarding classes to a total of 350 participants.

## Silverwood Lake State Recreation Area

In 2014, California State Parks sponsored the following activities at Silverwood Lake State Recreation Area:

- Bald Eagle Barge Tours for 475 park visitors on Saturdays and Sundays from January through March, where monthly eagle counts were taken;
- an Adopt-a-School program for 100 participants;
- a Coastal Cleanup Day with 25 volunteers who cleaned up the lake shoreline;
- the fourth annual Apple Festival, held near the Silverwood Historic Apple Orchard, which included apple picking

and demonstrations of an antique apple press, apple cooking, and canning. In addition, live music, a barbecue lunch, raffle, car show, and a preview of exhibits in the Silverwood Lake Nature Center were available to the 250 participants;

- Earth Day with approximately 40 volunteers;
- Veterans Appreciation Day, co-sponsored by the Mojave River Natural History Association, which included a raffle and barbecue and was attended by approximately 75 participants;
- three CAPS Program days (Creative Before and After School Programs for Success, San Bernardino City Unified School District), which served 105 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 throughout the summer; and
- a C.A.S.T. for Kids fishing event, which paired 46 special-needs children with 38 experienced bass fishermen for a day of fishing on the lake, co-hosted by DWR.

## Lake Perris State Recreation Area

In 2014, California State Parks sponsored the following activities at Lake Perris State Recreation Area:

- 12 Junior Ranger Programs conducted by a State Park Interpreter for participants aged 3 to 15;
- 12 Campfire Programs, with audiences of 20 to 65 visitors for each program;
- a 3-week Junior Lifeguard Program for 23 participants ages 8 to 15 who learned about natural and cultural resources, first aid, CPR, and aquatic safety;
- four Bald Eagle counts at the lake for volunteers to assist with the U.S. Forest Service’s annual winter Bald Eagle count;



- three sessions of Aquatic Adventure Camp, co-hosted by DWR, where more than 150 children enjoyed recreation activities while learning swimming strokes, basic first aid, CPR, and how to manage basic aquatic emergencies;
- a Holiday Boat Parade with 25 boats, which was enjoyed by 400 visitors; and
- a Summer Enhancement Program, in cooperation with the San Bernardino Unified School District, which hosted 500 students at Lake Perris who participated in swimming, fishing, and outdoor education throughout the summer.

## 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 and its Davis-Dolwig Act (DDA) collaborating partners, California State Parks, the California State Parks Division of Boating and Waterways, and DFW, will continue to operate Oroville Facilities' recreational installations consistent with the existing FERC license (renewed annually) and its associated 1993 Amended Recreation Plan.

## Fish Plantings

In 2014, DFW planted 895,500 fish in SWP reservoirs (see Table 13-2). This was 49.2 percent more than the 600,300 planted in 2013 and 8.3 percent more than the 826,700 planted in 2012. The 3-year average for 2012 through 2014 was 774,200 fish, whereas the average from 2009 through 2011 was 726,400 fish. This represents a 6.6 percent increase in fish planting at SWP reservoirs between the last 3 years and the prior 3 years.

## 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 5 percent SWP Table A allocation for 2014, maximum diversion amounts under the onshore recreation agreement were allocated at 5 percent, or a total of 341 acre-feet (af), as follows: 138 af at San Luis Reservoir; 20 af at Lake del Valle; 117 af at Castaic Lake and Castaic Lagoon; 63 af at Lake Perris; and 3 af at Bethany Reservoir. Actual deliveries under the agreement totaled 113 af as follows: 7 af at San Luis Reservoir; 46 af at Lake del Valle; 47 af at Castaic Lake and Castaic Lagoon; 13 af at Lake Perris; 0 af at Bethany Reservoir; and deliveries to California State Parks of 54 af at Silverwood Lake and 44 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* (RFWE). This report is no longer mandated by the Legislature. DWR initially began reporting recreation



**Table 13-2 Fish Planted by the Department of Fish and Wildlife in 2014 (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>							63.4
Fingerlings	26.6						
Catchables		25.8	11.0				
<b>Lake Davis</b>							274.2
Fingerlings	274.2						
<b>Frenchman Lake</b>							195.1
Fingerlings	195.1						
<b>Lake Oroville</b>							139.7
Fingerlings				139.7			
<b>Thermalito Afterbay</b>							11.0
Catchables					11.0		
<b>Lake del Valle</b>							62.8
Fingerlings				10.0		19.9	
Catchables	7.8		25.1				
<b>Los Banos Reservoir</b>							15.8
Catchables	12.0		3.8				
<b>Pyramid Lake</b>							26.7
Catchables			26.7				
<b>Castaic Lake</b>							42.4
Catchables			42.4				
<b>Silverwood Lake</b>							41.3
Subcatchables			0.5				
Catchables			40.8				
<b>Lake Perris</b>							23.1
Catchables			23.1				
<b>Total</b>	<b>515.7</b>	<b>25.8</b>	<b>173.4</b>	<b>149.7</b>	<b>11.0</b>	<b>19.9</b>	<b>895.5</b>

<sup>a</sup> Information provided by DFW, using the following size classes: fingerlings = 16.1 fish per pound or smaller; subcatchables = between 16.0 and 6.1 fish per pound; catchables = between 6.0 and 1.0 fish per pound; supercatchables = 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).

capital cost information in this bulletin for fiscal year 2000–2001.

The approach to financing RFWE in connection with the SWP is provided in the DDA (California Water Code [CWC] Sections 11900–11925, 1961) and the Burns-Porter Act (CWC Section 12937, 1959). 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, Senate Bill (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 the fiscal year 2012–2013 State budget, passed by the Legislature and effective July 1, 2012, the DDA was amended to continuously appropriate \$10 million per 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. The dam, however, cannot be physically separated into discrete elements for cost-sharing purposes, so DWR, by statute, must determine and allocate shares of such facilities to all of the

respective purposes. Moreover, and by law (the DDA), the SWP RFWE purpose costs cannot be included in charges for water and power to SWP customers, so the 2012 amendment filled a long-standing shortfall in SWP RFWE funding and helped provide a continuing benefit to Californians, with 4 million or more visitors per year enjoying SWP facilities that offer water-focused recreation and sport-fishing opportunities.

The 2012 DDA amendment was the result of several years of close, cooperative solution development that involved the Natural Resources Agency Secretary's office, the Department of Finance, the Legislative Analyst's Office, legislative staff, DWR, and many of DWR's long-term SWP water supply contracting public water agencies.

Another part of the cooperative solution to the long-standing DDA funding difficulties was concurrence from DWR to reexamine the joint RFWE allocation for SWP transportation facilities located south of Dos Amigos Pumping Plant. DWR did so, and commencing on 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 2014. Total capital costs increased by \$4,452,179 since Bulletin 132-14 due to an increase of \$4,046,643 in 2014 and an upward adjustment of \$405,536 in years prior to 2014. The increase in 2014 included \$3,796,563 in joint costs and \$250,080 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
	1952-2013 Updated	2014	Subtotal	1952-2013 Updated	2014	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	2,719,922	2	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	4,626,080	5	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	4,118,668	52,246	4,170,913	554,246	0	554,246	4,725,159
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	1	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	13,683,328	153,652	13,836,980	0	0	0	13,836,980
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	4,450,816	493,940	4,944,756	867,243	0	867,243	5,811,999
California Aqueduct Delta to Dos Amigos P. P. (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	5,357,577	468,931	5,826,508	(91,879)	0	(91,879)	5,734,629
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	6,438,691	555,297	6,993,989	6,021,441	0	6,021,441	13,015,430
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	4,343,344	38,821	4,382,165	(32,202)	0	(32,202)	4,349,963
California Aqueduct Dos Amigos P. P. 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	96,257,683	2,033,668	98,291,351	6,692,715	250,080	6,942,795	105,234,146
<b>Total</b>	<b>217,992,349</b>	<b>3,796,563</b>	<b>221,788,912</b>	<b>27,511,048</b>	<b>250,080</b>	<b>27,761,128</b>	<b>249,550,041</b>

<sup>a</sup> Percentages are the share of Joint Costs.<sup>b</sup> Specific Costs for Dos Amigos to Termini include \$2,905,649 for Castaic Dam and Lake, \$795,130 for Cedar Springs Dam and Silverwood Lake, and \$6,224,504 for Perris Dam and Lake Perris.



## Chapter 14

# Financial Analysis

*Agriculture in the Sacramento-San Joaquin Delta.*



## Significant Events in 2014

On March 6, the Department of Water Resources (DWR) delivered \$161.445 million of Water System Revenue Bonds, series AR. The proceeds were presold on February 25 to refinance commercial paper, provide up-front financing of construction expenditures, and pay bond financing costs.

On October 30, DWR delivered \$645.795 million of Water System Revenue Bonds, series AS. The proceeds were presold on September 30 to refinance previously sold bonds and to pay bond financing costs.

On November 6, DWR delivered \$149.245 million of Water System Revenue Bonds, series AT. The proceeds were presold on October 29 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 2014 through 2024.

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, 2014, 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 2024 including reimbursement of \$63 million interim financing for prior expenditures will total \$1.97 billion. Special capital requirements for revenue bond financing of these construction costs are projected at \$139 million for a total capital requirement of \$2.1 billion. This projection includes construction and financing costs for the following significant SWP projects planned for completion by 2024:

- Perris Dam remediation;
- Phase II enlargement of the East Branch of the California Aqueduct;
- Phase I improvements to the East Branch Extension;
- Phase II of the East Branch Extension;
- enlargement of and improvement to the South Bay Aqueduct (SBA); and
- a new intake to the North Bay Aqueduct.

Most of these capital requirements will be financed from the projected sale of \$1.6 billion of revenue bonds. SWP water contractors will directly be paying \$469 million. The remaining \$45 million of the total capital requirement of \$2.1 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 does not include the costs of associated work essential for realizing full benefits from the SWP, but financed and constructed by local interests or State agencies other than DWR. Those facilities 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 2024. Estimates of future capital expenditures include allowances for construction cost escalation of 5 percent per year from 2015 through 2024. Right-of-way costs are escalated at 4 percent per year from 2015 through 2024. 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 estimated costs for improvements and the historical costs for Phase II. 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.

*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.

*Line 7, East Branch Enlargement*, includes expenditures for Phases I and II of the East

**Table 14-3 Allocation of Capital Expenditures (in thousands of dollars)**

Facilities and Construction Divisions	Expenditures Incurred Through 2014	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	19,988	0	19,988	1,559	0	18,429	0
Oroville Division (excludes Small Hydro)	792,201	337,702	1,129,903	1,031,647	71,690	26,566	0
Delta Facilities Division	437,595	191,396	628,992	603,606	0	25,386	0
North Bay Aqueduct	112,071	469,300	581,371	581,371	0	0	0
South Bay Aqueduct	395,141	46,754	441,896	418,184	8295	15,416	0
California Aqueduct							
North San Joaquin Division	305,601	35,849	341,449	329,613	0	11,837	0
San Luis Division	327,484	25,856	353,339	338,742	0	14,597	0
South San Joaquin Division	342,763	23,892	366,655	348,869	0	17,787	0
Tehachapi Division	373,699	133,901	507,600	486,314	0	21,286	0
Mojave Division (excludes Small Hydro)	373,980	20,328	394,308	354,150	0	40,158	0
Santa Ana Division	323,522	198,432	521,954	440,626	0	81,328	0
West Branch	563,021	149,569	712,590	668,599	0	43,991	0
Coastal Branch	497,359	8,939	506,298	506,298	0	0	0
Subtotal, California Aqueduct	3,107,428	596,766	3,704,194	3,473,210	0	230,984	0
Other Project Facilities							
Small Hydroelectric Power							
Generating Facilities	99,991	0	99,991	99,991	0	0	0
Off-Aqueduct Power							
Generating Facilities	491,574	122,961	614,535	614,535	0	0	0
East Branch Enlargement	461,986	66	462,052	462,052	0	0	0
East Branch Extension	325,379	91,477	416,856	416,856	0	0	0
Coastal Power Allocation	30,708	0	30,708	30,708	0	0	0
Agricultural Drainage Facilities	85,061	18,220	103,281	0	0	0	103,281
Planning and Pre-operations	73,443	29,000	102,443	102,443	0	0	0
Unassigned/Miscellaneous	61,309	7,476	68,786	0	0	0	68,786
Subtotal, Project Construction Expenditures	6,493,876	1,911,119	8,404,995	7,836,163	79,985	316,780	172,067
Other Capital Requirements							
Davis-Grunsky Act Program	130,000	0	130,000	0	0	0	130,000
Total Capital Expenditures	6,623,876	1,911,119	8,534,995	7,836,163	79,985	316,780	302,067

<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.

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 Pearlblossom Pumping Plant. Construction of Unit 2 at Alamo Powerplant is expected to be completed in 2021, 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 2015 through 2024 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 Bay Delta Conservation Plan expenditures for preliminary planning and environmental

**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	41.0
Hyatt	29.5
Robie Thermalito	102.2
<i>Subtotal</i>	823.5
<b>Transmission Lines</b>	
Midway–Wheeler Ridge	10.7
Geysers–Lakeville	6.9
<i>Subtotal</i>	17.6
<b>Total</b>	<b>841.1</b>

**Table 14-6 Estimated Future Costs for Planning Additional Conservation Facilities**

Activity	Amount (in millions of dollars)
SWP Future Water Supply	29.0
Other Planning Costs	0.0
<b>Total</b>	<b>29.0</b>



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, 2014, 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 expended only for the construction of SWP facilities and for the Davis-Grunsky Act Program. Approximately 24 percent of the

**Table 14-7 Application of Revenue Bond Proceeds (in millions of dollars)**

Bond Series <sup>a</sup>	Construction Expenditures	Other Capital Requirements					Total Principal Amount of Bonds
		Reimbursement of General Fund	Capitalized Interest	Capitalized Operating Costs	Bond Financing and Refunding Costs <sup>b</sup>	Subtotal	
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
<i>Subtotal</i>	<i>3,803.2</i>	<i>2.6</i>	<i>294.5</i>	<i>14.8</i>	<i>6,193.1</i>	<i>6,505.0</i>	<i>10,308.3<sup>c</sup></i>
Future East Branch Enlargement Bonds	0.8	0.0	0.0	0.0	0.0	0.0	0.8
Future East Branch Extension Bonds	41.2	0.0	4.0	0.0	5.1	9.1	50.4
Future SBA Enlargement Bonds	5.1	0.0	0.2	0.0	0.2	0.4	5.5
Future Water System Facilities Bonds	1,405.7	0.0	57.1	0.0	72.7	129.9	1,535.5
<b>Total</b>	<b>5,256.0</b>	<b>2.6</b>	<b>355.8</b>	<b>14.8</b>	<b>6,271.2</b>	<b>6,644.5</b>	<b>11,900.4</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 \$4,397.1 million.

expenditures through 2014 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 2014.

### 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, 2014, DWR had sold \$10.3 billion of revenue bonds. That amount includes \$5.9 billion of refunded bonds, leaving a total principal obligation of \$4.4 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, Warne, 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, 2014. 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 DWR's estimate of \$0.8 million of additional bonds required to complete

construction of Unit 2 at Alamo Powerplant of East Branch Enlargement Phase II.

*Line 24, East Branch Extension, Current Bonds*, shows that \$383 million of Water System Revenue Bond proceeds has been spent through December 31, 2014.

*Line 25, East Branch Extension, Future Bonds*, shows DWR's estimate of \$50.4 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 \$215 million of Water System Revenue Bond proceeds had been spent through December 31, 2014.

*Line 27, South Bay Aqueduct Enlargement, Future Bonds*, shows DWR's estimate of \$5.5 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, 2014, \$2.1 billion of proceeds from Water System Revenue Bonds, Series A through Series AT, was applied to SWP projects other than the East Branch Enlargement, the East Branch Extension, and the SBA Enlargement. Of this total, \$1.9 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 \$1.5 billion of future water revenue bonds is needed to provide \$1.4 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, 2014, 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 2015 through 2024 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 2015 through 2024. 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 have amounted to \$5 million per year and have been 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 \$58.9 million in capital costs through December 31, 2014.

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 2016 water charges to be billed on July 1, 2015. 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 2015 charges included in Appendix B are as follows.

- Future capital costs in Appendix B are based on the prevailing prices as of December 31, 2014. Those costs presented in the financial analysis include allowances for price escalation.
- Pre-2015 charges in Appendix B represent charges as they should have been, according to currently known conditions. Pre-2015 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 2015 and thereafter have been adjusted for any apparent overpayments or underpayments of pre-2015 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	5/05/64	5/05/64	1,726,000	60,986	3.533	3.516
\$100,000,000 Series C Water Bonds	10/07/64	10/07/64	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	6/08/66	6/08/66	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	4/03/68	4/03/68	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	4/01/69	4/01/69	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	2/02/71	2/02/71	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	11/09/71	11/09/71	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	8/08/72	8/08/72	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	7/07/82	7/07/82	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	5/05/87	5/05/87	2,564,012	194,817	7.598	
\$ 9,000,000 Series C Water System Revenue Bonds	12/01/87	12/01/87	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	3/06/90	3/06/90	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	6/02/93	11,414,859	640,518	5.611	4.620
\$ 2,000,000 Series X Water Bonds	9/01/93	9/01/93	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	3/03/95	3/14/95	2,241,606	122,658	5.472	
\$335,000,000 Series O Water System Revenue Bonds	12/05/95	12/20/95	7,528,890	375,667	4.990	
\$160,000,000 Series P Water System Revenue Bonds	5/07/96	5/22/96	3,553,823	204,524	5.755	
\$266,630,000 Series Q Water System Revenue Bonds	11/05/96	12/04/96	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	3/04/98	1,310,620	66,942	5.108	
\$207,180,000 Series U Water System Revenue Bonds	11/19/98	12/01/98	4,032,075	200,758	4.979	
\$ 20,580,000 Series V Water System Revenue Bonds	11/19/98	12/01/98	525,100	32,819	6.250	
\$260,995,000 Series W Water System Revenue Bonds	5/01/01	5/17/01	3,659,312	195,822	5.351	4.613
\$160,225,000 Series X Water System Revenue Bonds	5/01/02	6/04/02	2,732,785	139,109	5.090	4.610
\$329,885,000 Series Y Water System Revenue Bonds	7/25/02	3/05/03	4,422,973	222,654	5.034	
\$170,655,000 Series Z Water System Revenue Bonds	10/01/02	10/16/02	1,706,132	75,696	4.437	
\$108,705,000 Series AA Water System Revenue Bonds	10/04/02	3/05/03	2,114,341	104,220	4.929	
\$189,625,000 Series AB Water System Revenue Bonds	3/09/04	3/18/04	4,344,942	173,788	4.000	
\$272,070,000 Series AC Water System Revenue Bonds	12/15/04	1/06/05	4,479,436	209,150	4.669	
\$112,390,000 Series AD Water System Revenue Bonds	6/14/05	7/07/05	1,827,449	90,461	4.950	4.608
\$632,890,000 Series AE Water System Revenue Bonds	4/23/08	5/01/08	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	12/02/09	2,907,605	311,889	10.727	
\$ 97,675,000 Series AH Water System Revenue Bonds	10/27/10	11/09/10	1,432,014	72,176	5.040	4.610
\$ 92,275,000 Series AI Water System Revenue Bonds	10/27/10	9/07/11	698,716	34,936	5.000	
\$216,930,000 Series AJ Water System Revenue Bonds	10/06/11	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	9/05/12	739,447	36,972	5.000	
\$183,960,000 Series AM Water System Revenue Bonds	2/28/12	3/05/13	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	10/29/14	11/6/14	2,784,834	83,541	3.000	
<b>Total</b>			<b>239,397,234</b>	<b>13,771,256</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.)



- 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 AT bonds. Charges in Table 14-2 apply to Series A through Series AT 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 AT bonds. Surcharge values included in Table 14-2 apply to Series B through Series AT 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. The most recent review of the percentage paid by Reclamation was completed in 1987 and resulted in a federal share of 44.09 percent. The amounts in Line 16 are based on the assumption that the federal share will continue at this level for calendar years 2015 through 2024.

*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 \$182.0 million in OMP&R costs through December 31, 2014.

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 OMP&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 \$74.9 million of loans disbursed as of December 31, 2014. 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 2014. 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, 2014, a net deposit (which includes returned deposits) of \$96.6 million had been made. \$84.5 million had been spent for replacement costs. The balance of the replacement reserve as of that date was \$33.2 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 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;

**Table 14-10 Operations, Maintenance, Power, and Replacement Costs, by Facility, Composition, and Purpose (in thousands of dollars)**

	Calendar Year												
Feature	1962–2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025–2035	TOTAL
Project Facility													
Feather River facilities	1,567,472	66,050	72,077	74,775	74,889	74,980	75,205	76,936	77,107	78,259	78,815	898,363	3,214,928
North Bay Aqueduct	107,237	6,173	7,342	7,751	8,081	8,124	7,691	7,851	7,853	7,954	7,995	90,058	274,110
Delta facilities	921,080	100,901	108,997	108,154	106,813	106,943	97,963	100,217	87,417	88,724	89,355	1,018,494	2,935,058
Suisun Marsh	62,268	4,743	4,923	4,826	4,847	4,853	4,867	4,979	4,990	5,065	5,101	58,142	169,604
South Bay Aqueduct	379,345	22,062	24,760	26,895	24,707	24,679	24,949	25,463	25,459	25,778	25,901	291,176	921,174
California Aqueduct													
Delta to Edmonston	4,368,699	154,251	240,727	247,691	272,470	248,358	253,506	272,842	265,897	268,062	265,705	2,994,285	9,852,495
Edmonston to Perris	3,925,010	173,060	241,482	257,371	278,889	260,354	286,303	290,200	289,840	293,915	290,312	3,252,114	9,838,850
West Branch	141,491	37,945	31,301	28,602	30,857	32,199	31,426	32,471	32,352	32,947	33,058	379,785	844,434
Coastal Branch	331,316	20,420	19,063	19,582	21,238	21,203	21,090	21,511	21,495	21,753	21,843	244,715	785,229
East Branch Enlargement	126,817	7,592	9,338	10,111	10,026	9,939	9,870	9,053	8,983	9,027	9,001	96,603	316,360
East Branch Extension	44,759	3,957	4,425	4,551	4,732	4,725	4,730	4,825	4,823	4,882	4,903	54,999	146,311
Off-Aqueduct power-generating facilities	1,589,487	109	110	110	111	112	112	113	113	114	114	1,296	1,591,901
Recreation, planning, and CVP negotiations	7,912	650	650	650	650	650	650	650	650	650	650	6,500	20,912
Water quality monitoring	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	5,964	250	250	250	250	250	250	250	250	250	250	2,500	10,964
Subtotal	14,016,517	610,846	778,128	804,002	851,243	808,748	829,991	858,740	838,608	848,759	844,382	9,502,820	31,592,785
Payments to/credits from PG&E under Comprehensive Agreement	(59,848)	0	0	0	0	0	0	0	0	0	0	0	(59,848)
Total OMP&R Costs	13,956,669	610,846	778,128	804,002	851,243	808,748	829,991	858,740	838,608	848,759	844,382	9,502,820	31,532,937
Composition													
Salaries and expenses of headquarters personnel	3,953,939	136,346	217,553	221,997	252,398	228,190	239,813	251,684	244,527	246,025	246,445	2,801,735	9,040,652
Salaries and expenses of field personnel	5,506,765	136,805	218,286	222,744	253,248	228,959	240,620	252,531	245,351	246,854	247,275	2,811,172	10,610,610
Pumping power													
Used by pumping plants	3,743,943	342,821	380,511	392,012	383,218	389,050	396,907	402,020	397,855	405,036	399,947	4,404,589	12,037,910
Produced by generation plants	(669,548)	(5,512)	(38,609)	(33,138)	(38,009)	(37,840)	(47,738)	(47,885)	(49,515)	(49,547)	(49,676)	(518,742)	(1,585,759)
Off-Aqueduct power-generating facilities requirement	1,589,487	109	110	110	111	112	112	113	113	114	114	1,296	1,591,901
Oroville-Thermalito insurance premiums	12,982	277	277	277	277	277	277	277	277	277	277	2,770	18,522
Less portion of costs incurred during construction	(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	0	0	0	0	0	0	0	0	0	0	(59,848)
Total OMP&R Costs	13,956,669	610,846	778,128	804,002	851,243	808,748	829,991	858,740	838,608	848,759	844,382	9,502,820	31,532,937
Project Purpose													
Water supply and power generation	13,329,236	570,451	737,824	763,698	810,939	768,443	789,686	818,435	798,304	808,454	804,078	9,099,773	30,099,319
Recreation and fish and wildlife enhancement	270,033	17,650	17,650	17,650	17,650	17,650	17,650	17,650	17,650	17,650	17,650	176,503	623,039
Flood control	10,994	1,052	1,052	1,052	1,052	1,052	1,052	1,052	1,052	1,052	1,052	10,515	32,025
Miscellaneous purposes													
Federal share: San Luis and Delta facilities	386,189	19,532	19,532	19,532	19,532	19,532	19,532	19,532	19,532	19,532	19,532	195,319	776,827
Other (Davis-Grunsky, drainage, City of Los Angeles)	20,064	2,162	2,071	2,071	2,071	2,071	2,071	2,071	2,071	2,071	2,071	20,710	61,575
Payments to/credits from PG&E under Comprehensive Agreement	(59,848)	0	0	0	0	0	0	0	0	0	0	0	(59,848)
Total OMP&R Costs	13,956,669	610,846	778,128	804,002	851,243	808,748	829,991	858,740	838,608	848,759	844,382	9,502,820	31,532,937



- 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 1952–2014 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, 2014*, 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 AT).

*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 3.5 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 2016 and 2021. 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 2016 and 2021, 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 2016 dollars and as escalated rates reflecting assumed future inflation of 7.0 percent in 2016 and 4.5 percent from 2017 through 2021.

**Table 14-12 Estimated Unit Water Charges for 2016 and 2021, by Service Area (in dollars per acre-foot)**

Service Area and Charge	2016	2021
	(in 2016 dollars)	(in 2021 dollars)
<b>Feather River Area</b>		
Capital; Operations, Maintenance, and Replacement (OM&R)	475	384
<b>North Bay Area</b>		
Capital; OM&R	452	470
Power	28	37
<b>Total</b>	<b>480</b>	<b>507</b>
<b>South Bay Area</b>		
Capital; OM&R	395	414
Power	57	69
<b>Total</b>	<b>452</b>	<b>483</b>
<b>Coastal Area</b>		
Capital; OM&R	1,078	1,183
Power	156	187
<b>Total</b>	<b>1,234</b>	<b>1,370</b>
<b>San Joaquin Area</b>		
Capital; OM&R	200	217
Power	28	34
<b>Total</b>	<b>228</b>	<b>251</b>
<b>Southern California Area</b>		
Capital; OM&R	386	421
Power	156	213
<b>Total</b>	<b>542</b>	<b>634</b>



Table 14-1 Capital Requirements and Financing, December 31, 2014 (in thousands of dollars)

Line Number/Item	Calendar Year												
	1952–2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2015–2024	1952–2024
<b>CAPITAL REQUIREMENTS</b>													
1. Initial Project Facilities	2,202,316	0	0	0	0	0	0	0	0	0	0	0	2,202,316
2. North Bay Aqueduct	114,582	1,597	11,058	42,369	65,069	163,069	132,069	54,069	0	0	0	469,300	583,882
3. Delta and Suisun Marsh Facilities	300,594	28,011	106,458	30,577	24,776	783	791	0	0	0	0	191,396	491,990
4. Final Four Units at Banks Pumping Plant	43,673	0	0	0	0	0	0	0	0	0	0	0	43,673
5. Coastal Branch Aqueduct	514,094	1,426	1,035	818	0	0	0	0	0	0	0	3,279	517,373
6. West Branch Aqueduct	213,490	8,117	5,445	10,236	14,693	26,179	73,975	10,000	0	0	0	148,645	362,135
7. East Branch Enlargement	461,986	66	0	0	0	0	0	0	0	0	0	66	462,052
8. East Branch Improvements	424,729	42,378	33,525	35,496	29,920	79,400	24,953	350	0	0	0	246,022	670,751
9. East Branch Extension	325,379	41,571	30,236	12,441	4,621	2,608	0	0	0	0	0	91,477	416,856
10. South Bay Aqueduct Improvements and Enlargement	299,740	8,017	11,570	11,647	6,358	6,070	755	767	779	791	0	46,754	346,494
11. Power Generation and Transmission Facilities	841,057	30,284	36,911	47,246	8,521	0	0	0	0	0	0	122,961	964,018
12. Additional Conservation Facilities	167,004	2,900	2,900	2,900	2,900	2,900	2,900	2,900	2,900	2,900	2,900	29,000	196,004
13. Agricultural Drainage Facilities	85,061	1,912	1,812	1,812	1,812	1,812	1,812	1,812	1,812	1,812	1,812	18,220	103,281
14. Other Costs	500,171	78,332	96,540	125,744	99,826	49,020	30,301	21,354	19,348	15,768	7,765	543,998	1,044,169
<b>15. Total Project Construction Expenditures</b>	<b>6,493,876</b>	<b>244,612</b>	<b>337,489</b>	<b>321,286</b>	<b>258,497</b>	<b>331,841</b>	<b>267,556</b>	<b>91,251</b>	<b>24,838</b>	<b>21,271</b>	<b>12,477</b>	<b>1,911,119</b>	<b>8,404,995</b>
16. Davis-Grunsky Act Program Costs	130,000	0	0	0	0	0	0	0	0	0	0	0	130,000
17. Special Capital Requirements Under Revenue Bond Financing	577,878	23,821	32,172	27,420	18,871	16,406	13,077	3,247	2,013	1,656	777	139,460	717,338
<b>18. Total Capital Requirements</b>	<b>7,201,753</b>	<b>268,433</b>	<b>369,661</b>	<b>348,706</b>	<b>277,368</b>	<b>348,247</b>	<b>280,633</b>	<b>94,498</b>	<b>26,851</b>	<b>22,927</b>	<b>13,254</b>	<b>2,050,579</b>	<b>9,252,332</b>
19. Power Facilities Capital Requirements	841,057	30,284	36,911	47,246	8,521	0	0	0	0	0	0	122,961	964,018
20. Water Facilities Capital Requirements	6,360,696	238,149	332,750	301,461	268,847	348,247	280,633	94,498	26,851	22,927	13,254	1,927,618	8,288,314
<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	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	481,781	0	0	0	0	0	0	0	0	0	0	0	481,781
23. East Branch Enlargement, Future Bonds	0	817	0	0	0	0	0	0	0	0	0	817	817
24. East Branch Extension, Current Bonds	382,745	0	0	0	0	0	0	0	0	0	0	0	382,745
25. East Branch Extension, Future Bonds	0	5,728	22,984	13,685	5,083	2,869	0	0	0	0	0	50,350	50,350
26. South Bay Aqueduct Enlargement, Current Bonds	215,008	0	0	0	0	0	0	0	0	0	0	0	215,008
27. South Bay Aqueduct Enlargement, Future Bonds	0	5,505	0	0	0	0	0	0	0	0	0	5,505	5,505
28. Water System Facilities, Current Bonds	2,124,622	0	0	0	0	0	0	0	0	0	0	0	2,124,622
29. Water System Facilities, Future Bonds	0	290,631	314,287	264,837	216,758	199,324	161,450	40,087	24,848	20,444	9,587	1,542,253	1,542,253
30. Subtotal, Water System Revenue Bonds	3,204,157	302,681	337,271	278,522	221,841	202,193	161,450	40,087	24,848	20,444	9,587	1,598,925	4,803,081
<b>Other Capital Financing</b>													
31. Initial Project Facilities Bond Proceeds	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	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	0	0	0	0	0	0	0	0	0	508,056
34. Interim Financing	62,645	(40,345)	16,832	23,315	(14,042)	(21,515)	(17,386)	(4,158)	(2,497)	(2,017)	(833)	(62,645)	0
35. Direct Pay	6,726	1,597	11,058	42,369	65,069	163,069	132,069	54,069	0	0	0	469,300	476,026
36. Application of Capital Resources Revenues to Construction	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	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	45,000	153,990
38. Subtotal, Other Capital Financing	2,835,139	(34,248)	32,390	70,184	55,527	146,054	119,183	54,411	2,003	2,483	3,667	451,655	3,286,793
<b>39. Total Financing of Capital Requirements</b>	<b>7,201,753</b>	<b>268,433</b>	<b>369,661</b>	<b>348,706</b>	<b>277,368</b>	<b>348,247</b>	<b>280,633</b>	<b>94,498</b>	<b>26,851</b>	<b>22,927</b>	<b>13,254</b>	<b>2,050,579</b>	<b>9,252,332</b>

Table 14-2 State Water Project Revenues and Expenditures, December 31, 2014 (in thousands of dollars)

Line Number/Item	Calendar Year												
	1952–2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2015–2024	1952–2024
<b>PROJECT REVENUES</b>													
1. Capital Resources Revenues	814,701	0	0	0	0	0	0	0	0	0	0	0	814,701
<b>Water Contractor Payments</b>													
2. Transportation Capital	4,972,926	178,801	185,212	187,382	185,844	182,698	183,859	183,819	178,726	178,083	177,610	1,822,034	6,794,959
3. Transportation Minimum	4,493,881	281,682	282,341	290,990	284,240	287,083	289,954	292,853	295,782	298,739	301,727	2,905,391	7,399,273
4. Transportation Variable	6,008,413	136,873	263,956	280,623	335,784	298,050	328,798	342,733	337,458	338,783	332,186	2,995,242	9,003,656
5. Off-Aqueduct Power Facilities	3,185,683	25,289	15,121	14,907	3,854	3,844	4,175	6,171	5,841	4,285	3,204	86,691	3,272,375
6. Delta Water Charge	3,364,922	249,669	313,865	313,865	313,865	313,865	313,865	313,865	313,865	313,865	313,865	3,074,457	6,439,379
7. East Branch Enlargement	976,828	45,962	46,115	48,354	47,374	47,464	46,602	46,496	45,064	38,564	40,047	452,043	1,428,870
8. East Branch Extension	173,884	34,666	34,099	36,264	37,644	38,079	38,389	38,394	38,443	38,457	38,501	372,935	546,819
9. Coastal Extension	55,605	4,605	4,594	4,347	3,345	2,534	3,531	3,656	4,531	3,406	3,406	37,954	93,559
10. South Bay Aqueduct Improvements and Enlargement	83,280	20,404	20,637	19,626	19,435	19,380	19,262	19,216	19,219	19,438	19,447	196,062	279,342
11. Tehachapi East Afterbay	38,842	6,750	6,793	6,293	6,131	6,139	6,128	6,116	6,118	6,189	6,196	62,853	101,695
12. Water Revenue Bond Surcharge	733,628	80,465	81,446	81,023	72,892	76,656	72,524	71,859	69,597	69,313	67,258	743,032	1,476,660
13. Subtotal, Water Contractor Payments	24,087,892	1,065,167	1,254,179	1,283,675	1,310,407	1,275,792	1,307,086	1,325,178	1,314,644	1,309,121	1,303,446	12,748,695	36,836,587
14. Revenue Bond Cover Adjustments	(927,077)	(54,001)	(54,472)	(54,583)	(50,253)	(51,837)	(50,120)	(51,080)	(49,411)	(48,498)	(47,822)	(512,076)	(1,439,153)
15. Rate Management Adjustments	(502,091)	(40,470)	(40,470)	(40,470)	(40,470)	(40,470)	(40,470)	(40,470)	(40,470)	(40,470)	(40,470)	(404,705)	(906,796)
<b>Other Revenues</b>													
16. Federal Payments for Project Operating Costs	408,251	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	200,000	608,251
17. Appropriations for Operating Costs Allocated to Recreation	36,099	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	100,000	136,099
18. Davis-Grunsky Loan Repayments	74,893	1,442	1,223	1,218	1,027	960	889	882	885	867	789	10,181	85,073
19. Revenue Bond Proceeds	652,977	0	0	0	0	0	0	0	0	0	0	0	652,977
20. Interest Earnings on Operating Revenues	576,862	360	360	360	360	360	480	480	480	480	480	4,200	581,062
21. Oroville-Thermalito Payments	249,279	0	0	0	0	0	0	0	0	0	0	0	249,279
22. Miscellaneous Revenues	0	0	0	0	0	0	0	0	0	0	0	0	0
23. Subtotal, Other Revenues	1,998,361	31,802	31,583	31,578	31,387	31,320	31,369	31,362	31,365	31,347	31,269	314,381	2,312,742
<b>24. Total Operating Revenues</b>	<b>24,657,085</b>	<b>1,002,497</b>	<b>1,190,819</b>	<b>1,220,199</b>	<b>1,251,071</b>	<b>1,214,805</b>	<b>1,247,864</b>	<b>1,264,990</b>	<b>1,256,127</b>	<b>1,251,499</b>	<b>1,246,422</b>	<b>12,146,295</b>	<b>36,803,380</b>
<b>25. Total Operating Revenues and Capital Resources Revenues</b>	<b>25,471,786</b>	<b>1,002,497</b>	<b>1,190,819</b>	<b>1,220,199</b>	<b>1,251,071</b>	<b>1,214,805</b>	<b>1,247,864</b>	<b>1,264,990</b>	<b>1,256,127</b>	<b>1,251,499</b>	<b>1,246,422</b>	<b>12,146,295</b>	<b>37,618,081</b>
<b>PROJECT EXPENSES</b>													
26. Project Operations, Maintenance, Power, and Replacement Costs	13,956,669	610,846	778,128	804,002	851,243	808,748	829,991	858,740	838,608	848,759	844,382	8,073,449	22,030,117
27. Deposits to Replacement Reserves	96,620	0	0	0	0	0	0	0	0	0	0	0	96,620
28. Deposits to Special Reserves Under Revenue Bond Financing	753,775	64,557	88,531	82,061	80,557	72,773	72,825	60,974	75,665	81,109	83,965	763,015	1,516,791
29. Capital Resources Expenditures	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, 2014 (Current Bonds)	3,325,752	186,252	188,275	181,650	153,942	156,259	157,796	151,165	150,586	134,665	135,813	1,596,403	4,922,155
31. Interest on Bonds Sold Through December 31, 2014 (Current Bonds)	6,232,783	115,979	108,631	100,633	92,359	86,520	80,031	72,870	66,356	59,645	52,822	835,846	7,068,629
32. Future Water Bond Principal Repayments	0	9,888	9,435	22,654	34,915	46,011	57,369	67,858	72,618	76,824	81,042	478,614	478,614
33. Future Water Bond Interest Payments	0	10,475	13,319	24,699	33,555	39,994	45,353	48,883	47,794	45,998	43,898	353,968	353,968
<b>34. Total Principal</b>	<b>3,325,752</b>	<b>196,140</b>	<b>197,710</b>	<b>204,304</b>	<b>188,857</b>	<b>202,270</b>	<b>215,165</b>	<b>219,023</b>	<b>223,204</b>	<b>211,489</b>	<b>216,855</b>	<b>2,075,017</b>	<b>5,400,769</b>
<b>35. Total Interest</b>	<b>6,232,783</b>	<b>126,454</b>	<b>121,950</b>	<b>125,332</b>	<b>125,914</b>	<b>126,514</b>	<b>125,384</b>	<b>121,753</b>	<b>114,150</b>	<b>105,643</b>	<b>96,720</b>	<b>1,189,814</b>	<b>7,422,597</b>
36. Subtotal, Bond Debt Service	9,558,535	322,594	319,660	329,636	314,771	328,784	340,549	340,776	337,354	317,132	313,575	3,264,831	12,823,366
<b>NET REVENUES</b>													
<b>37. Total Operating Expenses and Bond Debt Service</b>	<b>25,052,531</b>	<b>997,997</b>	<b>1,186,319</b>	<b>1,215,699</b>	<b>1,246,571</b>	<b>1,210,305</b>	<b>1,243,364</b>	<b>1,260,490</b>	<b>1,251,627</b>	<b>1,246,999</b>	<b>1,241,922</b>	<b>12,101,295</b>	<b>37,153,826</b>
38. Net System Revenues	419,255	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	45,000	464,255
<b>Application of Net System Revenues</b>													
39. California Water Fund Repayment	305,765	0	0	0	0	0	0	0	0	0	0	0	305,765
40. Revenues Used for Capital Expenditures	113,490	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	4,500	45,000	158,490

Table 14-11 Annual Debt Service on Bonds Sold through December 31, 2014 (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	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	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	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	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	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	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	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	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	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	4,257	430	3,276	2,129	27,569	46,294	101,285	1,435	7,107	7,170	29,302	818	5,535	1,791	11,376												



Table 14-11 Annual Debt Service on Bonds Sold through December 31, 2014 (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	49,266	103,577	54,612	6,910	2,045	104	273	707	210	1,228	542	19,271	9,802	1,680	996	10,431	13,902	7,418	7,706	2,616	2,271	153,942	92,359
2019	16,975	1,804	0	0	4,504	882	2,736	607	2,184	430	76,730	47,114	103,129	50,837	7,325	1,682	109	269	746	189	1,243	500	21,446	9,049	1,094	933	10,787	13,467	7,659	7,422	2,721	2,172	156,259	86,520
2020	17,405	956	0	0	5,518	681	3,327	491	2,797	322	72,194	44,293	101,241	46,743	7,765	1,298	113	263	873	163	1,455	453	22,383	8,143	1,926	898	11,287	12,952	7,912	7,075	2,841	2,043	157,796	80,031
2021	8,595	318	0	0	2,636	446	1,680	354	1,150	197	77,163	40,885	91,224	42,200	8,230	890	957	258	927	131	2,248	396	22,459	7,150	2,090	834	11,801	12,415	8,258	6,691	2,971	1,905	151,165	72,870
2022	1,885	60	0	0	5,241	339	4,962	289	1,204	145	74,424	37,643	87,716	38,476	8,725	458	1,003	211	853	95	2,194	298	23,097	6,134	2,852	773	12,376	11,853	8,653	6,298	3,117	1,760	150,586	66,356
2023	85	7	0	0	1,024	96	550	55	635	90	81,068	34,477	83,362	34,725	0	0	554	161	555	59	1,881	196	20,738	5,082	2,052	673	12,954	11,258	9,243	5,884	3,326	1,607	134,665	59,645
2024	35	3	0	0	661	50	380	31	427	60	82,261	30,237	83,764	30,381	0	0	346	133	441	32	1,498	93	20,830	4,104	2,135	589	13,596	10,622	9,707	5,426	3,496	1,442	135,813	52,822
2025	0	0	0	0	149	23	106	16	170	41	78,190	26,902	78,615	26,982	0	0	137	116	62	10	61	9	25,671	3,133	1,709	502	14,248	9,974	10,006	4,977	3,571	1,279	134,080	46,982
2026	0	0	0	0	153	18	110	13	178	33	75,479	22,935	75,920	22,999	0	0	244	109	64	8	63	7	9,320	1,862	1,787	426	14,439	9,296	11,451	4,478	4,333	1,100	117,621	40,285
2027	0	0	0	0	397	13	283	9	263	25	86,420	19,426	87,363	19,473	0	0	314	97	166	6	162	5	8,632	1,421	1,782	346	18,217	8,577	12,523	3,914	4,860	886	134,019	34,725
2028	0	0	0	0	0	0	0	0	139	14	70,829	15,511	70,968	15,525	0	0	421	81	0	0	0	0	8,909	1,011	2,725	280	23,802	7,671	14,054	3,296	5,612	645	126,491	28,509
2029	0	0	0	0	0	0	0	0	148	7	80,035	11,767	80,183	11,774	0	0	439	60	0	0	0	0	7,328	591	2,881	144	24,836	6,490	14,712	2,597	5,880	364	136,259	22,020
2030	0	0	0	0	0	0	0	0	0	0	34,620	8,263	34,620	8,263	0	0	103	38	0	0	0	0	1,290	253	0	0	19,490	5,260	7,148	1,895	324	77	62,975	15,786
2031	0	0	0	0	0	0	0	0	0	0	35,680	7,254	35,680	7,254	0	0	110	33	0	0	0	0	1,310	228	0	0	20,280	4,469	7,515	1,573	335	68	65,230	13,625
2032	0	0	0	0	0	0	0	0	0	0	37,245	5,690	37,245	5,690	0	0	120	27	0	0	0	0	1,370	172	0	0	21,105	3,645	7,865	1,212	350	53	68,055	10,799
2033	0	0	0	0	0	0	0	0	0	0	38,605	4,344	38,605	4,344	0	0	125	21	0	0	0	0	1,410	131	0	0	21,960	2,788	5,800	843	365	41	68,265	8,168
2034	0	0	0	0	0	0	0	0	0	0	39,990	2,950	39,990	2,950	0	0	130	14	0	0	0	0	1,455	89	0	0	22,855	1,896	6,075	575	380	28	70,885	5,552
2035	0	0	0	0	0	0	0	0	0	0	41,425	1,502	41,425	1,502	0	0	140	7	0	0	0	0	1,495	45	0	0	23,790	967	6,350	294	390	14	73,590	2,829
Total	1,582,400	2,386,523	244,995	246,522	107,639	195,719	60,748	100,924	49,125	81,976	1,936,162	1,947,007	3,981,069	4,958,671	139,165	283,872	448,266	570,610	74,460	115,803	156,316	227,907	485,722	613,618	43,771	46,195	370,931	292,566	211,589	144,738	68,336	45,132	5,979,625	7,299,112

<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**

*Children learn about drought tolerant plants at the Department of Water Resources' outdoor exhibit at the California State Fair.*

## Significant Events in 2014

**O**n January 17, the Governor declared a State of Emergency in response to California's third consecutive drought year. The State of Emergency recognized the critical role of the Department of Water Resources (DWR) in managing the State Water Project (SWP) to meet urgent water supply needs with limited storage.

On February 12, DWR and the Bureau of Reclamation (Reclamation) filed a petition with the State Water Resources Control Board (SWRCB) requesting the ability to jointly serve SWP and Central Valley Project (CVP) service areas to more efficiently meet supply demands.

In March, DWR allocated \$200 million to fund local projects throughout the State to help alleviate impacts of the 3-year drought and to mitigate the effects of future droughts.

*Save Our Water*, a partnership between DWR and the Association of California Water Agencies (ACWA), launched the *Californians Don't Waste* and the *Join the Effort* campaigns featuring billboard, radio, and Internet advertisements; public service announcements by celebrities and professional athletes; and a social media contest urging continued water conservation efforts.

DWR made numerous drought presentations to service clubs and other organizations and hosted a series of landscape workshops with the California Center for Urban Horticulture, educating professional landscapers on efficient outdoor water use.

*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, photography, public meetings, social media, and special events.

## News Topics

Selected highlights below provide examples of PAO's 2014 outreach efforts and news media responses related to DWR's water policy, programs, and activities.

### Drought

With 2014 registering as the driest year on record, 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 drought public outreach efforts.

On March 10, DWR released the *Klamath/San Joaquin/Sacramento Hydroclimatic Reconstructions from Tree Rings* draft final report. As a tool to help understand historic drought periods and to help adapt to climate change, the study focuses on analyzing tree-ring chronologies, river streamflow, and precipitation records.

From April through September, DWR and the California Center for Urban Horticulture hosted 11 landscaper workshops throughout the State. The Get Ahead or Get Parched: 6 Ways to Survive the Drought workshops educated professional landscapers on rebate programs, water meters, and efficient irrigation. Workshops were held in Truckee, Roseville, Santa Rosa, San Luis Obispo, Walnut Creek, Fresno, Riverside, San Diego, La Jolla, Arcadia, and Irvine.

PAO announced that DWR was observing May as Save Our Water Month, formerly known as Water Awareness Month.

*Save Our Water*, a partnership between DWR and the Association of California Water Agencies, increased water conservation messaging by launching its *Californians Don't Waste* and *Join the Effort* campaigns in 2014. The campaigns included public service announcements by Lady Gaga and Conan O'Brien, billboard advertisements, and Spanish and English radio advertisements by the Oakland A's, Los Angeles Angels, San Diego Padres, and San Francisco Giants pitchers. These new campaigns also featured a new microsite and a Spanish-language website highlighting water conservation tips.

PAO also made drought-focused presentations at 18 Rotary Clubs in District 5180, educating audiences on past and current drought conditions and water conservation awareness.

### 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 hot summer months.

The final snow survey on May 1 measured statewide snowpack water content at only 18 percent of the historical average for the date. In 2013, water content was 17 percent of average, and 39 percent of average in 2012.

In 2014, due to increased public and news media interest in snowpack readings, PAO stepped up its snow survey outreach efforts via social media and news releases including historical readings, graphics, and links to hydrology websites. Video footage and still photos of DWR snow surveys were supplied to the news media.

### State Water Project Allocations

On January 31, for the first time in the history of the State Water Project (SWP), DWR announced a “zero” allocation of water for the 29 public agencies (SWP water contractors) that collectively serve more than 25 million Californians and about 750,000 acres of irrigated farmland. Snow in February and March allowed DWR on April 18 to announce a final allocation of 5 percent. The 2014 final allocation 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.

### Contract Extension Program

DWR and the SWP water contractors continued negotiations on December 10 to extend the contracts under which DWR delivers water to 29 agencies throughout the State. PAO announced the public negotiations.

Announcements and information about the negotiation sessions are available on the Water Supply Contract Extension Program web page on DWR’s website.

### Bay Delta Conservation Plan

On July 29, the extended public comment period for the initial draft Bay Delta Conservation Plan (BDCP) and the associated environmental documents concluded. On August 27, DWR and other lead agencies announced a partially recirculated draft of the plan, the environmental impact report/ environmental impact statement, and the implementing agreement detailing agency roles will be published in 2015.

Responding to public comments, in late December DWR publicized changes to the BDCP to reduce local impacts of the project in the Sacramento-San Joaquin Delta. One major modification to the plan eliminated the proposed construction of three, 2-story pumping plants totaling 46,000 square feet. These and other changes will be available for review and comment in the partially recirculated draft environmental documents.

The BDCP is a collaborative effort by State and federal agencies to improve water delivery reliability while reducing water project impacts on fish and wildlife and restoring natural habitat in the Sacramento-San Joaquin Delta.

Additional information about the BDCP can be found in Chapter 3, Environmental Programs.

### Flood Preparedness

On October 1, DWR released *Guidance on General Plan Amendments for Addressing Flood Risk*, a guide to assist cities and counties when amending their general plans. The guide provides examples of general plan content and details how to request appropriate data from DWR.

On October 22, During California Flood Preparedness Week, DWR staged the Twitchell Island Flood-Fight Exercise in the Sacramento-San Joaquin Delta in cooperation with the Sacramento County



Office of Emergency Services, Reclamation District 1601, and the U.S. Army Corps of Engineers. The exercise focused on training the California Conservation Corps on flood-fighting techniques, and emphasized that catastrophic floods are possible during a drought.

## Integrated Regional Water Management Grants

In March, DWR received \$200 million from drought legislation to fund local projects and programs to alleviate the impacts of the drought and prepare for future dry years. DWR's Division of Integrated Regional Water Management recommended funding more than 100 projects.

On November 6, PAO issued a press release announcing \$14 million in grants awarded to the Sacramento Regional Water Authority and the Yolo County Flood Control and Water Conservation District for drought relief. The 17 projects and programs funded include Lower American River pump station modifications, City of Lincoln well improvements, and agricultural and rural residential drought response incentives.

## Perris Dam Remediation Project

On October 2, PAO publicized kickoff of the multiyear seismic safety upgrade of Perris Dam in Riverside County. On October 15, upgrade activity closed the southeast side of the Lake Perris State Recreation Area to the public. In addition to keeping the public informed of the upgrade's progress and its impacts through news releases, PAO posted updates in English and Spanish on DWR's Lake Perris website.

## 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 2014 included updated versions of *Pyramid Lake*, *San Luis Joint-Use Complex*, *South Bay Aqueduct*, *Upper Feather River Lakes*, and *History of California Water Development*. Spanish translations were completed for the *Easy Ways to Save Water* brochure, the campaign ads for *Brown is the New Green*, aerator and shower timer cards, and the *Save Our Water* website.

## 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, 69 Spotlight Stories were featured about DWR's projects and programs in 2014. Subjects included drought preparedness, snow surveys, groundwater legislation, water quality monitoring, the Georgiana Slough fish barrier, Perris Dam seismic upgrades, the *California Water Plan Update 2013*, and Curtis Landing Fish Release Site improvements. DWR uses Facebook two or three times each week to send messages to followers on numerous projects and activities. In 2014, DWR's Facebook followers increased from 1,904 to 3,828. DWR's Twitter account averages three postings a week with various items of interest to the public and DWR staff.

### **DWR Magazine**

Published three times a year, this news magazine features articles describing DWR programs, staff, and activities.

In 2014, the magazine included articles on the South Bay Aqueduct enlargement, Feather River gravel improvements, water bond legislation, and the Feather River Fish Barrier Dam.

### **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. During 2014, a full schedule of foreign, domestic, and school tour groups received briefings and escorted trips to DWR's Headquarters and selected SWP facilities. As a basic component of DWR's Training Program, tours were provided for recently hired DWR employees to the Sacramento–San Joaquin Delta and to Oroville Dam and Lake Oroville.

During 2014, DWR hosted 31 Foreign delegations including South Sudan, the Democratic Republic of the Congo, China, Ghana, Guinea, Liberia, Madagascar, Papua New Guinea, Djibouti, Pakistan, Haiti, Peru, Germany, the Philippines, the United Kingdom, Ethiopia, Vietnam, Canada, Spain, Panama, Algeria, South Korea, Brazil, Iraq, Central African Republic, Myanmar, the Netherlands, Singapore, Colombia, Georgia, and Moldova.

In 2014, several visits were highlighted among the foreign and domestic tour groups.

- Eleven foreign visitors affiliated with the Hubert H. Humphrey Fellowship Program at the University of California, Davis visited DWR for a briefing on the SWP and a tour of the Sacramento–San Joaquin Delta.

- Fourteen foreign economists and consultants with the World Bank visited the Joint Operations Center.
- The Stockholm Environmental Institute sent eight engineers to DWR to learn about the SWP and the *California Water Plan Update*.
- The U.S. Geological Survey sponsored eight participants on a visit to Banks Pumping Plant and the Skinner Fish Facility.
- Twenty students from Anacapa School in Santa Barbara were briefed on how the SWP provides water to consumers. The group also visited Banks Pumping Plant.
- Due to the exceptional drought conditions throughout California, several domestic and foreign media representatives visited SWP facilities, including Tokyo Broadcasting System International, German and French television networks, *The Atlantic* magazine, and numerous U.S. media outlets.

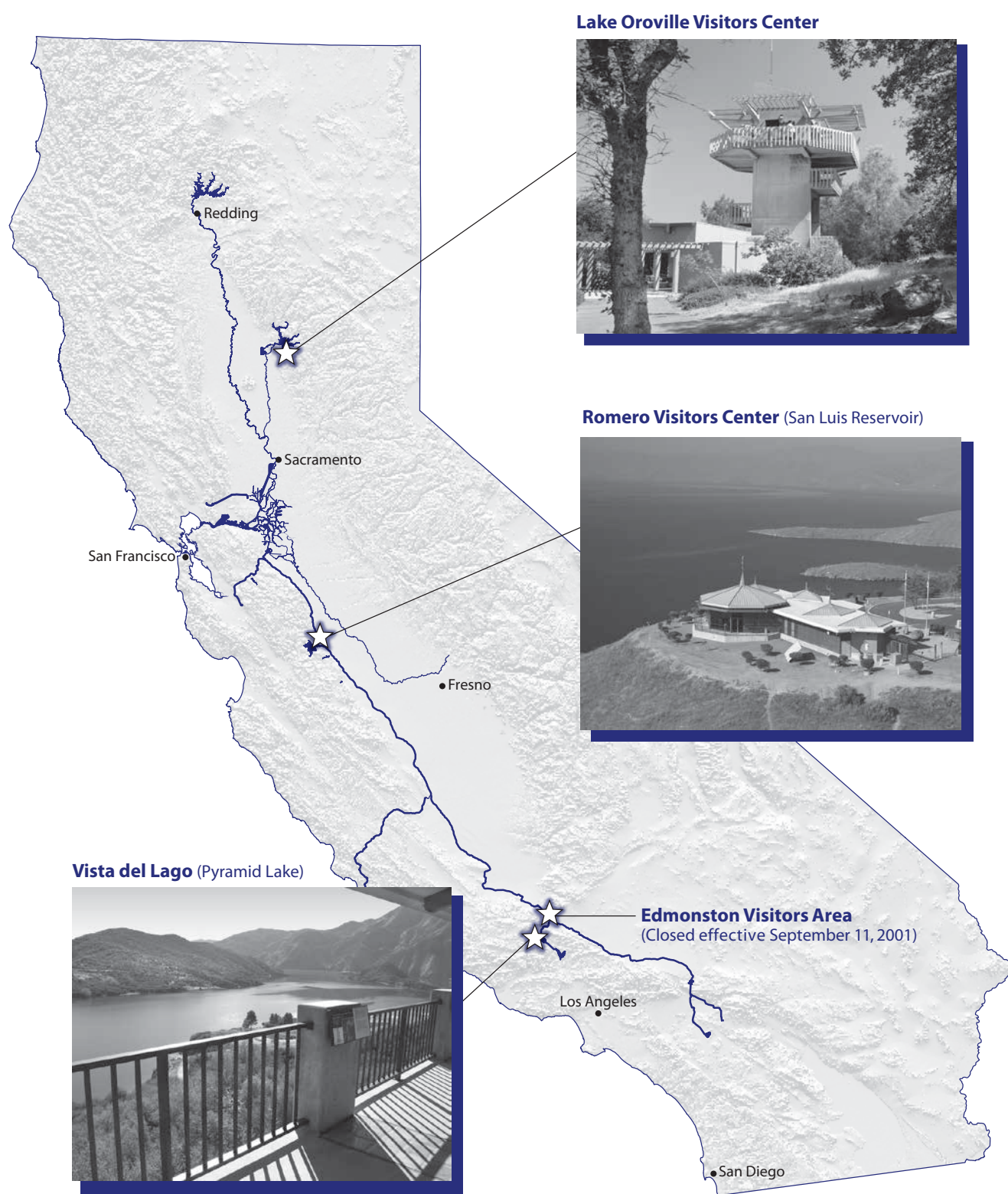
Figure 15-1 shows the SWP visitors center locations.

## **Community Relations and Recreational Safety**

In 2014, 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 garden and exhibits at the California State Fair, which ran from July 11– July 27.

PAO staff also provided exhibits at the following events:

- San Francisco Flower & Garden Show;
- Sacramento Boat Show and Off-Road Exposition;
- CalEPA Earth Day event, Sacramento;
- Dixon May Fair;



**Figure 15-1 Visitors Centers on the SWP**



- Feather Fiesta Days, Oroville;
- Jack Splash Club/Oroville YMCA;
- Kids' Fish, Swim, and Play Day, San Luis Reservoir;
- San Mateo County Fair;
- Department of Social Services' Emergency Preparedness Fair 2014, Sacramento;
- 2014 Native American Day, California State Capitol, Sacramento;
- Office of Emergency Services' National Preparedness Month, California Day of Preparedness, Sacramento;
- Department of Technology Presents: Green Fair 2014, Rancho Cordova;
- Oroville Salmon Festival; and
- Grape, Raisin & Nut Expo, Fresno.

In 2014, DWR worked with Radio Disney for the sixth year, focusing on *Save Our Water* messaging in the Sacramento, San Francisco, and Los Angeles areas to educate younger Californians about water conservation.

DWR also co-sponsors and coordinates "Catch A Special Thrill" (C.A.S.T.) fishing events for children with special needs. During 2014, 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 2014, the camps utilized SWP facilities at Lake del Valle, Castaic Lake, and Lake Perris.

PAO also completed the *Visitors Center Peer Review Report* in 2014, a collaborative cross-division evaluation of DWR's three visitors centers—Vista del Lago Visitors Center, Romero Overlook Visitors Center, and Lake Oroville Visitors Center.

## 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 2014:

- International Sportsmen's Exposition, Sacramento;
- Jack Splash Club/Oroville YMCA Fit-N-Fun Day, Oroville;
- Feather Fiesta Days, Oroville;
- Dixon May Fair;
- 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 2014 are described below.

## Public Events and Outreach

PAO staff provided displays of DWR's interactive children's exhibits and other educational materials at:

- 2014 Native American Day, California State Capitol, Sacramento;
- Family Farm Fest 2014, Sloughhouse;
- AgVenture, San Joaquin County;
- Sacramento Area Creeks Council Creek Week Event, Sacramento;
- CalEPA Earth Day event, Sacramento; and
- State Scientists 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 assisted at the *Save Our Water* booths at four events in Sacramento: the California Green Fair; the Office of Emergency Services' National Preparedness Month, California Day of Preparedness; the California State Teachers' Retirement System's Preparedness Fair; 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 2014, the following materials were purchased or reprinted:

- 10,500 *California Water Works & Why It Does* student booklets;
- 6,500 *KIDS: Conserve Water* student activity booklets;
- 6,500 *KIDS: Discover Drought* student activity booklets;
- 500 *KIDS: Discover Floods* student activity booklets;

- 1,000 *KIDS: Watershed Protection* student activity booklets;
- 5,000 water conservation class pledge sheets;
- 10,000 *Water & Me* student activity booklets; and
- 6,000 *Water Fun* student booklets.

## 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 2014, 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;

- Delta Studies Institute for teachers, co-sponsored with the San Joaquin County Office of Education; and
- 13th Edition of the California Foundation for Agriculture in the Classroom's *What's Growin' On?* educational publication themed, *Let's Look at Water*.

## Glossary

This glossary contains terms used in the text of Bulletin 132-15 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.

**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 document required by the Endangered Species Act stating the opinion of the U.S. Fish and Wildlife Service or National Marine Fisheries Service on whether or not a federal action is likely 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 Estuary 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.

# Bulletin 132-15

## Appendix B

### Data and Computations Used to Determine 2016 Water Charges

Appendix B, Data and Computations Used to Determine 2016 Water Charges, was previously printed and distributed under an August 2015 cover letter from Robert Cooke, 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 2015. However, Table B-7 was not published in the August 2015 version of Appendix B because the data was not available at the time of publication. Table B-7 now appears in its entirety on page B-78.





**DEPARTMENT OF WATER RESOURCES**

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SACRAMENTO, CA 94236-0001  
(916) 653-5791



August 6, 2015

State Water Project Contractors:

We have completed the annual review and redetermination of all water supply and financial aspects of the State Water Project as required by the water supply contracts. This report presents the data and computations used by the State of California in determining the long-term water supply contractors' Statements of Charges to be paid in calendar year 2016.

The information contained herein is published in compliance with Article 22(f) and Article 29(e) of the water supply contracts.

The report, Bulletin 132-15, Appendix B, will also be published as part of the Department of Water Resources' Bulletin 132-15.

Sincerely,

A handwritten signature in cursive script that reads "Robert B. Cooke".

Robert B. Cooke, Chief  
State Water Project Analysis Office



## Appendix B

### Data and Computations

### Used to Determine 2016 Water Charges

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## Appendix B

### Data and Computations Used to Determine 2016 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 2016. The information is based on established data about the SWP, both known and projected, as of June 2015; 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
- A portion of the California Aqueduct from the Delta to Dos Amigos Pumping Plant
- Sisk Dam, San Luis Reservoir, and Gianelli Pumping-Generating Plant

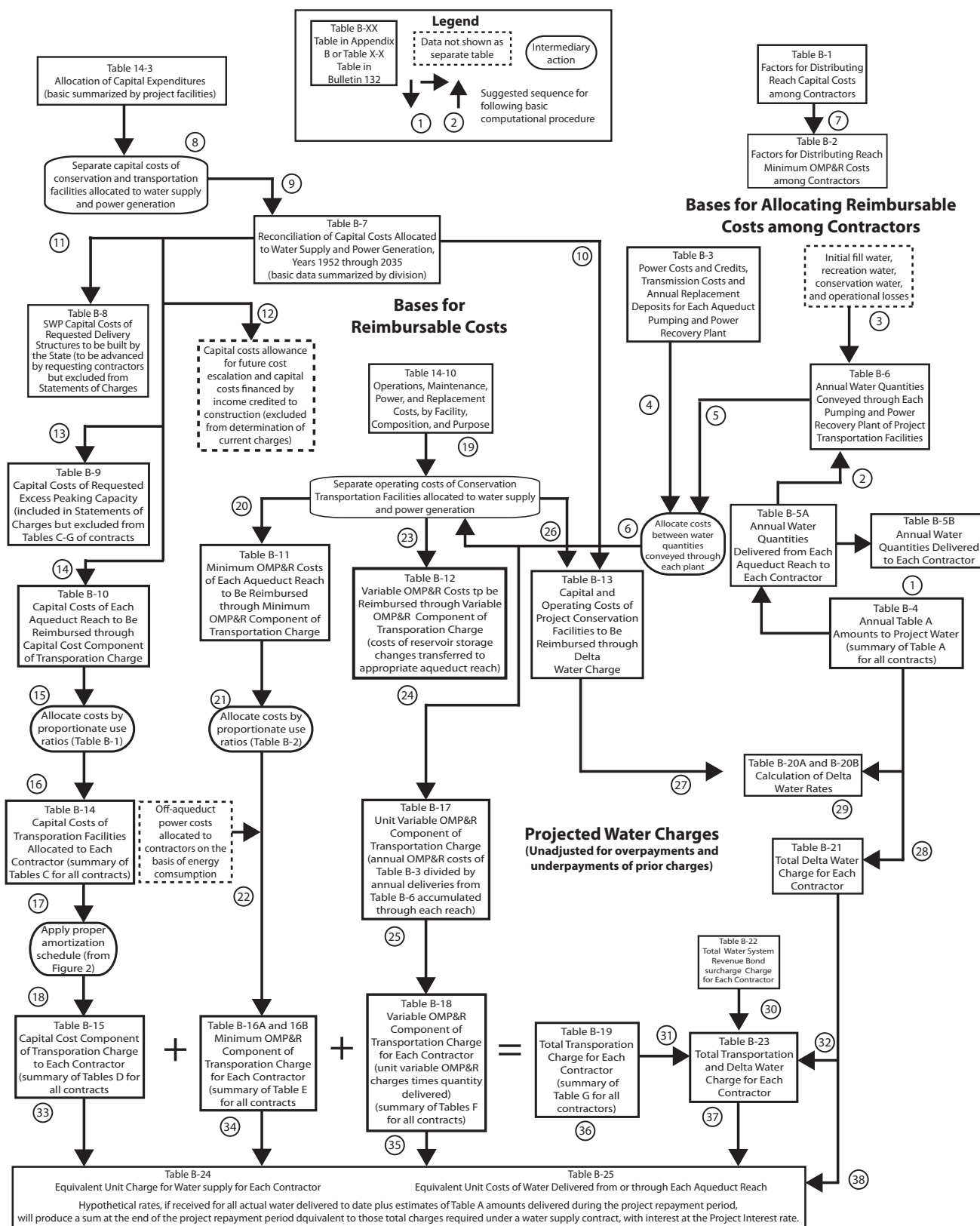
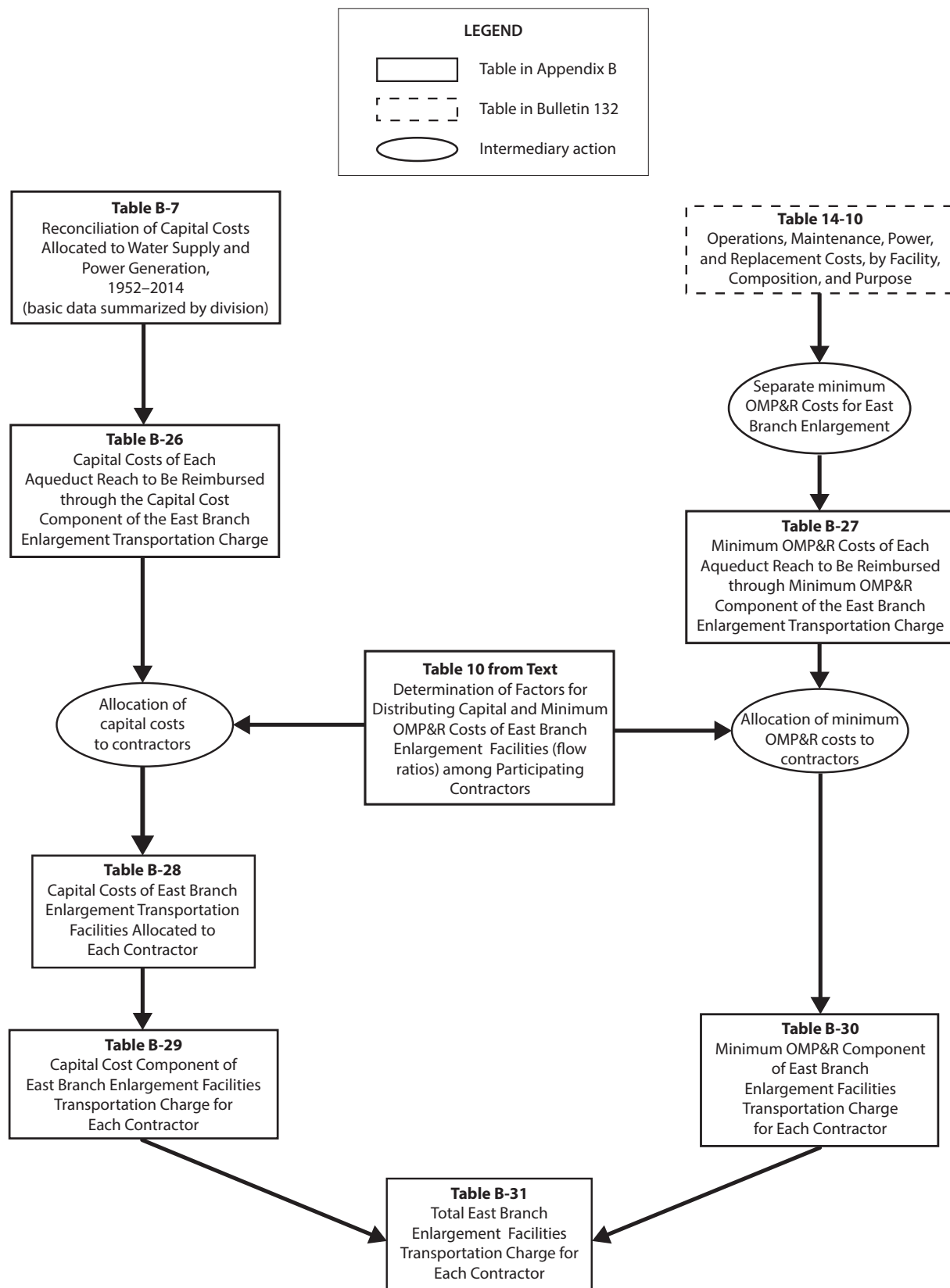


Figure B-1 Relationships of Data Used to Substantiate Statements of Charges



**Figure B-2 Relationships of Data Used to Substantiate East Branch Enlargement Charges**

### 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 the State all reimbursable operating costs that depend on and vary with quantities of water actually delivered to the contractors.



## 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
5. Other power costs
  - a. Station service at Transportation Facility power and pumping plants
  - b. Transmission service costs related to “backbone” Transportation Facilities
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 costs to provide service to “backbone,” 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 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 2016.

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 2015, 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 the annual Statements 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 2015 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.

### Variable OMP&R Costs

Article 26(a) includes provisions to ensure that the variable OMP&R component of the Transportation Charge will result in

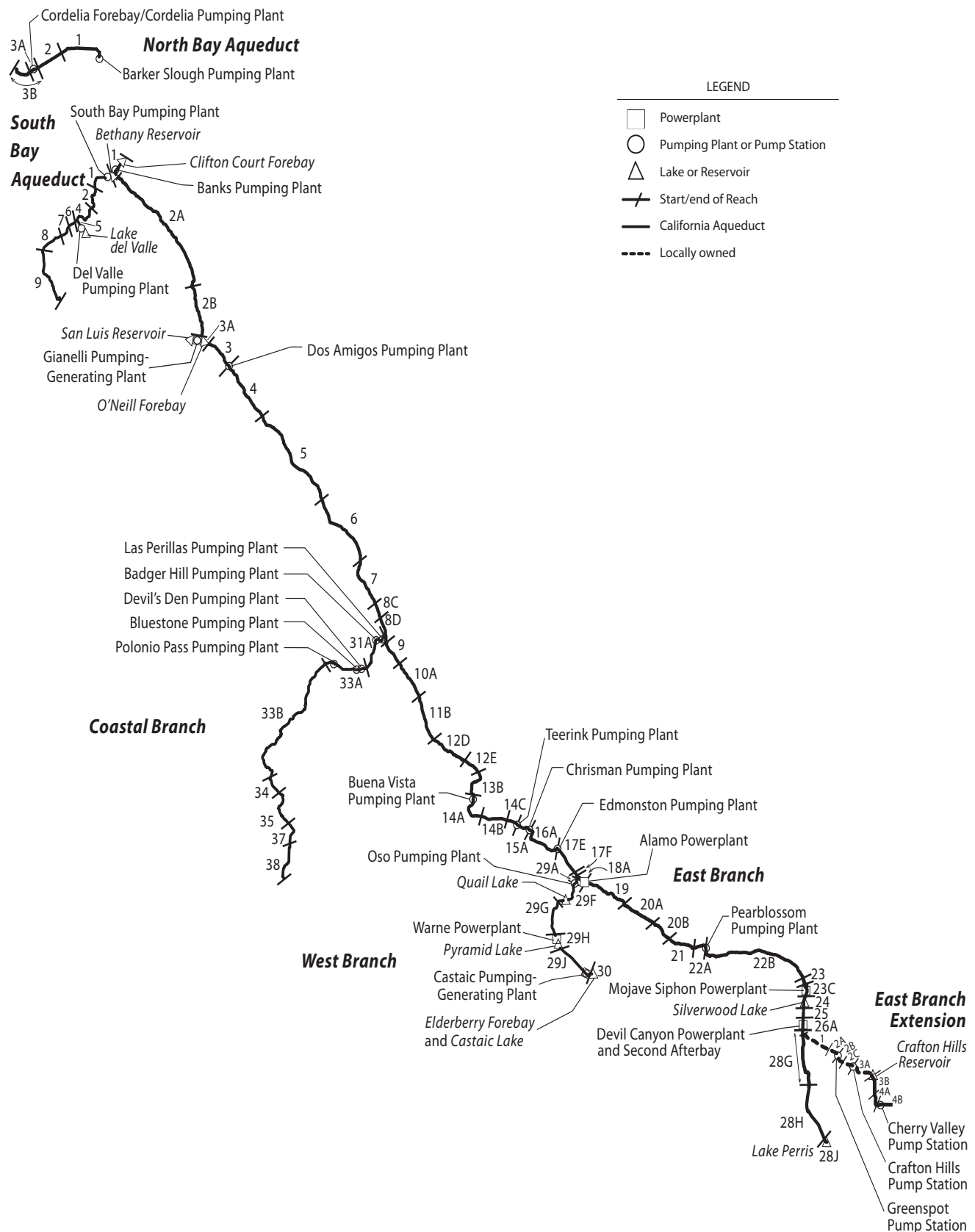


Figure B-4 Repayment Reaches and Descriptions

**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



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 2014 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 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

**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>		

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, 2014; 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 Facilities under Amendment 7. Metropolitan paid \$16.3 million as a prepayment of the capital cost component of the 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.

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 up-aqueduct pumping plants and power plants 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 projected operating costs at 9.5 percent per year for 2015, 7.0 percent for 2016, and 4.5 percent for 2017, and escalation of certain projected operating costs at 1 percent per year for 2018-2035.

*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, Empire, Kern (agricultural use), Oak Flat, and Tulare, 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

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 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>

*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 2014. 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 2015 through 2035.



**Table 5 Summary of 2014 Off-Aqueduct Power Facility Charges and Credits (in dollars)**

<b>Charges by Item</b>	
Reid Gardner Powerplant	864,974
Reid Gardner Closure Costs	18,913,623
Bottle Rock Powerplant	12,601,370
South Geysers Powerplant	6,176,183
<i>Subtotal</i>	<i>38,556,150</i>
<b>Credits by Item</b>	
Power Sales	0
<b>Net Total Charge</b>	<b>38,556,150</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>
2015	25,166,051	2,303,210
<b>2016</b>	<b>15,095,840</b>	<b>1,974,219</b>
2017	14,906,835	1,936,418
2018	3,854,130	765,877
2019	3,844,127	763,876
2020	4,174,681	829,987
2021	6,171,271	1,229,305
2022	5,841,109	1,163,273
2023	4,284,505	851,952
2024	3,203,899	635,831
2025	518,205	98,692
2026	642,904	123,632
2027	961,006	187,252
2028	651,730	125,397
2029	648,573	124,766
2030	200,913	35,234
2031	203,261	35,703
2032	208,542	36,759
2033	206,917	36,434
2034	204,964	36,044
2035	208,933	36,838

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.
- 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 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.

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 2015 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 2015 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 2015-2035 include the following assumptions:

- (1) Escalation of projected operating costs at 7.0 percent per year for 2016 and 4.5 percent for 2017.
- (2) Escalation of projected operating costs at 1.0 percent per year for 2018-2035.

## 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 as delivery of allocations down-aqueduct from a contractor's turnout) and for wheeling service to entities other than the SWP contractors.

Table 8 Extra Peaking Charges for Additional Power, by Pumping Plant (in dollars)

Year	Cordelia Napa		Cordelia Solano	Barker Slough	South Bay	Banks	Dos Amigos	Las Perillas		Buena Vista	Teerink	Chrisman	Edmonston	Pearlblossom	Oso	Total
								Badger Hill								
1972	0	0	0	0	0	0	10,579	24,700	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	6,016
1974	0	0	0	0	0	0	0	7,140	0	0	0	0	0	0	0	7,140
1975	0	0	0	0	0	0	494	6,397	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	1,981
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	45,145	3,680	0	0	0	0	0	0	0	48,825
1979	0	0	0	0	0	0	0	3,306	0	0	0	0	0	0	0	3,306
1980	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	12,126	0	0	0	0	0	0	0	0	12,126
1982	0	0	0	0	0	0	89,339	0	0	0	0	0	0	0	0	89,339
1983	0	0	0	0	35	7,594	3,534	152	0	0	0	0	0	0	0	11,315
1984	0	0	0	0	2,096	84,396	38,607	7,203	11,173	3,823	3,593	0	0	0	0	150,891
1985	0	0	0	0	1,480	19,612	8,841	763	4,488	4,412	8,929	28,353	0	0	0	76,878
1986	0	0	0	0	0	1,864	863	0	291	354	766	2,683	0	0	0	6,821
1987	0	0	0	0	604	17,129	7,838	835	2,295	1,806	3,460	11,058	0	0	0	45,025
1988	639	39	287	894	894	43,475	20,082	2,213	5,792	4,367	8,272	25,886	0	0	0	111,946
1989	2,491	566	1,483	70	343	40,251	18,642	1,935	3,401	1,531	2,058	3,793	0	0	0	76,221
1990	45	0	18	343	0	19,524	9,044	0	150	145	314	643	0	0	0	30,226
1991	903	0	281	0	0	21	8	0	15	17	39	139	41	0	0	1,464
1992	208	117	203	0	0	7,070	2,502	0	182	190	435	0	0	0	0	10,907
1993	0	681	889	4,483	0	123,080	54,741	0	8,898	5,458	10,900	35,068	11,139	0	0	255,337
1994	0	366	393	679	0	6,566	2,795	454	1,083	155	357	1,121	0	132	0	14,101
1995	0	0	0	0	1,717	24,464	9,422	27	1,865	3,475	782	1,104	400	0	0	43,256
1996	4	0	1	1,983	0	10,031	4,976	0	391	432	1,015	3,404	1,160	0	0	23,397
1997	0	1,780	2,152	3,107	0	337,357	165,774	1,753	34,604	12,296	15,910	21,028	0	0	0	595,761
1998	0	0	0	20,966	0	235,693	106,251	2,354	697	848	1,836	6,426	0	0	0	375,071
1999	0	0	0	0	0	63,196	26,235	0	3,394	4,136	8,959	31,350	7,740	0	0	145,010
2000-2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	4,290	3,549	5,707	38,457	38,457	1,041,323	637,838	70,909	78,719	43,445	67,625	172,056	20,480	132	0	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- 2014	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>

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 accordance with their amended water supply contracts. The factors for distributing



**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

minimum costs are shown in *Table 11*. *Table 12* shows the capital factors and the corresponding debt service for each of the phases in 2016.

**Table 11 Factors for Distributing Minimum OMP&R Costs of the East Branch Extension Facilities**

Reach Number	Reach Description	San Bernardino	San Gorgonio	Total
<b>Minimum</b>				
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 2016**

Contractor	Share of Participation (percent)	Total Debt Service Charge (in dollars)
<b>Phase 1 Original</b>		
San Bernardino	45.8417	4,375,512
San Gorgonio	54.1583	5,169,317
<i>Subtotal</i>	100.0000	9,544,829
<b>Phase 1 Improvements</b>		
San Bernardino	63.3410	3,685,357
San Gorgonio	36.6590	2,132,923
<i>Subtotal</i>	100.0000	5,818,280
<b>Phase 2</b>		
San Bernardino	64.4210	9,767,583
San Gorgonio	35.5790	5,394,527
<i>Subtotal</i>	100.0000	15,162,110
<b>Total</b>		30,525,219

## 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	0.02399391	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 2016 and reflect permanent capacity water transfers that have been signed as of February 1, 2015.

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	CALIFORNIA AQUEDUCT								1.00000000
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	0.00567708	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	0.00652003	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
17E	0.00080298	0.02962205	0.00740997	0.03886148	0.01066844	0.00655218	0.70161679	0.00700445	1.00000000
18A	0.00083480	0.03079028	0.00770356	0.04043105	0.01109636	0.00681681	0.72976182	0.00728186	1.00000000
19	0.00083646	0.03085132	0.00771884	0.04051162	0.01111844	0.00683040	0.73121394	0.00729630	1.00000000
20A	0.00220155	0.04929713	0.01652427	0.10664131	0.02926634	0.01798005	0.46986948		1.00000000
21	0.00220151	0.04929585	0.01652388	0.10664396	0.02926656	0.01798044	0.46987231		1.00000000
22A									1.00000000
22B									1.00000000
23									1.00000000
24									1.00000000
25									1.00000000
26A									1.00000000
28G									1.00000000
28H									1.00000000
28J									1.00000000
29A									1.00000000
29F									1.00000000
29G									1.00000000
29H									1.00000000
29J									1.00000000
30									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 2016, and reflect permanent capacity water transfers that have been signed as of February 1, 2015.

**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	37,776,092	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	460,639	227,736	256,882	4,804,117	23,639,900	11,654,638	17,464,035	18,942,905
2008	429,423	195,200	306,988	3,419,838	14,678,233	6,657,159	11,637,172	13,369,805
2009	222,938	103,911	165,832	2,517,554	13,886,937	4,348,837	7,155,507	7,966,782
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	269,367	120,002	188,385	3,676,691	32,760,461	12,267,440	14,210,513	14,544,503
2013	445,065	207,486	331,169	5,268,237	23,409,986	9,708,091	13,337,872	13,755,885
2014	389,195	184,954	476,742	4,482,850	18,454,977	4,778,144	8,588,416	8,942,555
2015	286,828	107,940	293,416	6,032,182	19,646,435	5,433,699	9,445,964	10,266,064
2016	425,065	366,090	383,940	5,023,756	43,018,480	16,487,963	19,369,681	19,946,342
2017	447,970	405,122	404,629	5,749,432	41,462,289	16,768,138	18,863,021	19,339,774
2018	567,879	545,408	831,659	5,845,527	48,299,033	18,465,376	20,912,114	21,471,263
2019	567,866	572,717	855,680	5,845,527	42,585,149	18,449,917	20,913,995	21,473,304
2020	586,326	317,213	662,933	6,095,915	31,079,432	18,172,429	23,419,376	24,164,696
2021	586,326	317,213	662,933	6,095,915	47,517,541	18,172,429	23,430,608	24,176,878
2022	586,326	317,213	662,933	6,095,915	37,186,566	18,172,429	23,443,244	24,190,583
2023	586,326	317,213	662,933	6,095,915	40,195,483	18,172,428	23,454,477	24,202,765
2024	586,326	317,213	662,933	6,095,915	39,487,501	18,172,429	23,467,113	24,216,470
2025	586,326	317,213	662,933	6,095,915	40,273,884	18,172,429	23,478,345	24,228,653
2026	586,326	317,213	662,933	6,095,915	29,154,976	18,172,429	23,485,365	24,236,266
2027	586,326	317,213	662,933	6,095,915	44,392,226	18,172,429	23,493,789	24,245,403
2028	586,326	317,213	662,933	6,095,915	44,398,767	18,172,429	23,500,809	24,253,016
2029	586,326	317,213	662,933	6,095,915	39,298,485	18,172,429	23,510,638	24,263,676
2030	586,326	317,213	662,933	6,095,915	38,606,260	18,172,429	23,519,062	24,272,813
2031	586,326	317,213	662,933	6,095,915	39,990,712	18,172,429	23,531,698	24,286,518
2032	586,326	317,213	662,933	6,095,915	39,298,486	18,172,429	23,542,930	24,298,700
2033	586,326	317,213	662,933	6,095,915	35,356,870	18,172,429	23,554,162	24,310,882
2034	586,326	317,213	662,933	6,095,915	41,901,385	18,172,429	23,565,395	24,323,064
2035	586,326	317,213	662,933	6,095,915	40,637,203	18,172,429	23,576,627	24,335,246
<b>TOTAL</b>	<b>16,383,600</b>	<b>9,561,398</b>	<b>16,840,127</b>	<b>191,490,982</b>	<b>1,274,966,518</b>	<b>548,276,605</b>	<b>677,446,032</b>	<b>703,786,475</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	41,336,441	138,414,734	(3,029,048)	19,214,244	(5,896,486)	(28,814,592)	266,842	262,395
2008	26,200,184	82,292,575	(3,426,928)	10,844,108	(3,300,797)	(16,968,293)	260,607	333,172
2009	16,611,014	75,554,088	(3,266,008)	9,243,761	(2,288,833)	(13,842,660)	360,800	391,813
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	32,069,991	111,988,486	(2,492,869)	16,896,826	(8,905,115)	(23,525,846)	437,834	534,678
2013	30,054,768	105,802,190	(2,081,221)	12,309,693	(4,915,165)	(14,305,918)	486,392	569,138
2014	19,644,897	67,980,411	(1,786,122)	7,172,179	(1,465,644)	(5,391,598)	316,446	439,313
2015	24,049,163	86,826,582	(2,654,365)	9,795,320	(2,738,150)	(6,917,765)	126,135	152,015
2016	<b>45,458,586</b>	<b>166,155,621</b>	<b>(7,815,071)</b>	<b>22,543,445</b>	<b>(9,438,855)</b>	<b>(17,853,250)</b>	<b>480,073</b>	<b>599,126</b>
2017	44,008,984	160,598,167	(7,709,095)	23,752,025	(9,300,726)	(17,595,500)	513,134	640,387
2018	48,866,033	178,449,152	(8,410,784)	25,164,573	(10,426,330)	(19,809,332)	521,936	651,371
2019	48,870,766	178,466,760	(8,403,652)	25,087,736	(10,394,494)	(19,747,846)	521,936	651,371
2020	55,087,457	201,997,257	(9,976,003)	31,207,465	(12,930,055)	(24,575,462)	521,936	651,371
2021	55,115,716	202,102,374	(9,996,374)	31,207,465	(12,930,055)	(24,575,462)	521,936	651,371
2022	55,147,507	202,220,622	(11,556,859)	31,207,465	(12,930,055)	(24,575,461)	521,936	651,371
2023	55,175,766	202,325,735	(11,555,292)	31,207,465	(12,930,055)	(24,575,461)	521,936	651,371
2024	55,207,558	202,443,991	(11,556,834)	31,207,466	(12,930,055)	(24,575,462)	521,936	651,371
2025	55,235,818	202,549,105	(11,556,834)	31,207,466	(12,930,055)	(24,575,462)	521,936	651,371
2026	55,253,481	202,614,797	(11,554,786)	31,207,466	(12,930,055)	(24,575,462)	521,936	651,371
2027	55,274,674	202,693,631	(11,556,810)	31,207,466	(12,930,055)	(24,575,462)	521,936	651,371
2028	55,292,336	202,759,325	(11,556,809)	31,207,465	(12,930,055)	(24,575,461)	521,936	651,371
2029	55,317,063	202,851,305	(11,555,255)	31,207,465	(12,930,055)	(24,575,461)	521,936	651,371
2030	55,338,257	202,930,138	(11,556,797)	31,207,466	(12,930,055)	(24,575,462)	521,936	651,371
2031	55,370,050	203,048,392	(11,556,785)	31,207,466	(12,930,055)	(24,575,462)	521,936	651,371
2032	55,398,309	203,153,503	(11,554,749)	31,207,466	(12,930,055)	(24,575,462)	521,936	651,371
2033	55,426,568	203,258,614	(11,556,785)	31,207,465	(12,930,055)	(24,575,461)	521,936	651,371
2034	55,454,826	203,363,725	(11,556,772)	31,207,465	(12,930,055)	(24,575,461)	521,936	651,371
2035	55,483,086	203,468,839	(11,555,218)	31,207,465	(12,930,055)	(24,575,461)	521,936	651,371
<b>TOTAL</b>	<b>1,579,646,312</b>	<b>5,719,380,746</b>	<b>(295,529,300)</b>	<b>864,072,892</b>	<b>(336,724,345)</b>	<b>(1,046,914,968)</b>	<b>13,612,457</b>	<b>16,844,307</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	14,286	7,571,697	(11,444,524)	(21,845,299)	1,339,784	2,342,600	217,183,925
2008	10,419	4,777,044	(7,762,363)	(14,997,326)	1,164,440	1,729,060	131,849,718
2009	7,522	4,631,584	(6,997,502)	(16,308,270)	715,154	1,024,695	102,205,455
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	48,270	5,521,926	(8,863,057)	(15,797,149)	1,043,767	2,023,059	180,018,164
2013	69,039	6,806,468	(9,189,037)	(15,851,695)	1,454,326	2,083,671	179,756,441
2014	51,932	4,819,809	(4,376,621)	(7,912,327)	1,672,355	2,538,903	130,001,769
2015	20,527	5,539,634	(5,218,338)	(8,645,111)	797,211	2,163,587	154,808,973
2016	111,569	8,974,897	(9,473,500)	(15,548,000)	1,222,888	4,735,953	295,174,799
2017	119,252	7,751,234	(7,701,250)	(12,641,000)	1,288,940	4,988,898	292,153,825
2018	121,298	8,421,084	(8,137,605)	(12,905,909)	834,577	5,550,062	325,828,385
2019	121,298	8,421,084	(8,157,984)	(12,905,909)	834,943	5,553,332	320,183,496
2020	125,436	8,851,150	(8,549,109)	(13,573,528)	846,955	5,431,695	339,614,885
2021	125,436	8,863,527	(8,559,966)	(13,592,742)	846,955	5,431,695	356,171,719
2022	125,436	8,877,452	(8,601,046)	(13,614,359)	846,955	5,431,695	344,407,868
2023	125,436	8,889,830	(8,611,017)	(13,633,574)	846,955	5,431,695	347,558,330
2024	125,436	8,903,755	(8,626,716)	(13,655,191)	846,955	5,431,695	347,001,805
2025	125,436	8,916,133	(8,607,924)	(13,674,405)	846,955	5,431,695	347,956,933
2026	125,436	8,923,869	(8,616,948)	(13,686,414)	846,955	5,431,695	336,924,764
2027	125,436	8,933,152	(8,625,714)	(13,700,826)	846,955	5,431,695	352,263,683
2028	125,436	8,940,888	(8,660,064)	(13,712,835)	846,955	5,431,695	352,329,591
2029	125,436	8,951,719	(8,671,178)	(13,729,648)	846,955	5,431,695	347,350,963
2030	125,436	8,961,002	(8,679,944)	(13,744,059)	846,955	5,431,695	346,760,890
2031	125,436	8,974,927	(8,662,585)	(13,765,676)	846,955	5,431,695	348,331,409
2032	125,436	8,987,305	(8,676,824)	(13,784,890)	846,955	5,431,695	347,776,928
2033	125,436	8,999,683	(8,716,471)	(13,804,105)	846,955	5,431,695	343,943,576
2034	125,436	9,012,061	(8,705,332)	(13,823,320)	846,955	5,431,695	350,649,190
2035	125,436	9,024,438	(8,718,738)	(13,842,535)	846,955	5,431,695	349,523,106
<b>TOTAL</b>	<b>2,783,168</b>	<b>271,468,076</b>	<b>(397,349,651)</b>	<b>(712,464,200)</b>	<b>37,885,538</b>	<b>136,199,680</b>	<b>9,291,662,448</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
2017	29,025	47,756	76,781	80,619	42,000	100,000	222,619	25,000	45,486	70,486
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
2017	45,350	3,000	134,600	848,130	982,730	9,305	5,700	87,471	1,133,556
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							Total
	Butte	Grizzly Valley Pipeline Plumas	Yuba City	Reach 1	Reach 3A		Reach 3A-T		Reach 3B		
				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	13,680	0	33,400
2015	3,345	730	4,151	13,130	0	4,975	120	1,533	10,835	0	30,593
2016	449	730	5,760	8,910	0	19,745	0	0	15,963	0	44,618
2017	449	730	5,760	7,922	0	20,733	0	0	15,963	0	44,618
2018	449	730	5,760	6,886	0	21,769	0	0	15,963	0	44,618
2019	449	730	5,760	5,795	0	22,859	0	0	15,963	0	44,617
2020	1,846	1,619	5,760	15,993	0	12,661	0	0	17,415	0	46,069
2021	1,911	1,619	5,760	15,993	0	12,661	0	0	17,415	0	46,069
2022	1,982	1,619	5,760	15,993	0	12,661	0	0	17,415	0	46,069
2023	2,061	1,619	5,760	15,993	0	12,661	0	0	17,415	0	46,069
2024	2,061	1,619	5,760	15,993	0	12,661	0	0	17,415	0	46,069
2025	2,061	1,619	5,760	15,993	0	12,661	0	0	17,415	0	46,069
2026	2,061	1,619	5,760	15,993	0	12,661	0	0	17,415	0	46,069
2027	2,061	1,619	5,760	15,993	0	12,661	0	0	17,415	0	46,069
2028	2,061	1,619	5,760	15,993	0	12,661	0	0	17,415	0	46,069
2029	2,061	1,619	5,760	15,993	0	12,661	0	0	17,415	0	46,069
2030	2,061	1,619	5,760	15,993	0	12,661	0	0	17,415	0	46,069
2031	2,061	1,619	5,760	15,993	0	12,661	0	0	17,415	0	46,069
2032	2,061	1,619	5,760	15,993	0	12,661	0	0	17,415	0	46,069
2033	2,061	1,619	5,760	15,993	0	12,661	0	0	17,415	0	46,069
2034	2,061	1,619	5,760	15,993	0	12,661	0	0	17,415	0	46,069
2035	2,143	1,619	5,760	15,993	0	12,661	0	0	17,415	0	46,069
TOTAL	58,927	41,506	164,625	650,721	15	615,382	1,133	121,480	655,344	3,500	2,047,575

<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	7,481	4,321	974	0	15,469	8,989	13,669	39,970	91,079
2015	269	0	6,982	5,257	2,379	0	19,021	12,939	18,562	69,102	134,511
2016	0	0	6,360	5,640	1,890	0	28,981	0	25,200	60,000	128,071
2017	0	0	6,600	5,640	1,890	0	28,741	0	25,200	60,000	128,071
2018	0	0	6,840	5,640	1,890	0	28,501	0	25,200	60,000	128,071
2019	0	0	6,950	5,640	1,890	0	28,391	0	25,200	60,000	128,071
2020	460	0	15,400	8,500	3,770	0	20,241	5,729	19,471	60,000	133,571
2021	460	0	15,400	8,500	3,770	0	20,241	5,729	19,471	60,000	133,571
2022	460	0	15,400	8,500	3,770	0	20,241	5,729	19,471	60,000	133,571
2023	460	0	15,400	8,500	3,770	0	20,241	5,729	19,471	60,000	133,571
2024	460	0	15,400	8,500	3,770	0	20,241	5,729	19,471	60,000	133,571
2025	460	0	15,400	8,500	3,770	0	20,241	5,729	19,471	60,000	133,571
2026	460	0	15,400	8,500	3,770	0	20,241	5,729	19,471	60,000	133,571
2027	460	0	15,400	8,500	3,770	0	20,241	5,729	19,471	60,000	133,571
2028	460	0	15,400	8,500	3,770	0	20,241	5,729	19,471	60,000	133,571
2029	460	0	15,400	8,500	3,770	0	20,241	5,729	19,471	60,000	133,571
2030	460	0	15,400	8,500	3,770	0	20,241	5,729	19,471	60,000	133,571
2031	460	0	15,400	8,500	3,770	0	20,241	5,729	19,471	60,000	133,571
2032	460	0	15,400	8,500	3,770	0	20,241	5,729	19,471	60,000	133,571
2033	460	0	15,400	8,500	3,770	0	20,241	5,729	19,471	60,000	133,571
2034	460	0	15,400	8,500	3,770	0	20,241	5,729	19,471	60,000	133,571
2035	460	0	15,400	8,500	3,770	0	20,241	5,729	19,471	60,000	133,571
<b>TOTAL</b>	<b>31,944</b>	<b>53,844</b>	<b>572,765</b>	<b>400,163</b>	<b>133,053</b>	<b>11,722</b>	<b>918,113</b>	<b>422,354</b>	<b>880,957</b>	<b>4,680,954</b>	<b>8,105,869</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
1967	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	5,671	7,408	0	0
2015	0	0	585	2,072	0	0	0	0	8,641	6,993	0	0
2016	0	0	1,300	3,420	0	0	0	0	0	0	0	0
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	1,171	3,420	0	0	0	0	0	0	0	0
2021	0	0	1,171	3,420	0	0	0	0	0	0	0	0
2022	0	0	1,171	3,420	0	0	0	0	0	0	0	0
2023	0	0	1,171	3,420	0	0	0	0	0	0	0	0
2024	0	0	1,171	3,420	0	0	0	0	0	0	0	0
2025	0	0	1,171	3,420	0	0	0	0	0	0	0	0
2026	0	0	1,171	3,420	0	0	0	0	0	0	0	0
2027	0	0	1,171	3,420	0	0	0	0	0	0	0	0
2028	0	0	1,171	3,420	0	0	0	0	0	0	0	0
2029	0	0	1,171	3,420	0	0	0	0	0	0	0	0
2030	0	0	1,171	3,420	0	0	0	0	0	0	0	0
2031	0	0	1,171	3,420	0	0	0	0	0	0	0	0
2032	0	0	1,171	3,420	0	0	0	0	0	0	0	0
2033	0	0	1,171	3,420	0	0	0	0	0	0	0	0
2034	0	0	1,171	3,420	0	0	0	0	0	0	0	0
2035	0	0	1,171	3,420	0	0	0	0	0	0	0	0
TOTAL	8,885	1,041	38,987	260,633	200	300	602	0	14,312	14,401	5,873	3,300

<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					Reach 5
	Dudley Ridge	Kern		Metropolitan	Santa Clara	Tulare	Castaic Lake	Dudley Ridge	Kern		Tulare	Castaic Lake
		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	1,898	0	12,647	0	0
1990	0	0	0	0	0	0	0	0	0	0	1,500	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	5,095
1994	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	14,446	0	3,500	0	0
1996	0	0	0	0	0	0	0	0	1,125	4,162	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	1,300	0
2000	0	3,320	68,960	0	0	0	0	0	1,517	878	0	0
2001	0	0	140,242	0	30,000	0	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	1,351	0	0
2004	0	0	44,877	0	0	0	0	0	0	0	0	0
2005	0	0	109,712	50,000	8,804	277	0	0	0	7,000	0	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	10,721	0	0
2009	0	0	164,653	52,933	9,999	0	0	0	0	0	0	0
2010	0	0	35,896	120,274	9,993	0	0	0	0	0	0	0
2011	0	0	0	78,324	1,825	0	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	6,000	0	6,000	0	0	0	0	0
2014	16,789	0	104,826	15,000	26,876	0	0	0	0	0	0	0
2015	14,622	0	69,421	0	20,985	0	0	0	0	1,569	0	0
2016	0	0	0	0	0	0	0	0	0	0	0	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	37,479	80,887	1,269,989	346,127	114,482	277	6,000	16,344	2,642	41,828	2,800	5,095

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 (continued)							Reach 6				
	Dudley Ridge	Empire	Kern		Metropolitan	Oak Flat	Tulare	Empire	Kern		Kings	Metropolitan
			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	1,550	0	0	0	0	0
1989	0	0	0	18,831	0	0	0	0	0	8,260	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	10,823	0	0	0	0	0	0	0	0	0	0	0
1993	27,200	0	0	28,200	0	2,000	1,624	0	0	31,200	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	21,776	0	0	0	0	0	3,932	0	0
1996	0	0	1,125	81,507	0	0	4,000	0	0	0	0	0
1997	0	0	9,080	154,940	0	0	3,500	0	0	0	0	0
1998	0	0	0	0	0	0	0	0	20,400	33,340	0	0
1999	0	0	0	0	21,500	0	8,000	0	0	33,776	0	11,000
2000	0	0	8,130	57,647	0	0	0	0	1,457	35,847	0	0
2001	0	0	0	0	0	0	2,457	0	0	0	0	0
2002	0	0	0	0	0	0	3,000	0	0	0	0	0
2003	0	0	0	0	0	0	3,900	0	0	0	0	0
2004	0	0	0	0	0	0	3,850	0	0	0	3,250	0
2005	0	0	0	0	0	0	1,000	0	0	0	6,954	0
2006	0	0	0	0	0	0	3,000	0	0	0	2,659	0
2007	0	0	0	0	0	0	3,600	0	0	0	3,119	0
2008	0	0	0	0	0	0	1,355	0	0	0	2,159	0
2009	0	870	0	0	0	0	1,490	0	0	0	1,779	0
2010	0	431	0	0	0	0	0	0	0	0	2,477	0
2011	0	0	0	0	0	0	0	400	0	0	2,964	0
2012	0	449	0	0	0	0	2,800	514	0	0	2,706	0
2013	0	692	0	8,393	0	0	5,350	280	0	0	2,666	0
2014	0	303	0	0	0	0	661	38	0	0	1,109	0
2015	0	200	0	3	0	0	1,262	120	0	0	1,387	0
2016	0	0	0	0	0	0	0	0	0	0	3,120	0
2017	0	0	0	0	0	0	0	0	0	0	3,120	0
2018	0	0	0	0	0	0	0	0	0	0	3,120	0
2019	0	0	0	0	0	0	0	0	0	0	3,120	0
2020	0	0	0	0	0	0	0	0	0	0	3,120	0
2021	0	0	0	0	0	0	0	0	0	0	3,120	0
2022	0	0	0	0	0	0	0	0	0	0	3,120	0
2023	0	0	0	0	0	0	0	0	0	0	3,120	0
2024	0	0	0	0	0	0	0	0	0	0	3,120	0
2025	0	0	0	0	0	0	0	0	0	0	3,120	0
2026	0	0	0	0	0	0	0	0	0	0	3,120	0
2027	0	0	0	0	0	0	0	0	0	0	3,120	0
2028	0	0	0	0	0	0	0	0	0	0	3,120	0
2029	0	0	0	0	0	0	0	0	0	0	3,120	0
2030	0	0	0	0	0	0	0	0	0	0	3,120	0
2031	0	0	0	0	0	0	0	0	0	0	3,120	0
2032	0	0	0	0	0	0	0	0	0	0	3,120	0
2033	0	0	0	0	0	0	0	0	0	0	3,120	0
2034	0	0	0	0	0	0	0	0	0	0	3,120	0
2035	0	0	0	0	0	0	0	0	0	0	3,120	0
TOTAL	38,023	2,945	18,335	371,297	21,500	2,000	52,399	1,352	21,857	146,355	95,629	11,000



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			Reach 7					Reach 8C			
	Tulare	Castaic Lake	Dudley Ridge	Kern		Kings	Metropolitan	Tulare	Dudley Ridge	Empire	Kern	
				Municipal and Industrial	Agricultural						Municipal and Industrial	Agricultural
	[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	1,978	0	0
1969	0	0	0	0	0	0	0	0	0	56	0	0
1970	0	0	0	0	0	0	0	0	0	3,942	0	0
1971	0	0	0	0	0	0	0	0	0	5,990	0	0
1972	0	0	0	0	0	0	0	0	0	5,795	0	0
1973	0	0	0	0	0	0	0	0	0	3,000	0	0
1974	0	0	0	0	0	0	0	0	0	3,000	0	0
1975	0	0	0	0	0	0	0	0	0	3,000	0	0
1976	0	0	0	0	0	0	0	0	0	3,000	0	0
1977	0	0	0	0	0	0	0	0	0	738	0	0
1978	0	0	0	0	0	0	0	0	0	454	0	0
1979	0	0	0	0	0	0	0	0	0	1,739	0	0
1980	0	0	0	0	0	0	0	0	0	894	0	0
1981	0	0	0	0	0	0	0	0	0	5,859	0	0
1982	0	0	0	0	0	0	0	0	0	361	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	5,197	0	0
1986	0	0	0	0	0	0	0	0	0	1,170	0	0
1987	0	0	0	0	0	0	0	0	0	2,525	0	0
1988	0	0	0	0	0	0	0	0	0	3,475	0	0
1989	0	0	0	0	5,262	0	0	0	2,391	3,000	0	0
1990	0	0	0	0	0	0	0	0	0	1,279	0	0
1991	0	0	0	0	0	0	0	0	0	221	0	0
1992	0	0	0	0	0	0	0	0	280	1,354	0	0
1993	0	0	0	18,157	10,043	0	0	0	0	2,741	0	0
1994	0	2,100	0	0	0	0	0	0	0	1,666	0	0
1995	0	0	0	10,875	20,595	0	0	0	0	1,631	989	10,527
1996	0	0	0	3,424	69,704	0	0	0	95	1,868	0	1,500
1997	0	0	0	27,079	32,463	0	0	0	0	0	0	1,500
1998	3,000	0	200	3,998	62,081	0	0	0	90	542	0	1,000
1999	23,000	0	0	7,923	19,500	0	500	4,470	86	3,176	0	400
2000	3,000	1,200	0	0	45,137	0	20,000	20,500	166	1,799	0	400
2001	600	0	0	0	0	0	0	0	14	1,360	0	0
2002	0	0	0	0	0	0	0	12,067	0	1,405	0	0
2003	0	0	0	0	0	0	0	15,103	0	1,436	0	0
2004	0	0	0	0	0	0	0	0	0	3,562	0	0
2005	0	0	0	0	0	6,904	0	4,000	0	3,834	0	0
2006	0	0	0	0	0	2,500	0	6,000	0	3,282	0	0
2007	0	0	0	0	16,214	0	0	2,545	0	2,084	0	0
2008	0	0	400	0	1,998	1,330	0	1,500	0	947	0	0
2009	2,100	0	1,400	0	0	0	0	600	0	164	0	0
2010	0	0	0	0	0	0	0	3,850	0	2,828	0	0
2011	0	0	0	0	0	0	0	2,500	0	1,515	0	0
2012	500	0	0	0	0	2,000	0	0	0	1,279	0	0
2013	1,159	0	500	0	0	0	0	1,121	0	595	0	0
2014	275	0	0	0	0	0	0	0	0	175	0	0
2015	398	0	0	0	0	0	0	0	0	314	0	0
2016	0	0	0	0	0	0	0	0	0	1,800	0	0
2017	0	0	0	0	0	0	0	0	0	1,800	0	0
2018	0	0	0	0	0	0	0	0	0	1,800	0	0
2019	0	0	0	0	0	0	0	0	0	1,800	0	0
2020	0	0	0	0	0	0	0	0	0	1,800	0	0
2021	0	0	0	0	0	0	0	0	0	1,800	0	0
2022	0	0	0	0	0	0	0	0	0	1,800	0	0
2023	0	0	0	0	0	0	0	0	0	1,800	0	0
2024	0	0	0	0	0	0	0	0	0	1,800	0	0
2025	0	0	0	0	0	0	0	0	0	1,800	0	0
2026	0	0	0	0	0	0	0	0	0	1,800	0	0
2027	0	0	0	0	0	0	0	0	0	1,800	0	0
2028	0	0	0	0	0	0	0	0	0	1,800	0	0
2029	0	0	0	0	0	0	0	0	0	1,800	0	0
2030	0	0	0	0	0	0	0	0	0	1,800	0	0
2031	0	0	0	0	0	0	0	0	0	1,800	0	0
2032	0	0	0	0	0	0	0	0	0	1,800	0	0
2033	0	0	0	0	0	0	0	0	0	1,800	0	0
2034	0	0	0	0	0	0	0	0	0	1,800	0	0
2035	0	0	0	0	0	0	0	0	0	1,800	0	0
TOTAL	34,032	3,300	2,500	71,456	282,997	12,734	20,500	74,256	3,122	132,230	989	15,327

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			
	Kings	Tulare	Dudley Ridge	Kern		Kings	San Luis Obispo	Tulare	Dudley Ridge	Kern		Tulare
				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	900	25,100	26,360	0	0	0	0	0	0	0	30,951	0
1969	100	7,081	31,375	0	0	0	0	0	0	0	24,489	0
1970	0	0	40,407	0	0	0	0	3,408	0	0	46,114	1,855
1971	3,700	80,906	41,053	0	0	0	0	41,579	0	0	58,356	0
1972	1,400	144,843	42,443	0	0	0	0	113,550	0	0	75,464	0
1973	1,500	26,317	22,057	0	1,500	0	0	24,147	0	0	54,583	0
1974	1,500	32,603	33,390	0	0	0	0	39,686	0	0	63,814	0
1975	1,600	41,536	40,555	0	0	0	0	44,722	0	0	50,021	0
1976	1,600	26,595	41,421	0	0	0	0	32,216	0	0	53,465	0
1977	1,530	12,984	11,153	0	0	0	0	5,097	0	0	24,668	0
1978	2,070	3,934	51,747	0	0	0	0	8,119	0	0	72,231	0
1979	2,000	74,758	38,544	0	0	0	0	80,363	0	0	74,524	0
1980	2,200	35,140	41,000	0	0	0	0	40,304	0	0	79,946	0
1981	2,300	50,888	41,000	0	0	0	0	32,550	0	0	76,508	0
1982	1,536	4,405	41,000	0	0	214	0	14,146	0	0	76,877	0
1983	3,550	1,001	42,900	0	0	0	0	5	0	2,217	84,573	0
1984	3,100	3,677	45,100	0	0	0	0	2,066	0	4,100	85,732	0
1985	3,400	68,638	46,251	0	0	0	0	41,153	0	0	67,696	0
1986	3,700	40,017	50,249	0	0	0	0	39,338	0	0	79,943	0
1987	4,000	30,359	46,288	0	0	0	0	62,725	0	0	97,732	0
1988	4,000	46,281	47,994	0	0	0	0	48,035	0	1,100	83,858	0
1989	4,000	63,703	52,158	0	0	0	0	63,947	0	0	91,134	0
1990	2,000	23,504	36,296	0	161	0	0	32,066	0	0	83,108	0
1991	0	1,697	927	0	0	0	0	483	0	13,683	601	0
1992	1,806	15,982	12,667	0	0	0	0	30,746	0	28	40,183	0
1993	4,000	57,112	23,221	0	0	0	0	65,732	197	5,945	53,597	0
1994	2,116	21,510	28,793	0	1,726	0	0	40,852	0	0	44,994	0
1995	4,000	40,934	45,240	2,959	27,270	0	0	57,435	0	0	64,076	0
1996	4,000	84,130	52,722	0	1,455	0	100	148,745	0	2,236	89,291	0
1997	0	9,467	57,496	0	0	0	100	9,402	4,900	0	72,013	0
1998	15	8,956	49,435	0	20,000	0	0	8,721	0	0	57,530	0
1999	4,000	90,334	58,290	0	9,000	0	0	162,631	0	0	72,734	0
2000	3,600	63,842	57,920	0	0	0	0	113,952	0	0	73,562	0
2001	1,560	23,300	40,155	0	6,089	0	0	58,369	0	0	54,198	0
2002	2,854	34,009	48,179	0	7,522	0	0	47,426	0	0	60,957	0
2003	3,692	25,317	45,732	0	8,350	0	0	61,521	0	0	54,724	0
2004	5,803	30,546	45,823	0	4,979	0	0	55,625	0	0	54,330	0
2005	4,057	42,450	58,627	0	0	1,891	0	92,552	0	0	53,206	0
2006	1,105	34,367	61,410	0	0	3,266	0	64,840	0	0	56,909	0
2007	657	31,305	39,974	0	7,740	1,921	0	49,633	0	0	66,018	0
2008	240	14,146	18,974	0	21,242	107	0	16,903	0	0	63,315	0
2009	1,612	13,522	12,037	0	19,684	0	0	16,794	5,500	0	64,007	2,330
2010	26	14,005	17,346	0	14,094	1,900	0	40,609	0	0	76,357	0
2011	2,160	23,814	22,427	0	65	1,194	0	30,827	292	0	78,177	2,000
2012	2,699	25,847	17,122	0	2,168	0	0	56,570	3,400	0	69,395	2,000
2013	1,029	16,490	19,605	0	4,239	950	0	24,241	1,941	0	82,005	0
2014	81	2,880	12,960	0	3,554	66	0	5,118	1,000	0	67,754	0
2015	372	6,902	17,106	0	11,700	554	0	8,932	0	0	46,065	0
2016	912	20,993	29,615	0	0	1,368	0	31,490	0	0	59,816	0
2017	912	20,993	29,615	0	0	1,368	0	31,490	0	0	59,816	0
2018	912	20,993	29,615	0	0	1,368	0	31,490	0	0	59,816	0
2019	912	21,863	26,611	0	0	1,368	0	31,490	0	0	59,816	0
2020	2,280	21,341	26,006	0	0	0	0	32,012	0	0	57,366	0
2021	2,280	21,341	26,006	0	0	0	0	32,012	0	0	57,366	0
2022	2,280	21,341	26,006	0	0	0	0	32,012	0	0	57,366	0
2023	2,280	21,341	26,006	0	0	0	0	32,012	0	0	57,366	0
2024	2,280	21,341	26,006	0	0	0	0	32,012	0	0	57,366	0
2025	2,280	21,341	26,006	0	0	0	0	32,012	0	0	57,366	0
2026	2,280	21,341	26,006	0	0	0	0	32,012	0	0	57,366	0
2027	2,280	21,341	26,006	0	0	0	0	32,012	0	0	57,366	0
2028	2,280	21,341	26,006	0	0	0	0	32,012	0	0	57,366	0
2029	2,280	21,341	26,006	0	0	0	0	32,012	0	0	57,366	0
2030	2,280	21,341	26,006	0	0	0	0	32,012	0	0	57,366	0
2031	2,280	21,341	26,006	0	0	0	0	32,012	0	0	57,366	0
2032	2,280	21,341	26,006	0	0	0	0	32,012	0	0	57,366	0
2033	2,280	21,341	26,006	0	0	0	0	32,012	0	0	57,366	0
2034	2,280	21,341	26,006	0	0	0	0	32,012	0	0	57,366	0
2035	2,280	21,341	26,006	0	0	0	0	32,012	0	0	57,366	0
TOTAL	143,298	2,003,432	2,306,481	2,959	172,538	17,535	200	2,676,033	17,230	29,309	4,208,905	8,185

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 10A										Reach 11B	
	Alameda-Zone 7	Alameda County	Castaic Lake	Dudley Ridge	Kern		Metropolitan	San Bernardino	Santa Clara	Tulare	Castaic Lake	Dudley Ridge
					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	2,842	0	0
1970	0	0	0	0	0	158	0	0	0	4,315	0	0
1971	0	0	0	0	0	9,973	0	0	0	0	0	0
1972	0	0	0	0	0	5,876	0	0	0	0	0	0
1973	0	0	0	0	0	22,948	0	0	0	0	0	0
1974	0	0	0	0	10,019	22,719	0	0	0	0	0	0
1975	0	0	0	0	2,791	72,121	0	0	0	0	0	0
1976	0	0	0	0	74	50,444	0	0	0	0	0	0
1977	0	0	0	0	201	34,451	0	0	0	0	0	0
1978	0	0	0	0	0	161,889	0	0	0	0	0	0
1979	0	0	0	0	285	153,245	0	0	0	0	0	0
1980	0	0	0	0	3,780	131,836	0	0	0	0	0	0
1981	0	0	0	0	341	133,500	0	0	0	0	0	0
1982	0	0	0	0	4,700	164,832	0	0	0	0	0	0
1983	0	0	0	0	0	146,493	0	0	0	0	0	0
1984	0	0	0	0	6,910	150,302	0	0	0	0	0	0
1985	0	0	0	0	6,495	153,473	0	0	0	0	0	0
1986	0	0	0	0	5,065	198,099	0	0	0	0	0	0
1987	0	0	0	0	900	226,521	0	0	0	0	0	0
1988	0	0	0	0	9,529	212,495	0	0	0	0	0	0
1989	0	0	0	0	21,038	251,979	0	0	0	0	0	0
1990	0	0	0	0	25,189	47,472	0	0	0	0	0	0
1991	0	0	0	0	1,142	6,820	0	0	0	0	0	0
1992	0	0	0	0	3,685	89,390	0	0	0	0	0	0
1993	0	0	0	0	775	233,862	44,496	0	0	0	0	0
1994	0	0	0	0	5,227	126,792	0	0	0	0	0	0
1995	0	0	0	0	366	229,448	50,000	0	0	0	0	0
1996	0	6,200	0	0	6,666	199,854	95,000	0	45,000	0	0	0
1997	0	10,000	0	900	3,577	157,385	125,000	0	35,000	0	0	0
1998	1,970	3,780	0	0	2,603	163,587	39,500	0	23,800	0	0	0
1999	22,910	16,100	0	0	1,657	190,787	75,850	0	30,000	0	0	0
2000	23,940	13,380	0	0	7,672	283,208	0	0	23,730	0	0	1,500
2001	5,000	0	0	0	160	98,175	0	0	0	0	0	0
2002	14,287	2,083	24,000	0	145	171,498	0	0	3,311	0	0	0
2003	6,500	18,800	0	0	217	174,674	70,940	0	33,000	0	0	0
2004	5,740	8,000	32,522	0	65,751	117,286	0	0	0	0	0	0
2005	0	28,422	0	0	146	232,519	31,210	0	55,448	0	0	0
2006	5,740	27,447	0	5,000	0	237,623	0	0	64,036	0	0	0
2007	717	1,029	0	3,000	0	203,794	0	0	3,692	0	0	0
2008	0	0	0	2,800	1,702	103,176	0	0	4,306	0	0	0
2009	0	0	0	2,000	690	95,798	0	0	0	0	0	300
2010	3,000	7,000	0	2,000	14	102,773	74,000	0	51,990	800	0	5,350
2011	3,414	16,020	0	2,908	26	137,476	149,012	0	65,770	500	0	0
2012	0	7,500	0	1,660	29	201,876	45,000	2,868	0	0	5,500	2,000
2013	0	0	0	2,500	2,057	116,190	0	0	0	0	5,500	2,500
2014	0	0	0	0	0	40,332	0	0	0	0	0	9,786
2015	0	0	0	0	0	52,374	0	0	0	0	0	0
2016	5,500	0	0	0	0	140,643	0	0	0	0	0	0
2017	5,500	0	0	0	0	140,643	0	0	0	0	0	0
2018	5,500	0	0	0	0	140,643	0	0	0	0	0	0
2019	5,500	0	0	0	0	140,643	0	0	0	0	0	0
2020	0	0	0	0	0	141,941	0	0	0	0	0	0
2021	0	0	0	0	0	141,941	0	0	0	0	0	0
2022	0	0	0	0	0	141,941	0	0	0	0	0	0
2023	0	0	0	0	0	141,941	0	0	0	0	0	0
2024	0	0	0	0	0	141,941	0	0	0	0	0	0
2025	0	0	0	0	0	141,941	0	0	0	0	0	0
2026	0	0	0	0	0	141,941	0	0	0	0	0	0
2027	0	0	0	0	0	141,941	0	0	0	0	0	0
2028	0	0	0	0	0	141,941	0	0	0	0	0	0
2029	0	0	0	0	0	141,941	0	0	0	0	0	0
2030	0	0	0	0	0	141,941	0	0	0	0	0	0
2031	0	0	0	0	0	141,941	0	0	0	0	0	0
2032	0	0	0	0	0	141,941	0	0	0	0	0	0
2033	0	0	0	0	0	141,941	0	0	0	0	0	0
2034	0	0	0	0	0	141,941	0	0	0	0	0	0
2035	0	0	0	0	0	141,941	0	0	0	0	0	0
TOTAL	115,218	165,761	56,522	22,768	201,624	8,951,151	800,008	2,868	439,083	8,457	11,000	21,436

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					
	Kern		Tulare	Kern		Alameda-Zone 7	Alameda County	Castaic Lake	Dudley Ridge	Kern	
	Municipal and Industrial	Agricultural		Municipal and Industrial	Agricultural					Municipal and Industrial	Agricultural
	[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	24,776	0	0	0	0	0	0	0	0	0
1969	0	64,682	0	0	0	0	0	0	0	0	0
1970	0	72,279	0	0	0	0	0	0	0	0	9,279
1971	0	63,773	0	0	0	0	0	0	0	0	28,056
1972	0	72,358	0	0	0	0	0	0	0	0	62,342
1973	0	67,544	0	0	0	0	0	0	0	0	13,082
1974	0	87,476	0	0	0	0	0	0	0	2,651	4,248
1975	0	85,675	0	0	0	0	0	0	0	0	10,787
1976	0	85,067	0	0	0	0	0	0	0	37,519	20,555
1977	3,981	29,603	0	0	0	0	0	0	0	20,280	1,737
1978	0	88,753	0	0	0	0	0	0	0	47,133	15,011
1979	484	108,379	0	0	0	0	0	0	0	50,740	61,567
1980	3,112	103,207	0	0	0	0	0	0	0	32,039	22,252
1981	494	104,395	0	0	0	0	0	0	0	59,917	58,470
1982	798	99,081	0	0	0	0	0	0	0	36,139	75,587
1983	2,069	94,117	0	0	0	0	0	0	0	0	10,950
1984	2,349	124,819	0	0	0	0	0	0	0	63,941	39,929
1985	10,666	118,646	0	0	0	0	0	0	0	69,839	84,117
1986	8,673	124,836	0	0	0	0	0	0	0	62,109	51,540
1987	13,074	111,877	0	0	0	0	0	0	0	95,297	86,223
1988	13,509	114,031	0	0	0	0	0	0	0	86,390	123,249
1989	9,986	127,058	0	0	0	0	0	0	0	83,965	146,544
1990	9,319	104,107	0	0	0	0	0	0	0	82,164	38,973
1991	6,099	118	0	0	0	0	0	0	0	8,842	303
1992	7,419	35,093	0	0	0	0	0	0	0	47,181	57,048
1993	2,696	72,645	0	0	0	0	0	0	0	84,822	285,554
1994	3,506	71,202	0	0	0	0	0	0	0	66,188	77,839
1995	1,154	97,072	0	0	0	0	0	0	1,000	107,130	181,097
1996	1,185	96,250	0	0	0	0	0	0	4,131	89,257	134,138
1997	1,111	104,823	0	0	0	0	0	0	8,012	128,061	128,329
1998	1,311	72,646	0	0	0	0	0	0	5,925	28,258	88,998
1999	2,127	92,262	0	0	0	0	0	0	1,321	110,161	255,343
2000	3,793	89,622	0	21	0	0	0	0	953	11,772	156,215
2001	636	73,105	0	41	0	0	0	0	0	385	51,076
2002	1,457	91,123	0	760	6	0	0	0	0	0	135,335
2003	1,379	87,174	0	2,431	152	0	0	0	0	39,479	112,056
2004	1,299	97,722	0	3,419	768	0	0	0	1,600	52,303	95,983
2005	824	93,554	0	2,841	644	3,419	1,878	20,000	1,154	43,835	340,281
2006	0	98,417	0	2,513	1,556	10,000	0	20,000	0	82,207	296,230
2007	4,030	94,334	0	2,164	2,284	0	0	8,200	0	1,179	87,764
2008	263	93,417	0	1,514	3,000	0	0	0	0	0	58,983
2009	127	96,776	0	564	4,274	0	0	0	0	0	82,434
2010	381	92,220	974	1,904	2,206	10,000	0	25,844	0	4,851	72,809
2011	1,160	105,682	3,500	973	65	10,000	1,960	0	0	26,249	313,619
2012	1,019	94,519	0	3,128	939	20,308	0	6,416	200	19,423	102,054
2013	1,167	110,418	0	3,473	1,531	0	0	0	0	26,652	60,295
2014	0	87,728	0	0	5,225	0	0	0	0	0	500
2015	0	47,529	0	402	14,320	0	0	0	0	2,400	65,165
2016	9,000	47,679	0	3,900	0	0	0	0	0	51,703	69,724
2017	9,000	47,679	0	3,900	0	0	0	0	0	51,703	69,724
2018	9,000	47,679	0	3,900	0	0	0	0	0	51,703	69,724
2019	9,000	47,679	0	3,900	0	0	0	0	0	51,703	69,724
2020	9,000	44,254	0	7,200	0	0	0	13,620	0	49,744	68,236
2021	9,000	44,254	0	7,200	0	0	0	12,820	0	49,744	68,236
2022	9,000	44,254	0	7,200	0	0	0	11,920	0	49,744	68,236
2023	9,000	44,254	0	7,200	0	0	0	11,120	0	49,744	68,236
2024	9,000	44,254	0	7,200	0	0	0	10,220	0	49,744	68,236
2025	9,000	44,254	0	7,200	0	0	0	9,420	0	49,744	68,236
2026	9,000	44,254	0	7,200	0	0	0	8,920	0	49,744	68,236
2027	9,000	44,254	0	7,200	0	0	0	8,320	0	49,744	68,236
2028	9,000	44,254	0	7,200	0	0	0	7,820	0	49,744	68,236
2029	9,000	44,254	0	7,200	0	0	0	7,120	0	49,744	68,236
2030	9,000	44,254	0	7,200	0	0	0	6,520	0	49,744	68,236
2031	9,000	44,254	0	7,200	0	0	0	5,620	0	49,744	68,236
2032	9,000	44,254	0	7,200	0	0	0	4,820	0	49,744	68,236
2033	9,000	44,254	0	7,200	0	0	0	4,020	0	49,744	68,236
2034	9,000	44,254	0	7,200	0	0	0	3,220	0	49,744	68,236
2035	9,000	44,254	0	7,200	0	0	0	2,420	0	49,744	68,236
TOTAL	302,657	5,070,770	4,474	156,948	36,970	53,727	3,838	208,380	24,296	2,717,474	5,574,528

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							
	Metropolitan	San Bernardino	Santa Clara	Alameda-Zone 7	Alameda County	Dudley Ridge	Kern		Metropolitan	Palmdale	Santa Barbara
							Municipal and Industrial	Agricultural			
	[106]	[107]	[108]	[109]	[110]	[111]	[112]	[113]	[114]	[115]	[116]
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	4,891	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	17,388	0	0	0
1973	0	0	0	0	0	0	0	9,297	0	0	0
1974	0	0	0	0	0	0	8,038	4,246	0	0	0
1975	0	0	0	0	0	0	8,538	7,059	0	0	0
1976	0	0	0	0	0	0	5,626	8,855	0	0	0
1977	0	0	0	0	0	0	0	5,024	0	0	0
1978	0	0	0	0	0	0	21,773	7,601	0	0	0
1979	0	0	0	0	0	0	5,663	17,766	0	0	0
1980	0	0	0	0	0	0	0	22,515	0	0	0
1981	0	0	0	0	0	0	7,844	14,037	0	0	0
1982	0	0	0	0	0	0	0	25,553	0	0	0
1983	0	0	0	0	0	0	0	3,491	0	0	0
1984	0	0	0	0	0	0	12,117	26,178	0	0	0
1985	0	0	0	0	0	0	0	67,711	0	0	0
1986	0	0	0	0	0	0	0	66,551	0	0	0
1987	0	0	0	0	0	0	5,609	40,374	0	0	0
1988	0	0	0	0	0	0	9,298	47,167	0	0	0
1989	0	0	0	0	0	0	5,504	57,114	0	0	0
1990	0	0	0	0	0	0	7,645	20,423	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	789	17,449	0	0	0
1993	5,504	0	0	0	0	0	12,798	88,157	0	0	0
1994	0	0	0	0	0	0	2,494	33,148	0	0	0
1995	0	0	0	0	0	0	8,751	110,685	0	0	0
1996	0	0	0	0	0	0	28,063	64,849	0	0	0
1997	1,486	0	0	0	0	0	43,803	49,312	0	0	0
1998	24,234	0	0	0	0	0	29,444	40,085	5,500	0	0
1999	62,162	0	0	0	0	0	12,969	92,998	0	0	0
2000	149,731	0	0	0	0	0	0	102,202	0	0	0
2001	0	0	0	0	0	1,733	0	33,925	0	0	0
2002	0	0	0	0	0	736	0	71,444	0	0	0
2003	45,989	0	0	0	0	350	2,396	124,582	1,865	0	0
2004	0	0	0	0	0	1,657	1,922	73,801	0	0	0
2005	15,384	0	2,619	2,321	0	14,540	21,781	269,631	192	0	0
2006	5,065	0	0	0	0	5,670	11,787	196,116	0	0	0
2007	0	0	0	0	0	2,161	0	72,240	0	0	0
2008	0	0	0	0	0	0	200	9,785	0	0	0
2009	0	0	0	0	0	0	0	12,060	0	0	0
2010	134,855	0	0	0	0	304	0	63,966	22,000	0	0
2011	109,787	8,066	706	2,331	3,420	34,733	4,896	273,275	25,845	4,452	2,548
2012	92,803	19,066	0	0	0	0	448	70,805	1,950	2,500	0
2013	0	0	0	0	0	0	0	14,189	0	0	0
2014	0	0	0	0	0	0	0	2,246	0	0	0
2015	0	0	0	0	0	0	0	36,825	0	0	0
2016	226,938	0	0	0	0	600	3,900	23,300	0	0	0
2017	262,707	0	0	0	0	600	3,900	23,300	0	0	0
2018	262,707	0	0	0	0	600	3,900	23,300	0	0	0
2019	262,707	0	0	0	0	600	3,900	23,300	0	0	0
2020	38,000	0	0	0	0	0	4,800	25,447	0	0	0
2021	38,000	0	0	0	0	0	4,800	25,447	0	0	0
2022	38,000	0	0	0	0	0	4,800	25,447	0	0	0
2023	38,000	0	0	0	0	0	4,800	25,447	0	0	0
2024	38,000	0	0	0	0	0	4,800	25,447	0	0	0
2025	38,000	0	0	0	0	0	4,800	25,447	0	0	0
2026	38,000	0	0	0	0	0	4,800	25,447	0	0	0
2027	38,000	0	0	0	0	0	4,800	25,447	0	0	0
2028	38,000	0	0	0	0	0	4,800	25,447	0	0	0
2029	38,000	0	0	0	0	0	4,800	25,447	0	0	0
2030	38,000	0	0	0	0	0	4,800	25,447	0	0	0
2031	38,000	0	0	0	0	0	4,800	25,447	0	0	0
2032	38,000	0	0	0	0	0	4,800	25,447	0	0	0
2033	38,000	0	0	0	0	0	4,800	25,447	0	0	0
2034	38,000	0	0	0	0	0	4,800	25,447	0	0	0
2035	38,000	0	0	0	0	0	4,800	25,447	0	0	0
TOTAL	2,270,059	27,132	3,325	4,652	3,420	64,284	372,596	2,897,368	57,352	6,952	2,548



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	39,194	0	37,169	0	32,769	0	0	26,370	0
2016	0	0	0	16,900	0	40,800	0	18,100	0	0	26,400	0
2017	0	0	0	16,900	0	40,800	0	18,100	0	0	26,400	0
2018	0	0	0	16,900	0	40,800	0	18,100	0	0	26,400	0
2019	0	0	0	16,900	0	40,800	0	18,100	0	0	26,400	0
2020	0	0	0	16,900	0	40,900	0	19,700	0	0	27,153	0
2021	0	0	0	16,900	0	40,900	0	19,700	0	0	27,153	0
2022	0	0	0	16,900	0	40,900	0	19,700	0	0	27,153	0
2023	0	0	0	16,900	0	40,900	0	19,700	0	0	27,153	0
2024	0	0	0	16,900	0	40,900	0	19,700	0	0	27,153	0
2025	0	0	0	16,900	0	40,900	0	19,700	0	0	27,153	0
2026	0	0	0	16,900	0	40,900	0	19,700	0	0	27,153	0
2027	0	0	0	16,900	0	40,900	0	19,700	0	0	27,153	0
2028	0	0	0	16,900	0	40,900	0	19,700	0	0	27,153	0
2029	0	0	0	16,900	0	40,900	0	19,700	0	0	27,153	0
2030	0	0	0	16,900	0	40,900	0	19,700	0	0	27,153	0
2031	0	0	0	16,900	0	40,900	0	19,700	0	0	27,153	0
2032	0	0	0	16,900	0	40,900	0	19,700	0	0	27,153	0
2033	0	0	0	16,900	0	40,900	0	19,700	0	0	27,153	0
2034	0	0	0	16,900	0	40,900	0	19,700	0	0	27,153	0
2035	0	0	0	16,900	0	40,900	0	19,700	0	0	27,153	0
TOTAL	11,338	21,500	24,473	1,274,724	3,714	3,395,246	2,447	1,527,638	115,671	24	1,978,638	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	AVEK	AVEK	Mojave	AVEK	Mojave	Palmdale	AVEK	Littlerock	Palmdale
	Municipal and Industrial	Agricultural	(Municipal and Industrial)									
	[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	0	25,011	0	0	0	0	28,109	521	0	2,006	0	3,088
2016	7,483	16,180	0	2,066	14,107	1,500	63,949	0	0	2,229	0	18,780
2017	7,483	16,180	0	2,066	14,107	1,500	63,949	0	0	2,229	0	18,780
2018	7,483	16,180	0	2,066	14,107	1,500	61,883	0	0	2,229	0	18,780
2019	7,483	16,180	0	2,066	14,107	1,500	61,883	0	0	2,229	0	18,780
2020	6,966	13,600	0	2,300	18,450	898	54,860	0	0	1,830	0	12,780
2021	6,966	13,600	0	2,300	18,450	898	54,860	0	0	1,830	0	12,780
2022	6,966	13,600	0	2,300	18,450	898	54,860	0	0	1,830	0	12,780
2023	6,966	13,600	0	2,300	18,450	898	54,860	0	0	1,830	0	12,780
2024	6,966	13,600	0	2,300	18,450	898	54,860	0	0	1,830	0	12,780
2025	6,966	13,600	0	2,300	18,450	898	54,860	0	0	1,830	0	12,780
2026	6,966	13,600	0	2,300	18,450	898	54,860	0	0	1,830	0	12,780
2027	6,966	13,600	0	2,300	18,450	898	54,860	0	0	1,830	0	12,780
2028	6,966	13,600	0	2,300	18,450	898	54,860	0	0	1,830	0	12,780
2029	6,966	13,600	0	2,300	18,450	898	54,860	0	0	1,830	0	12,780
2030	6,966	13,600	0	2,300	18,450	898	54,860	0	0	1,830	0	12,780
2031	6,966	13,600	0	2,300	18,450	898	54,860	0	0	1,830	0	12,780
2032	6,966	13,600	0	2,300	18,450	898	54,860	0	0	1,830	0	12,780
2033	6,966	13,600	0	2,300	18,450	898	54,860	0	0	1,830	0	12,780
2034	6,966	13,600	0	2,300	18,450	898	54,860	0	0	1,830	0	12,780
2035	6,966	13,600	0	2,300	18,450	898	54,860	0	0	1,830	0	12,780
TOTAL	240,909	928,262	5	60,317	1,254,154	41,478	2,091,196	10,954	10,268	62,019	67	567,162

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	1,246
2015	0	30	0	5,206	0	392	0	0	0	7,609	0	2,416
2016	0	1,380	0	4,455	0	100	0	0	0	43,180	0	3,480
2017	0	1,380	0	4,455	0	100	0	0	0	43,180	0	3,480
2018	0	1,380	0	4,455	0	100	0	0	0	41,180	0	3,480
2019	0	1,380	0	4,455	0	100	0	0	0	45,380	0	3,480
2020	0	1,380	0	7,400	0	0	0	0	0	43,982	0	3,480
2021	0	1,380	0	7,400	0	0	0	0	0	43,982	0	3,480
2022	0	1,380	0	7,400	0	0	0	0	0	43,982	0	3,480
2023	0	1,380	0	7,400	0	0	0	0	0	43,982	0	3,480
2024	0	1,380	0	7,400	0	0	0	0	0	43,982	0	3,480
2025	0	1,380	0	7,400	0	0	0	0	0	43,982	0	3,480
2026	0	1,380	0	7,400	0	0	0	0	0	43,982	0	3,480
2027	0	1,380	0	7,400	0	0	0	0	0	43,982	0	3,480
2028	0	1,380	0	7,400	0	0	0	0	0	43,982	0	3,480
2029	0	1,380	0	7,400	0	0	0	0	0	43,982	0	3,480
2030	0	1,380	0	7,400	0	0	0	0	0	43,982	0	3,480
2031	0	1,380	0	7,400	0	0	0	0	0	43,982	0	3,480
2032	0	1,380	0	7,400	0	0	0	0	0	43,982	0	3,480
2033	0	1,380	0	7,400	0	0	0	0	0	43,982	0	3,480
2034	0	1,380	0	7,400	0	0	0	0	0	43,982	0	3,480
2035	0	1,380	0	7,400	0	0	0	0	0	43,982	0	3,480
TOTAL	5,002	40,868	2,436	270,920	5	2,649	251,189	402,027	(596,717)	1,157,051	272	118,174

<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>a</sup>	Mojave	San Bernardino	Coachella <sup>a</sup>	Desert <sup>a</sup>	Metropolitan <sup>a</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	149	34,103	5,770	122,641	5,000	5,760	0	10,067	5,380
2016	0	5,000	0	83,010	33,450	377,714	0	17,280	0	0	0
2017	0	5,000	0	83,010	33,450	377,714	0	17,280	0	0	0
2018	0	7,000	0	83,010	33,450	377,714	0	17,280	0	0	0
2019	0	7,000	0	83,010	33,450	377,714	0	17,280	0	0	0
2020	0	9,000	260	83,010	33,450	465,085	0	17,280	0	0	0
2021	0	9,000	260	83,010	33,450	465,085	0	17,280	0	0	0
2022	0	9,000	260	83,010	33,450	465,085	0	17,280	0	0	0
2023	0	9,000	260	83,010	33,450	465,085	0	17,280	0	0	0
2024	0	9,000	260	83,010	33,450	465,085	0	17,280	0	0	0
2025	0	9,000	260	83,010	33,450	465,085	0	17,280	0	0	0
2026	0	9,000	260	83,010	33,450	465,085	0	17,280	0	0	0
2027	0	9,000	260	83,010	33,450	465,085	0	17,280	0	0	0
2028	0	9,000	260	83,010	33,450	465,085	0	17,280	0	0	0
2029	0	9,000	260	83,010	33,450	465,085	0	17,280	0	0	0
2030	0	9,000	260	83,010	33,450	465,085	0	17,280	0	0	0
2031	0	9,000	260	83,010	33,450	465,085	0	17,280	0	0	0
2032	0	9,000	260	83,010	33,450	465,085	0	17,280	0	0	0
2033	0	9,000	260	83,010	33,450	465,085	0	17,280	0	0	0
2034	0	9,000	260	83,010	33,450	465,085	0	17,280	0	0	0
2035	0	9,000	260	83,010	33,450	465,085	0	17,280	0	0	0
<b>TOTAL</b>	<b>48,442</b>	<b>228,773</b>	<b>5,838</b>	<b>2,689,040</b>	<b>1,467,839</b>	<b>19,078,006</b>	<b>482,578</b>	<b>795,981</b>	<b>18,942</b>	<b>113,476</b>	<b>44,251</b>

<sup>a</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 af recaptured from groundwater storage in 1982, 10,000 af in 1987, and 8,749 af 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	16,573	0	0	5,940	0	0	21,263	11	133	0	1,833
2016	49,707	0	0	10,621	0	0	41,560	0	0	1,000	9,380
2017	49,707	0	0	0	0	0	41,565	0	0	1,000	9,380
2018	49,707	0	0	0	0	0	41,560	0	0	1,000	9,380
2019	49,707	0	0	0	0	0	41,560	0	0	1,000	9,380
2020	69,282	0	0	58,345	0	0	61,300	0	0	680	9,700
2021	69,282	0	0	58,345	0	0	61,300	0	0	680	9,700
2022	69,282	0	0	58,345	0	0	61,300	0	0	680	9,700
2023	69,282	0	0	58,345	0	0	61,300	0	0	680	9,700
2024	69,282	0	0	58,345	0	0	61,300	0	0	680	9,700
2025	69,282	0	0	58,345	0	0	61,300	0	0	680	9,700
2026	69,282	0	0	58,345	0	0	61,300	0	0	680	9,700
2027	69,282	0	0	58,345	0	0	61,300	0	0	680	9,700
2028	69,282	0	0	58,345	0	0	61,300	0	0	680	9,700
2029	69,282	0	0	58,345	0	0	61,300	0	0	680	9,700
2030	69,282	0	0	58,345	0	0	61,300	0	0	680	9,700
2031	69,282	0	0	58,345	0	0	61,300	0	0	680	9,700
2032	69,282	0	0	58,345	0	0	61,300	0	0	680	9,700
2033	69,282	0	0	58,345	0	0	61,300	0	0	680	9,700
2034	69,282	0	0	58,345	0	0	61,300	0	0	680	9,700
2035	69,282	0	0	58,345	0	0	61,300	0	0	680	9,700
TOTAL	6,809,920	11,114	8,396	2,458,484	8,163	632,126	1,483,735	20,893	74,793	34,239	240,600



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	61,240	0	0	418,274	0	0	370
2016	0	0	1,890	57,120	0	0	501,920	0	0	1,110
2017	0	0	1,890	57,120	0	0	476,772	0	0	1,110
2018	0	0	1,890	57,120	0	0	476,772	0	0	1,110
2019	0	0	1,890	57,120	0	0	476,772	0	0	1,110
2020	0	0	1,890	39,500	0	0	516,188	0	0	7,110
2021	0	0	1,890	40,300	0	0	516,188	0	0	7,110
2022	0	0	1,890	41,200	0	0	516,188	0	0	7,110
2023	0	0	1,890	42,000	0	0	516,188	0	0	7,110
2024	0	0	1,890	42,900	0	0	516,188	0	0	7,110
2025	0	0	1,890	43,700	0	0	516,188	0	0	7,110
2026	0	0	1,890	44,200	0	0	516,188	0	0	7,110
2027	0	0	1,890	44,800	0	0	516,188	0	0	7,110
2028	0	0	1,890	45,300	0	0	516,188	0	0	7,110
2029	0	0	1,890	46,000	0	0	516,188	0	0	7,110
2030	0	0	1,890	46,600	0	0	516,188	0	0	7,110
2031	0	0	1,890	47,500	0	0	516,188	0	0	7,110
2032	0	0	1,890	48,300	0	0	516,188	0	0	7,110
2033	0	0	1,890	49,100	0	0	516,188	0	0	7,110
2034	0	0	1,890	49,900	0	0	516,188	0	0	7,110
2035	0	0	1,890	50,700	0	0	516,188	0	0	7,110
TOTAL	254	6,768	74,881	1,882,522	10,240	16,890	27,632,133	8,601	1,240	144,256

<sup>9</sup> Deliveries exclude 6,171 af 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					
	[185]	[186]	[187]	[188]	[189]	[190]	[191]	[192]	[193]	[194]
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	54,911
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	3,510,684	3,666,432
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	1,110,635	1,241,219
2015	0	0	0	0	25,280	72	3,728	10,076	1,403,401	1,576,731
2016	0	0	0	0	52,810	183	13,195	27,292	2,302,052	2,481,680
2017	0	0	0	0	52,810	183	13,219	27,292	2,302,081	2,481,709
2018	0	0	0	0	52,810	183	13,242	27,292	2,302,099	2,481,727
2019	0	0	0	0	52,810	183	13,266	27,292	2,302,123	2,481,750
2020	0	4,000	0	0	55,260	183	12,373	27,292	2,294,525	2,483,390
2021	0	4,000	0	0	55,260	183	12,373	27,292	2,294,525	2,483,455
2022	0	4,000	0	0	55,260	183	12,373	27,292	2,294,525	2,483,526
2023	0	4,000	0	0	55,260	183	12,373	27,292	2,294,525	2,483,605
2024	0	4,000	0	0	55,260	183	12,373	27,292	2,294,525	2,483,605
2025	0	4,000	0	0	55,260	183	12,373	27,292	2,294,525	2,483,605
2026	0	4,000	0	0	55,260	183	12,373	27,292	2,294,525	2,483,605
2027	0	4,000	0	0	55,260	183	12,373	27,292	2,294,525	2,483,605
2028	0	4,000	0	0	55,260	183	12,373	27,292	2,294,525	2,483,605
2029	0	4,000	0	0	55,260	183	12,373	27,292	2,294,525	2,483,605
2030	0	4,000	0	0	55,260	183	12,373	27,292	2,294,525	2,483,605
2031	0	4,000	0	0	55,260	183	12,373	27,292	2,294,525	2,483,605
2032	0	4,000	0	0	55,260	183	12,373	27,292	2,294,525	2,483,605
2033	0	4,000	0	0	55,260	183	12,373	27,292	2,294,525	2,483,605
2034	0	4,000	0	0	55,260	183	12,373	27,292	2,294,525	2,483,605
2035	0	4,000	0	0	55,260	183	12,373	27,292	2,294,525	2,483,687
TOTAL	33,511	426,797	7,851	17,259	5,002,567	4,295	322,116	929,384	134,509,644	144,928,146

## 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	0	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	(710)	(355)	0	0	0	0	0	0	0	0	0	0
2016	0	0	0	0	0	0	0	0	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)	(710)	(355)	(5,958)	(3,372)	(6)	(6,708)	(620,468)	(2)	(285,503)	(11)	(29)	(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	0	0	(3,005)	0	0	0	0	0	0	(10,524)	(16,134)
2016	0	0	0	0	0	0	0	0	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
<b>TOTAL</b>	<b>(10)</b>	<b>(17)</b>	<b>(136)</b>	<b>(945)</b>	<b>(177,331)</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>(31,405)</b>	<b>(51,869)</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)	(2,500)	0	(7,476)	(27,549)	(694)	(29,134)	(5,764)	0	(13,824)	(2,500)	0	(91,133)
2015	(4,238)	0	0	(1,453)	(45,393)	0	(37,650)	(6,598)	0	(13,936)	0	0	(75,284)
2016	0	0	0	0	0	0	0	0	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	(14,139)	(2,500)	(4,864)	(55,629)	(504,050)	(694)	(198,411)	(12,362)	(14,786)	(63,510)	(37,393)	(3,486)	(516,897)

**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							Reach 14B
	Metropolitan	San Bernardino	Dudley Ridge	Alameda-Zone 7	Alameda County	Dudley Ridge	Kern (Agricultural)	Metropolitan	San Bernardino	Santa Clara	Kern (Agricultural)
	[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	(396)
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	0	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	(1,706)
2010	(52,413)	0	0	0	0	0	(59,451)	0	0	0	(1,867)
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	(73)
2013	(31,478)	(1,500)	0	0	0	0	(160,286)	(1,033)	0	(17,692)	(264)
2014	(12,382)	(400)	0	(931)	(1,088)	(16,789)	(161,077)	(17,184)	(3,906)	(5,253)	(6,898)
2015	0	0	0	0	0	(14,622)	(142,740)	0	0	0	(2,757)
2016	0	0	0	0	0	0	0	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
TOTAL	(191,248)	(1,900)	(6,134)	(931)	(1,088)	(37,479)	(1,542,022)	(73,274)	(3,906)	(22,945)	(13,961)

**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 14C		Reach 15A	Reach 16A	Reach 19	Reach 22A	Reach 22B		Reach 24	Reach EBX2C	
	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]
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	(51,089)
2001	(242)	0	0	0	0	0	(152)	0	0	0	(255,589)
2002	0	0	0	0	0	0	0	0	0	0	(46,131)
2003	0	(12,380)	0	0	0	0	0	0	0	0	(90,890)
2004	0	(25,512)	0	0	0	0	0	0	0	(844)	(197,363)
2005	0	0	0	0	0	0	0	0	0	(7)	(40,942)
2006	0	0	0	0	0	0	0	0	0	(2)	(73,814)
2007	0	(24,225)	0	0	0	0	0	(8,751)	(17,249)	0	(481,915)
2008	0	(37,602)	0	0	0	0	0	(4,816)	(3,679)	(6)	(681,260)
2009	(5,168)	(54,948)	(2,788)	(444)	0	0	0	0	(7,488)	(11)	(609,996)
2010	(4,761)	(32,758)	(2,913)	0	0	0	0	0	(2,891)	0	(542,451)
2011	0	(16,065)	0	0	0	0	0	0	0	0	(308,580)
2012	(862)	(10,010)	(405)	0	0	0	0	0	0	0	(230,793)
2013	(4,691)	(33,205)	(406)	0	0	0	0	0	0	0	(416,788)
2014	(10,773)	(47,358)	(5,962)	0	0	(1,046)	0	0	0	0	(614,333)
2015	(30,455)	(57,229)	(2,487)	0	(4,199)	(1,499)	0	0	0	0	(471,268)
2016	0	0	0	0	0	0	0	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
TOTAL	(56,952)	(351,292)	(14,961)	(444)	(4,199)	(2,545)	(152)	(13,567)	(31,307)	(870)	(5,113,202)

## 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	13,721	19,679	33,400	34,122	30,066	66,846	131,034	3,206	16,757	19,963
2015	10,955	19,638	30,593	42,549	38,494	90,087	171,130	3,728	10,076	13,804
2016	15,963	28,655	44,618	48,371	25,200	60,000	133,571	13,195	27,292	40,487
2017	15,963	28,655	44,618	48,371	25,200	60,000	133,571	13,219	27,292	40,511
2018	15,963	28,655	44,618	48,371	25,200	60,000	133,571	13,242	27,292	40,534
2019	15,963	28,654	44,617	48,371	25,200	60,000	133,571	13,266	27,292	40,558
2020	17,415	28,654	46,069	48,371	25,200	60,000	133,571	12,373	27,292	39,665
2021	17,415	28,654	46,069	48,371	25,200	60,000	133,571	12,373	27,292	39,665
2022	17,415	28,654	46,069	48,371	25,200	60,000	133,571	12,373	27,292	39,665
2023	17,415	28,654	46,069	48,371	25,200	60,000	133,571	12,373	27,292	39,665
2024	17,415	28,654	46,069	48,371	25,200	60,000	133,571	12,373	27,292	39,665
2025	17,415	28,654	46,069	48,371	25,200	60,000	133,571	12,373	27,292	39,665
2026	17,415	28,654	46,069	48,371	25,200	60,000	133,571	12,373	27,292	39,665
2027	17,415	28,654	46,069	48,371	25,200	60,000	133,571	12,373	27,292	39,665
2028	17,415	28,654	46,069	48,371	25,200	60,000	133,571	12,373	27,292	39,665
2029	17,415	28,654	46,069	48,371	25,200	60,000	133,571	12,373	27,292	39,665
2030	17,415	28,654	46,069	48,371	25,200	60,000	133,571	12,373	27,292	39,665
2031	17,415	28,654	46,069	48,371	25,200	60,000	133,571	12,373	27,292	39,665
2032	17,415	28,654	46,069	48,371	25,200	60,000	133,571	12,373	27,292	39,665
2033	17,415	28,654	46,069	48,371	25,200	60,000	133,571	12,373	27,292	39,665
2034	17,415	28,654	46,069	48,371	25,200	60,000	133,571	12,373	27,292	39,665
2035	17,415	28,654	46,069	48,371	25,200	60,000	133,571	12,373	27,292	39,665
<b>TOTAL</b>	<b>656,492</b>	<b>1,391,083</b>	<b>2,047,575</b>	<b>2,244,988</b>	<b>1,556,297</b>	<b>5,249,382</b>	<b>9,050,667</b>	<b>322,316</b>	<b>933,172</b>	<b>1,255,488</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	657,159	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	516,138	516,139	1,256	1,520	8,934	568,900
2015	31,728	634	2,802	531,349	534,151	2,385	2,072	17,494	588,464
2016	30,215	1,800	75,986	513,652	589,638	5,583	3,420	52,483	683,139
2017	30,215	1,800	75,986	513,652	589,638	5,583	3,420	52,483	683,139
2018	30,215	1,800	75,986	513,652	589,638	5,583	3,420	52,483	683,139
2019	27,211	1,800	75,986	513,652	589,638	5,583	3,420	53,353	681,005
2020	26,006	1,800	77,710	511,928	589,638	5,583	3,420	53,353	679,800
2021	26,006	1,800	77,710	511,928	589,638	5,583	3,420	53,353	679,800
2022	26,006	1,800	77,710	511,928	589,638	5,583	3,420	53,353	679,800
2023	26,006	1,800	77,710	511,928	589,638	5,583	3,420	53,353	679,800
2024	26,006	1,800	77,710	511,928	589,638	5,583	3,420	53,353	679,800
2025	26,006	1,800	77,710	511,928	589,638	5,583	3,420	53,353	679,800
2026	26,006	1,800	77,710	511,928	589,638	5,583	3,420	53,353	679,800
2027	26,006	1,800	77,710	511,928	589,638	5,583	3,420	53,353	679,800
2028	26,006	1,800	77,710	511,928	589,638	5,583	3,420	53,353	679,800
2029	26,006	1,800	77,710	511,928	589,638	5,583	3,420	53,353	679,800
2030	26,006	1,800	77,710	511,928	589,638	5,583	3,420	53,353	679,800
2031	26,006	1,800	77,710	511,928	589,638	5,583	3,420	53,353	679,800
2032	26,006	1,800	77,710	511,928	589,638	5,583	3,420	53,353	679,800
2033	26,006	1,800	77,710	511,928	589,638	5,583	3,420	53,353	679,800
2034	26,006	1,800	77,710	511,928	589,638	5,583	3,420	53,353	679,800
2035	26,006	1,800	77,710	511,928	589,638	5,583	3,420	53,353	679,800
TOTAL	2,562,416	136,527	4,268,564	43,194,970	47,463,534	273,491	262,633	4,886,145	55,584,746

TABLE B-5B Annual Water Quantities Delivered to Each Contractor (acre-feet)

Sheet 3 of 4

Calendar Year	SOUTHERN CALIFORNIA AREA (continued)									
	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	14,333	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	1,246	3,049	0	3,581	8,406	10,956	1,200
2015	35,713	61,240	44,170	2,416	11,150	30	8,130	3,088	26,556	5,760
2016	86,906	57,120	83,010	3,480	33,450	1,380	49,680	18,780	41,560	17,280
2017	86,906	57,120	83,010	3,480	33,450	1,380	49,680	18,780	41,560	17,280
2018	86,906	57,120	83,010	3,480	33,450	1,380	49,680	18,780	41,560	17,280
2019	84,840	57,120	83,010	3,480	33,450	1,380	53,880	18,780	41,560	17,280
2020	84,840	57,120	83,010	3,480	33,450	1,380	53,880	12,780	61,560	17,280
2021	84,840	57,120	83,010	3,480	33,450	1,380	53,880	12,780	61,560	17,280
2022	84,840	57,120	83,010	3,480	33,450	1,380	53,880	12,780	61,560	17,280
2023	84,840	57,120	83,010	3,480	33,450	1,380	53,880	12,780	61,560	17,280
2024	84,840	57,120	83,010	3,480	33,450	1,380	53,880	12,780	61,560	17,280
2025	84,840	57,120	83,010	3,480	33,450	1,380	53,880	12,780	61,560	17,280
2026	84,840	57,120	83,010	3,480	33,450	1,380	53,880	12,780	61,560	17,280
2027	84,840	57,120	83,010	3,480	33,450	1,380	53,880	12,780	61,560	17,280
2028	84,840	57,120	83,010	3,480	33,450	1,380	53,880	12,780	61,560	17,280
2029	84,840	57,120	83,010	3,480	33,450	1,380	53,880	12,780	61,560	17,280
2030	84,840	57,120	83,010	3,480	33,450	1,380	53,880	12,780	61,560	17,280
2031	84,840	57,120	83,010	3,480	33,450	1,380	53,880	12,780	61,560	17,280
2032	84,840	57,120	83,010	3,480	33,450	1,380	53,880	12,780	61,560	17,280
2033	84,840	57,120	83,010	3,480	33,450	1,380	53,880	12,780	61,560	17,280
2034	84,840	57,120	83,010	3,480	33,450	1,380	53,880	12,780	61,560	17,280
2035	84,840	57,120	83,010	3,480	33,450	1,380	53,880	12,780	61,560	17,280
TOTAL	3,787,895	2,609,684	3,083,222	118,174	1,939,403	40,940	1,438,528	586,818	2,106,438	795,981

<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	2,036,591	2,297	1,092	98	3,487	0	3,666,432
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	481,817	4,237	1,617	251	6,105	0	1,241,219
2015	1,833	563,428	1,000	764,514	4,151	3,345	730	8,226	0	1,576,731
2016	10,380	1,166,900	3,000	1,572,926	5,760	449	730	6,939	0	2,481,680
2017	10,380	1,166,900	3,000	1,572,931	5,760	449	730	6,939	0	2,481,709
2018	10,380	1,166,900	3,000	1,572,926	5,760	449	730	6,939	0	2,481,727
2019	10,380	1,166,900	3,000	1,575,060	5,760	449	730	6,939	0	2,481,750
2020	10,380	1,146,900	9,000	1,575,060	5,760	1,846	1,619	9,225	0	2,483,390
2021	10,380	1,146,900	9,000	1,575,060	5,760	1,911	1,619	9,290	0	2,483,455
2022	10,380	1,146,900	9,000	1,575,060	5,760	1,982	1,619	9,361	0	2,483,526
2023	10,380	1,146,900	9,000	1,575,060	5,760	2,061	1,619	9,440	0	2,483,605
2024	10,380	1,146,900	9,000	1,575,060	5,760	2,061	1,619	9,440	0	2,483,605
2025	10,380	1,146,900	9,000	1,575,060	5,760	2,061	1,619	9,440	0	2,483,605
2026	10,380	1,146,900	9,000	1,575,060	5,760	2,061	1,619	9,440	0	2,483,605
2027	10,380	1,146,900	9,000	1,575,060	5,760	2,061	1,619	9,440	0	2,483,605
2028	10,380	1,146,900	9,000	1,575,060	5,760	2,061	1,619	9,440	0	2,483,605
2029	10,380	1,146,900	9,000	1,575,060	5,760	2,061	1,619	9,440	0	2,483,605
2030	10,380	1,146,900	9,000	1,575,060	5,760	2,061	1,619	9,440	0	2,483,605
2031	10,380	1,146,900	9,000	1,575,060	5,760	2,061	1,619	9,440	0	2,483,605
2032	10,380	1,146,900	9,000	1,575,060	5,760	2,061	1,619	9,440	0	2,483,605
2033	10,380	1,146,900	9,000	1,575,060	5,760	2,061	1,619	9,440	0	2,483,605
2034	10,380	1,146,900	9,000	1,575,060	5,760	2,061	1,619	9,440	0	2,483,605
2035	10,380	1,146,900	9,000	1,575,060	5,760	2,143	1,619	9,522	0	2,483,687
TOTAL	274,839	59,723,553	219,137	76,724,612	164,625	58,927	41,506	265,058	0	144,928,146

**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	33,400	35,997	0	0	12,366	12,366	0	970	13,680	14,650
2015	0	51	30,593	30,644	0	0	6,628	6,628	0	5	10,835	10,840
2016	0	51	44,618	44,669	0	0	19,745	19,745	0	5	15,963	15,968
2017	0	51	44,618	44,669	0	0	20,733	20,733	0	5	15,963	15,968
2018	0	51	44,618	44,669	0	0	21,769	21,769	0	5	15,963	15,968
2019	0	51	44,617	44,668	0	0	22,859	22,859	0	5	15,963	15,968
2020	0	51	46,069	46,120	0	0	12,661	12,661	0	5	17,415	17,420
2021	0	51	46,069	46,120	0	0	12,661	12,661	0	5	17,415	17,420
2022	0	51	46,069	46,120	0	0	12,661	12,661	0	5	17,415	17,420
2023	0	51	46,069	46,120	0	0	12,661	12,661	0	5	17,415	17,420
2024	0	51	46,069	46,120	0	0	12,661	12,661	0	5	17,415	17,420
2025	0	51	46,069	46,120	0	0	12,661	12,661	0	5	17,415	17,420
2026	0	51	46,069	46,120	0	0	12,661	12,661	0	5	17,415	17,420
2027	0	51	46,069	46,120	0	0	12,661	12,661	0	5	17,415	17,420
2028	0	51	46,069	46,120	0	0	12,661	12,661	0	5	17,415	17,420
2029	0	51	46,069	46,120	0	0	12,661	12,661	0	5	17,415	17,420
2030	0	51	46,069	46,120	0	0	12,661	12,661	0	5	17,415	17,420
2031	0	51	46,069	46,120	0	0	12,661	12,661	0	5	17,415	17,420
2032	0	51	46,069	46,120	0	0	12,661	12,661	0	5	17,415	17,420
2033	0	51	46,069	46,120	0	0	12,661	12,661	0	5	17,415	17,420
2034	0	51	46,069	46,120	0	0	12,661	12,661	0	5	17,415	17,420
2035	0	51	46,069	46,120	0	0	12,661	12,661	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								
							NORTH SAN JOAQUIN DIVISION								
	South Bay Pumping Plant						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					
			Water Supply	Recreation	Total							Water Supply	Recreation	Total	
1961	[13] 0	[14] 0	[15] 0	[16] 0	[17] 0	[18] 0	[19] 0	[20] 0	[21] 0	[22] 0	[23] 0	[24] 0	[25] 0	[26] 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	2,074,676	
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	91,079	46	99,361	0	114,127	39,694	587,381	650	741,852	301,102	1,042,954	
2015	0	3,342	(10,000)	134,511	400	128,253	0	127,427	66,000	1,066,644	8,660	1,268,731	(130,004)	1,138,727	
2016	0	3,342	(10,000)	128,071	400	121,813	0	131,412	104,000	2,430,123	8,660	2,674,195	212,960	2,887,155	
2017	0	3,332	0	128,071	400	131,803	0	131,587	0	2,430,152	8,660	2,570,399	41,224	2,611,623	
2018	0	3,351	0	128,071	400	131,822	0	128,369	(80,817)	2,430,170	8,660	2,486,382	(194,534)	2,291,848	
2019	0	3,351	0	128,071	400	131,822	0	128,613	50,179	2,430,194	8,660	2,617,646	77,224	2,694,870	
2020	0	3,351	0	133,571	400	137,322	0	128,690	(366)	2,428,096	8,660	2,565,080	(8,687)	2,556,393	
2021	0	3,351	0	133,571	400	137,322	0	128,769	10,725	2,428,096	8,660	2,576,250	(1,095)	2,575,155	
2022	0	3,351	0	133,571	400	137,322	0	128,846	(3,483)	2,428,096	8,660	2,562,119	(185,907)	2,376,212	
2023	0	3,351	0	133,571	400	137,322	0	128,818	(18,971)	2,428,096	8,660	2,546,603	115,791	2,662,394	
2024	0	3,351	0	133,571	400	137,322	0	128,625	11,289	2,428,096	8,660	2,576,670	79,858	2,656,528	
2025	0	3,351	0	133,571	400	137,322	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	34,743	433,638	214	574,336	0	72,181	34,743	523,739	172	630,835
2015	0	67,645	76,000	812,884	7,210	963,739	0	38,183	76,000	826,401	7,010	947,594
2016	0	73,360	114,000	2,297,332	7,210	2,491,902	0	43,898	114,000	1,471,851	7,010	1,636,759
2017	0	73,590	0	2,297,361	7,210	2,378,161	0	44,128	0	1,436,087	7,010	1,487,225
2018	0	70,740	(80,817)	2,297,379	7,210	2,294,512	0	41,278	(80,817)	1,436,082	7,010	1,403,553
2019	0	70,564	50,179	2,297,403	7,210	2,425,356	0	41,102	50,179	1,438,216	7,010	1,536,507
2020	0	70,628	(366)	2,289,934	7,210	2,367,406	0	41,166	(366)	1,644,659	7,010	1,692,469
2021	0	70,711	10,725	2,289,934	7,210	2,378,580	0	41,249	10,725	1,645,459	7,010	1,704,443
2022	0	70,705	(3,483)	2,289,934	7,210	2,364,366	0	41,243	(3,483)	1,646,359	7,010	1,691,129
2023	0	70,696	(18,971)	2,289,934	7,210	2,348,869	0	41,234	(18,971)	1,647,159	7,010	1,676,432
2024	0	70,575	11,289	2,289,934	7,210	2,379,008	0	41,113	11,289	1,648,059	7,010	1,707,471
2025	0	70,638	(12,518)	2,289,934	7,210	2,355,264	0	41,176	(12,518)	1,648,859	7,010	1,684,527
2026	0	70,650	24,308	2,289,934	7,210	2,392,102	0	41,188	24,308	1,649,359	7,010	1,721,865
2027	0	70,563	(17,799)	2,289,934	7,210	2,349,908	0	41,101	(17,799)	1,649,959	7,010	1,680,271
2028	0	70,703	12,291	2,289,934	7,210	2,380,138	0	41,241	12,291	1,650,459	7,010	1,711,001
2029	0	70,630	(9,046)	2,289,934	7,210	2,358,728	0	41,168	(9,046)	1,651,159	7,010	1,690,291
2030	0	70,694	20,756	2,289,934	7,210	2,388,594	0	41,232	20,756	1,651,759	7,010	1,720,757
2031	0	70,566	(97,726)	2,289,934	7,210	2,269,984	0	41,104	(97,726)	1,652,659	7,010	1,603,047
2032	0	70,168	84,999	2,289,934	7,210	2,452,311	0	40,706	84,999	1,653,459	7,010	1,786,174
2033	0	70,373	(94,652)	2,289,934	7,210	2,272,865	0	40,911	(94,652)	1,654,259	7,010	1,607,528
2034	0	69,865	69,593	2,289,934	7,210	2,436,602	0	40,403	69,593	1,655,059	7,010	1,772,065
2035	0	69,205	(242,659)	2,289,934	7,210	2,123,690	0	39,743	(242,659)	1,655,859	7,010	1,459,953

**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	
	[39]	[40]	[41]	[42]	[43]	[44]	[45]	[46]	[47]	[48]	[49]	[50]
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	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	34,743	489,267	172	594,837	0	52,458	34,743	484,445	172	571,818
2015	0	34,553	76,000	807,710	7,010	925,273	0	34,303	76,000	783,827	7,010	901,140
2016	0	40,268	114,000	1,396,051	7,010	1,557,329	0	40,018	114,000	1,369,651	7,010	1,530,679
2017	0	40,498	0	1,360,287	7,010	1,407,795	0	40,248	0	1,333,887	7,010	1,381,145
2018	0	37,648	(80,817)	1,360,282	7,010	1,324,123	0	37,398	(80,817)	1,333,882	7,010	1,297,473
2019	0	37,472	50,179	1,362,416	7,010	1,457,077	0	37,222	50,179	1,336,016	7,010	1,430,427
2020	0	37,536	(366)	1,567,159	7,010	1,611,339	0	37,286	(366)	1,540,006	7,010	1,583,936
2021	0	37,619	10,725	1,567,959	7,010	1,623,313	0	37,369	10,725	1,540,806	7,010	1,595,910
2022	0	37,613	(3,483)	1,568,859	7,010	1,609,999	0	37,363	(3,483)	1,541,706	7,010	1,582,596
2023	0	37,604	(18,971)	1,569,659	7,010	1,595,302	0	37,354	(18,971)	1,542,506	7,010	1,567,899
2024	0	37,483	11,289	1,570,559	7,010	1,626,341	0	37,233	11,289	1,543,406	7,010	1,598,938
2025	0	37,546	(12,518)	1,571,359	7,010	1,603,397	0	37,296	(12,518)	1,544,206	7,010	1,575,994
2026	0	37,558	24,308	1,571,859	7,010	1,640,735	0	37,308	24,308	1,544,706	7,010	1,613,332
2027	0	37,471	(17,799)	1,572,459	7,010	1,599,141	0	37,221	(17,799)	1,545,306	7,010	1,571,738
2028	0	37,611	12,291	1,572,959	7,010	1,629,871	0	37,361	12,291	1,545,806	7,010	1,602,468
2029	0	37,538	(9,046)	1,573,659	7,010	1,609,161	0	37,288	(9,046)	1,546,506	7,010	1,581,758
2030	0	37,602	20,756	1,574,259	7,010	1,639,627	0	37,352	20,756	1,547,106	7,010	1,612,224
2031	0	37,474	(97,726)	1,575,159	7,010	1,521,917	0	37,224	(97,726)	1,548,006	7,010	1,494,514
2032	0	37,076	84,999	1,575,959	7,010	1,705,044	0	36,826	84,999	1,548,806	7,010	1,677,641
2033	0	37,281	(94,652)	1,576,759	7,010	1,526,398	0	37,031	(94,652)	1,549,606	7,010	1,498,995
2034	0	36,773	69,593	1,577,559	7,010	1,690,935	0	36,523	69,593	1,550,406	7,010	1,663,532
2035	0	36,113	(242,659)	1,578,359	7,010	1,378,823	0	35,863	(242,659)	1,551,206	7,010	1,351,420

**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	34,743	465,772	172	543,866	0	16,120	41,923	1,120,238	81	1,181,362
2015	0	32,753	76,000	758,816	7,010	874,579	0	19,793	24,000	278,302	1,630	323,725
2016	0	38,468	114,000	1,345,988	7,010	1,505,466	0	21,241	0	783,948	1,630	806,819
2017	0	38,698	0	1,310,224	7,010	1,355,932	0	21,243	0	773,332	1,630	796,205
2018	0	35,848	(80,817)	1,310,219	7,010	1,272,260	0	20,998	(50,078)	773,327	1,630	745,877
2019	0	35,672	50,179	1,312,353	7,010	1,405,214	0	20,924	31,508	775,461	1,630	829,523
2020	0	35,736	(366)	1,519,440	7,010	1,561,820	0	20,947	(3,398)	954,752	1,630	973,931
2021	0	35,819	10,725	1,520,240	7,010	1,573,794	0	20,946	(1,117)	954,752	1,630	976,211
2022	0	35,813	(3,483)	1,521,140	7,010	1,560,480	0	20,940	(3,434)	954,752	1,630	973,888
2023	0	35,804	(18,971)	1,521,940	7,010	1,545,783	0	20,939	(18,638)	954,752	1,630	958,683
2024	0	35,683	11,289	1,522,840	7,010	1,576,822	0	20,881	21,309	954,752	1,630	998,572
2025	0	35,746	(12,518)	1,523,640	7,010	1,553,878	0	20,965	(11,624)	954,752	1,630	965,723
2026	0	35,758	24,308	1,524,140	7,010	1,591,216	0	20,930	13,030	954,752	1,630	990,342
2027	0	35,671	(17,799)	1,524,740	7,010	1,549,622	0	20,861	(6,161)	954,752	1,630	971,082
2028	0	35,811	12,291	1,525,240	7,010	1,580,352	0	20,961	4,006	954,752	1,630	981,349
2029	0	35,738	(9,046)	1,525,940	7,010	1,559,642	0	20,955	(913)	954,752	1,630	976,424
2030	0	35,802	20,756	1,526,540	7,010	1,590,108	0	20,930	8,528	954,752	1,630	985,840
2031	0	35,674	(97,726)	1,527,440	7,010	1,472,398	0	20,956	(31,057)	954,752	1,630	946,281
2032	0	35,276	84,999	1,528,240	7,010	1,655,525	0	20,865	43,953	954,752	1,630	1,021,200
2033	0	35,481	(94,652)	1,529,040	7,010	1,476,879	0	20,854	(37,929)	954,752	1,630	939,307
2034	0	34,973	69,593	1,529,840	7,010	1,641,416	0	20,769	28,588	954,752	1,630	1,005,739
2035	0	34,313	(242,659)	1,530,640	7,010	1,329,304	0	20,892	(49,219)	954,752	1,630	928,055

**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	133,389	81	186,536	0	13,671	41,923	130,765	81	186,440
2015	0	14,443	24,000	245,040	1,430	284,913	0	10,973	24,000	237,039	1,430	273,442
2016	0	15,891	0	675,482	1,430	692,803	0	12,421	0	632,202	1,430	646,053
2017	0	15,893	0	664,866	1,430	682,189	0	12,423	0	621,586	1,430	635,439
2018	0	15,648	(50,078)	664,861	1,430	631,861	0	12,178	(50,078)	623,581	1,430	587,111
2019	0	15,574	31,508	669,061	1,430	717,573	0	12,104	31,508	623,581	1,430	668,623
2020	0	15,597	(3,398)	854,854	1,430	868,483	0	12,127	(3,398)	810,872	1,430	821,031
2021	0	15,596	(1,117)	854,854	1,430	870,763	0	12,126	(1,117)	810,872	1,430	823,311
2022	0	15,590	(3,434)	854,854	1,430	868,440	0	12,120	(3,434)	810,872	1,430	820,988
2023	0	15,589	(18,638)	854,854	1,430	853,235	0	12,119	(18,638)	810,872	1,430	805,783
2024	0	15,531	21,309	854,854	1,430	893,124	0	12,061	21,309	810,872	1,430	845,672
2025	0	15,615	(11,624)	854,854	1,430	860,275	0	12,145	(11,624)	810,872	1,430	812,823
2026	0	15,580	13,030	854,854	1,430	884,894	0	12,110	13,030	810,872	1,430	837,442
2027	0	15,511	(6,161)	854,854	1,430	865,634	0	12,041	(6,161)	810,872	1,430	818,182
2028	0	15,611	4,006	854,854	1,430	875,901	0	12,141	4,006	810,872	1,430	828,449
2029	0	15,605	(913)	854,854	1,430	870,976	0	12,135	(913)	810,872	1,430	823,524
2030	0	15,580	8,528	854,854	1,430	880,392	0	12,110	8,528	810,872	1,430	832,940
2031	0	15,606	(31,057)	854,854	1,430	840,833	0	12,136	(31,057)	810,872	1,430	793,381
2032	0	15,515	43,953	854,854	1,430	915,752	0	12,045	43,953	810,872	1,430	868,300
2033	0	15,504	(37,929)	854,854	1,430	833,859	0	12,034	(37,929)	810,872	1,430	786,407
2034	0	15,419	28,588	854,854	1,430	900,291	0	11,949	28,588	810,872	1,430	852,839
2035	0	15,542	(49,219)	854,854	1,430	822,607	0	12,072	(49,219)	810,872	1,430	775,155

**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	6,727	22,000	234,474	1,250	264,451	0	0	1,977	1,977
2016	0	8,174	0	623,722	1,250	633,146	0	0	10,380	10,380
2017	0	8,176	0	613,106	1,250	622,532	0	0	10,380	10,380
2018	0	8,484	(19,777)	613,101	1,250	603,058	0	0	10,380	10,380
2019	0	8,492	17,408	613,101	1,250	640,251	0	0	10,380	10,380
2020	0	8,483	(17,305)	798,132	1,250	790,560	0	0	10,380	10,380
2021	0	8,486	(398)	798,132	1,250	807,470	0	0	10,380	10,380
2022	0	8,486	13,735	798,132	1,250	821,603	0	0	10,380	10,380
2023	0	8,482	(8,417)	798,132	1,250	799,447	0	0	10,380	10,380
2024	0	8,462	689	798,132	1,250	808,533	0	0	10,380	10,380
2025	0	8,489	4,591	798,132	1,250	812,462	0	0	10,380	10,380
2026	0	8,475	(3,819)	798,132	1,250	804,038	0	0	10,380	10,380
2027	0	8,479	745	798,132	1,250	808,606	0	0	10,380	10,380
2028	0	8,481	(5,355)	798,132	1,250	802,508	0	0	10,380	10,380
2029	0	8,481	2,909	798,132	1,250	810,772	0	0	10,380	10,380
2030	0	8,480	296	798,132	1,250	808,158	0	0	10,380	10,380
2031	0	8,475	(1,976)	798,132	1,250	805,881	0	0	10,380	10,380
2032	0	8,449	18,821	798,132	1,250	826,652	0	0	10,380	10,380
2033	0	8,449	(23,419)	798,132	1,250	784,412	0	0	10,380	10,380
2034	0	8,443	21,651	798,132	1,250	829,476	0	0	10,380	10,380
2035	0	8,451	(31,434)	798,132	1,250	776,399	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	(7,180)	305,533	91	325,449
2015	0	0	1,966	1,966	0	0	1,833	1,833	0	12,910	52,000	480,514	5,380	550,804
2016	0	0	10,380	10,380	0	0	9,380	9,380	0	17,177	114,000	562,040	5,380	698,597
2017	0	0	10,380	10,380	0	0	9,380	9,380	0	17,405	0	536,892	5,380	559,677
2018	0	0	10,380	10,380	0	0	9,380	9,380	0	14,800	(30,739)	536,892	5,380	526,333
2019	0	0	10,380	10,380	0	0	9,380	9,380	0	14,698	18,671	536,892	5,380	575,641
2020	0	0	10,380	10,380	0	0	9,700	9,700	0	14,739	3,032	564,688	5,380	587,839
2021	0	0	10,380	10,380	0	0	9,700	9,700	0	14,823	11,842	565,488	5,380	597,533
2022	0	0	10,380	10,380	0	0	9,700	9,700	0	14,823	(49)	566,388	5,380	586,542
2023	0	0	10,380	10,380	0	0	9,700	9,700	0	14,815	(333)	567,188	5,380	587,050
2024	0	0	10,380	10,380	0	0	9,700	9,700	0	14,752	(10,020)	568,088	5,380	578,200
2025	0	0	10,380	10,380	0	0	9,700	9,700	0	14,731	(894)	568,888	5,380	588,105
2026	0	0	10,380	10,380	0	0	9,700	9,700	0	14,778	11,278	569,388	5,380	600,824
2027	0	0	10,380	10,380	0	0	9,700	9,700	0	14,760	(11,638)	569,988	5,380	578,490
2028	0	0	10,380	10,380	0	0	9,700	9,700	0	14,800	8,285	570,488	5,380	598,953
2029	0	0	10,380	10,380	0	0	9,700	9,700	0	14,733	(8,133)	571,188	5,380	583,168
2030	0	0	10,380	10,380	0	0	9,700	9,700	0	14,822	12,228	571,788	5,380	604,218
2031	0	0	10,380	10,380	0	0	9,700	9,700	0	14,668	(66,669)	572,688	5,380	526,067
2032	0	0	10,380	10,380	0	0	9,700	9,700	0	14,361	41,046	573,488	5,380	634,275
2033	0	0	10,380	10,380	0	0	9,700	9,700	0	14,577	(56,723)	574,288	5,380	537,522
2034	0	0	10,380	10,380	0	0	9,700	9,700	0	14,154	41,005	575,088	5,380	635,627
2035	0	0	10,380	10,380	0	0	9,700	9,700	0	13,371	(193,440)	575,888	5,380	401,199

**TABLE B-6 Annual Water Quantities Conveyed through Each Pumping and Power Recovery Plant of Project Transportation Facilities (acre-feet)**

Sheet 9 of 10

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	(7,180)	305,533	91	315,999	0	4,742	(7,666)	305,533	47	302,656
2015	0	11,000	52,000	480,514	5,380	548,894	0	5,323	52,000	479,884	2,330	539,537
2016	0	15,267	114,000	562,040	5,380	696,687	0	9,590	114,000	560,150	2,330	686,070
2017	0	15,495	0	536,892	5,380	557,767	0	9,818	0	535,002	2,330	547,150
2018	0	12,890	(30,739)	536,892	5,380	524,423	0	6,605	(30,739)	535,002	2,330	513,198
2019	0	12,788	18,671	536,892	5,380	573,731	0	6,503	18,671	535,002	2,330	562,506
2020	0	12,829	3,032	564,688	5,380	585,929	0	6,544	3,032	562,798	2,330	574,704
2021	0	12,913	11,842	565,488	5,380	595,623	0	6,628	11,842	563,598	2,330	584,398
2022	0	12,913	(49)	566,388	5,380	584,632	0	6,628	(49)	564,498	2,330	573,407
2023	0	12,905	(333)	567,188	5,380	585,140	0	6,620	(333)	565,298	2,330	573,915
2024	0	12,842	(10,020)	568,088	5,380	576,290	0	6,557	(10,020)	566,198	2,330	565,065
2025	0	12,821	(894)	568,888	5,380	586,195	0	6,536	(894)	566,998	2,330	574,970
2026	0	12,868	11,278	569,388	5,380	598,914	0	6,583	11,278	567,498	2,330	587,689
2027	0	12,850	(11,638)	569,988	5,380	576,580	0	6,565	(11,638)	568,098	2,330	565,355
2028	0	12,890	8,285	570,488	5,380	597,043	0	6,605	8,285	568,598	2,330	585,818
2029	0	12,823	(8,133)	571,188	5,380	581,258	0	6,538	(8,133)	569,298	2,330	570,033
2030	0	12,912	12,228	571,788	5,380	602,308	0	6,627	12,228	569,898	2,330	591,083
2031	0	12,758	(66,669)	572,688	5,380	524,157	0	6,473	(66,669)	570,798	2,330	512,932
2032	0	12,451	41,046	573,488	5,380	632,365	0	6,166	41,046	571,598	2,330	621,140
2033	0	12,667	(56,723)	574,288	5,380	535,612	0	6,382	(56,723)	572,398	2,330	524,387
2034	0	12,244	41,005	575,088	5,380	633,717	0	5,959	41,005	573,198	2,330	622,492
2035	0	11,461	(193,440)	575,888	5,380	399,289	0	5,176	(193,440)	573,998	2,330	388,064

**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	802	39,156	39,958	0	212	13,804	14,016
2016	0	802	93,480	94,282	0	212	40,487	40,699
2017	0	802	93,504	94,306	0	212	40,511	40,723
2018	0	802	93,527	94,329	0	212	40,534	40,746
2019	0	802	93,551	94,353	0	212	40,558	40,770
2020	0	802	99,108	99,910	0	212	39,665	39,877
2021	0	802	99,108	99,910	0	212	39,665	39,877
2022	0	802	99,108	99,910	0	212	39,665	39,877
2023	0	802	99,108	99,910	0	212	39,665	39,877
2024	0	802	99,108	99,910	0	212	39,665	39,877
2025	0	802	99,108	99,910	0	212	39,665	39,877
2026	0	802	99,108	99,910	0	212	39,665	39,877
2027	0	802	99,108	99,910	0	212	39,665	39,877
2028	0	802	99,108	99,910	0	212	39,665	39,877
2029	0	802	99,108	99,910	0	212	39,665	39,877
2030	0	802	99,108	99,910	0	212	39,665	39,877
2031	0	802	99,108	99,910	0	212	39,665	39,877
2032	0	802	99,108	99,910	0	212	39,665	39,877
2033	0	802	99,108	99,910	0	212	39,665	39,877
2034	0	802	99,108	99,910	0	212	39,665	39,877
2035	0	802	99,108	99,910	0	212	39,665	39,877

**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	8,933	9,053
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>656</b>	<b>0</b>	<b>902</b>	<b>18,429</b>	<b>19,331</b>
Oroville Division									
Multipurpose Facilities	340,930	0	0	0	491,028	0	831,958	99,142	931,100
Specific Power Facilities	230	0	0	0	199,459	0	199,689	(887)	198,803
<b>Total, Oroville Division</b>	<b>341,160</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>690,488</b>	<b>0</b>	<b>1,031,647</b>	<b>98,256</b>	<b>1,129,903</b>
California Aqueduct									
North San Joaquin Division	1,210	0	0	0	90,773	0	91,983	3,670	95,653
San Luis Division	13,152	0	0	0	144,136	0	157,288	5,847	163,134
<b>Total, California Aqueduct</b>	<b>14,362</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>234,909</b>	<b>0</b>	<b>249,271</b>	<b>9,516</b>	<b>258,787</b>
Delta Facilities	37,311	0	0	0	351,561	0	388,872	25,386	414,258
Planning and Preoperation	5,302	0	0	0	57,086	0	62,388	0	62,388
<b>TOTAL, CONSERVATION FACILITIES</b>	<b>398,380</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1,334,700</b>	<b>0</b>	<b>1,733,080</b>	<b>151,586</b>	<b>1,884,666</b>
<b>TRANSPORTATION FACILITIES</b>									
Upper Feather Division									
Grizzly Valley Pipeline	(4)	0	320	0	0	341	656	0	656
North Bay Aqueduct	466,642	0	676	0	0	114,054	581,371	0	581,371
South Bay Aqueduct	241,199	0	3,656	0	0	173,329	418,184	23,712	441,896
California Aqueduct									
North San Joaquin Division	872	0	108	0	0	236,650	237,630	8,167	245,797
San Luis Division	17,596	0	0	0	0	163,859	181,455	8,750	190,205
South San Joaquin Division	15,247	0	4,755	2,093	0	326,773	348,869	17,787	366,655
Tehachapi Division	(456)	0	0	5,230	0	481,540	486,314	21,286	507,600
Mojave Division	(1,179)	0	1,899	0	0	353,430	354,150	40,158	394,308
Santa Ana Division	(41,292)	0	6,052	5,331	0	470,535	440,626	81,328	521,954
West Branch	29,594	0	461	37	0	638,507	668,599	43,991	712,590
Coastal Branch	32,604	0	191	0	0	473,503	506,298	0	506,298
<b>Total, California Aqueduct</b>	<b>52,985</b>	<b>0</b>	<b>13,466</b>	<b>12,691</b>	<b>0</b>	<b>3,144,797</b>	<b>3,223,940</b>	<b>221,467</b>	<b>3,445,407</b>
<b>TOTAL, TRANSPORTATION FACILITIES</b>	<b>760,821</b>	<b>0</b>	<b>18,117</b>	<b>12,691</b>	<b>0</b>	<b>3,432,521</b>	<b>4,224,151</b>	<b>245,179</b>	<b>4,469,330</b>
East Branch Enlargement	0	0	0	0	0	462,052	462,052	0	462,052
East Branch Extension	0	0	0	0	0	416,856	416,856	0	416,856
Coastal Power Allocation	0	0	0	0	0	30,708	30,708	0	30,708
Agricultural Drainage Facilities	0	0	0	0	0	0	0	103,281	103,281
Off-Aqueduct									
Power Generation Facilities	0	0	0	0	0	614,535	614,535	0	614,535
Small Hydro									
Power Generation Facilities	0	0	0	0	14,095	85,896	99,991	0	99,991
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	68,786	68,786
Davis-Grunsky	0	0	0	0	0	0	0	130,000	130,000
<b>TOTAL THROUGH 2024</b>	<b>1,159,202</b>	<b>0</b>	<b>18,117</b>	<b>12,691</b>	<b>1,383,481</b>	<b>5,042,569</b>	<b>7,616,060</b>	<b>698,832</b>	<b>8,314,892</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 \$85,843,000 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>						
	1952-2012	2013	2014	2015	2016	2017	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	5,000	0	13,723
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>5,000</i>	<i>0</i>	<i>319,641</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	0	5,216	20,000	5,000	0	1,912,889
Alameda County Water District	630,576	0		0	0	0	630,576
Santa Clara Valley Water District	21,500	0	1,215	13,000	10,000	0	45,715
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>0</i>	<i>6,431</i>	<i>33,000</i>	<i>15,000</i>	<i>0</i>	<i>3,655,860</i>
<b>CENTRAL COASTAL AREA</b>							
San Luis Obispo County Flood Control and Water Conservation District	26,204	0	204	15,000	0	0	41,408
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>0</i>	<i>204</i>	<i>15,000</i>	<i>0</i>	<i>0</i>	<i>108,466</i>
<b>SAN JOAQUIN VALLEY AREA</b>							
Castaic Lake Water Agency	82,567	0	0	0	0	0	82,567
County of Kings	17,206	4	16,731	5,000	30,000	0	68,941
Dudley Ridge Water District <sup>c</sup>	304,541	0	19,171	5,000	15,000	0	343,712
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	3,861,226	129,193	22,998	10,000	35,000	0	4,058,417
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>4,662,590</i>	<i>129,197</i>	<i>58,900</i>	<i>20,000</i>	<i>80,000</i>	<i>0</i>	<i>4,950,687</i>
<b>SOUTHERN CALIFORNIA AREA</b>							
Antelope Valley-East Kern Water Agency	1,038,197	57,721	118,410	120,000	70,000	0	1,404,328
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	309,030	12	0	0	0	0	309,042
Palmdale Water District	34,173	0	0	10,000	55,000	0	99,173
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	118,558	1,096	3,063	0	15,000	0	137,717
The Metropolitan Water District of Southern California	4,816,090	1,519	1	0	5,000	0	4,822,610
Ventura County Flood Control District	79,699	0	0	0	0	0	79,699
<i>Subtotal</i>	<i>7,949,751</i>	<i>60,348</i>	<i>121,474</i>	<i>130,000</i>	<i>145,000</i>	<i>0</i>	<i>8,406,573</i>
<b>TOTAL</b>	<b>17,297,376</b>	<b>189,545</b>	<b>187,009</b>	<b>198,000</b>	<b>245,000</b>	<b>0</b>	<b>18,116,930</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 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	Over-payment (+) or Under-payment (-) <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	
28J	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)
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) (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	
Total Unadjusted Incremental Costs for Past Payments															
			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) (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	
Total Unadjusted Incremental Costs for Past Payments															
				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	2,840,452	68,374	259,542	523
2007	0	61,330	1	0	3,219,041	3,280,372	3,069,619	15,183	70,776	1,884
2008	4	75,107	6,065	5,318	7,878,424	7,964,914	5,592,420	35,890	169,891	5,098
2009	13	26,653	348	0	1,188,748	1,215,749	9,800,960	1,029,437	1,545,005	1,984
2010	0	4,735	(10)	(1)	395,362	400,086	6,233,750	104,212	441,325	14,866,013
2011	1	57,126	34	0	175,933	233,093	9,878,569	1,580,329	3,748,675	3,416,729
2012	0	585,216	3	15,163	311,585	911,967	7,915,029	1,379,855	3,102,674	104,555
2013	0	870,300	27	67,533	394,181	1,332,041	2,904,256	1,228,777	1,071,752	328,413
2014	0	781,566	3	109,243	355,488	1,246,300	(2,185)	(1,111,982)	(319,804)	127,441
2015	0	788,972	46,767	213,817	343,117	1,392,673	2,081,098	126,384	467,338	149,907
2016	0	422,027	36,518	142,237	177,075	777,857	251,807	39,634	115,833	89,384
2017	0	243,760	53,781	190,864	80,936	569,341	2,278,397	527,396	52,693	101,703
2018	0	88,767	47,036	43,227	8,943	187,973	114,472	658,842	41,695	23,089
2019	0	30,079	16,159	14,435	3,072	63,745	71,616	72,541	24,674	13,139
2020	0	1,759	945	844	180	3,728	4,188	672	1,443	768
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>46,033,485</b>	<b>33,260,987</b>	<b>5,414,117</b>	<b>29,345,141</b>	<b>114,053,730</b>	<b>82,476,373</b>	<b>7,988,339</b>	<b>17,141,206</b>	<b>30,970,317</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	388,781	44,543	22,639	455,963
2003	67,216	509,964	477,926	1,409,228	7,689,872	178,162	22,779	13,565	214,507
2004	3,193	3,100	39,326	3,276,907	4,931,451	892,410	15,333	77,640	985,383
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	3,188,263	422,511	15,048	177,980	615,539
2007	7,470	7,471	7,471	13,906,04	472,887	58,152	121,987	653,025	653,025
2008	8,415	8,730	8,932	12,419	5,841,795	1,183,588	39,742	85,604	1,308,934
2009	3,054	3,271	3,369	4,804	12,391,884	553,321	41,137	30,031	624,489
2010	734	731	730	1,045	21,648,539	179,482	8,328	2,386	190,196
2011	6,514	7,668	6,484	9,188	18,654,155	750,682	51,659	3,983	806,325
2012	51,903	117,364	68,876	393,352	13,133,608	1,460,309	226,476	75,111	1,761,895
2013	130,731	137,199	384,922	875,282	7,061,331	6,747,460	800,204	237,566	7,785,230
2014	102,374	121,005	107,609	207,301	(768,241)	5,281,837	3,238,636	167,361	8,687,833
2015	49,001	61,077	59,863	91,317	3,085,985	5,400,177	641,629	605,594	6,647,400
2016	24,269	25,966	25,893	39,711	612,497	7,837,464	1,084,067	176,045	9,097,576
2017	7,728	9,373	9,333	17,104	3,003,727	3,825,950	1,062,107	2,132,118	7,020,175
2018	6,367	7,772	7,985	13,301	873,523	3,687,659	41,645	608,831	4,338,135
2019	3,111	3,673	3,164	8,478	200,396	4,527,768	47,878	28,971	4,604,617
2020	182	215	185	496	8,149	643,118	2,800	1,694	647,612
2021	0	0	0	0	0	1,457,544	0	0	1,457,544
2022	0	0	0	0	0	1,508,115	0	0	1,508,115
2023	0	0	0	0	0	527,383	0	0	527,383
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>1,365,533</b>	<b>5,438,609</b>	<b>7,652,935</b>	<b>20,295,948</b>	<b>173,329,260</b>	<b>158,537,667</b>	<b>50,050,063</b>	<b>28,061,942</b>	<b>236,649,672</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	(2,453,483)	3,665,985	3,627	44,010	20,221	87,805
2003	8,864	79,647	(5,377,004)	7,923	2,183,795	(3,096,775)	2,130	18,793	16,716	22,946
2004	(16,126)	(14,365)	(50,563)	(2,487)	(459,225)	(542,766)	22,520	5,980	5,879	5,493
2005	261	11,360	129,470	3,529	995,531	1,140,151	26,301	11,593	6,323	7,316
2006	1,421	27,658	(10,639)	1,444	(366,505)	(346,620)	6,106	2,942	1,621	1,872
2007	2	87,855	39,476	7,718	(120,678)	14,373	13,352	21,920	11,909	13,807
2008	14,780	16,097	46,719	13,920	1,110,583	1,202,099	9,017	13,020	7,277	8,919
2009	934	216,920	45,727	5,164	(42,304)	226,441	2,380	16,160	8,894	10,504
2010	(16)	1,560,454	130,995	655	(347,589)	1,344,499	(1)	1,824	989	1,148
2011	7,073	644,242	481,776	1,325	78,207	1,212,623	3	6,385	1,768	14,006
2012	44,540	213,896	2,935	29,658	170,506	461,535	1,139	114,545	36,447	73,710
2013	810,117	299,508	906,029	120,630	215,316	2,351,600	42,393	383,194	323,185	342,033
2014	843,003	317,107	459,189	67,178	212,152	1,898,629	20,475	181,707	136,459	158,996
2015	96,007	2,226,405	2,664,524	170,787	1,385,962	6,543,685	43,801	186,236	138,172	230,829
2016	271,237	3,658,025	5,297,326	627,922	1,070,100	10,924,610	90,717	337,739	203,210	394,192
2017	206,165	3,182,266	725,224	466,079	440,464	5,020,198	82,222	269,177	120,252	317,207
2018	14,540	3,139,131	97,230	60,008	56,510	3,367,419	0	0	1,345,596	0
2019	0	0	0	0	0	0	0	0	0	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>23,129,003</b>	<b>46,967,806</b>	<b>34,438,066</b>	<b>7,518,281</b>	<b>51,806,129</b>	<b>163,859,285</b>	<b>1,223,505</b>	<b>14,626,886</b>	<b>13,470,846</b>	<b>11,985,180</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	93,988	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	507,519	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	223,132
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	81,178	138,499	132,824	185,187	1,075,653	183,439	62,664	954,312	1,502,787	4,915,581
2016	129,436	379,037	276,384	625,583	905,262	503,580	109,127	639,645	1,243,104	5,837,016
2017	84,918	275,826	125,307	476,068	739,765	368,638	91,717	401,580	726,598	4,079,275
2018	0	0	0	0	198,563	0	0	1,204	1,204	1,546,567
2019	0	0	0	0	1,106,082	0	0	201,758	362,166	1,670,006
2020	0	0	0	0	1,133,445	0	0	1,133,445	1,133,445	3,400,335
2021	0	0	0	0	0	0	0	1,162,041	1,162,041	2,324,082
2022	0	0	0	0	0	0	0	0	119,192	119,192
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>13,240,265</b>	<b>12,574,336</b>	<b>9,329,426</b>	<b>17,854,075</b>	<b>74,028,951</b>	<b>10,821,451</b>	<b>7,624,863</b>	<b>54,182,346</b>	<b>85,811,225</b>	<b>326,773,355</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	23,540	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	31,289	906,531	95,936	114,523	0	152,679	114,484	152,651	38,158
2013	690,468	80,016	770,484	234,199	314,887	0	419,827	314,845	419,785	104,949
2014	2,928,755	58,157	2,986,912	1,077,259	203,219	0	270,945	203,188	270,922	67,726
2015	13,187,192	46,059	13,233,251	292,782	92,148	0	124,866	93,042	120,087	32,153
2016	7,797,180	49,249	7,846,429	152,998	59,705	0	83,870	60,685	77,049	21,173
2017	10,098,583	0	10,098,583	243,707	208,385	0	433,453	221,047	268,586	71,058
2018	18,243,726	0	18,243,726	231,973	201,286	0	545,141	223,805	251,909	69,935
2019	10,710,662	0	10,710,662	294,486	63,456	0	546,794	101,063	57,099	25,894
2020	15,125,647	0	15,125,647	167,873	36,173	0	311,703	57,611	32,549	14,761
2021	17,529,794	0	17,529,794	0	0	0	0	0	0	0
2022	17,673,227	0	17,673,227	0	0	0	0	0	0	0
2023	15,705,111	0	15,705,111	0	0	0	0	0	0	0
2024	7,734,093	0	7,734,093	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0	0	0
2026	183,264	0	183,264	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>426,630,002</b>	<b>54,910,116</b>	<b>481,540,119</b>	<b>53,780,170</b>	<b>25,039,977</b>	<b>759,941</b>	<b>21,349,516</b>	<b>19,185,276</b>	<b>10,168,030</b>	<b>13,374,073</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	10,634	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	50,573
1985	608,583	966,160	51,634	8,422,377	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	6,138,027	11,944,009
2014	2,576,361	184,199	28,491	4,882,310	15,952	2,420,591	79,084	64,672	3,932,174	6,512,475
2015	1,259,991	695,800	55,944	2,766,813	11,564	1,503,165	16,484	21,228	27,733,766	29,286,207
2016	502,756	1,486,937	44,022	2,489,195	14,842	1,649,166	21,042	891,907	21,946,189	24,523,146
2017	1,234,217	980,454	150,835	3,811,742	1,219,812	3,730,279	204,264	12,749,279	13,597,508	31,501,142
2018	1,611,950	316,376	168,230	3,620,605	94,950	5,092,619	306,854	1,536,549	18,604,013	25,634,985
2019	2,818,490	435,439	203,097	4,545,818	67,669	31,273,681	421,547	137,096	34,503,164	66,403,157
2020	2,109,612	248,224	115,776	3,094,282	38,575	7,761,946	240,305	78,152	12,727,622	20,846,600
2021	0	0	0	0	0	0	0	0	236,954	236,954
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>163,607,909</b>	<b>73,398,101</b>	<b>58,663,638</b>	<b>439,326,630</b>	<b>62,221,628</b>	<b>100,443,339</b>	<b>45,194,360</b>	<b>48,807,734</b>	<b>213,868,148</b>	<b>470,535,210</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	894,067	39,656	0
2012	615,441	76,325	91,531	55,362	18,910	79,163	936,732	336,197	271,091	0
2013	182,443	231,925	230,217	172,032	51,955	257,967	1,126,538	801,825	1,075,581	0
2014	300,223	264,332	332,856	96,090	39,531	1,098,436	2,131,468	1,304,845	1,310,625	0
2015	255,364	600,906	553,681	89,861	15,665	6,628,605	8,144,082	1,819,962	2,237,887	0
2016	270,915	1,972,814	558,771	269,633	17,820	2,671,595	5,761,548	2,521,353	1,029,734	0
2017	1,677,544	160,343	4,228,936	2,514,870	101,595	4,549,295	13,232,583	1,083,894	235,631	0
2018	1,373,939	172,309	1,087,859	2,439,492	122,997	11,403,301	16,599,897	2,418	3,626	0
2019	1,388,042	105,755	696,443	2,992,094	112,277	22,085,266	27,379,877	0	0	0
2020	791,033	60,269	396,897	516,073	63,986	67,513,022	69,341,280	0	0	0
2021	0	0	0	0	0	9,110,000	9,110,000	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>50,237,816</b>	<b>35,649,549</b>	<b>135,850,849</b>	<b>75,809,450</b>	<b>78,311,939</b>	<b>262,646,909</b>	<b>638,506,512</b>	<b>30,117,543</b>	<b>140,690,642</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	8,836,704	17,138,613
2003	25,734	6,272	0	0	149,540	3,105,115	10,869,934
2004	3,142	1,942	0	0	66,873	5,117,635	10,222,860
2005	526	327	0	0	(192,669)	8,116,622	10,591,731
2006	4	18,012	0	0	68,949	15,693,856	19,790,103
2007	0	152	0	0	113,088	13,497,805	19,968,781
2008	24	14,163	0	0	101,277	14,846,171	28,652,884
2009	43	44,176	0	0	83,443	26,272,439	39,880,086
2010	(1)	(1,210)	0	0	635,568	23,066,882	45,115,508
2011	4	4,284	0	0	938,010	17,867,965	36,755,214
2012	96	1,455	0	0	608,839	23,863,404	37,908,980
2013	209	1,590	0	0	1,879,204	41,384,619	49,777,992
2014	114	1,113	0	0	2,616,696	33,597,501	34,075,561
2015	1,833	0	0	0	4,059,682	75,596,701	80,075,359
2016	2,659	0	0	0	3,553,746	70,033,266	71,423,620
2017	0	0	0	0	1,319,525	76,083,223	79,656,291
2018	0	0	0	0	6,044	73,357,378	74,418,874
2019	0	0	0	0	0	115,314,137	115,578,278
2020	0	0	0	0	0	112,455,756	112,467,633
2021	0	0	0	0	0	30,658,374	30,658,374
2022	0	0	0	0	0	19,300,534	19,300,534
2023	0	0	0	0	0	16,232,494	16,232,494
2024	0	0	0	0	0	7,734,093	7,734,093
2025	0	0	0	0	0	0	0
2026	0	0	0	0	0	183,264	183,264
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	81,146,753	50,131,923	16,067,297	16,612,628	506,182,619	3,263,373,403	3,551,097,542



**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	1,072,590	232,733	455,788	181,399	1,942,510	2,907,982	272,736	289,992	391,005
2002	3,627	1,586,514	416,245	411,031	398,722	2,812,512	3,854,560	341,692	466,403	538,492
2003	393	1,777,923	549,313	567,865	354,483	3,249,584	2,352,925	366,425	576,304	965,154
2004	455	1,602,959	638,663	738,316	818,552	3,798,489	3,346,328	511,141	747,866	701,021
2005	452	1,061,534	323,660	767,626	412,975	2,565,794	3,319,592	263,889	429,381	811,597
2006	3,875	799,327	244,815	601,133	434,105	2,079,380	3,445,200	376,508	748,578	596,424
2007	(8)	1,079,215	227,805	465,919	273,136	2,046,074	5,055,162	696,305	592,522	793,387
2008	3,540	840,721	231,094	521,655	609,909	2,203,379	5,241,195	678,577	748,551	923,093
2009	88	1,249,009	297,827	608,156	563,789	2,718,781	3,997,036	668,227	703,649	1,346,084
2010	25	2,700,511	128,237	1,086,766	286,466	4,201,980	4,516,352	582,743	812,534	715,454
2011	63	2,659,596	606,841	1,210,476	429,121	4,906,034	5,165,779	835,498	874,346	498,832
2012	(24)	2,620,658	148,414	1,439,549	1,127,909	5,336,531	5,315,458	1,115,086	751,559	833,824
2013	277	3,363,950	136,712	478,897	376,428	4,355,987	6,217,659	1,231,771	670,017	1,112,978
2014	111	4,091,772	176,655	609,037	552,088	5,429,552	7,361,085	628,104	639,713	1,306,214
2015	361	4,188,817	171,835	601,273	489,104	5,451,029	7,825,891	1,285,146	876,161	(31,587)
2016	117	4,464,185	171,642	639,896	540,828	5,816,551	9,861,504	749,960	792,149	226,299
2017	121	4,741,335	182,561	680,204	573,706	6,177,806	11,196,132	763,451	799,903	1,007,313
2018	201	4,509,427	177,099	646,863	539,891	5,873,280	9,724,120	942,181	830,964	404,682
2019	203	4,554,521	178,870	653,331	545,290	5,932,012	9,821,362	951,602	839,274	408,729
2020	205	4,600,066	180,659	659,865	550,743	5,991,333	9,919,575	961,118	847,667	412,816
2021	207	4,646,067	182,466	666,463	556,251	6,051,247	10,018,771	970,730	856,143	416,944
2022	209	4,692,528	184,290	673,128	561,813	6,111,759	10,118,959	980,437	864,705	421,113
2023	211	4,739,453	186,133	679,859	567,431	6,172,876	10,220,148	990,241	873,352	425,325
2024	213	4,786,847	187,995	686,658	573,106	6,234,606	10,322,350	1,000,144	882,085	429,578
2025	215	4,834,716	189,875	693,524	578,837	6,296,952	10,425,573	1,010,145	890,906	433,874
2026	218	4,883,063	191,773	700,459	584,625	6,359,920	10,529,829	1,020,246	899,815	438,212
2027	220	4,931,894	193,691	707,464	590,471	6,423,520	10,635,127	1,030,449	908,813	442,594
2028	222	4,981,213	195,628	714,539	596,376	6,487,756	10,741,479	1,040,753	917,902	447,020
2029	224	5,031,025	197,584	721,684	602,340	6,552,633	10,848,893	1,051,161	927,081	451,491
2030	226	5,081,335	199,560	728,901	608,363	6,618,159	10,957,382	1,061,673	936,351	456,006
2031	229	5,132,148	201,556	736,190	614,447	6,684,341	11,066,956	1,072,289	945,715	460,566
2032	231	5,183,470	203,571	743,552	620,591	6,751,184	11,177,626	1,083,012	955,172	465,171
2033	233	5,235,305	205,607	750,987	626,797	6,818,696	11,289,402	1,093,842	964,724	469,823
2034	236	5,287,658	207,663	758,497	633,065	6,886,883	11,402,296	1,104,781	974,371	474,521
2035	238	5,340,534	209,740	766,082	639,396	6,955,752	11,516,319	1,115,829	984,115	479,266
TOTAL	85,857	135,074,460	11,347,012	27,588,970	25,373,277	199,383,719	341,194,438	36,255,218	37,317,804	27,710,917

**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	112,967	188,991	197,715	1,048,040	5,409,426	17,554,406	1,386,320	755,810	19,696,537
2002	143,698	171,099	500,887	2,780,200	8,797,032	14,393,881	860,342	618,786	15,873,010
2003	78,088	97,972	248,074	987,795	5,672,737	16,535,395	1,744,997	755,647	19,036,039
2004	156,690	179,275	205,599	454,472	6,302,393	13,910,225	1,213,840	681,865	15,805,930
2005	143,222	202,538	135,810	224,827	5,530,856	12,477,158	1,946,470	877,727	15,301,356
2006	143,860	122,043	76,771	382,672	5,892,057	13,775,379	1,933,818	1,263,004	16,972,200
2007	78,869	115,056	66,448	239,144	7,636,893	12,052,508	1,708,497	626,913	14,387,919
2008	171,182	157,953	235,276	241,298	8,397,125	15,593,738	1,463,728	814,753	17,872,219
2009	84,262	143,278	117,635	627,893	7,688,065	13,677,843	1,077,063	866,882	15,621,788
2010	53,031	578,394	27,080	463,414	7,749,002	12,826,604	2,084,438	1,431,077	16,342,120
2011	82,906	80,485	63,301	484,920	8,086,067	16,666,140	2,833,977	1,458,911	20,959,028
2012	56,296	134,177	62,834	2,501,317	10,770,551	15,684,615	1,339,383	1,318,532	18,342,530
2013	83,503	178,197	100,471	1,181,195	10,775,790	17,750,491	2,007,760	2,592,568	22,350,820
2014	186,243	170,285	58,219	2,046,721	12,396,584	23,683,933	2,758,169	1,996,202	28,438,304
2015	119,912	202,327	1,167,755	4,166,826	15,612,431	25,493,405	2,455,605	2,531,815	30,480,825
2016	218,778	199,937	1,093,560	5,153,803	18,295,990	32,696,676	2,866,202	1,783,770	37,346,648
2017	222,947	203,700	266,294	5,751,266	20,211,006	34,635,034	2,894,166	1,797,690	39,326,890
2018	189,084	204,008	850,961	5,074,205	18,220,205	31,251,122	2,766,045	2,058,136	36,075,303
2019	190,975	206,048	859,471	5,124,947	18,402,408	31,563,633	2,793,705	2,078,717	36,436,055
2020	192,885	208,108	868,066	5,176,196	18,586,431	31,879,270	2,821,642	2,099,504	36,800,416
2021	194,814	210,190	876,746	5,227,958	18,772,296	32,198,062	2,849,858	2,120,499	37,168,419
2022	196,762	212,291	885,514	5,280,238	18,960,019	32,520,043	2,878,357	2,141,704	37,540,104
2023	198,729	214,414	894,369	5,333,040	19,149,618	32,845,243	2,907,141	2,163,121	37,915,505
2024	200,717	216,558	903,313	5,386,370	19,341,115	33,173,696	2,936,212	2,184,752	38,294,660
2025	202,724	218,724	912,346	5,440,234	19,534,526	33,505,433	2,965,574	2,206,600	38,677,607
2026	204,751	220,911	921,469	5,494,637	19,729,870	33,840,487	2,995,230	2,228,666	39,064,383
2027	206,799	223,120	930,684	5,549,583	19,927,169	34,178,892	3,025,182	2,250,953	39,455,027
2028	208,867	225,352	939,991	5,605,079	20,126,443	34,520,681	3,055,434	2,273,462	39,849,577
2029	210,955	227,605	949,391	5,661,130	20,327,707	34,865,888	3,085,988	2,296,197	40,248,073
2030	213,065	229,881	958,885	5,717,741	20,530,984	35,214,547	3,116,848	2,319,159	40,650,554
2031	215,195	232,180	968,473	5,774,918	20,736,292	35,566,692	3,148,017	2,342,350	41,057,059
2032	217,347	234,502	978,158	5,832,667	20,943,655	35,922,359	3,179,497	2,365,774	41,467,630
2033	219,521	236,847	987,940	5,890,994	21,153,093	36,281,583	3,211,292	2,389,432	41,882,307
2034	221,716	239,215	997,819	5,949,904	21,364,623	36,644,398	3,243,405	2,413,326	42,301,129
2035	223,933	241,607	1,007,797	6,009,403	21,578,269	37,010,842	3,275,839	2,437,459	42,724,140
TOTAL	6,398,795	8,707,042	23,706,054	137,431,301	618,721,569	1,090,075,296	113,546,384	82,862,680	1,286,484,360

**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	(577,350)	7,163,270	850,673	372,421	677,868	8,486,881	58,396	554,622	604,391	871,889
2002	1,075,107	5,162,820	664,281	250,085	732,057	7,884,349	54,699	729,884	416,531	1,308,649
2003	1,036,004	6,049,399	747,526	303,818	619,980	8,756,727	62,676	677,693	647,067	820,529
2004	622,332	6,885,677	683,988	340,581	581,893	9,114,471	35,756	475,332	335,958	606,737
2005	557,283	6,010,592	990,575	405,738	804,045	8,768,233	28,876	405,555	298,762	900,856
2006	(80,597)	6,161,538	1,598,668	640,055	918,725	9,238,388	47,639	538,704	797,327	488,341
2007	1,134,509	7,744,816	1,968,764	691,232	933,551	12,472,871	243,953	861,020	538,519	636,654
2008	879,803	10,680,603	2,160,781	665,411	986,923	15,373,521	72,156	460,940	663,150	948,362
2009	940,232	8,145,087	1,230,347	507,467	1,165,236	11,988,370	36,753	765,193	477,557	925,843
2010	941,141	9,547,126	1,620,760	574,691	1,337,640	14,021,359	67,782	751,135	556,128	732,812
2011	1,094,590	7,246,035	2,717,008	572,067	1,600,381	13,230,081	13,523	606,536	798,483	1,164,512
2012	1,609,600	10,278,567	2,279,344	604,649	1,176,453	15,948,613	36,474	666,301	811,965	818,696
2013	1,803,183	11,266,414	2,788,042	1,299,244	3,124,832	20,281,715	40,836	632,527	629,156	1,043,821
2014	1,259,273	11,055,091	2,429,360	744,113	1,227,230	16,715,066	3,966	1,133,787	251,100	1,962,780
2015	1,071,174	10,044,485	2,283,907	(1,044)	2,062,732	15,461,254	40,266	824,150	596,483	1,404,024
<b>2016</b>	<b>1,382,294</b>	<b>12,316,522</b>	<b>2,369,749</b>	<b>812,958</b>	<b>1,317,555</b>	<b>18,199,078</b>	<b>9,129</b>	<b>1,312,524</b>	<b>300,776</b>	<b>2,256,400</b>
2017	1,413,209	13,038,765	3,019,873	825,140	1,334,989	19,631,976	9,301	1,345,282	309,859	2,310,989
2018	1,301,781	11,917,923	2,583,421	551,142	1,587,477	17,941,744	19,761	1,172,259	406,397	2,010,376
2019	1,314,799	12,037,102	2,609,256	556,653	1,603,351	18,121,161	19,958	1,183,981	410,461	2,030,479
2020	1,327,947	12,157,473	2,635,348	562,220	1,619,385	18,302,373	20,158	1,195,821	414,565	2,050,784
2021	1,341,226	12,279,048	2,661,702	567,842	1,635,579	18,485,397	20,359	1,207,779	418,711	2,071,292
2022	1,354,638	12,401,839	2,688,319	573,520	1,651,935	18,670,251	20,563	1,219,857	422,898	2,092,005
2023	1,368,185	12,525,857	2,715,202	579,256	1,668,454	18,856,954	20,769	1,232,055	427,127	2,112,925
2024	1,381,867	12,651,116	2,742,354	585,048	1,685,138	19,045,523	20,976	1,244,376	431,398	2,134,054
2025	1,395,685	12,777,627	2,769,777	590,899	1,701,990	19,235,978	21,186	1,256,820	435,712	2,155,395
2026	1,409,642	12,905,403	2,797,475	596,808	1,719,010	19,428,338	21,398	1,269,388	440,069	2,176,949
2027	1,423,739	13,034,457	2,825,450	602,776	1,736,200	19,622,622	21,612	1,282,082	444,470	2,198,718
2028	1,437,976	13,164,802	2,853,704	608,803	1,753,562	19,818,847	21,828	1,294,903	448,915	2,220,705
2029	1,452,356	13,296,450	2,882,242	614,892	1,771,097	20,017,037	22,046	1,307,852	453,404	2,242,913
2030	1,466,879	13,429,414	2,911,064	621,040	1,788,808	20,217,205	22,267	1,320,930	457,938	2,265,342
2031	1,481,548	13,563,708	2,940,175	627,251	1,806,696	20,419,378	22,489	1,334,140	462,517	2,287,995
2032	1,496,364	13,699,345	2,969,576	633,523	1,824,763	20,623,571	22,714	1,347,481	467,143	2,310,875
2033	1,511,327	13,836,339	2,999,272	639,859	1,843,011	20,829,808	22,942	1,360,956	471,814	2,333,984
2034	1,526,441	13,974,702	3,029,265	646,257	1,861,441	21,038,106	23,171	1,374,565	476,532	2,357,324
2035	1,541,705	14,114,449	3,059,557	652,720	1,880,056	21,248,487	23,403	1,388,311	481,297	2,380,897
<b>TOTAL</b>	<b>51,604,194</b>	<b>467,348,816</b>	<b>96,860,525</b>	<b>28,642,972</b>	<b>74,081,725</b>	<b>718,538,232</b>	<b>3,897,695</b>	<b>47,068,264</b>	<b>27,083,715</b>	<b>74,349,028</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	20,885,007
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	416,214	896,678	521,912	661,676	4,694,761	(137,575)	(97,259)	6,010,462	15,789,253	30,845,420
2002	380,653	296,837	958,653	860,806	5,944,088	31,933	251,389	5,591,499	11,455,167	28,280,787
2003	340,822	236,702	692,521	615,715	6,174,346	(135,976)	18,962	6,997,457	11,513,908	28,662,421
2004	246,360	176,853	626,301	588,304	7,253,252	(136,779)	(164,022)	8,922,010	14,650,087	33,616,149
2005	212,935	119,500	851,871	470,149	6,253,367	(180,406)	(191,075)	5,898,529	13,870,005	28,938,923
2006	196,446	58,773	769,162	511,443	5,124,628	(173,290)	(177,127)	8,406,517	13,789,626	30,378,189
2007	258,707	293,251	555,362	553,643	6,730,413	(433,007)	(341,609)	10,943,648	8,542,545	29,383,098
2008	431,975	241,771	426,539	727,945	11,128,543	(260,665)	(202,350)	13,044,265	10,964,555	38,647,186
2009	416,036	217,364	618,555	554,437	7,815,992	579,001	(45,413)	8,740,469	13,392,591	34,494,377
2010	453,762	119,660	428,830	713,046	7,843,263	(169,466)	(63,859)	6,653,477	9,574,113	27,660,683
2011	628,420	319,322	875,361	1,586,161	8,797,626	(227,572)	(39,576)	6,246,060	15,898,972	36,667,828
2012	798,726	283,238	1,053,759	3,234,501	11,253,326	393,980	450,640	8,904,454	12,866,347	41,572,407
2013	498,545	466,506	928,771	851,423	12,081,966	290,845	174,328	9,718,442	14,810,489	42,167,657
2014	113,163	74,481	560,055	333,149	15,065,516	207,604	329,201	10,338,979	15,932,952	46,306,731
2015	459,746	402,756	933,033	775,896	14,588,699	464,935	308,471	9,483,005	16,058,766	46,340,230
<b>2016</b>	<b>135,301</b>	<b>85,177</b>	<b>631,958</b>	<b>349,298</b>	<b>16,235,582</b>	<b>168,128</b>	<b>255,474</b>	<b>9,814,554</b>	<b>14,748,147</b>	<b>46,302,448</b>
2017	139,716	89,283	648,944	359,415	15,741,676	173,105	263,691	9,525,458	13,526,128	44,442,847
2018	247,370	194,329	745,358	499,818	15,677,206	271,410	278,638	9,703,749	14,925,457	46,152,128
2019	249,844	196,272	752,811	504,816	15,833,978	274,124	281,424	9,800,786	15,074,711	46,613,645
2020	252,342	198,235	760,339	509,864	15,992,318	276,866	284,238	9,898,794	15,225,458	47,079,782
2021	254,866	200,217	767,943	514,963	16,152,241	279,634	287,081	9,997,782	15,377,713	47,550,581
2022	257,414	202,220	775,622	520,112	16,313,763	282,431	289,952	10,097,760	15,531,490	48,026,087
2023	259,989	204,242	783,379	525,313	16,476,901	285,255	292,851	10,198,737	15,686,805	48,506,348
2024	262,588	206,284	791,212	530,567	16,641,670	288,107	295,780	10,300,725	15,843,673	48,991,410
2025	265,214	208,347	799,124	535,872	16,808,087	290,989	298,737	10,403,732	16,002,110	49,481,325
2026	267,866	210,431	807,116	541,231	16,976,167	293,898	301,725	10,507,769	16,162,131	49,976,138
2027	270,545	212,535	815,187	546,643	17,145,929	296,837	304,742	10,612,847	16,323,752	50,475,899
2028	273,251	214,660	823,339	552,110	17,317,388	299,806	307,789	10,718,976	16,486,990	50,980,660
2029	275,983	216,807	831,572	557,631	17,490,562	302,804	310,867	10,826,165	16,651,860	51,490,466
2030	278,743	218,975	839,888	563,207	17,665,468	305,832	313,976	10,934,427	16,818,378	52,005,371
2031	281,530	221,165	848,287	568,839	17,842,123	308,890	317,116	11,043,771	16,986,562	52,525,424
2032	284,346	223,776	856,770	574,528	18,020,544	311,979	320,287	11,154,209	17,156,428	53,050,680
2033	287,189	225,610	865,337	580,273	18,200,749	315,099	323,490	11,265,751	17,327,992	53,581,186
2034	290,061	227,866	873,991	586,076	18,382,757	318,250	326,725	11,378,409	17,501,272	54,116,999
2035	292,962	230,145	882,731	591,936	18,566,584	321,432	329,992	11,492,193	17,676,285	54,658,168
<b>TOTAL</b>	<b>17,934,598</b>	<b>13,338,475</b>	<b>36,357,105</b>	<b>33,520,986</b>	<b>561,938,495</b>	<b>14,521,238</b>	<b>12,613,228</b>	<b>423,103,513</b>	<b>661,105,162</b>	<b>1,926,831,504</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 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	98,757	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	24,050,600	618,564	24,669,164	2,441,255	2,555,606	1,847,442	1,531,140	1,073,766	478,385
2002	20,735,130	472,442	21,207,572	1,399,590	801,160	757,658	584,504	1,156,711	282,353
2003	20,858,664	283,463	21,142,127	3,736,202	678,826	711,735	625,670	470,229	279,963
2004	26,623,316	246,187	26,869,503	1,825,870	1,375,392	1,323,174	1,044,919	1,055,076	412,817
2005	16,422,658	1,499,104	17,921,762	2,846,681	1,504,453	1,543,852	881,586	678,973	353,257
2006	14,835,938	290,553	15,126,491	4,475,723	1,315,824	1,204,938	2,924,059	965,161	759,157
2007	15,950,439	339,460	16,289,899	5,963,984	1,632,978	1,806,847	1,826,661	832,857	656,100
2008	23,252,982	342,346	23,595,328	2,287,536	1,380,292	1,266,786	835,259	502,897	713,700
2009	23,085,986	195,126	23,281,112	2,556,209	1,549,372	1,347,831	1,175,258	780,556	545,905
2010	14,206,657	290,709	14,497,367	3,422,518	1,631,196	2,636,625	1,750,282	797,160	707,800
2011	18,756,105	179,755	18,935,860	2,570,718	1,786,114	2,319,662	2,222,078	630,007	587,852
2012	21,102,213	229,581	21,331,795	5,087,988	1,489,900	1,624,350	2,724,691	1,818,686	663,035
2013	34,304,568	272,814	34,577,382	6,022,452	1,703,098	3,072,076	3,102,400	1,445,464	539,715
2014	38,172,760	221,465	38,394,225	3,944,398	2,620,738	1,358,545	2,956,595	621,344	754,614
2015	40,717,089	313,741	41,030,830	6,558,737	2,086,315	1,392,105	2,754,976	1,904,465	851,616
2016	33,173,348	246,888	33,420,236	4,554,132	3,098,213	1,559,771	1,423,641	701,421	794,538
2017	33,873,864	2,466,325	36,340,189	4,621,889	3,165,559	1,595,847	1,461,352	719,462	811,503
2018	36,280,648	1,019,075	37,299,723	5,297,368	2,811,196	1,531,066	1,898,790	1,119,533	827,411
2019	36,643,455	1,029,266	37,672,721	5,350,342	2,839,308	1,546,377	1,917,778	1,130,729	835,685
2020	37,009,889	1,039,558	38,049,447	5,403,845	2,867,701	1,561,840	1,936,956	1,142,036	844,042
2021	37,379,988	1,049,954	38,429,942	5,457,884	2,896,378	1,577,459	1,956,325	1,153,456	852,483
2022	37,753,788	1,060,453	38,814,241	5,512,463	2,925,341	1,593,233	1,975,888	1,164,991	861,007
2023	38,131,326	1,071,058	39,202,384	5,567,587	2,954,595	1,609,166	1,995,647	1,176,641	869,617
2024	38,512,639	1,081,768	39,594,407	5,623,263	2,984,141	1,625,257	2,015,604	1,188,407	878,314
2025	38,897,766	1,092,586	39,990,352	5,679,496	3,013,982	1,641,510	2,035,760	1,200,291	887,097
2026	39,286,743	1,103,512	40,390,255	5,736,291	3,044,122	1,657,925	2,056,117	1,212,294	895,968
2027	39,679,611	1,114,547	40,794,158	5,793,654	3,074,563	1,674,504	2,076,679	1,224,417	904,927
2028	40,076,407	1,125,693	41,202,100	5,851,590	3,105,309	1,691,249	2,097,445	1,236,661	913,977
2029	40,477,171	1,136,950	41,614,121	5,910,106	3,136,362	1,708,162	2,118,420	1,249,028	923,116
2030	40,881,943	1,148,319	42,030,262	5,969,207	3,167,726	1,725,244	2,139,604	1,261,518	932,348
2031	41,290,762	1,159,802	42,450,564	6,028,899	3,199,403	1,742,496	2,161,000	1,274,134	941,671
2032	41,703,670	1,171,400	42,875,070	6,089,188	3,231,397	1,759,921	2,182,610	1,286,875	951,088
2033	42,120,706	1,183,114	43,303,820	6,150,080	3,263,711	1,777,520	2,204,436	1,299,744	960,599
2034	42,541,913	1,194,945	43,736,858	6,211,581	3,296,348	1,795,295	2,226,480	1,312,741	970,205
2035	42,967,333	1,206,895	44,174,228	6,273,697	3,329,311	1,813,248	2,248,745	1,325,868	979,907
TOTAL	1,511,151,924	31,956,951	1,543,108,875	192,599,859	98,667,893	84,838,700	84,409,020	49,009,909	30,483,767



**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	7,663,929	1,891,894	17,570	19,500,989		296,466	2,423,837	1,667,769	810,651	5,720,030	10,918,752
2002	11,250,023	1,693,719	935,850	18,861,569		509,124	3,399,580	1,250,579	422,825	2,237,335	7,819,442
2003	13,362,824	2,096,448	(448,817)	21,513,080		368,569	3,734,728	546,222	376,281	1,284,633	6,310,434
2004	10,521,892	2,128,941	1,093,259	20,781,339		427,841	5,444,207	1,239,624	440,803	3,574,302	11,126,777
2005	7,631,077	2,415,938	2,247,814	20,103,631		452,766	5,618,734	1,520,387	685,061	(1,898,832)	6,378,115
2006	10,158,181	1,931,861	598,033	24,332,938		320,451	5,211,857	644,966	327,700	5,210,221	11,715,195
2007	10,145,591	2,989,818	658,049	26,512,885		221,302	8,178,693	827,536	708,772	3,286,932	13,223,235
2008	14,753,373	2,428,842	1,031,349	25,200,034		332,817	6,669,221	820,244	790,793	4,586,836	13,199,911
2009	12,247,173	3,478,855	1,537,935	25,219,095		546,994	7,175,723	642,314	691,389	2,778,267	11,834,686
2010	12,856,715	3,270,922	2,920,062	29,993,281		638,529	6,583,322	489,571	439,136	3,615,893	11,766,452
2011	13,507,624	4,112,709	3,350,751	31,087,516		475,694	5,558,723	900,453	584,749	4,887,891	12,407,510
2012	13,641,029	2,860,856	4,893,911	34,804,446		255,543	6,362,645	1,717,092	551,978	4,069,706	12,956,965
2013	15,124,572	3,648,811	3,793,917	36,705,505		458,850	8,216,414	874,034	745,620	2,300,703	12,595,621
2014	18,014,438	4,339,760	2,968,671	37,579,103		317,578	9,134,877	1,179,556	332,677	9,558,439	20,523,127
2015	20,020,232	3,501,209	4,063,314	43,132,969		528,975	9,867,186	1,168,206	789,529	2,605,174	14,959,070
2016	21,678,391	5,060,379	3,951,501	42,821,987		351,003	11,194,606	1,318,541	371,690	4,357,569	17,593,409
2017	25,896,789	5,145,691	4,328,754	47,746,846		356,550	11,767,903	1,345,250	377,079	4,518,220	18,365,002
2018	22,757,122	4,614,784	4,155,668	45,012,938		416,298	11,052,664	1,290,105	517,894	3,865,257	17,142,218
2019	22,984,693	4,660,932	4,197,225	45,463,069		420,461	11,163,191	1,303,006	523,073	3,903,909	17,313,640
2020	23,214,540	4,707,541	4,239,197	45,917,698		424,665	11,274,823	1,316,036	528,303	3,942,949	17,486,776
2021	23,446,686	4,754,616	4,281,589	46,376,876		428,912	11,387,571	1,329,197	533,586	3,982,378	17,661,644
2022	23,681,152	4,802,163	4,324,405	46,840,643		433,201	11,501,447	1,342,489	538,922	4,022,202	17,838,261
2023	23,917,964	4,850,184	4,367,649	47,309,050		437,533	11,616,461	1,355,914	544,311	4,062,424	18,016,643
2024	24,157,144	4,898,686	4,411,326	47,782,142		441,908	11,732,626	1,369,473	549,755	4,103,048	18,196,810
2025	24,398,715	4,947,673	4,455,439	48,259,963		446,328	11,849,952	1,383,168	555,252	4,144,079	18,378,779
2026	24,642,702	4,997,150	4,499,993	48,742,562		450,791	11,968,452	1,396,999	560,805	4,185,519	18,562,566
2027	24,889,129	5,047,121	4,544,993	49,229,987		455,299	12,088,136	1,410,969	566,413	4,227,735	18,748,192
2028	25,138,021	5,097,592	4,590,443	49,722,287		459,852	12,209,018	1,425,079	572,077	4,269,648	18,935,674
2029	25,389,401	5,148,568	4,636,348	50,219,511		464,450	12,331,108	1,439,330	577,798	4,312,345	19,125,031
2030	25,643,295	5,200,054	4,682,711	50,721,707		469,095	12,454,419	1,453,723	583,576	4,355,468	19,316,281
2031	25,899,728	5,252,055	4,729,538	51,228,924		473,786	12,578,963	1,468,260	589,411	4,399,023	19,509,443
2032	26,158,725	5,304,575	4,776,833	51,741,212		478,524	12,704,753	1,482,943	595,305	4,443,013	19,704,538
2033	26,420,312	5,357,621	4,824,602	52,258,625		483,309	12,831,800	1,497,772	601,258	4,487,443	19,901,582
2034	26,684,515	5,411,197	4,872,848	52,781,210		488,142	12,960,118	1,512,750	607,271	4,532,318	20,100,599
2035	26,951,360	5,465,309	4,921,576	53,309,021		493,023	13,089,719	1,527,877	613,344	4,577,641	20,301,604
TOTAL	834,446,864	157,790,282	144,163,490	1,676,409,783		17,073,897	414,226,609	54,208,156	36,120,292	163,674,586	685,303,541

**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	10,013	10,201	533,244	9,249	47,848	395,473	1,058	14,639	69,689	1,091,413
2007	27,263	9,784	636,387	5,031	106,184	608,435	58,593	38,282	133,448	1,623,406
2008	76,489	34,460	824,550	1,316	182,992	1,302,060	92,209	75,903	224,952	2,814,931
2009	77,398	17,652	979,048	888	180,036	957,266	24,061	136,393	218,241	2,590,983
2010	52,589	3,474	799,231	15,541	210,543	1,197,203	9,271	161,456	332,864	2,782,170
2011	20,703	5,358	690,287	4,288	90,929	998,487	10,607	72,705	517,527	2,410,891
2012	5,649	15,487	746,659	15,564	149,503	1,519,666	26,395	18,233	193,366	2,690,523
2013	1,096	6,026	596,205	178,794	210,660	1,464,442	4,278	6,167	175,534	2,643,202
2014	8,223	9,523	798,766	104,207	135,021	1,782,606	3,958	2,423	322,120	3,166,847
2015	3,087	14,914	639,970	182,656	418,962	2,111,483	4,802	6,076	254,241	3,636,191
<b>2016</b>	<b>8,776</b>	<b>12,992</b>	<b>447,100</b>	<b>111,156</b>	<b>227,931</b>	<b>1,899,945</b>	<b>4,231</b>	<b>2,594</b>	<b>308,081</b>	<b>3,022,806</b>
2017	8,874	13,336	452,602	112,415	212,702	1,976,295	4,278	2,623	309,297	3,092,422
2018	6,981	13,884	518,356	136,763	289,397	2,015,867	4,481	3,802	293,445	3,282,976
2019	7,051	14,023	523,540	138,131	292,291	2,036,026	4,526	3,840	296,380	3,315,808
2020	7,121	14,164	528,775	139,512	295,214	2,056,386	4,571	3,878	299,344	3,348,965
2021	7,193	14,305	534,063	140,907	298,166	2,076,950	4,617	3,917	302,337	3,382,455
2022	7,265	14,448	539,404	142,316	301,148	2,097,719	4,663	3,956	305,360	3,416,279
2023	7,337	14,593	544,798	143,739	304,159	2,118,697	4,710	3,996	308,414	3,450,443
2024	7,411	14,739	550,246	145,177	307,201	2,139,884	4,757	4,036	311,498	3,484,949
2025	7,485	14,886	555,748	146,629	310,273	2,161,282	4,805	4,076	314,613	3,519,797
2026	7,560	15,035	561,306	148,095	313,376	2,182,895	4,853	4,117	317,759	3,554,996
2027	7,635	15,185	566,919	149,576	316,510	2,204,724	4,901	4,158	320,937	3,590,545
2028	7,711	15,337	572,588	151,072	319,675	2,226,771	4,950	4,199	324,146	3,626,449
2029	7,789	15,490	578,314	152,582	322,871	2,249,039	5,000	4,241	327,388	3,662,714
2030	7,867	15,645	584,097	154,108	326,100	2,271,529	5,050	4,284	330,662	3,699,342
2031	7,945	15,802	589,938	155,649	329,361	2,294,245	5,100	4,327	333,968	3,736,335
2032	8,025	15,960	595,837	157,206	332,655	2,317,187	5,151	4,370	337,308	3,773,699
2033	8,105	16,119	601,796	158,778	335,981	2,340,359	5,203	4,414	340,681	3,811,436
2034	8,186	16,281	607,813	160,365	339,341	2,363,763	5,255	4,458	344,088	3,849,550
2035	8,268	16,443	613,892	161,969	342,735	2,387,400	5,307	4,502	347,529	3,888,045
<b>TOTAL</b>	<b>458,705</b>	<b>565,816</b>	<b>19,721,995</b>	<b>3,432,500</b>	<b>7,849,766</b>	<b>57,153,688</b>	<b>341,373</b>	<b>746,134</b>	<b>9,136,691</b>	<b>99,406,666</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	5,907,524	1,539,363	5,136,046	4,410,076	240,652	(966,591)	16,267,071
2002	5,325,201	1,490,197	4,067,608	4,478,209	(52,904)	3,472,130	18,780,441
2003	4,462,511	1,315,154	3,728,869	3,353,017	(627,463)	955,435	13,187,523
2004	8,923,655	1,375,960	3,491,591	5,119,984	(615,245)	1,511,921	19,807,866
2005	5,774,599	2,599,076	7,397,492	(591,184)	2,650,320	(1,238,767)	16,591,536
2006	6,937,638	2,303,366	5,164,401	3,576,682	(531,364)	(4,199,613)	13,251,111
2007	5,766,757	2,720,614	10,476,970	7,855,636	357,369	12,009,011	39,186,358
2008	8,334,714	846,756	16,257,492	7,467,359	(76,223)	490,576	33,320,674
2009	7,841,195	904,981	8,697,946	5,660,431	301,029	2,912,615	26,318,197
2010	10,078,610	810,092	8,952,994	6,323,873	472,471	5,422,380	32,060,419
2011	6,940,010	953,006	9,675,986	8,073,570	104,851	(168,785)	25,578,639
2012	7,507,231	2,960,028	9,469,881	6,525,350	125,937	6,901,929	33,490,356
2013	9,135,677	3,792,673	12,590,150	7,485,459	422,740	3,851,952	37,278,652
2014	10,811,424	3,067,549	7,318,911	7,334,718	396,792	6,754,580	35,683,974
2015	11,403,814	1,640,450	10,810,240	6,872,321	536,625	13,894,429	45,157,879
<b>2016</b>	<b>11,638,530</b>	<b>1,623,959</b>	<b>7,759,440</b>	<b>7,038,848</b>	<b>531,643</b>	<b>14,330,695</b>	<b>42,923,115</b>
2017	11,826,535	1,813,818	7,309,150	7,586,927	1,069,922	10,166,335	39,772,687
2018	11,739,190	1,709,669	8,712,540	7,237,692	719,857	12,925,125	43,044,073
2019	11,856,581	1,726,766	8,799,665	7,310,069	727,056	13,054,376	43,474,513
2020	11,975,147	1,744,034	8,887,662	7,383,170	734,326	13,184,920	43,909,259
2021	12,094,899	1,761,474	8,976,538	7,457,002	741,670	13,316,769	44,348,352
2022	12,215,848	1,779,089	9,066,304	7,531,572	749,086	13,449,936	44,791,835
2023	12,338,006	1,796,880	9,156,967	7,606,887	756,577	13,584,436	45,239,753
2024	12,461,386	1,814,849	9,248,537	7,682,956	764,143	13,720,280	45,692,151
2025	12,586,000	1,832,997	9,341,022	7,759,786	771,784	13,857,483	46,149,072
2026	12,711,860	1,851,327	9,434,432	7,837,384	779,502	13,996,058	46,610,563
2027	12,838,979	1,869,840	9,528,776	7,915,757	787,297	14,136,018	47,076,667
2028	12,967,369	1,888,539	9,624,064	7,994,915	795,170	14,277,379	47,547,436
2029	13,097,042	1,907,424	9,720,305	8,074,864	803,122	14,420,152	48,022,909
2030	13,228,013	1,926,498	9,817,508	8,155,613	811,153	14,564,354	48,503,139
2031	13,360,293	1,945,763	9,915,683	8,237,169	819,265	14,709,997	48,988,170
2032	13,493,896	1,965,221	10,014,840	8,319,541	827,457	14,857,097	49,478,052
2033	13,628,835	1,984,873	10,114,988	8,402,736	835,732	15,005,668	49,972,832
2034	13,765,123	2,004,722	10,216,138	8,486,763	844,089	15,155,725	50,472,560
2035	13,902,774	2,024,769	10,318,299	8,571,631	852,530	15,307,282	50,977,285
<b>TOTAL</b>	<b>455,723,468</b>	<b>79,502,956</b>	<b>372,501,115</b>	<b>281,596,615</b>	<b>35,821,178</b>	<b>365,009,262</b>	<b>1,590,154,595</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	3,114,131	2,233,156	14,426	151,374	57,878	5,570,965	135,955,778	143,308,028
2002	3,175,579	2,686,500	49,511	189,458	81,857	6,182,904	124,890,074	136,503,244
2003	3,338,349	2,780,275	44,211	200,986	85,015	6,448,835	126,274,357	135,197,072
2004	3,542,984	2,673,103	69,895	240,426	109,830	6,636,238	144,682,516	154,783,853
2005	3,846,789	2,979,940	120,379	292,354	137,878	7,377,339	122,685,580	130,782,682
2006	2,528,156	3,201,830	56,543	171,978	93,845	6,052,352	128,158,278	136,133,589
2007	3,236,744	2,920,935	(31,578)	(13,385)	8,597	6,121,313	159,200,986	168,883,945
2008	5,620,652	4,258,283	50,165	24,605	28,722	9,982,427	180,006,230	190,610,274
2009	5,154,443	3,759,372	126,090	59,314	47,087	9,146,306	160,494,915	170,901,849
2010	6,492,312	6,435,472	139,994	49,002	47,339	13,164,119	162,287,969	174,238,977
2011	6,161,798	5,789,705	146,747	64,927	52,594	12,215,771	173,493,123	186,485,286
2012	5,345,291	6,435,146	24,816	11,516	18,411	11,835,181	192,972,813	209,079,871
2013	6,077,056	7,957,778	54,228	26,379	25,928	14,141,369	222,741,923	237,873,977
2014	7,919,133	4,185,541	15,209	7,392	15,980	12,143,254	238,950,631	256,776,879
2015	8,687,670	8,706,075	0	0	0	17,393,745	257,592,993	278,656,814
2016	7,189,979	5,038,938	0	0	0	12,228,917	253,858,644	277,971,302
2017	7,371,037	5,171,312	0	0	0	12,542,349	261,261,208	287,650,141
2018	7,827,058	6,368,496	0	0	0	14,195,554	260,146,657	284,240,343
2019	7,905,328	6,432,181	0	0	0	14,337,509	262,748,121	287,082,744
2020	7,984,381	6,496,503	0	0	0	14,480,884	265,375,600	289,953,569
2021	8,064,225	6,561,468	0	0	0	14,625,693	268,029,359	292,853,109
2022	8,144,868	6,627,083	0	0	0	14,771,951	270,709,652	295,781,639
2023	8,226,316	6,693,354	0	0	0	14,919,670	273,416,750	298,739,455
2024	8,308,579	6,760,287	0	0	0	15,068,866	276,150,918	301,726,852
2025	8,391,665	6,827,890	0	0	0	15,219,555	278,912,428	304,744,121
2026	8,475,582	6,896,169	0	0	0	15,371,751	281,701,552	307,791,560
2027	8,560,338	6,965,131	0	0	0	15,525,469	284,518,566	310,869,475
2028	8,645,941	7,034,782	0	0	0	15,680,723	287,363,753	313,978,174
2029	8,732,400	7,105,130	0	0	0	15,837,530	290,237,392	317,117,956
2030	8,819,724	7,176,181	0	0	0	15,995,905	293,139,766	320,289,135
2031	8,907,922	7,247,943	0	0	0	16,155,865	296,071,162	323,492,024
2032	8,997,001	7,320,422	0	0	0	16,317,423	299,031,875	326,726,945
2033	9,086,971	7,393,627	0	0	0	16,480,598	302,022,194	329,994,216
2034	9,177,841	7,467,563	0	0	0	16,645,404	305,042,415	333,294,157
2035	9,269,619	7,542,239	0	0	0	16,811,858	308,092,836	336,627,095
TOTAL	301,342,642	208,547,686	919,453	2,074,883	1,096,431	513,981,095	10,040,218,650	10,858,409,796

<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		Reach 1	Reach 1	Reach 4	Reach 14A
	Barker Slough Pumping Plant	Cordelia Pumping Plant (Solano)	Cordelia Pumping Plant (Napa) <sup>b</sup>	Total	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	823,681
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	358,490	250,964	214,751	824,204	4,079,624	23,854,387	9,746,081	14,601,129
2002	189,982	104,564	61,470	356,016	2,324,926	17,025,395	6,894,112	8,423,370
2003	177,882	118,387	97,762	394,031	2,568,902	21,144,226	8,873,179	10,393,210
2004	248,763	139,241	107,251	495,256	2,554,982	21,514,896	9,305,544	12,252,402
2005	285,238	147,895	149,083	582,216	2,835,208	28,306,475	12,456,873	11,506,630
2006	234,970	116,406	147,445	498,821	2,764,840	23,330,330	10,474,002	11,242,457
2007	451,387	227,736	256,770	935,893	4,238,246	25,166,403	10,877,756	16,109,795
2008	422,884	195,200	301,397	919,481	3,326,822	17,243,375	6,103,162	11,177,264
2009	220,114	103,911	163,959	487,984	2,503,507	9,264,132	4,078,273	6,907,392
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	264,741	120,002	184,713	569,456	3,428,665	26,663,093	11,655,779	13,299,139
2013	434,737	207,486	322,133	964,356	5,440,056	22,777,570	8,699,662	12,276,604
2014	361,117	184,954	445,176	991,247	4,109,192	11,316,516	3,537,853	7,017,657
2015	286,351	107,940	293,281	687,572	6,326,517	18,402,788	4,583,157	8,237,868
2016	424,580	366,090	383,820	1,174,490	5,281,846	36,208,724	15,200,568	17,418,132
2017	447,459	405,122	404,502	1,257,083	5,586,637	38,581,244	16,198,427	18,214,419
2018	567,231	545,408	831,399	1,944,038	5,679,192	51,214,069	18,488,449	21,396,777
2019	567,218	572,717	855,412	1,995,347	5,679,192	38,402,659	17,476,566	19,576,118
2020	585,678	317,213	662,743	1,565,634	5,929,403	29,519,657	17,577,747	22,757,810
2021	585,678	317,213	662,743	1,565,634	5,929,403	44,803,964	17,495,171	22,619,768
2022	585,678	317,213	662,743	1,565,634	5,929,403	37,998,526	17,600,348	22,822,621
2023	585,678	317,213	662,743	1,565,634	5,929,403	36,658,170	17,716,467	23,044,927
2024	585,678	317,213	662,743	1,565,634	5,929,403	36,092,013	17,492,023	22,650,567
2025	585,678	317,213	662,743	1,565,634	5,929,403	42,380,301	17,668,365	22,981,217
2026	585,678	317,213	662,743	1,565,634	5,929,403	24,956,191	17,396,275	22,496,420
2027	585,678	317,213	662,743	1,565,634	5,929,403	42,514,366	17,708,635	23,069,962
2028	585,678	317,213	662,743	1,565,634	5,929,403	41,571,022	17,483,719	22,669,257
2029	585,678	317,213	662,743	1,565,634	5,929,403	37,484,437	17,642,417	22,966,342
2030	585,678	317,213	662,743	1,565,634	5,929,403	34,579,132	17,421,824	22,576,007
2031	585,678	317,213	662,743	1,565,634	5,929,403	43,990,321	18,332,139	24,259,970
2032	585,678	317,213	662,743	1,565,634	5,929,403	34,221,907	16,969,162	21,793,660
2033	585,678	317,213	662,743	1,565,634	5,929,403	37,561,067	18,308,902	24,238,884
2034	585,678	317,213	662,743	1,565,634	5,929,403	36,936,819	17,078,564	22,009,418
2035	585,678	317,213	662,743	1,565,634	5,929,403	56,905,513	19,594,980	26,740,292
TOTAL	16,226,161	9,561,390	16,775,139	42,562,690	188,533,385	1,221,744,966	529,170,462	656,623,979

<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	14,958,673	33,678,960	124,403,012	(3,276,174)	18,950,572	(3,621,886)	932,752
2002	8,731,681	19,721,183	72,470,283	(4,919,131)	10,667,925	(5,247,076)	95,264
2003	10,814,097	24,634,682	90,645,571	(3,362,477)	14,524,228	(6,610,346)	231,996
2004	12,865,137	29,371,211	107,981,361	(6,248,061)	16,993,228	(7,691,613)	0
2005	11,769,614	26,675,094	94,387,897	(5,791,742)	17,552,581	(6,359,950)	0
2006	11,416,278	26,012,299	81,782,430	(4,022,340)	15,973,485	(6,347,742)	0
2007	16,637,353	37,612,273	125,409,096	(2,976,651)	19,458,414	(5,872,118)	0
2008	12,234,832	24,812,133	77,900,555	(3,305,736)	10,677,303	(3,203,162)	320,549
2009	7,339,736	15,861,209	71,113,232	(3,096,612)	9,138,416	(2,225,065)	2,060
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	13,377,416	30,256,034	105,918,364	(2,424,628)	16,769,370	(8,836,129)	0
2013	12,481,710	28,257,267	99,344,524	(1,989,602)	12,049,822	(4,750,469)	0
2014	7,230,928	16,358,574	57,183,208	(1,306,010)	5,106,721	(1,023,474)	136,275
2015	8,961,682	20,918,374	75,333,846	(2,281,922)	8,424,485	(2,373,623)	0
2016	17,880,686	40,676,326	148,554,316	(7,593,536)	21,979,829	(9,236,491)	0
2017	18,687,126	42,503,149	155,184,458	(7,487,632)	23,148,884	(9,097,964)	0
2018	22,057,598	50,237,286	183,773,340	(8,720,320)	26,478,835	(11,073,990)	0
2019	20,078,261	45,645,199	166,673,110	(7,855,966)	23,391,663	(9,694,266)	0
2020	23,502,144	53,559,623	196,516,060	(9,779,552)	30,717,730	(12,770,065)	0
2021	23,352,461	53,212,666	195,225,114	(9,776,634)	30,637,299	(12,734,701)	0
2022	23,572,446	53,722,645	197,122,601	(11,329,777)	30,719,251	(12,770,734)	0
2023	23,813,728	54,282,164	199,204,952	(11,507,910)	31,266,681	(13,011,716)	0
2024	23,385,867	53,290,169	195,513,385	(11,049,689)	29,870,239	(12,397,974)	0
2025	23,744,532	54,121,705	198,607,560	(11,425,544)	31,010,813	(12,899,019)	0
2026	23,218,858	52,903,174	194,073,788	(11,139,541)	30,148,048	(12,519,816)	0
2027	23,840,863	54,345,117	199,439,016	(11,362,467)	30,818,830	(12,814,532)	0
2028	23,406,147	53,337,243	195,688,450	(11,243,591)	30,457,582	(12,655,721)	0
2029	23,728,360	54,084,234	198,467,931	(11,298,783)	30,629,806	(12,731,407)	0
2030	23,305,114	53,103,135	194,817,568	(11,192,359)	30,302,214	(12,587,485)	0
2031	25,136,146	57,351,868	210,638,860	(11,660,240)	31,727,855	(13,215,113)	0
2032	22,459,101	51,143,977	187,534,051	(10,802,898)	29,132,153	(12,074,881)	0
2033	25,112,980	57,297,951	210,437,383	(11,746,813)	31,993,210	(13,332,307)	0
2034	22,692,220	51,683,704	189,539,983	(10,970,889)	29,632,448	(12,293,785)	0
2035	27,856,915	63,685,380	234,286,171	(11,887,622)	32,430,828	(13,525,836)	0
<b>TOTAL</b>	<b>676,202,877</b>	<b>1,528,607,994</b>	<b>5,540,745,104</b>	<b>(288,129,870)</b>	<b>849,863,222</b>	<b>(331,523,379)</b>	<b>4,725,749</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	6,159,837	(7,614,510)
2002	(24,676,763)	0	0	0	0	3,806,290	(10,286,903)
2003	(26,945,899)	0	0	0	1,149,468	4,337,256	(9,899,070)
2004	(31,246,167)	78,555	68,914	7,290	0	5,408,387	(11,835,098)
2005	(28,682,474)	69,542	48,909	2,544	5,151,488	3,422,418	(6,683,632)
2006	(34,389,659)	135,205	148,128	18,268	0	2,545,881	(6,870,988)
2007	(28,529,045)	266,842	262,395	14,286	588,781	6,185,263	(9,522,236)
2008	(16,403,544)	260,607	333,172	10,419	0	4,425,625	(7,184,125)
2009	(13,474,182)	360,800	391,813	7,522	420,622	4,336,673	(6,578,745)
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)	437,834	534,678	48,270	221,074	5,016,560	(8,230,796)
2013	(14,097,814)	486,392	569,138	69,039	0	6,295,725	(8,740,718)
2014	(3,836,008)	316,446	439,313	51,932	0	4,410,693	(4,125,491)
2015	(6,133,598)	126,135	152,015	20,527	0	4,832,702	(4,568,249)
2016	(17,587,515)	480,073	599,126	111,569	0	7,220,545	(7,642,580)
2017	(17,329,080)	513,134	640,387	119,252	0	7,435,674	(7,413,023)
2018	(20,139,226)	521,936	651,371	121,298	0	8,590,023	(8,331,090)
2019	(18,910,434)	521,936	651,371	121,298	0	7,854,223	(7,634,164)
2020	(24,810,846)	521,936	651,371	125,436	0	8,502,563	(8,239,188)
2021	(24,291,259)	521,936	651,371	125,436	0	8,388,186	(8,126,882)
2022	(23,873,406)	521,936	651,371	125,436	0	8,572,416	(8,332,642)
2023	(24,535,037)	521,936	651,371	125,436	0	8,589,055	(8,346,832)
2024	(24,259,322)	521,936	651,371	125,436	0	8,748,039	(8,503,937)
2025	(24,142,006)	521,936	651,371	125,436	0	8,624,788	(8,353,781)
2026	(24,394,945)	521,936	651,371	125,436	0	8,456,959	(8,192,139)
2027	(24,257,132)	521,936	651,371	125,436	0	8,801,863	(8,527,097)
2028	(24,441,453)	521,936	651,371	125,436	0	8,515,976	(8,274,886)
2029	(24,192,328)	521,936	651,371	125,436	0	8,767,824	(8,520,954)
2030	(24,270,579)	521,936	651,371	125,436	0	8,480,041	(8,240,116)
2031	(24,339,155)	521,936	651,371	125,436	0	9,770,301	(9,464,642)
2032	(23,727,594)	521,936	651,371	125,436	0	8,125,989	(7,868,959)
2033	(25,005,306)	521,936	651,371	125,436	0	9,615,253	(9,345,879)
2034	(23,646,811)	521,936	651,371	125,436	0	8,153,726	(7,899,949)
2035	(25,263,379)	521,936	651,371	125,436	0	12,953,835	(12,574,893)
<b>TOTAL</b>	<b>(1,032,333,833)</b>	<b>13,612,457</b>	<b>16,844,307</b>	<b>2,783,168</b>	<b>7,710,794</b>	<b>261,175,376</b>	<b>(377,584,685)</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	1,003,368	(13,495,346)	2,423,880	1,085,700	2,170,015	206,450,172	211,354,000
2002	0	(18,455,025)	0	544,053	1,351,161	86,145,817	88,826,760
2003	833,204	(16,903,355)	963,706	636,922	1,525,172	126,985,769	129,948,702
2004	222,030	(21,110,644)	685,288	672,555	1,779,029	141,074,243	144,124,481
2005	4,755,972	(12,763,664)	4,548,884	846,064	1,714,252	162,933,774	166,351,199
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	1,305,094	2,310,932	196,287,306	201,461,445
2008	0	(14,961,833)	1,320,687	1,125,234	1,729,630	124,616,145	128,862,448
2009	409,539	(16,146,570)	0	699,462	1,218,334	90,028,039	93,019,530
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	180,305	(15,133,885)	0	977,038	1,970,365	169,128,622	173,126,743
2013	76,964	(15,520,329)	461,211	1,359,113	2,050,022	162,155,830	168,560,242
2014	0	(7,781,730)	1,461,660	1,561,360	2,107,842	100,164,267	105,264,706
2015	0	(7,689,279)	0	781,210	2,130,862	129,858,980	136,873,069
2016	0	(12,694,349)	0	1,212,486	4,711,284	257,499,193	263,955,529
2017	0	(12,360,340)	0	1,277,979	4,962,926	273,779,020	280,622,740
2018	0	(13,454,236)	0	827,481	5,521,185	328,160,786	335,784,016
2019	0	(12,274,868)	0	827,846	5,524,455	290,375,007	298,049,546
2020	0	(13,292,329)	0	840,156	5,402,818	321,303,071	328,798,108
2021	0	(13,108,947)	0	840,156	5,402,818	335,237,923	342,732,960
2022	0	(13,402,833)	0	840,156	5,402,818	329,963,179	337,458,216
2023	0	(13,428,874)	0	840,156	5,402,818	331,287,492	338,782,529
2024	0	(13,682,571)	0	840,156	5,402,818	324,690,526	332,185,563
2025	0	(13,484,808)	0	840,156	5,402,818	336,375,840	343,870,877
2026	0	(13,216,195)	0	840,156	5,402,818	311,728,794	319,223,831
2027	0	(13,767,300)	0	840,156	5,402,818	337,351,841	344,846,878
2028	0	(13,309,749)	0	840,156	5,402,818	330,745,713	338,240,750
2029	0	(13,711,945)	0	840,156	5,402,818	330,857,651	338,352,688
2030	0	(13,251,458)	0	840,156	5,402,818	322,584,755	330,079,792
2031	0	(15,318,639)	0	840,156	5,402,818	354,751,388	362,246,425
2032	0	(12,685,410)	0	840,156	5,402,818	311,761,975	319,257,012
2033	0	(15,067,960)	0	840,156	5,402,818	347,609,082	355,104,119
2034	0	(12,728,677)	0	840,156	5,402,818	317,728,488	325,223,525
2035	0	(20,474,941)	0	840,156	5,402,818	398,268,960	405,763,997
TOTAL	7,594,210	(696,563,144)	13,888,912	37,317,404	134,984,644	8,777,460,714	9,008,556,789

<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	10,999,478	0	50,885,567	(14,650,000)	(5,503,289)	2,448,692	44,180,448
1997	15,275,437	0	51,788,497	(14,650,000)	(5,740,515)	1,699,730	48,373,149
1998	3,861,442	0	54,726,293	(14,650,000)	(8,155,000)	1,193,198	36,975,933
1999	7,480,334	0	56,065,583	(14,650,000)	(9,198,000)	9,686	39,707,603
2000	10,106,978	0	56,064,265	(14,688,338)	(10,297,482)	13,491	41,198,915
2001	10,297,891	0	75,962,371	(16,223,803)	(14,328,482)	23,866	55,731,844
2002	19,507,470	0	67,925,080	(19,498,891)	(20,826,560)	24,426	47,131,525
2003	22,837,086	0	77,535,660	(20,605,664)	(29,982,088)	9,833	49,794,828
2004	20,906,818	0	90,889,636	(17,530,688)	(35,845,422)	7,548	58,427,892
2005	5,913,206	0	103,848,097	(15,354,462)	(22,004,805)	0	72,402,036
2006	10,768,909	0	102,314,962	(15,210,585)	(21,005,765)	0	76,867,520
2007	7,642,441	0	87,199,206	(14,734,855)	(16,759,447)	0	63,347,345
2008	6,361,865	0	104,642,245	(14,953,084)	(19,295,181)	0	76,755,845
2009	6,748,654	0	114,728,677	(15,959,419)	(20,877,805)	0	84,640,106
2010	7,417,223	0	117,650,843	(15,958,194)	(20,222,025)	0	88,887,846
2011	12,298,360	0	125,030,882	(15,958,715)	(19,207,013)	0	102,163,514
2012	27,821,195	0	126,789,706	(16,032,565)	(22,105,563)	0	116,472,772
2013	100,226,513	0	144,736,707	(16,034,532)	(20,414,514)	0	208,514,174
2014	74,408,561	0	157,914,266	(15,852,875)	(18,597,043)	0	197,872,908
2015	93,136,441	0	181,293,094	(20,661,827)	(17,225,432)	0	236,542,276
2016	197,283,734	0	225,389,278	(21,519,913)	(20,218,072)	0	380,935,027
2017	155,623,981	0	228,472,007	(21,809,404)	(21,659,996)	0	340,626,588
2018	92,651,814	0	221,880,235	(21,681,288)	(19,898,178)	0	272,952,583
2019	20,864,159	0	214,531,084	(21,769,890)	(20,097,160)	0	193,528,193
2020	4,739,006	0	202,417,324	(21,865,941)	(20,298,132)	0	164,992,257
2021	1,062,403	0	215,320,089	(21,769,182)	(20,501,113)	0	174,112,197
2022	1,085,123	0	197,698,378	(21,762,416)	(20,706,124)	0	156,314,961
2023	644,504	0	203,735,321	(21,758,866)	(20,913,185)	0	161,707,774
2024	407,564	0	203,051,629	(21,668,153)	(21,122,317)	0	160,668,723
2025	407,564	0	202,281,419	(21,855,970)	(21,333,540)	0	159,499,473
2026	407,564	0	200,865,673	(21,755,071)	(21,546,876)	0	157,971,290
2027	407,564	0	211,474,906	(21,753,380)	(21,762,345)	0	168,366,745
2028	407,564	0	212,926,304	(21,763,992)	(21,979,968)	0	169,589,908
2029	407,564	0	211,338,525	(21,664,358)	(22,199,768)	0	167,881,963
2030	407,564	0	211,562,490	(26,455,057)	(22,421,765)	0	163,093,232
2031	407,564	0	214,591,101	(26,461,634)	(22,645,983)	0	165,891,048
2032	407,564	0	215,852,848	(26,461,796)	(22,872,443)	0	166,926,173
2033	407,564	0	218,034,263	(26,459,133)	(23,101,167)	0	168,881,527
2034	407,564	0	223,869,774	(26,464,913)	(23,332,179)	0	174,480,246
2035	407,564	0	223,192,758	(26,451,867)	(23,565,501)	0	173,582,954
TOTAL	1,895,673,301	(11,528,320)	6,770,557,213	(1,203,223,724)	(919,625,182)	57,085,905	6,588,939,194

<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	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	805,478	1,189,615	5,876,842	7,871,934	63,183	376,338	439,521
2003	54,235	20,712	74,947	1,156,874	1,331,274	4,619,175	7,107,323	(2,583)	77,174	74,591
2004	153,240	20,534	173,774	360,395	346,064	4,106,508	4,812,967	8,906	46,169	55,074
2005	60,543	62,997	123,541	358,153	339,995	1,541,971	2,240,119	(10,551)	(177,303)	(187,854)
2006	887,892	20,086	907,978	712,304	661,467	1,591,690	2,965,460	6,555	61,585	68,140
2007	3,237,236	43,135	3,280,372	716,835	662,514	1,589,925	2,969,275	15,304	82,402	97,706
2008	7,903,036	61,877	7,964,914	1,318,378	1,216,886	2,912,795	5,448,058	22,797	88,983	111,780
2009	1,196,789	18,960	1,215,749	2,754,993	2,576,789	6,145,267	11,477,049	8,763	74,478	83,241
2010	396,763	3,323	400,086	3,666,367	3,334,846	8,364,519	15,365,732	75,756	140,801	216,558
2011	192,894	40,199	233,093	3,822,208	3,626,745	8,747,526	16,196,479	109,530	234,618	344,148
2012	485,208	426,760	911,967	2,742,392	2,672,202	6,768,005	12,182,600	75,587	334,173	409,761
2013	652,391	679,649	1,332,041	1,274,011	1,355,114	4,135,313	6,764,439	250,608	1,230,601	1,481,210
2014	587,364	658,937	1,246,300	(230,403)	(154,009)	(149,724)	(534,136)	329,057	1,424,272	1,871,328
2015	595,154	797,519	1,392,673	670,388	665,423	1,684,676	3,020,488	491,866	2,503,771	2,995,637
2016	316,310	461,547	777,857	179,732	183,979	482,151	845,861	482,549	1,626,312	2,108,862
2017	173,914	395,427	569,341	696,714	644,256	1,555,698	2,896,669	206,446	548,786	755,232
2018	53,347	134,626	187,973	222,369	209,453	513,522	945,344	42,682	81,327	124,009
2019	18,203	45,542	63,745	82,971	78,774	196,747	358,493	24,562	45,314	69,875
2020	1,065	2,663	3,728	7,657	7,172	17,618	32,447	3,453	6,370	9,823
2021	0	0	0	13,916	12,723	30,319	56,958	7,769	14,333	22,101
2022	0	0	0	14,399	13,165	31,371	58,934	8,038	14,830	22,868
2023	0	0	0	5,035	4,604	10,970	20,609	2,811	5,186	7,997
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	56,103,493	54,348,163	110,451,656	29,972,008	31,566,807	96,820,493	158,359,308	41,114,465	450,496,056	491,610,522

Note: Allocated capital costs as a result of permanent water transfers under the Monterey Amendment are not reflected in this table.

\* 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 County Water Agency			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	1,860,213
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	74,205	3,811	16,014	132,974	20,050	1,498,693	3,898	727	151,445	1,901,817
2003	(51,255)	(2,679)	(5,522)	(76,239)	(13,107)	(824,213)	(2,740)	337	(105,557)	(1,080,975)
2004	7,704	394	2,497	17,036	2,079	183,122	404	1,518	15,697	230,453
2005	28,573	1,473	5,736	52,697	7,564	539,512	1,505	561	58,418	696,039
2006	4,624	237	1,048	20,418	1,235	90,400	243	732	9,434	128,371
2007	12,185	612	3,708	31,576	3,386	270,085	626	892	24,584	347,652
2008	44,351	2,291	8,689	75,110	11,698	830,752	2,341	2,047	90,773	1,068,053
2009	15,102	769	3,234	48,477	4,096	304,381	786	996	30,683	408,526
2010	27,308	1,416	36,048	67,817	7,142	850,033	1,449	314	56,010	1,047,537
2011	35,601	1,843	50,425	69,823	9,383	1,162,732	1,884	1,345	72,942	1,405,976
2012	40,679	2,004	23,031	87,006	11,393	1,106,338	2,049	2,835	81,276	1,356,611
2013	183,520	9,166	67,830	379,858	52,558	4,509,894	9,375	12,671	369,245	5,594,116
2014	188,491	9,615	93,974	352,796	51,321	4,508,324	9,839	14,472	383,341	5,612,173
2015	235,628	12,058	126,969	459,008	63,910	5,737,667	12,330	10,143	479,998	7,137,712
2016	359,369	18,340	180,811	673,682	97,692	8,549,633	18,754	14,987	731,032	10,644,301
2017	218,449	11,088	87,276	426,752	59,817	5,014,603	11,341	8,245	443,136	6,280,707
2018	134,765	6,998	20,220	299,496	42,209	2,843,403	7,157	6,235	276,588	3,637,070
2019	78,694	4,086	11,737	159,800	20,531	1,567,972	4,179	7,650	161,509	2,016,158
2020	11,063	574	1,650	72,264	2,886	477,361	588	1,080	22,706	590,171
2021	24,892	1,293	3,712	92,930	6,494	574,110	1,322	2,436	51,087	758,274
2022	25,755	1,337	3,841	79,729	6,719	460,017	1,368	2,520	52,859	634,146
2023	9,006	468	1,343	47,835	2,350	159,187	478	881	18,485	240,034
2024	0	0	0	16,436	0	0	0	0	0	16,436
2025	0	0	0	0	0	0	0	0	0	0
2026	0	0	0	389	0	0	0	0	0	389
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>7,318,576</b>	<b>32,964</b>	<b>2,611,117</b>	<b>16,572,027</b>	<b>2,122,316</b>	<b>184,805,238</b>	<b>374,463</b>	<b>352,181</b>	<b>14,737,767</b>	<b>228,926,649</b>

<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 No. 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	188,562	606,124	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	372,408
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	167,056	107,515	34,405	11,395	56,741	2,453	68,208	18,551	9,841,902	126,427
2003	(45,784)	(11,499)	2,940	2,123	4,849	(803)	4,179	(5,961)	3,944,702	27,216
2004	63,046	38,831	20,124	5,569	33,188	1,133	41,043	8,244	2,148,312	38,381
2005	185,058	105,446	38,609	11,966	63,674	3,220	76,154	23,692	990,923	61,078
2006	324,039	242,177	66,458	24,708	109,605	5,452	123,066	40,810	2,029,684	111,403
2007	253,606	180,015	56,818	21,828	93,705	4,478	109,791	32,703	2,130,800	107,453
2008	127,887	161,815	65,267	59,472	107,653	2,270	71,462	16,555	3,345,653	256,989
2009	578,462	339,859	153,761	60,390	253,594	9,843	275,831	73,252	4,780,817	271,766
2010	645,140	340,904	193,795	62,836	319,614	10,815	371,182	81,100	5,464,397	285,883
2011	339,341	218,486	230,458	59,319	380,068	5,713	474,147	42,746	6,475,405	287,540
2012	254,303	142,858	342,780	87,673	565,307	5,007	707,269	34,667	12,007,080	444,379
2013	778,937	370,263	346,827	90,909	571,985	15,101	714,070	105,331	34,501,062	486,056
2014	854,932	436,967	244,537	63,481	403,288	15,640	504,616	112,216	30,940,706	405,182
2015	1,394,764	924,402	298,188	81,088	491,770	23,942	611,577	177,412	20,718,127	453,308
2016	1,318,387	904,268	262,391	77,740	432,735	22,455	533,382	167,067	21,392,828	443,410
2017	1,183,629	946,361	272,604	77,654	449,577	21,372	554,765	155,288	10,385,652	572,325
2018	1,366,013	1,008,575	315,813	83,866	520,837	24,532	647,532	179,323	5,225,517	611,533
2019	874,211	1,128,888	253,158	69,243	417,506	15,634	516,234	116,254	7,611,240	1,585,408
2020	1,041,164	2,430,147	257,100	67,995	424,006	17,996	527,066	134,449	2,380,861	639,733
2021	1,093,220	701,095	198,282	50,144	327,003	18,294	409,643	137,307	886,742	243,298
2022	992,266	394,530	179,986	45,517	296,831	16,605	371,815	124,627	804,923	220,843
2023	852,487	338,010	154,671	39,115	255,082	14,266	319,439	107,071	691,710	189,764
2024	412,180	163,116	74,797	18,916	123,354	6,897	154,450	51,769	334,501	91,762
2025	0	0	0	0	0	0	0	0	0	0
2026	9,767	3,865	1,772	448	2,923	163	3,660	1,227	7,926	2,174
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	66,106,723	44,012,843	18,599,061	5,826,099	30,673,797	1,179,611	36,743,937	8,659,732	330,536,762	33,764,749

<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 district.

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	11,145,574	5,297,703	34,824	26,912,753	0	0	14	14	380,629	37,572,525
2003	4,489,333	3,954,532	(4,182)	12,361,646	0	0	0	0	590,121	19,127,653
2004	2,289,248	4,276,877	13,219	8,977,217	0	0	0	0	156,413	14,405,899
2005	809,998	6,615,791	36,038	9,021,649	0	0	0	0	123,949	12,017,443
2006	1,804,218	13,712,116	88,687	18,682,423	0	0	5	5	240,761	22,993,138
2007	2,115,305	11,644,750	64,654	16,815,907	0	0	0	0	241,429	23,752,340
2008	2,803,394	11,419,739	55,927	18,494,085	0	0	4	4	444,042	33,530,936
2009	4,253,379	22,122,745	122,400	33,296,098	0	0	13	13	938,353	47,419,029
2010	5,295,555	18,065,368	107,502	31,244,091	0	0	0	0	6,290,436	54,564,439
2011	6,510,257	12,701,354	55,318	27,780,151	0	0	1	1	2,489,582	48,449,429
2012	12,374,716	17,371,040	42,252	44,379,331	0	0	0	0	1,013,075	60,253,345
2013	38,756,510	28,185,042	109,174	105,031,266	0	0	0	0	583,679	120,786,750
2014	35,043,031	20,989,075	118,248	90,131,920	0	0	0	0	(9,611)	98,317,975
2015	22,793,597	58,565,948	270,705	106,804,829	0	0	0	0	295,020	121,646,359
2016	11,222,328	50,637,812	249,388	87,664,189	0	0	0	0	99,750	102,140,820
2017	4,959,735	61,871,771	300,568	81,751,301	0	0	0	0	269,672	92,522,922
2018	2,049,388	61,687,647	340,166	74,060,743	0	0	0	0	84,915	79,040,054
2019	1,922,485	100,771,516	361,883	115,643,661	0	0	0	0	34,346	118,186,278
2020	398,309	102,762,287	747,316	111,828,427	0	0	0	0	3,037	112,467,633
2021	149,508	25,363,495	238,019	29,816,049	0	0	0	0	4,992	30,658,374
2022	135,713	14,850,864	144,901	18,579,421	0	0	0	0	5,165	19,300,534
2023	116,625	12,759,320	124,489	15,962,048	0	0	0	0	1,806	16,232,494
2024	56,398	6,169,327	60,191	7,717,657	0	0	0	0	0	7,734,093
2025	0	0	0	0	0	0	0	0	0	0
2026	1,336	146,186	1,426	182,875	0	0	0	0	0	183,264
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>238,164,462</b>	<b>2,108,874,498</b>	<b>14,553,792</b>	<b>2,937,696,066</b>	<b>0</b>	<b>0</b>	<b>341,149</b>	<b>341,149</b>	<b>21,708,248</b>	<b>3,949,093,598</b>

<sup>a</sup> Costs from Table B-10 allocated to Metropolitan Water District of Southern California are reduced herein by \$16,425,374 in 1972 under provisions of Amendment No. 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	507,943	361,935	1,309,946	2,179,824	104,160	208,037	312,197
1969	165,289	0	165,289	610,229	397,386	1,411,701	2,419,316	122,043	242,426	364,469
1970	169,077	0	169,077	644,615	412,322	1,450,660	2,507,597	125,963	250,808	376,771
1971	171,286	0	171,286	651,543	415,439	1,457,564	2,524,546	128,402	256,371	384,773
1972	172,649	0	172,649	653,071	416,368	1,461,847	2,531,285	129,861	260,482	390,343
1973	173,649	31,366	205,015	654,504	417,018	1,465,086	2,536,608	130,843	263,040	393,883
1974	176,527	32,938	209,466	655,578	417,636	1,467,092	2,540,305	132,015	265,901	397,916
1975	184,973	36,291	221,264	658,042	418,879	1,470,816	2,547,736	133,290	269,028	402,318
1976	189,650	40,836	230,485	659,442	419,684	1,472,924	2,552,049	134,041	272,155	406,196
1977	192,592	45,096	237,688	662,208	421,449	1,478,507	2,562,163	135,754	278,799	414,553
1978	195,860	49,178	245,038	665,914	423,747	1,485,299	2,574,960	141,271	292,281	433,552
1979	199,390	53,340	252,730	671,338	427,108	1,494,207	2,592,654	142,362	297,569	439,930
1980	209,132	67,748	276,880	675,255	429,296	1,499,843	2,604,393	143,530	303,969	447,499
1981	222,599	87,408	310,007	685,548	435,629	1,515,357	2,636,534	148,789	327,544	476,333
1982	234,191	106,918	341,110	683,561	434,108	1,512,014	2,629,684	148,004	320,657	468,660
1983	262,160	151,259	413,419	684,953	434,532	1,513,393	2,632,877	148,213	317,658	465,870
1984	326,072	224,245	550,317	696,143	441,230	1,530,671	2,668,044	149,853	323,275	473,127
1985	455,836	364,305	820,141	708,691	448,410	1,548,594	2,705,695	151,658	328,761	480,419
1986	819,636	692,479	1,512,115	710,716	449,390	1,551,318	2,711,425	152,545	332,779	485,324
1987	1,360,688	1,559,243	2,919,931	713,428	451,007	1,555,828	2,720,264	154,805	348,472	503,277
1988	1,771,651	2,208,121	3,979,772	717,771	453,514	1,562,985	2,734,270	161,346	417,591	578,937
1989	1,891,484	2,433,160	4,324,645	726,747	459,332	1,578,655	2,764,734	169,453	494,247	663,699
1990	1,955,330	2,514,151	4,469,481	734,890	464,692	1,592,216	2,791,798	177,387	557,384	734,771
1991	1,978,582	2,557,403	4,535,985	751,998	476,459	1,625,032	2,853,489	189,050	639,235	828,285
1992	1,983,860	2,562,121	4,545,981	782,597	496,722	1,675,047	2,954,366	204,822	754,678	959,500
1993	1,986,897	2,565,427	4,552,324	796,956	505,773	1,698,585	3,001,315	224,056	941,300	1,165,356
1994	1,993,467	2,572,330	4,565,797	807,387	512,498	1,716,961	3,036,846	286,878	1,585,162	1,872,040
1995	1,997,323	2,576,836	4,574,159	811,863	515,639	1,729,387	3,056,888	517,412	4,095,799	4,613,211
1996	1,998,994	2,578,433	4,577,427	819,767	520,936	1,743,439	3,084,143	1,187,010	12,569,247	13,756,257
1997	2,000,110	2,579,484	4,579,594	823,817	523,583	1,750,461	3,097,861	1,808,545	20,578,178	22,386,724
1998	2,001,225	2,585,478	4,586,703	830,547	527,976	1,762,113	3,120,637	1,985,644	22,700,288	24,685,933
1999	2,002,204	2,586,690	4,588,893	832,776	529,331	1,765,656	3,127,763	2,035,260	23,293,767	25,329,027
2000	2,006,043	2,592,730	4,598,773	993,539	533,508	1,777,485	3,304,533	2,088,005	23,838,744	25,926,748
2001	2,326,640	2,782,577	5,109,217	1,127,714	535,165	1,782,101	3,444,980	2,116,046	24,156,352	26,272,398
2002	2,327,079	2,783,417	5,110,496	1,142,116	550,866	1,890,059	3,583,041	2,120,253	24,187,702	26,307,955
2003	2,328,423	2,786,226	5,114,650	1,226,869	620,921	2,236,139	4,083,929	2,123,974	24,209,864	26,333,838
2004	2,332,107	2,787,520	5,119,627	1,360,766	700,388	2,511,867	4,573,021	2,123,820	24,214,471	26,338,291
2005	2,342,655	2,788,858	5,131,513	1,397,559	721,344	2,760,543	4,879,446	2,124,359	24,217,267	26,341,626
2006	2,346,907	2,793,091	5,139,997	1,433,076	742,250	2,855,355	5,030,681	2,123,710	24,206,365	26,330,075
2007	2,409,942	2,794,461	5,204,403	1,504,335	783,587	2,954,825	5,242,747	2,124,120	24,210,213	26,334,333
2008	2,643,757	2,797,458	5,441,215	1,577,123	825,710	3,055,913	5,458,747	2,125,093	24,215,453	26,340,545
2009	3,225,132	2,801,783	6,026,915	1,713,480	904,515	3,244,545	5,862,541	2,126,569	24,221,215	26,347,784
2010	3,314,917	2,803,150	6,118,068	2,005,600	1,074,688	3,650,383	6,730,671	2,127,148	24,226,134	26,353,282
2011	3,345,311	2,803,395	6,148,706	2,703,938	1,299,578	4,214,455	8,217,971	2,132,257	24,235,629	26,367,885
2012	3,360,438	2,806,425	6,166,863	3,201,349	1,549,680	4,817,689	9,568,719	2,139,810	24,251,808	26,391,618
2013	3,399,542	2,839,268	6,238,810	3,343,562	1,632,747	4,930,891	9,907,200	2,145,149	24,275,411	26,420,560
2014	3,453,512	2,892,640	6,346,152	3,431,900	1,665,692	5,065,355	10,162,947	2,156,613	24,342,922	26,499,535
2015	3,503,461	2,945,530	6,448,990	3,333,611	1,565,205	4,684,867	9,583,683	2,174,066	24,443,447	26,617,513
2016	3,535,039	3,010,684	6,545,723	3,381,680	1,585,402	4,640,243	9,607,325	2,199,041	24,610,257	26,809,298
2017	3,536,942	3,049,438	6,586,380	3,332,505	1,569,798	4,564,097	9,466,399	2,207,331	24,682,201	26,889,532
2018	3,462,441	3,083,179	6,545,621	3,306,514	1,581,697	4,569,375	9,457,587	2,176,573	24,637,441	26,814,013
2019	3,417,903	3,095,138	6,513,042	3,231,910	1,564,084	4,511,354	9,307,348	2,162,325	24,609,978	26,772,302
2020	3,415,433	3,099,353	6,514,786	3,208,241	1,556,136	4,489,850	9,254,226	2,160,584	24,605,615	26,766,199
2021	3,413,015	3,099,611	6,512,625	3,202,192	1,553,684	4,484,579	9,240,456	2,158,465	24,600,644	26,759,108
2022	3,411,454	3,099,611	6,511,065	3,202,948	1,553,995	4,483,250	9,240,193	2,157,763	24,597,929	26,755,692
2023	3,410,311	3,066,078	6,476,389	3,203,866	1,554,699	4,483,235	9,241,800	2,157,607	24,596,895	26,754,502
2024	3,407,031	3,064,444	6,471,475	3,203,668	1,554,583	4,482,427	9,240,677	2,156,742	24,594,600	26,751,342
2025	3,397,415	3,060,867	6,458,283	3,201,332	1,553,340	4,478,703	9,233,375	2,155,467	24,591,474	26,746,940
2026	3,392,072	3,056,113	6,448,185	3,199,858	1,552,535	4,476,594	9,228,988	2,154,716	24,588,346	26,743,062
2027	3,388,700	3,051,679	6,440,379	3,196,871	1,550,770	4,471,012	9,218,652	2,153,003	24,581,702	26,734,705
2028	3,384,961	3,047,419	6,432,380	3,192,862	1,548,472	4,464,219	9,205,553	2,147,486	24,568,220	26,715,706
2029	3,380,923	3,043,052	6,423,975	3,186,864	1,545,110	4,455,312	9,187,286	2,146,395	24,562,932	26,709,328
2030	3,369,767	3,027,589	6,397,356	3,182,668	1,542,923	4,449,675	9,175,266	2,145,227	24,556,532	26,701,759
2031	3,354,350	3,006,523	6,360,873	3,171,185	1,536,590	4,434,161	9,141,936	2,139,968	24,532,957	26,672,925
2032	3,341,053	2,985,579	6,326,632	3,173,702	1,538,111	4,437,504	9,149,316	2,140,753	24,539,845	26,680,598
2033	3,308,993	2,938,128	6,247,121	3,172,460	1,537,687	4,436,126	9,146,273	2,140,544	24,542,843	26,683,388
2034	3,235,897	2,861,511	6,097,408	3,160,037	1,530,989	4,418,848	9,109,874	2,138,905	24,537,227	26,676,131
2035	3,087,754	2,715,209	5,802,963	3,146,191	1,523,809	4,400,925	9,070,924	2,137,099	24,531,740	26,668,839
<b>TOTAL</b>	<b>141,940,852</b>	<b>139,122,018</b>	<b>281,062,869</b>	<b>119,809,924</b>	<b>62,347,627</b>	<b>195,972,288</b>	<b>378,129,839</b>	<b>89,014,692</b>	<b>973,746,568</b>	<b>1,062,761,260</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 County Water Agency			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	79,957	1,877	48,950	335,771	48,966	434,671	9,407	4,944	67,433	1,031,976
1969	80,096	5,630	57,418	392,005	52,536	892,678	10,158	5,374	255,143	1,751,037
1970	87,785	5,630	59,224	423,404	53,922	1,085,764	10,446	5,589	188,811	1,920,575
1971	100,086	5,630	60,329	444,522	54,712	1,442,081	10,612	6,018	200,922	2,324,912
1972	111,828	5,630	60,945	454,227	55,075	2,159,392	10,694	11,534	619,830	3,489,154
1973	123,010	5,630	61,370	458,449	55,248	2,490,531	10,736	6,663	239,741	3,451,378
1974	186,696	5,630	61,890	460,485	55,349	2,789,025	10,770	7,461	397,929	3,975,234
1975	226,758	5,630	62,452	462,798	55,490	3,340,484	10,812	7,686	474,825	4,646,935
1976	172,891	5,630	62,720	464,655	55,679	3,601,014	10,853	8,682	339,679	4,721,802
1977	169,978	5,630	63,362	467,359	55,965	3,945,676	10,914	7,953	324,777	5,051,614
1978	181,720	0	65,796	469,216	56,156	4,385,952	11,019	8,383	348,448	5,526,691
1979	215,514	5,630	66,111	471,978	56,491	4,815,969	11,086	8,598	392,161	6,043,538
1980	229,247	5,630	66,399	474,721	56,828	5,255,307	11,157	12,252	394,687	6,506,228
1981	229,247	5,630	67,986	491,115	58,770	5,751,541	11,565	9,243	418,357	7,043,454
1982	229,247	5,630	67,996	488,835	58,707	6,209,549	11,552	9,672	441,477	7,522,666
1983	239,870	5,630	68,332	493,076	59,377	6,730,973	11,685	8,103	52,559	7,669,606
1984	252,171	5,630	68,950	498,702	60,083	7,064,987	11,834	10,317	344,655	8,317,329
1985	263,913	5,630	69,678	506,586	61,243	7,522,979	12,069	10,532	250,734	8,703,365
1986	275,655	5,630	69,966	508,983	61,587	7,644,834	12,141	10,962	535,057	9,124,815
1987	287,397	5,630	70,471	512,652	62,116	8,439,909	12,251	11,177	558,177	9,959,780
1988	299,139	5,630	70,832	515,513	62,526	8,871,789	12,334	11,607	581,297	10,430,666
1989	310,881	5,630	71,717	519,169	63,150	9,183,333	12,501	12,037	604,967	10,783,385
1990	161,311	5,630	73,153	537,527	65,389	9,507,017	12,936	12,252	652,307	11,027,523
1991	298,641	5,630	75,796	566,573	69,966	9,507,017	13,762	12,252	652,307	11,201,945
1992	322,623	5,630	78,990	597,260	74,817	9,507,017	14,756	12,252	652,307	11,265,652
1993	322,623	5,630	80,482	610,123	76,657	9,507,017	15,124	12,252	652,307	11,282,215
1994	322,623	5,630	82,105	619,494	77,936	9,507,017	15,397	12,252	652,307	11,294,761
1995	322,623	5,630	83,398	626,231	78,890	9,507,017	15,608	12,252	652,307	11,303,956
1996	298,413	5,630	87,367	635,384	80,221	9,180,439	15,961	12,252	652,307	10,967,975
1997	298,413	5,630	90,231	639,177	80,707	9,113,457	16,133	12,252	652,307	10,908,306
1998	298,412	5,630	92,940	652,602	82,732	8,860,997	16,588	12,252	652,307	10,674,461
1999	298,412	5,630	94,237	659,509	83,778	8,860,997	16,823	12,252	652,307	10,683,946
2000	298,412	5,630	95,750	667,629	85,008	8,215,607	17,096	12,252	652,307	10,049,692
2001	298,412	5,630	96,315	670,255	85,354	8,081,639	17,172	12,252	652,307	9,919,335
2002	321,054	5,630	96,772	672,352	85,648	8,081,639	17,237	12,252	612,637	9,905,220
2003	321,054	5,630	97,715	680,183	86,829	8,081,639	17,476	12,252	610,374	9,913,152
2004	321,054	5,630	97,385	675,632	86,046	8,069,334	45,602	12,252	526,083	9,839,019
2005	321,054	5,630	97,536	676,664	86,172	8,069,334	45,630	12,252	526,083	9,840,355
2006	321,054	5,630	97,889	679,904	86,637	8,069,334	47,450	12,252	524,358	9,844,509
2007	321,054	5,630	97,954	681,180	86,715	8,069,334	47,466	12,252	524,358	9,845,943
2008	321,054	5,630	98,190	683,187	86,930	8,069,334	47,510	12,252	524,358	9,848,446
2009	321,054	5,630	98,753	688,052	87,687	8,069,334	47,667	12,252	524,358	9,854,787
2010	281,915	5,630	98,967	691,253	87,958	7,894,589	47,721	12,252	484,759	9,605,043
2011	281,915	5,630	101,397	695,826	88,439	7,894,589	47,894	12,252	484,759	9,612,702
2012	281,915	5,630	104,875	700,641	89,086	7,894,589	48,133	12,252	484,759	9,621,881
2013	281,915	5,630	106,502	706,787	89,891	7,894,589	48,320	12,252	484,759	9,630,644
2014	270,771	5,630	108,692	734,314	93,700	7,894,589	49,102	12,252	476,551	9,645,601
2015	253,998	5,630	112,388	696,310	88,239	7,894,589	50,007	12,252	476,551	9,973,316
2016	278,209	5,630	116,121	675,561	85,354	8,277,942	51,200	12,252	476,551	9,978,820
2017	278,209	5,630	116,229	615,933	75,818	8,277,942	53,039	12,252	476,551	9,911,604
2018	278,209	5,630	100,696	548,428	66,108	8,277,942	44,720	12,252	476,551	9,810,536
2019	278,209	5,630	93,950	517,700	66,133	8,277,942	44,580	12,252	476,551	9,772,947
2020	255,843	5,630	93,184	500,478	66,568	8,277,942	44,663	12,252	476,551	9,733,111
2021	255,843	5,630	92,233	486,063	66,046	8,277,942	44,551	12,252	476,551	9,717,110
2022	255,843	5,630	91,979	485,410	66,316	8,277,942	44,598	12,252	476,551	9,716,521
2023	255,843	5,630	91,948	489,385	66,833	8,277,942	44,696	12,252	476,551	9,721,080
2024	255,843	5,630	91,575	492,569	66,989	8,277,942	44,714	12,252	476,551	9,724,064
2025	255,843	5,630	91,012	492,172	66,848	8,277,942	44,673	12,252	476,551	9,722,923
2026	255,843	5,630	90,745	490,315	66,659	8,277,942	44,632	12,252	476,551	9,720,568
2027	255,843	5,630	90,103	487,664	66,373	8,277,942	44,570	12,252	476,551	9,716,928
2028	255,843	5,630	87,669	485,806	66,181	8,277,942	44,465	12,252	476,551	9,712,340
2029	255,843	5,630	87,354	483,045	65,846	8,277,942	44,399	12,252	476,551	9,708,862
2030	255,843	5,630	87,066	480,302	65,510	8,277,942	44,328	12,252	476,551	9,705,423
2031	255,843	5,630	85,479	463,908	63,568	8,277,942	43,919	12,252	476,551	9,685,092
2032	255,843	5,630	85,468	466,188	63,630	8,277,942	43,933	12,252	476,551	9,687,437
2033	255,843	5,630	85,132	461,946	62,961	8,277,942	43,800	12,252	476,551	9,682,057
2034	255,843	5,630	84,515	456,320	62,254	8,277,942	43,651	12,252	476,551	9,674,958
2035	255,843	5,630	83,786	448,436	61,095	8,277,942	43,415	12,252	476,551	9,664,951
<b>TOTAL</b>	<b>17,321,189</b>	<b>373,457</b>	<b>5,761,967</b>	<b>37,903,702</b>	<b>4,829,206</b>	<b>491,302,685</b>	<b>1,943,713</b>	<b>758,379</b>	<b>32,655,117</b>	<b>592,849,414</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	420,246	206,952	38,551	245,877	11,781	311,688	87,293	729,849	194,527
1969	1,003,797	624,537	318,583	57,301	368,426	17,249	468,018	127,219	1,136,415	302,649
1970	1,312,832	781,635	451,031	84,796	520,243	23,427	651,434	171,297	1,691,461	443,708
1971	1,581,850	949,058	595,102	120,210	700,914	28,845	864,126	208,821	2,394,083	619,778
1972	1,720,363	1,059,380	671,098	137,454	795,465	31,306	980,040	226,497	2,808,504	720,983
1973	1,772,377	1,074,258	696,065	142,143	825,044	32,281	1,017,853	233,340	2,945,564	756,530
1974	1,791,355	1,121,230	707,278	146,331	839,031	32,602	1,031,844	235,688	3,035,230	777,084
1975	1,815,881	1,136,285	724,295	150,105	861,611	33,017	1,060,973	238,700	3,117,604	798,777
1976	1,829,760	1,149,195	736,112	152,796	878,290	33,269	1,082,282	240,431	3,195,714	819,552
1977	1,842,615	1,162,663	744,718	154,692	890,124	33,485	1,097,860	242,010	3,244,723	832,585
1978	1,853,320	1,182,182	750,463	156,009	898,031	33,676	1,108,658	243,377	3,274,845	840,506
1979	1,869,355	1,206,713	756,140	157,141	904,987	33,943	1,118,335	245,346	3,296,693	846,199
1980	1,888,324	1,255,135	762,012	158,251	912,220	34,247	1,128,515	247,607	3,317,247	851,720
1981	1,987,339	1,346,328	796,384	164,015	950,529	35,899	1,178,430	259,877	3,421,183	879,634
1982	1,978,809	1,378,059	789,720	163,563	945,667	35,768	1,172,714	258,879	3,413,856	877,416
1983	2,061,590	1,422,668	809,319	167,582	971,692	37,104	1,206,825	268,895	3,486,248	897,190
1984	2,171,231	1,449,670	834,564	173,473	1,006,034	38,871	1,246,621	282,134	3,594,542	926,815
1985	2,251,676	1,465,359	851,720	177,807	1,031,452	40,260	1,279,322	291,738	3,673,311	948,379
1986	2,299,323	1,474,065	863,875	180,992	1,049,921	40,927	1,312,062	297,214	3,730,198	963,927
1987	2,344,046	1,480,066	876,261	183,970	1,068,826	41,390	1,328,058	301,992	3,783,895	978,588
1988	2,362,143	1,486,094	885,509	186,235	1,083,080	41,677	1,346,876	304,089	3,824,257	989,568
1989	2,376,030	1,495,542	889,631	187,412	1,088,857	41,852	1,354,535	305,475	3,846,509	995,456
1990	2,432,706	1,518,630	912,986	192,472	1,118,024	42,727	1,391,569	312,010	3,918,238	1,014,854
1991	2,469,661	1,538,277	932,659	197,604	1,147,282	43,112	1,427,676	315,536	3,997,480	1,036,359
1992	2,514,880	1,559,523	953,475	203,996	1,179,589	43,744	1,466,963	320,432	4,102,102	1,064,912
1993	2,549,874	1,578,530	969,784	210,989	1,203,773	44,253	1,494,370	324,519	4,213,571	1,095,444
1994	2,585,113	1,596,352	983,985	220,171	1,223,934	44,800	1,514,176	328,488	4,420,076	1,151,617
1995	2,611,217	1,605,312	992,587	225,248	1,236,069	45,193	1,526,524	331,367	4,547,097	1,186,123
1996	2,637,094	1,621,320	1,001,843	229,526	1,248,440	45,599	1,539,950	334,344	4,654,074	1,215,084
1997	2,654,359	1,632,707	1,010,118	232,003	1,258,944	45,868	1,552,426	336,316	4,875,746	1,268,666
1998	2,679,335	1,646,594	1,017,568	233,373	1,268,786	46,279	2,077,907	339,344	5,036,613	1,290,750
1999	2,692,811	1,657,979	1,022,130	235,684	1,274,800	46,503	2,085,181	341,005	5,243,553	1,307,788
2000	2,708,447	2,811,936	1,028,194	237,960	1,283,376	46,776	2,095,936	405,436	5,569,174	1,321,137
2001	2,716,761	2,817,877	1,032,076	239,333	1,288,723	46,930	2,102,778	406,640	6,393,264	1,330,966
2002	2,741,639	2,821,170	1,035,440	240,242	1,293,682	47,103	2,109,228	407,914	7,573,077	1,336,562
2003	2,751,646	2,828,812	1,038,199	240,913	1,297,179	47,248	2,114,149	409,106	8,152,654	1,344,008
2004	2,749,069	2,828,728	1,094,766	241,040	1,297,550	47,200	2,114,878	408,805	8,388,121	1,345,632
2005	2,753,050	2,832,147	6,708,247	241,377	2,057,675	47,268	2,117,999	409,379	8,518,216	1,347,956
2006	2,764,813	2,841,582	6,774,751	242,113	2,070,370	47,466	2,124,599	411,060	8,579,145	1,351,712
2007	2,785,961	2,866,900	6,903,471	243,657	2,094,340	47,807	2,137,078	414,175	8,705,987	1,358,674
2008	2,802,763	2,885,407	7,027,979	245,045	2,116,833	48,092	2,147,413	416,647	8,841,464	1,365,506
2009	2,811,238	2,900,316	7,118,041	248,897	2,135,442	48,239	2,152,742	417,800	9,058,128	1,382,148
2010	2,851,211	2,936,733	7,502,695	252,885	2,235,184	48,889	2,218,842	423,667	9,373,857	1,400,096
2011	2,896,843	2,973,018	7,677,001	257,122	2,279,117	49,618	2,253,664	430,290	9,742,355	1,419,375
2012	2,921,916	2,994,354	7,824,681	261,213	2,323,415	50,012	2,291,023	433,786	10,188,903	1,439,204
2013	2,907,409	3,007,733	8,011,866	267,405	2,371,414	50,366	2,343,382	436,509	10,985,242	1,457,489
2014	2,955,421	3,005,492	8,328,909	269,623	2,445,175	50,318	2,366,388	435,902	13,454,340	1,484,532
2015	2,964,216	3,014,500	8,481,487	271,528	2,477,269	50,543	2,399,753	437,354	15,706,928	1,500,652
2016	2,975,346	3,051,005	9,203,206	272,466	2,580,087	50,709	2,413,450	439,394	17,199,325	1,509,317
2017	2,875,822	3,007,025	9,691,031	267,632	2,614,248	48,958	2,362,679	425,663	18,693,494	1,490,341
2018	2,714,296	2,825,422	10,232,494	258,923	2,636,654	46,213	2,273,415	402,813	19,248,874	1,458,331
2019	2,520,656	2,649,770	10,539,395	247,315	2,612,679	42,835	2,156,563	374,392	19,287,333	1,402,290
2020	2,292,493	2,547,530	11,450,353	225,963	2,636,675	38,044	2,049,581	335,438	19,407,521	1,401,882
2021	2,124,652	2,573,952	11,388,722	196,856	2,504,601	34,296	1,870,117	307,113	18,925,753	1,285,154
2022	2,097,287	2,514,738	10,599,635	184,497	2,344,508	33,616	1,801,514	302,584	18,597,710	1,207,650
2023	2,151,713	2,576,298	10,002,466	184,487	2,267,114	34,348	1,820,939	310,166	18,543,396	1,194,805
2024	2,229,907	2,581,232	9,983,574	184,567	2,279,011	35,584	1,864,177	321,666	18,529,205	1,194,957
2025	2,255,628	2,596,552	9,918,957	182,998	2,263,927	35,973	1,863,525	325,510	18,485,836	1,183,964
2026	2,241,750	2,578,304	9,815,088	180,308	2,234,814	35,721	1,840,809	323,491	18,407,726	1,163,189
2027	2,230,290	2,560,714	9,740,143	178,473	2,214,406	35,527	1,825,234	321,885	18,359,801	1,150,453
2028	2,219,585	2,532,878	9,702,925	177,156	2,202,247	35,336	1,814,374	320,368	18,329,679	1,142,532
2029	2,203,551	2,494,565	9,670,595	176,024	2,191,692	35,069	1,803,988	318,156	18,307,830	1,136,839
2030	2,184,582	2,417,351	9,644,008	174,914	2,181,660	34,766	1,793,088	315,642	18,287,276	1,131,318
2031	2,085,567	2,274,298	9,505,397	169,150	2,129,272	33,114	1,731,092	301,479	18,183,340	1,103,404
2032	2,094,096	2,222,793	9,518,200	169,602	2,134,963	33,245	1,742,321	303,112	18,190,668	1,105,622
2033	2,011,315	2,150,242	9,436,669	165,583	2,100,572	31,909	1,704,910	292,446	18,118,275	1,085,848
2034	1,901,674	2,108,005	9,324,114	159,692	2,054,437	30,141	1,656,832	278,457	18,009,982	1,056,224
2035	1,821,230	2,086,284	9,240,188	155,358	2,020,000	28,752	1,623,148	268,560	17,931,212	1,034,659
<b>TOTAL</b>	<b>157,813,256</b>	<b>139,183,792</b>	<b>311,946,566</b>	<b>13,381,727</b>	<b>108,573,631</b>	<b>2,703,248</b>	<b>112,894,557</b>	<b>21,999,217</b>	<b>631,188,033</b>	<b>75,764,966</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	17,534,633	0	0	564	564	0	21,180,702
1969	187,059	21,857,456	202,599	26,671,308	0	0	3,191	3,191	0	31,374,609
1970	275,010	28,992,595	257,859	35,657,328	0	0	15,121	15,121	0	40,646,469
1971	385,025	37,242,413	316,307	46,006,533	0	0	15,947	15,947	0	51,427,997
1972	448,055	44,062,125	353,935	54,015,204	0	0	17,332	17,332	0	60,615,968
1973	470,185	46,299,581	357,342	56,622,560	0	0	17,333	17,333	0	63,226,778
1974	483,259	48,322,678	372,112	58,895,722	0	0	17,334	17,334	0	66,035,978
1975	496,722	49,285,084	376,511	60,095,565	0	0	17,337	17,337	0	67,931,154
1976	509,650	50,137,295	380,788	61,145,132	0	0	17,338	17,338	0	69,073,003
1977	517,741	50,827,166	385,097	61,975,480	0	0	17,340	17,340	0	70,258,838
1978	522,656	51,426,581	390,742	62,681,047	0	0	17,342	17,342	0	71,478,630
1979	526,178	52,230,344	399,649	63,591,022	0	0	17,344	17,344	0	72,937,218
1980	529,583	53,637,412	417,136	65,139,409	0	0	17,345	17,345	0	74,991,754
1981	546,787	56,667,437	449,812	68,683,654	0	0	17,346	17,346	0	79,167,328
1982	545,445	57,465,063	461,234	69,486,191	0	0	17,348	17,348	0	80,465,658
1983	557,607	59,037,472	477,333	71,401,526	0	0	17,348	17,348	0	82,600,646
1984	575,830	60,313,580	486,863	73,100,226	0	0	17,349	17,349	0	85,126,393
1985	589,089	61,144,629	492,117	74,236,858	0	0	17,351	17,351	0	86,963,827
1986	598,648	61,666,346	494,977	74,972,476	0	0	17,352	17,352	0	88,823,507
1987	607,664	62,094,710	496,758	75,586,224	0	0	17,354	17,354	0	91,706,830
1988	614,418	62,452,912	498,619	76,075,479	0	0	17,355	17,355	0	93,816,479
1989	618,059	62,796,236	501,579	76,497,173	0	0	17,358	17,358	0	95,050,994
1990	629,934	63,762,459	509,566	77,756,175	0	0	17,360	17,360	0	96,797,108
1991	643,118	64,677,355	516,147	78,942,267	0	0	17,364	17,364	0	98,379,334
1992	660,626	65,776,353	523,154	80,369,749	0	0	17,367	17,367	0	100,112,615
1993	679,343	66,905,041	529,383	81,798,875	0	0	17,369	17,369	0	101,817,454
1994	714,062	68,486,622	535,055	83,804,451	0	0	17,370	17,370	0	104,591,266
1995	735,431	69,373,540	537,812	84,953,519	0	0	17,371	17,371	0	108,519,104
1996	753,512	70,251,056	541,753	86,073,595	0	0	17,371	17,371	0	118,476,767
1997	812,976	71,530,953	544,467	87,755,550	0	0	17,371	17,371	0	128,745,407
1998	919,464	72,283,436	548,490	89,387,940	0	0	0	0	0	132,455,672
1999	1,100,324	72,917,423	552,184	90,477,365	0	0	0	0	0	134,206,993
2000	1,434,718	73,432,162	555,279	92,930,531	0	0	0	0	0	136,810,276
2001	2,371,146	73,741,965	556,658	95,045,116	0	0	0	0	0	139,791,046
2002	3,744,046	73,915,736	557,417	97,823,256	0	0	0	0	0	142,729,968
2003	4,400,394	74,227,711	559,468	99,411,486	0	0	17,375	17,375	0	144,874,429
2004	4,668,372	74,463,765	559,218	100,207,145	0	0	17,375	17,375	0	146,094,478
2005	4,807,001	68,352,994	560,019	100,753,328	0	0	17,375	17,375	0	146,963,643
2006	4,856,806	68,688,723	562,234	101,315,376	0	0	17,375	17,375	0	147,678,013
2007	4,969,557	69,408,562	567,777	102,503,946	0	0	17,376	17,376	0	149,148,749
2008	5,104,050	70,014,748	571,888	103,587,836	0	0	17,376	17,376	0	150,694,164
2009	5,285,597	70,657,492	575,509	104,791,590	0	0	17,376	17,376	0	152,900,993
2010	5,566,494	71,883,769	583,593	107,277,914	0	0	17,377	17,377	0	156,102,354
2011	5,923,606	72,927,843	590,842	109,420,694	0	0	17,377	17,377	0	159,785,336
2012	6,372,557	73,658,352	594,657	111,354,071	0	0	17,377	17,377	0	163,120,528
2013	7,238,440	74,011,669	597,641	113,686,564	0	0	17,377	17,377	0	165,901,155
2014	10,041,942	75,136,495	596,175	120,570,711	0	0	17,377	17,377	0	173,242,324
2015	12,643,721	75,616,144	596,595	126,160,690	0	0	16,972	16,972	0	178,801,165
2016	14,376,718	77,581,266	601,708	132,253,997	0	0	16,813	16,813	0	185,211,976
2017	15,232,577	77,214,812	586,739	134,511,019	0	0	16,815	16,815	0	187,381,749
2018	15,590,586	74,964,771	546,249	133,199,042	0	0	16,813	16,813	0	185,843,611
2019	15,698,154	72,280,817	505,919	130,318,118	0	0	14,186	14,186	0	182,697,943
2020	15,780,758	72,939,551	482,763	131,588,551	0	0	2,257	2,257	0	183,859,129
2021	15,707,690	74,175,536	493,638	131,588,080	0	0	1,430	1,430	0	183,818,810
2022	15,659,224	70,680,371	479,195	126,502,530	0	0	45	45	0	178,726,045
2023	15,651,046	70,661,539	490,685	125,889,002	0	0	44	44	0	178,082,817
2024	15,650,697	70,078,644	489,498	125,422,721	0	0	43	43	0	177,610,323
2025	15,643,810	69,910,132	492,118	125,158,931	0	0	41	41	0	177,320,492
2026	15,630,882	69,162,407	487,841	124,102,330	0	0	39	39	0	176,243,173
2027	15,622,975	68,568,388	483,726	123,292,015	0	0	37	37	0	175,402,716
2028	15,618,059	68,004,698	478,081	122,577,919	0	0	35	35	0	174,643,933
2029	15,614,537	67,231,187	469,175	121,653,208	0	0	34	34	0	173,682,692
2030	15,611,133	65,847,632	451,687	120,075,057	0	0	32	32	0	172,054,894
2031	15,593,928	62,935,926	419,011	116,464,979	0	0	31	31	0	168,325,836
2032	15,595,270	62,131,333	407,590	115,648,814	0	0	29	29	0	167,492,826
2033	15,583,108	60,629,220	391,491	113,701,589	0	0	29	29	0	165,460,457
2034	15,564,885	59,452,217	381,960	111,978,620	0	0	28	28	0	163,537,020
2035	15,551,627	58,696,956	376,707	110,834,681	0	0	26	26	0	162,042,385
TOTAL	418,932,516	4,327,279,823	32,870,155	6,354,524,485	0	0	781,795	781,795	0	8,670,109,663

<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	652,537	1,445,674	2,098,211	4,194,899	1,038,379	3,545,122	8,778,400	723,621	2,906,447	3,630,069
2002	1,097,374	1,872,079	2,969,454	8,257,520	1,356,607	6,056,536	15,670,663	755,217	3,285,573	4,040,791
2003	1,170,749	2,250,524	3,421,272	4,906,012	1,059,219	3,553,276	9,518,507	804,271	3,441,757	4,246,028
2004	1,620,523	2,349,218	3,969,741	2,580,519	1,279,546	3,535,663	7,395,728	800,243	3,356,298	4,156,541
2005	918,327	1,798,950	2,717,276	2,399,699	1,133,468	2,957,425	6,490,592	850,366	3,684,853	4,535,219
2006	828,944	1,402,647	2,231,591	2,476,992	1,200,470	3,265,138	6,942,600	750,916	3,645,262	4,396,178
2007	770,279	1,509,460	2,279,738	3,243,667	1,577,736	4,024,843	8,846,246	827,435	3,569,615	4,397,050
2008	1,071,395	1,441,204	2,512,599	3,641,793	1,775,199	4,510,848	9,927,839	1,250,942	5,342,948	6,593,908
2009	1,146,459	1,810,307	2,956,766	3,253,976	1,477,182	4,192,792	8,923,950	1,087,001	4,557,321	5,644,322
2010	1,219,759	3,208,980	4,428,739	3,153,175	1,549,002	4,272,339	8,974,515	1,415,346	6,262,897	7,678,243
2011	1,600,621	3,661,353	5,261,973	3,515,125	1,701,088	4,556,349	9,772,561	1,447,042	6,581,319	8,028,361
2012	2,071,137	3,556,759	5,627,895	3,710,633	1,775,597	6,759,825	12,246,055	1,441,273	7,245,042	8,686,315
2013	1,526,061	3,103,069	4,629,130	4,262,481	2,011,303	6,011,349	12,285,132	1,701,502	8,811,752	10,513,254
2014	1,951,287	3,802,214	5,753,501	4,748,913	2,201,352	7,332,971	14,283,235	1,534,023	5,812,571	7,346,594
2015	1,919,261	3,867,281	5,786,542	4,522,907	2,614,040	11,699,742	18,836,689	2,073,450	10,028,901	12,102,350
2016	2,052,635	4,101,168	6,153,803	5,331,554	2,984,387	14,002,541	22,318,482	1,599,388	6,540,993	8,140,381
2017	2,148,313	4,305,421	6,453,734	6,197,000	3,097,956	16,517,118	25,812,074	1,626,767	6,686,443	8,313,209
2018	2,041,871	4,101,603	6,143,475	5,352,334	2,900,870	12,045,621	20,298,824	1,768,181	7,800,487	9,568,668
2019	2,062,290	4,142,618	6,204,909	5,405,857	2,929,878	12,166,077	20,501,813	1,785,863	7,878,492	9,664,355
2020	2,082,911	4,184,041	6,266,953	5,459,895	2,959,177	12,287,737	20,706,810	1,803,721	7,957,277	9,760,998
2021	2,103,741	4,225,882	6,329,623	5,514,495	2,988,769	12,410,615	20,913,878	1,821,759	8,036,850	9,858,608
2022	2,124,778	4,268,141	6,392,919	5,569,639	3,018,656	12,534,722	21,123,017	1,839,976	8,117,219	9,957,195
2023	2,146,026	4,310,822	6,456,847	5,625,336	3,048,843	12,660,068	21,334,246	1,858,376	8,198,391	10,056,767
2024	2,167,487	4,353,930	6,521,417	5,681,589	3,079,331	12,786,669	21,547,590	1,876,960	8,280,374	10,157,334
2025	2,189,162	4,397,469	6,586,631	5,738,405	3,110,125	12,914,536	21,763,065	1,895,729	8,363,178	10,258,908
2026	2,211,053	4,441,443	6,652,496	5,795,789	3,141,225	13,043,681	21,980,695	1,914,687	8,446,810	10,361,497
2027	2,233,163	4,485,859	6,719,022	5,853,747	3,172,638	13,174,117	22,200,502	1,933,834	8,531,279	10,465,112
2028	2,255,495	4,530,718	6,786,213	5,912,285	3,204,365	13,305,860	22,422,509	1,953,172	8,616,591	10,569,763
2029	2,278,050	4,576,024	6,854,074	5,971,407	3,236,408	13,438,918	22,646,734	1,972,704	8,702,757	10,675,461
2030	2,300,830	4,621,784	6,922,614	6,031,122	3,268,772	13,573,307	22,873,201	1,992,431	8,789,784	10,782,215
2031	2,323,839	4,668,002	6,991,841	6,091,433	3,301,460	13,709,039	23,101,931	2,012,355	8,877,683	10,890,037
2032	2,347,077	4,714,682	7,061,759	6,152,347	3,334,474	13,846,130	23,332,951	2,032,478	8,966,459	10,998,937
2033	2,370,548	4,761,829	7,132,377	6,213,871	3,367,819	13,984,592	23,566,282	2,052,803	9,056,124	11,108,927
2034	2,394,253	4,809,447	7,203,701	6,276,009	3,401,497	14,124,437	23,801,944	2,073,331	9,146,685	11,220,017
2035	2,418,196	4,857,542	7,275,738	6,338,769	3,435,512	14,265,681	24,039,963	2,094,065	9,238,152	11,332,217
<b>TOTAL</b>	<b>72,981,033</b>	<b>135,816,161</b>	<b>208,797,194</b>	<b>195,912,644</b>	<b>106,035,265</b>	<b>398,800,655</b>	<b>700,748,564</b>	<b>63,977,723</b>	<b>266,305,082</b>	<b>330,282,805</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 County Water Agency		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	463,909	25,524	231,715	1,212,178	11,269,671	26,115	31,797	1,018,767	14,279,676
2002	426,450	21,584	223,874	1,081,329	10,232,829	22,092	25,655	814,113	12,847,927
2003	495,580	25,244	242,454	1,179,751	11,286,868	25,837	30,773	946,238	14,232,745
2004	443,264	22,698	244,833	1,126,801	10,663,047	61,862	25,511	733,665	13,321,680
2005	428,851	22,009	257,865	1,017,052	10,342,726	59,906	24,461	710,771	12,863,641
2006	466,904	23,876	197,054	1,115,540	10,382,032	72,088	26,494	769,649	13,053,637
2007	528,211	26,785	236,076	1,271,678	11,716,874	82,645	27,198	866,197	14,755,664
2008	629,096	32,427	371,213	1,533,716	15,148,429	101,958	32,705	1,042,304	18,891,847
2009	515,559	26,209	333,675	1,266,525	12,721,595	83,944	26,835	846,715	15,821,057
2010	502,294	29,175	408,542	1,320,475	13,206,814	94,684	27,842	871,650	16,461,476
2011	592,423	34,676	401,076	1,625,156	15,353,119	109,895	39,662	1,033,472	19,189,479
2012	558,729	32,615	360,561	1,590,975	15,069,840	102,111	31,237	972,917	18,718,986
2013	662,986	38,846	419,303	1,745,699	16,970,309	120,313	33,139	1,157,376	21,147,970
2014	676,970	40,869	519,335	1,811,601	18,603,359	130,048	44,307	1,201,448	23,027,936
2015	640,810	41,544	559,193	1,857,582	19,124,238	132,775	46,778	1,218,587	23,621,508
2016	851,805	50,113	509,671	2,100,823	22,223,039	154,879	59,502	1,472,546	27,422,377
2017	903,457	53,195	527,732	2,113,755	23,154,705	163,865	62,783	1,562,730	28,542,221
2018	827,299	48,767	537,521	1,993,673	22,002,986	152,011	56,918	1,432,134	27,051,309
2019	835,572	49,255	542,896	2,013,610	22,223,015	153,531	57,487	1,446,455	27,321,821
2020	776,017	49,747	548,326	2,033,169	22,440,630	155,068	58,062	1,460,920	27,521,939
2021	783,777	50,245	553,809	2,053,501	22,665,036	156,618	58,643	1,475,529	27,797,158
2022	791,615	50,747	559,347	2,074,036	22,891,687	158,184	59,229	1,490,284	28,075,131
2023	799,531	51,255	564,941	2,094,777	23,120,604	159,766	59,821	1,505,187	28,355,882
2024	807,527	51,767	570,590	2,115,724	23,351,810	161,364	60,420	1,520,239	28,639,440
2025	815,602	52,285	576,296	2,136,882	23,585,328	162,978	61,024	1,535,441	28,925,835
2026	823,758	52,808	582,059	2,158,250	23,821,182	164,607	61,634	1,550,796	29,215,094
2027	831,996	53,336	587,880	2,179,833	24,059,394	166,253	62,250	1,566,304	29,507,245
2028	840,315	53,869	593,758	2,201,631	24,299,987	167,916	62,873	1,581,967	29,802,317
2029	848,719	54,408	599,696	2,223,648	24,542,987	169,595	63,502	1,597,786	30,100,340
2030	857,206	54,952	605,693	2,245,884	24,788,417	171,291	64,137	1,613,764	30,401,343
2031	865,778	55,501	611,750	2,268,343	25,036,301	173,004	64,778	1,629,902	30,705,357
2032	874,436	56,056	617,867	2,291,026	25,286,664	174,734	65,426	1,646,201	31,012,411
2033	883,180	56,617	624,046	2,313,937	25,539,531	176,481	66,080	1,662,663	31,322,535
2034	892,012	57,183	630,286	2,337,076	25,794,927	178,246	66,741	1,679,290	31,635,760
2035	900,932	57,755	636,589	2,360,447	26,052,875	180,029	67,408	1,696,082	31,952,118
TOTAL	31,170,076	1,829,665	20,329,413	79,504,278	866,340,274	4,859,846	2,040,106	58,425,348	1,064,499,005

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	1,273,435
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	4,465,310	3,774,331	1,112,041	298,168	1,833,968	80,970	3,288,822	700,851	5,757,358	1,556,095
2002	3,641,693	3,497,159	1,017,999	282,460	1,678,883	62,590	3,000,833	549,748	5,630,959	1,510,998
2003	4,072,579	3,397,378	1,124,710	298,824	1,854,860	68,137	3,299,066	609,396	6,607,077	1,606,051
2004	4,452,493	4,039,116	1,444,327	323,492	1,912,176	76,926	3,432,033	678,015	7,233,473	1,768,150
2005	3,845,027	3,557,781	5,911,881	290,137	2,253,461	67,018	2,917,966	583,286	6,816,894	1,604,225
2006	4,097,736	3,259,596	8,454,975	309,527	2,823,470	74,946	3,164,202	642,598	7,018,087	1,698,008
2007	4,498,144	4,407,837	8,681,545	330,315	2,918,263	79,048	3,355,762	684,948	8,106,566	1,904,875
2008	4,948,400	5,313,198	9,772,572	374,072	3,312,918	82,405	4,125,614	749,600	9,319,603	2,049,586
2009	4,572,492	4,489,178	8,715,176	356,348	3,003,735	78,102	3,719,031	692,391	8,978,587	1,992,333
2010	4,149,150	4,309,193	9,356,923	365,686	3,217,699	73,264	3,780,994	621,658	8,961,671	1,986,039
2011	4,887,069	4,718,025	10,784,777	415,455	3,657,422	85,854	4,328,145	762,798	9,474,247	2,175,467
2012	5,435,046	5,168,177	11,332,286	457,861	3,940,112	97,216	4,575,968	834,099	10,754,627	2,374,889
2013	6,465,539	6,127,867	12,151,055	505,244	4,393,026	113,978	5,305,928	989,069	11,856,333	2,710,971
2014	6,946,059	6,451,068	15,341,733	530,136	5,011,463	116,329	5,843,495	1,039,281	12,654,912	2,872,102
2015	7,414,297	6,991,982	14,129,598	578,884	5,122,621	126,200	6,418,984	1,092,829	13,993,866	3,127,271
2016	7,128,864	6,721,064	14,559,384	574,313	5,074,000	116,256	6,155,999	1,038,686	13,627,681	3,153,636
2017	7,191,963	6,679,561	15,488,395	613,142	5,443,278	119,445	6,455,206	1,046,815	14,438,661	3,385,469
2018	7,224,681	6,804,510	14,873,050	590,951	5,265,432	121,840	6,349,289	1,056,389	14,094,526	3,254,347
2019	7,296,927	6,872,555	15,021,781	596,860	5,318,087	123,059	6,412,782	1,066,953	14,235,473	3,286,890
2020	7,364,358	6,937,482	15,166,432	602,590	5,368,999	124,198	6,652,321	1,076,806	14,373,566	3,318,585
2021	7,438,002	7,006,857	15,318,097	608,616	5,422,689	125,440	6,718,844	1,087,574	14,517,302	3,351,771
2022	7,512,382	7,076,926	15,471,278	614,702	5,476,916	126,694	6,786,032	1,098,450	14,662,475	3,385,289
2023	7,587,506	7,147,695	15,625,990	620,849	5,531,685	127,961	6,853,893	1,109,434	14,809,100	3,419,142
2024	7,663,381	7,219,172	15,782,250	627,058	5,587,002	129,241	6,922,432	1,120,529	14,957,192	3,453,333
2025	7,740,015	7,291,364	15,940,073	633,328	5,642,872	130,533	6,991,656	1,131,734	15,106,764	3,487,866
2026	7,817,415	7,364,277	16,099,474	639,662	5,699,301	131,839	7,061,572	1,143,051	15,257,832	3,522,745
2027	7,895,589	7,437,920	16,260,468	646,058	5,756,294	133,157	7,132,188	1,154,482	15,410,409	3,557,972
2028	7,974,545	7,512,299	16,423,073	652,519	5,813,857	134,489	7,203,510	1,166,027	15,564,513	3,593,552
2029	8,054,290	7,587,422	16,587,304	659,044	5,871,995	135,834	7,275,545	1,177,687	15,720,158	3,629,488
2030	8,134,833	7,663,296	16,753,177	665,635	5,930,715	137,192	7,348,301	1,189,464	15,877,360	3,665,783
2031	8,216,182	7,739,929	16,920,709	672,291	5,990,022	138,564	7,421,784	1,201,358	16,036,134	3,702,441
2032	8,298,343	7,817,329	17,089,916	679,014	6,049,923	139,950	7,496,001	1,213,372	16,196,495	3,739,465
2033	8,381,327	7,895,502	17,260,815	685,804	6,110,422	141,349	7,570,961	1,225,506	16,358,460	3,776,860
2034	8,465,140	7,974,457	17,433,423	692,662	6,171,526	142,763	7,646,671	1,237,761	16,522,044	3,814,628
2035	8,549,791	8,054,201	17,607,757	699,589	6,233,241	144,190	7,723,138	1,250,138	16,687,265	3,852,774
TOTAL	287,742,733	248,093,720	457,002,285	22,906,978	187,059,480	4,956,665	236,227,796	41,854,976	528,641,552	125,542,119

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	964,354	82,432,338	635,349	105,310,501	0	0	0	0	0	131,060,971
2001	949,543	93,007,571	709,334	117,534,362	0	0	0	0	0	146,320,718
2002	922,505	85,447,421	657,754	107,901,003	0	0	(0)	(0)	0	143,429,837
2003	1,515,811	82,473,079	622,224	107,549,192	0	0	3,425	3,425	0	138,971,170
2004	1,437,324	99,691,395	762,917	127,251,839	0	0	3,455	3,455	0	156,098,984
2005	1,589,458	74,389,347	654,070	104,480,552	0	0	3,452	3,452	0	131,090,731
2006	1,449,902	76,901,456	605,452	110,499,957	0	0	3,881	3,881	0	137,127,843
2007	1,825,676	105,666,485	867,275	143,326,740	0	0	3,514	3,514	0	173,608,952
2008	2,472,978	114,321,313	987,541	157,829,800	0	0	5,007	5,007	0	195,760,982
2009	2,330,779	100,435,901	833,646	140,197,699	0	0	865	865	0	173,544,659
2010	2,525,591	98,856,903	793,732	138,998,502	0	0	1,082	1,082	0	176,542,558
2011	2,582,996	105,971,618	851,157	150,695,031	0	0	2,773	2,773	0	192,950,178
2012	2,595,306	119,300,543	961,622	167,827,753	0	0	1,094	1,094	0	213,108,098
2013	2,743,403	136,166,527	1,149,577	190,678,518	0	0	290	290	0	239,254,294
2014	3,144,931	147,073,338	1,181,452	208,206,299	0	0	116	116	0	258,617,682
2015	3,430,127	157,612,421	1,295,610	221,334,690	0	0	361	361	0	281,682,141
2016	3,304,332	155,602,880	1,249,048	218,306,142	0	0	117	117	0	282,341,302
2017	3,464,681	156,294,648	1,247,519	221,868,782	0	0	121	121	0	290,990,141
2018	3,422,624	156,843,526	1,276,700	221,177,866	0	0	201	201	0	284,240,343
2019	3,456,851	158,411,959	1,289,467	223,389,644	0	0	203	203	0	287,082,744
2020	3,490,703	159,919,040	1,301,583	225,696,664	0	0	205	205	0	289,953,569
2021	3,525,611	161,518,233	1,314,599	227,953,634	0	0	207	207	0	292,853,109
2022	3,560,866	163,133,414	1,327,745	230,233,168	0	0	209	209	0	295,781,639
2023	3,596,476	164,764,748	1,341,022	232,535,502	0	0	211	211	0	298,739,455
2024	3,632,441	166,412,396	1,354,432	234,860,859	0	0	213	213	0	301,726,852
2025	3,668,765	168,076,521	1,367,977	237,209,467	0	0	215	215	0	304,744,121
2026	3,705,453	169,757,285	1,381,656	239,581,561	0	0	218	218	0	307,791,560
2027	3,742,507	171,454,857	1,395,473	241,977,375	0	0	220	220	0	310,869,475
2028	3,779,931	173,169,408	1,409,428	244,397,151	0	0	222	222	0	313,978,174
2029	3,817,731	174,901,102	1,423,522	246,841,123	0	0	224	224	0	317,117,956
2030	3,855,909	176,650,114	1,437,757	249,309,535	0	0	226	226	0	320,289,135
2031	3,894,468	178,416,613	1,452,135	251,802,628	0	0	229	229	0	323,492,024
2032	3,933,412	180,200,781	1,466,656	254,320,656	0	0	231	231	0	326,726,945
2033	3,972,747	182,002,787	1,481,323	256,863,862	0	0	233	233	0	329,994,216
2034	4,012,474	183,822,815	1,496,136	259,432,500	0	0	236	236	0	333,294,157
2035	4,052,598	185,661,042	1,511,097	262,026,822	0	0	238	238	0	336,627,095
TOTAL	120,372,569	6,299,914,611	50,706,297	8,611,021,781	0	0	99,904	99,904	8,748,370	10,924,197,624

**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	404,754	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	976,678
2012	130,199	185,005	315,203	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	94,154	94,511	188,665	316,256	234,681	539,187	1,090,124	83,178	441,138	524,316
2015	41,024	48,061	89,085	196,073	159,762	414,954	770,789	48,455	171,558	220,013
2016	23,835	32,289	56,124	110,463	65,564	176,455	352,482	61,440	145,826	207,266
2017	28,961	35,519	64,480	120,793	67,765	161,344	349,902	86,228	178,026	264,254
2018	7,487	9,451	16,938	31,228	17,519	41,712	90,460	22,331	46,025	68,356
2019	7,455	9,692	17,147	31,095	17,445	41,535	90,074	22,276	45,829	68,105
2020	7,816	6,786	14,602	32,177	16,764	39,913	88,854	19,966	44,040	64,006
2021	11,549	10,028	21,577	47,547	24,771	58,978	131,296	29,503	65,076	94,579
2022	10,927	9,487	20,414	44,983	23,435	55,797	124,215	27,912	61,567	89,478
2023	8,012	6,956	14,967	32,982	17,183	40,911	91,076	20,465	45,141	65,607
2024	5,988	5,199	11,187	24,652	12,843	30,579	68,075	15,297	33,741	49,038
2025	968	841	1,809	3,986	2,076	4,944	11,006	2,473	5,455	7,928
2026	1,201	1,043	2,243	4,944	2,575	6,132	13,651	3,067	6,766	9,834
2027	1,794	1,558	3,352	7,387	3,849	9,163	20,399	4,584	10,111	14,695
2028	1,217	1,056	2,273	5,009	2,609	6,213	13,831	3,108	6,855	9,963
2029	1,210	1,051	2,261	4,983	2,596	6,181	13,759	3,092	6,820	9,911
2030	375	325	700	1,543	804	1,914	4,261	957	2,112	3,069
2031	379	329	708	1,560	813	1,936	4,309	968	2,136	3,104
2032	389	338	726	1,600	834	1,985	4,419	993	2,190	3,183
2033	386	335	720	1,587	827	1,969	4,383	985	2,172	3,157
2034	382	331	713	1,572	819	1,949	4,340	975	2,151	3,126
2035	389	338	727	1,601	834	1,986	4,422	994	2,192	3,185
<b>TOTAL</b>	<b>2,759,485</b>	<b>5,061,904</b>	<b>7,821,388</b>	<b>16,732,228</b>	<b>12,019,403</b>	<b>40,110,321</b>	<b>68,861,951</b>	<b>2,703,639</b>	<b>13,527,191</b>	<b>16,230,830</b>

<sup>a</sup> 1983 through 2014 changes are debt service only and do not include bond cover; 2015 charges and after include both debt service and bond cover.<sup>b</sup> 2009 through 2016 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	5,126,982
2010	250,194	27,117	96,128	5,774,210	40,474	16,580	488,098	6,692,800
2011	362,592	11,506	290,168	7,797,111	39,939	11,233	338,448	8,850,998
2012	139,042	16,387	281,108	5,881,018	53,747	16,121	654,940	7,042,362
2013	174,617	9,247	247,481	4,100,710	25,730	11,818	300,486	4,870,089
2014	121,526	4,345	114,780	2,206,947	10,079	7,115	151,256	2,616,048
2015	64,956	2,904	87,359	1,560,050	7,967	4,859	114,767	1,842,862
<b>2016</b>	<b>37,636</b>	<b>1,934</b>	<b>94,406</b>	<b>812,698</b>	<b>5,435</b>	<b>2,605</b>	<b>68,324</b>	<b>1,023,038</b>
2017	30,268	1,803	96,433	666,895	5,710	2,337	52,576	856,021
2018	7,825	466	24,931	172,411	1,476	604	13,592	221,306
2019	7,017	464	24,824	171,677	1,470	602	13,759	219,813
2020	6,445	446	23,935	163,679	1,412	578	13,222	209,717
2021	9,523	659	35,368	241,863	2,087	854	19,537	309,892
2022	9,010	624	33,461	228,819	1,975	808	18,484	293,180
2023	6,606	457	24,534	167,773	1,448	592	13,552	214,963
2024	4,938	342	18,338	125,402	1,082	443	10,130	160,674
2025	798	55	2,965	20,275	175	72	1,638	25,977
2026	990	69	3,677	25,147	217	89	2,031	32,220
2027	1,480	102	5,495	37,578	324	133	3,035	48,148
2028	1,003	69	3,726	25,478	220	90	2,058	32,644
2029	998	69	3,706	25,346	219	90	2,047	32,475
2030	309	21	1,148	7,849	68	28	634	10,057
2031	313	22	1,161	7,937	68	28	641	10,170
2032	321	22	1,190	8,140	70	29	658	10,430
2033	318	22	1,181	8,074	70	29	652	10,344
2034	315	22	1,169	7,994	69	28	646	10,243
2035	321	22	1,191	8,146	70	29	658	10,437
<b>TOTAL</b>	<b>9,576,428</b>	<b>430,015</b>	<b>19,291,197</b>	<b>207,164,836</b>	<b>869,291</b>	<b>609,988</b>	<b>18,125,691</b>	<b>256,067,446</b>

<sup>a</sup> 1983 through 2014 charges are debt service only and do not include bond cover; 2015 charges and after include both debt service and bond cover.<sup>b</sup> 2009 through 2016 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	1,146,582	1,187,836	1,019,693	56,607	644,456	3,804	272,454	347,218	785,752	231,441
2015	866,738	1,078,976	1,106,447	47,856	562,440	3,141	237,470	124,995	674,702	225,578
<b>2016</b>	<b>688,174</b>	<b>460,886</b>	<b>738,914</b>	<b>28,368</b>	<b>379,162</b>	<b>9,031</b>	<b>383,107</b>	<b>141,309</b>	<b>390,374</b>	<b>171,291</b>
2017	771,662	543,994	871,612	36,540	351,228	12,251	519,210	166,718	436,436	181,441
2018	199,496	140,638	225,336	9,447	90,802	3,167	134,230	43,101	112,817	46,908
2019	193,926	140,039	224,377	9,406	90,416	3,154	145,012	42,918	112,337	46,708
2020	186,315	98,059	215,618	9,039	86,886	3,031	139,592	28,066	159,902	44,885
2021	275,311	147,391	318,611	13,357	128,389	4,478	206,271	41,472	236,281	66,324
2022	260,464	142,095	301,428	12,637	121,465	4,237	195,147	39,235	223,538	62,748
2023	190,975	105,914	221,011	9,265	89,059	3,106	143,084	28,768	163,901	46,007
2024	142,744	80,619	165,194	6,925	66,567	2,322	106,948	21,503	122,508	34,388
2025	23,078	13,243	26,708	1,120	10,762	375	17,291	3,476	19,807	5,560
2026	28,625	16,588	33,127	1,389	13,349	466	21,446	4,312	24,567	6,896
2027	42,775	25,078	49,502	2,075	19,948	696	32,048	6,443	36,711	10,305
2028	29,002	17,167	33,563	1,407	13,525	472	21,729	4,369	24,890	6,987
2029	28,851	17,306	33,389	1,400	13,454	469	21,616	4,346	24,761	6,950
2030	8,935	5,420	10,340	433	4,167	145	6,694	1,346	7,668	2,152
2031	9,035	5,573	10,456	438	4,213	147	6,769	1,361	7,754	2,177
2032	9,266	5,799	10,723	450	4,321	151	6,942	1,396	7,952	2,232
2033	9,190	5,835	10,635	446	4,286	149	6,885	1,384	7,887	2,214
2034	9,100	5,860	10,531	441	4,244	148	6,818	1,371	7,810	2,192
2035	9,272	6,055	10,730	450	4,324	151	6,947	1,397	7,958	2,234
<b>TOTAL</b>	<b>98,681,364</b>	<b>55,670,208</b>	<b>93,375,256</b>	<b>2,639,392</b>	<b>83,211,654</b>	<b>755,501</b>	<b>25,554,531</b>	<b>17,076,826</b>	<b>53,253,388</b>	<b>28,920,712</b>

<sup>a</sup> 1983 through 2014 changes are debt service only and do not include bond cover; 2015 charges and after include both debt service and bond cover.<sup>b</sup> 2009 through 2016 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	93,493,811	0	0	0	0	102,494,682
2010	1,048,807	88,263,837	322,003	117,224,130	0	0	0	0	128,041,372
2011	954,501	80,381,761	225,564	100,750,481	0	0	0	0	113,077,670
2012	1,225,982	78,031,474	299,385	110,930,715	0	0	0	0	121,679,593
2013	679,437	49,351,291	144,019	63,597,885	0	0	0	0	71,469,014
2014	282,894	24,187,465	30,056	30,196,258	0	0	0	0	34,615,411
2015	71,422	17,333,632	33,322	22,366,719	0	0	0	0	25,289,468
2016	116,584	9,948,844	26,141	13,482,185	0	0	0	0	15,121,095
2017	160,753	9,291,762	28,571	13,372,177	0	0	0	0	14,906,835
2018	41,559	2,402,182	7,386	3,457,071	0	0	0	0	3,854,130
2019	41,382	2,391,957	7,355	3,448,987	0	0	0	0	3,844,127
2020	39,808	2,765,098	21,204	3,797,502	0	0	0	0	4,174,681
2021	58,822	4,085,888	31,332	5,613,927	0	0	0	0	6,171,271
2022	55,650	3,865,537	29,642	5,313,822	0	0	0	0	5,841,109
2023	40,803	2,834,262	21,734	3,897,892	0	0	0	0	4,284,505
2024	30,498	2,118,464	16,245	2,914,926	0	0	0	0	3,203,899
2025	4,931	342,506	2,626	471,485	0	0	0	0	518,205
2026	6,116	424,819	3,258	584,956	0	0	0	0	642,904
2027	9,139	634,823	4,868	874,412	0	0	0	0	961,006
2028	6,196	430,412	3,301	593,019	0	0	0	0	651,730
2029	6,164	428,177	3,283	590,167	0	0	0	0	648,573
2030	1,909	132,599	1,017	182,826	0	0	0	0	200,913
2031	1,930	134,088	1,028	184,970	0	0	0	0	203,261
2032	1,980	137,517	1,055	189,784	0	0	0	0	208,542
2033	1,964	136,390	1,046	188,312	0	0	0	0	206,917
2034	1,944	135,049	1,036	186,542	0	0	0	0	204,964
2035	1,981	137,608	1,055	190,162	0	0	0	0	208,933
<b>TOTAL</b>	<b>6,932,538</b>	<b>1,891,755,451</b>	<b>3,569,046</b>	<b>2,361,395,867</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2,710,377,482</b>

<sup>a</sup> 1983 through 2014 changes are debt service only and do not include bond cover; 2015 charges and after include both debt service and bond cover.<sup>b</sup> 2009 through 2016 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	5.2455490	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	8.1602900	8.1602900	12.7154051	20.8756951	22.9802761	31.1405661	42.7925114	55.7071376	12.9146262	12.9146262
2002	4.1814024	4.1814024	5.3026984	9.4841009	8.9411156	13.1225181	18.1280636	24.2060285	6.0779649	6.0779649
2003	4.2763134	4.2763134	7.0890449	11.3653584	12.8010554	17.0773688	19.2857827	26.0113256	6.7255429	6.7255429
2004	4.8647425	4.8647425	6.4207890	11.2855314	12.6192952	17.4840377	19.8710423	27.1446725	7.2736302	7.2736302
2005	6.2706307	6.2706307	7.7072717	13.9779078	18.6144338	24.8850645	25.9513933	34.0659604	8.1145672	8.1145672
2006	5.4259377	5.4259377	6.2412600	11.6671976	18.2458557	23.6717934	22.8226972	29.6194124	6.7967153	6.7967153
2007	7.7481995	7.7481995	8.1940071	15.9422067	22.7693199	30.5175194	31.5881575	40.8058706	9.2177131	9.2177131
2008	7.7434247	7.7434247	10.0432111	17.7866358	21.9357373	29.6791620	28.5412232	40.8837064	12.3424832	12.3424832
2009	5.2590911	5.2590911	6.7156363	11.9747274	14.4114406	19.6705318	21.3496746	27.2815091	5.9318345	5.9318345
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	6.7443017	6.7443017	9.3125578	16.0568595	18.7336085	25.4779103	30.5977819	40.8377335	10.2399516	10.2399516
2013	8.9808695	8.9808695	10.6929288	19.6737983	25.8161011	34.7969706	36.4803531	49.5437029	13.0633498	13.0633498
2014	10.8118856	10.8118856	14.9566537	25.7685394	32.5421126	43.3539982	45.1167933	64.6569002	19.5401069	19.5401069
2015	9.3600052	9.3600052	16.2854556	25.6454609	27.0678967	36.4279019	47.0334573	64.2864381	17.2529807	17.2529807
2016	9.5158835	9.5158835	18.5408964	28.0567799	24.0443387	33.5602222	41.2415424	56.1414975	14.8999552	14.8999552
2017	10.0286552	10.0286552	19.5399605	29.5686157	25.3399952	35.3686477	43.6214047	59.4974668	15.8760621	15.8760621
2018	12.7130448	12.7130448	25.0543433	37.7673882	52.0828532	64.7958981	44.3440928	65.4183669	21.0742741	21.0742741
2019	12.7130384	12.7130384	25.0543331	37.7673715	53.5871744	66.3002128	44.3440928	60.1463946	15.8023018	15.8023018
2020	12.7130529	12.7130529	25.0543401	37.7673930	38.0558553	50.7689083	44.3913940	56.5489269	12.1575329	12.1575329
2021	12.7130529	12.7130529	25.0543401	37.7673930	38.0558553	50.7689083	44.3913940	62.8436972	18.4523033	18.4523033
2022	12.7130529	12.7130529	25.0543401	37.7673930	38.0558553	50.7689083	44.3913940	60.0409092	15.6495153	15.6495153
2023	12.7130529	12.7130529	25.0543401	37.7673930	38.0558553	50.7689083	44.3913940	59.4888900	15.0974961	15.0974961
2024	12.7130529	12.7130529	25.0543401	37.7673930	38.0558553	50.7689083	44.3913940	59.2557210	14.8643271	14.8643271
2025	12.7130529	12.7130529	25.0543401	37.7673930	38.0558553	50.7689083	44.3913940	61.8455229	17.4541289	17.4541289
2026	12.7130529	12.7130529	25.0543401	37.7673930	38.0558553	50.7689083	44.3913940	54.6694847	10.2780907	10.2780907
2027	12.7130529	12.7130529	25.0543401	37.7673930	38.0558553	50.7689083	44.3913940	61.9007373	17.5093433	17.5093433
2028	12.7130529	12.7130529	25.0543401	37.7673930	38.0558553	50.7689083	44.3913940	61.5122253	17.1208313	17.1208313
2029	12.7130529	12.7130529	25.0543401	37.7673930	38.0558553	50.7689083	44.3913940	59.8291841	15.4377902	15.4377902
2030	12.7130529	12.7130529	25.0543401	37.7673930	38.0558553	50.7689083	44.3913940	58.6326482	14.2412542	14.2412542
2031	12.7130529	12.7130529	25.0543401	37.7673930	38.0558553	50.7689083	44.3913940	62.5086024	18.1172084	18.1172084
2032	12.7130529	12.7130529	25.0543401	37.7673930	38.0558553	50.7689083	44.3913940	58.4855263	14.0941324	14.0941324
2033	12.7130529	12.7130529	25.0543401	37.7673930	38.0558553	50.7689083	44.3913940	59.8607439	15.4693500	15.4693500
2034	12.7130529	12.7130529	25.0543401	37.7673930	38.0558553	50.7689083	44.3913940	59.6036506	15.2122566	15.2122566
2035	12.7130529	12.7130529	25.0543401	37.7673930	38.0558553	50.7689083	44.3913940	67.8276638	23.4362699	23.4362699

<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	16.6021692	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	6.1343832	19.0490094	11.3027410	30.3517504	12.3948170	42.7465674	28.6469272	71.3934946	107.2174491	178.6109437
2002	2.6241510	8.7021160	4.6014508	13.3035668	5.0195661	18.3231329	11.6145173	29.9376502	43.1568537	73.0945038
2003	3.1187013	9.8442442	5.5847117	15.4289558	6.0840995	21.5130553	14.1510803	35.6641356	52.6132143	88.2773499
2004	3.3308089	10.6044391	5.8670952	16.4715343	6.3736692	22.8452035	14.8467069	37.6919104	55.1954594	92.8873698
2005	3.8324300	11.9469971	6.8775341	18.8245313	7.4552855	26.2798167	17.3347271	43.6145438	62.0848835	105.6994272
2006	3.1056782	9.9023935	5.7702305	15.6726240	6.2099396	21.8825636	14.5146252	36.3971888	46.2231736	82.6203624
2007	4.5076811	13.7253943	8.0673172	21.7927115	8.7338488	30.5265603	20.2484542	50.7750145	68.4882058	119.2632203
2008	4.7702825	17.1127657	8.8812836	25.9940493	10.3274543	36.3215036	21.5446500	57.8661536	68.9751071	126.8412607
2009	3.1166784	9.0485129	5.7183849	14.7668978	6.3297758	21.0966736	13.9581785	35.0548521	63.7367254	98.7915775
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	4.5996912	14.8396429	7.9710073	22.8106502	8.7219517	31.5326019	20.0870070	51.6196088	71.4239038	123.0435126
2013	5.6290238	18.6923736	9.6561172	28.3484908	10.5207121	38.8692029	24.3880323	63.2572352	87.3593462	150.6165814
2014	8.3165333	27.8566402	13.6132756	41.4699157	15.0322081	56.5021238	34.3518138	90.8539376	124.9813306	215.8352682
2015	5.6381437	22.8911245	9.9683662	32.8594907	11.0951730	43.9546637	26.6874881	70.6421517	99.2781464	169.9202981
2016	6.6166178	21.5165729	11.8341680	33.3507409	12.8080463	46.1587873	29.6983143	75.8571015	110.3682322	186.2253337
2017	7.0508843	22.9269464	12.6833674	35.6103138	13.7376351	49.3479489	31.8641301	81.2120790	118.4411659	199.6532449
2018	8.0476267	29.1219008	14.8994117	44.0213125	16.2154596	60.2367721	37.6624662	97.8992383	140.2615440	238.1607823
2019	7.6070964	23.4093982	13.6113893	37.0207876	14.7372472	51.7580348	34.1651591	85.9231939	127.0032607	212.9264546
2020	7.6760932	19.8336261	13.8374032	33.6710293	14.9966556	48.6676849	34.7788402	83.4465251	129.3345309	212.7810559
2021	7.6400327	26.0923360	13.7467830	39.8391189	14.8935406	54.7326595	34.5356041	89.2682636	128.4172986	217.6855622
2022	7.6859628	23.3354770	13.8624812	37.1979595	15.0252162	52.2231754	34.8462318	87.0694072	129.5887304	216.6581376
2023	7.7366716	22.8341677	13.9907118	36.8248795	15.1712748	51.9961543	35.1908930	87.1870473	130.8888343	218.0758816
2024	7.6386582	22.5029853	13.7437842	36.2467695	14.8901553	51.1369248	34.5276415	85.6645662	128.3873456	214.0519118
2025	7.7156654	25.1697944	13.9376484	39.1074427	15.1108260	54.2182687	35.0482413	89.2665100	130.3507129	219.6172228
2026	7.5968454	17.8749361	13.6394926	31.5144287	14.7715908	46.2860195	34.2480537	80.5340732	127.3333080	207.8673812
2027	7.7332513	25.2425946	13.9821428	39.2247373	15.1615167	54.3862540	35.1678677	89.5541217	130.8019833	220.3561050
2028	7.6350317	24.7558630	13.7351229	38.4909859	14.8803286	53.3713144	34.5044868	87.8758013	128.3001034	216.1759047
2029	7.7043343	23.1421245	13.9092251	37.0513496	15.0784639	52.1298134	34.9718876	87.1017011	130.0627356	217.1644366
2030	7.6080025	21.8492567	13.6678578	35.5171145	14.8038627	50.3209772	34.3241739	84.6451511	127.6203491	212.2655002
2031	8.0055318	26.1227402	14.6793563	40.8020964	15.9578466	56.7599430	37.0488667	93.8088097	132.9031974	231.7120071
2032	7.4103281	21.5044604	13.1806476	34.6851080	14.2510692	48.9361772	33.0215517	81.9577288	127.7124344	204.6701633
2033	7.9953842	23.4647342	14.6524117	38.1171458	15.9269614	54.0441072	36.9758191	91.0199264	137.6271272	228.6470536
2034	7.4581031	22.6703597	13.2982678	35.9686276	14.3843873	50.3530149	33.3355932	83.6886081	123.8952983	207.5839064
2035	8.5570064	31.9932763	16.1488945	48.1421709	17.6492893	65.7914601	41.0553980	106.8468582	153.0641892	259.9110474

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	34.3977175	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	173.9657329	30.0511278	204.0168607	-5.7699537	198.2469070	-30.9018397	167.3450673
2002	-5.4660286	67.6284752	12.9716035	80.6000788	-6.4072101	74.1928686	-30.1661590	44.0267096
2003	-3.3142156	84.9631342	15.4233965	100.3865308	-7.1779336	93.2085971	-30.3892607	62.8193365
2004	-5.5767140	87.3106558	16.2223266	103.5329825	-7.4292488	96.1037337	-30.2389380	65.8647957
2005	-5.5017080	100.1977192	17.9085490	118.1062682	-6.6110924	111.4951759	-30.2939296	81.2012463
2006	-3.1387155	79.4816469	13.4499174	92.9315643	-5.4976224	87.4339418	-29.8005787	57.6333631
2007	-2.7809944	116.4822259	20.0616686	136.5438944	-6.1785168	130.3653777	-30.0961198	100.2692579
2008	-5.4028716	121.4383890	19.4924166	140.9308056	-6.0198040	134.9110016	-30.7631237	104.1478779
2009	-6.3446583	92.4469192	21.4683104	113.9152296	-5.4878080	108.4274216	-33.3163093	75.1111123
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	120.3213922	21.0845829	141.4059752	-11.4254128	129.9805624	-30.6216868	99.3588756
2013	-3.7638094	146.8527720	25.8527160	172.7054880	-10.3251093	162.3803787	-30.7664075	131.6139712
2014	-8.1796355	207.6556327	38.4493037	246.1049364	-7.8612074	238.2437290	-29.6636049	208.5801241
2015	-8.1994440	161.7208542	34.3800388	196.1008930	-10.0136409	186.0872521	-26.1589671	159.9282850
2016	<b>-9.6862754</b>	<b>176.5390583</b>	<b>32.5394737</b>	<b>209.0785320</b>	<b>-14.6100320</b>	<b>194.4685000</b>	<b>-28.1976827</b>	<b>166.2708174</b>
2017	-9.6822992	189.9709458	34.8173673	224.7883131	-14.6366937	210.1516194	-28.2644105	181.8872089
2018	-11.2763686	226.8844137	39.8261216	266.7105353	-17.7587032	248.9518321	-32.8481373	216.1036947
2019	-10.1307040	202.7957506	34.9619286	237.7576792	-15.5461209	222.2115583	-30.8439128	191.3676455
2020	-10.2430285	202.5380274	35.9333056	238.4713330	-15.7485588	222.7227741	-31.0861440	191.6366301
2021	-10.2399727	207.4455895	35.8392180	243.2848075	-15.7049463	227.5798613	-30.4351394	197.1447219
2022	-11.8667229	204.7914147	35.9350848	240.7264994	-15.7493837	224.9771158	-29.9116009	195.0655149
2023	-12.0532981	206.0225835	36.5754628	242.5980463	-16.0465721	226.5514742	-30.7405757	195.8108985
2024	-11.5733608	202.4785510	34.9419185	237.4204695	-15.2896809	222.1307886	-30.3951255	191.7356631
2025	-11.9670278	207.6501950	36.2761512	243.9263463	-15.9075900	228.0187563	-30.2481371	197.7706191
2026	-11.6674704	196.1999108	35.2668975	231.4668803	-15.4399409	216.0268674	-30.5650504	185.4618170
2027	-11.9009620	208.4551430	36.0515715	244.5067145	-15.8033970	228.7033174	-30.3923815	198.3109360
2028	-11.7764516	204.3994531	35.6289866	240.0284397	-15.6075449	224.4208947	-30.6233221	193.7975726
2029	-11.8342595	205.3301771	35.8304534	241.1606305	-15.7008843	225.4597463	-30.3111861	195.1485601
2030	-11.7227917	200.5427085	35.4472394	235.9899479	-15.5233930	220.4665548	-30.4092294	190.0573254
2031	-12.2128469	219.4991602	37.1149396	256.6140998	-16.2974094	240.3166903	-30.4951500	209.8215403
2032	-11.3148737	193.3552896	34.0785125	227.4338021	-14.8912300	212.5425721	-29.7289089	182.8136632
2033	-12.3035227	216.3435309	37.4253501	253.7688810	-16.4419378	237.3269431	-31.3297872	205.9971560
2034	-11.4908262	196.0930803	34.6637532	230.7568334	-15.1611910	215.5956424	-29.6276939	185.9679485
2035	-12.4510056	247.4600418	37.9372714	285.3973132	-16.6806058	268.7167074	-31.6531333	237.0635741



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	0	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	13.5378957	192.1488394
2002	0	0	0	0	0	0	4.8843428	77.9788467
2003	0	0	0	0	0	0	6.1234299	94.4007798
2004	20.6831806	86.5479763	21.4551370	108.0031133	8.6683948	116.6715081	6.4696645	99.3570343
2005	18.8666468	100.0678930	17.9350642	118.0029572	3.6760116	121.6789688	7.3193186	113.0187458
2006	17.3897441	75.0231072	21.4927481	96.5158553	22.6369517	119.1528070	5.2194188	87.8397812
2007	21.9298225	122.1990804	29.0324109	151.2314914	80.7105085	231.9419998	8.1304808	127.3937011
2008	18.0876867	122.2355646	24.2694996	146.5050642	9.9988388	156.5039030	8.5510566	135.3923172
2009	17.5640201	92.6751324	23.7996137	116.4747460	3.9628873	120.4376333	6.9091824	105.7007598
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	18.4033555	117.7622310	25.9376167	143.6998477	4.3842080	148.0840557	8.4704707	131.5139833
2013	23.6571946	155.2711657	32.4739501	187.7451159	7.3095342	195.0546500	10.3450098	160.9615912
2014	32.1493549	240.7294789	46.3997993	287.1292782	10.2958267	297.4251050	14.8075917	230.6428599
2015	63.8012140	223.7294990	77.3219736	301.0514725	11.1985816	312.2500541	10.0573598	179.9776579
2016	46.2498073	212.5206247	57.7192678	270.2398925	11.8943497	282.1342422	12.8470306	199.0723642
2017	49.4348748	231.3220837	61.6943160	293.0163996	12.7134328	305.7298325	13.8494775	213.5027224
2018	50.2828516	266.3865463	62.7525048	329.1390512	12.9315565	342.0706077	15.9995364	254.1603187
2019	50.2828516	241.6504971	62.7525048	304.4030020	12.9315565	317.3345585	14.6290553	227.5555098
2020	50.2828516	241.9194817	62.7525048	304.6719866	12.9315464	317.6035329	15.0570990	227.8381549
2021	50.2828516	247.4275735	62.7525048	310.1800784	12.9315464	323.1116247	14.8335356	232.5190978
2022	50.2828516	245.3483665	62.7525048	308.1008714	12.9315464	321.0324177	15.1352367	231.7933743
2023	50.2828516	246.0937501	62.7525048	308.8462550	12.9315464	321.7778013	15.1432246	233.2191062
2024	50.2828516	242.0185147	62.7525048	304.7710196	12.9315464	317.7025659	15.3990920	229.4510038
2025	50.2828516	248.0534707	62.7525048	310.8059756	12.9315464	323.7375219	15.1607842	234.7780070
2026	50.2828516	235.7446686	62.7525048	298.4971735	12.9315464	311.4287198	14.8527173	222.7200985
2027	50.2828516	248.5937876	62.7525048	311.3462925	12.9315464	324.2778388	15.4421892	235.7982942
2028	50.2828516	244.0804242	62.7525048	306.8329291	12.9315464	319.7644754	14.9275285	231.1034332
2029	50.2828516	245.4314117	62.7525048	308.1839166	12.9315464	321.1154629	15.3501547	232.5145913
2030	50.2828516	240.3401770	62.7525048	303.0926819	12.9315464	316.0242282	14.8307432	227.0962434
2031	50.2828516	260.1043919	62.7525048	322.8568968	12.9315464	335.7884431	17.0604258	248.7724329
2032	50.2828516	233.0965148	62.7525048	295.8490197	12.9315464	308.7805660	14.1694139	218.8395772
2033	50.2828516	256.2800076	62.7525048	319.0325125	12.9315464	331.9640588	16.7429110	245.3899646
2034	50.2828516	236.2508001	62.7525048	299.0033050	12.9315464	311.9348513	14.1782225	221.7621289
2035	50.2828516	287.3464257	62.7525048	350.0989306	12.9315464	363.0304769	22.4936702	282.4047176

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 & 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	175.4139091	-29.2914159	146.1224931	12.3494291	31.3984385	93.4183473	124.8167859
2002	-13.2004543	64.7783923	-23.7780808	41.0003115	5.4523570	14.1544730	42.2356453	56.3901183
2003	-13.9757172	80.4250626	-23.8496317	56.5754309	6.2991088	16.1433530	48.5398873	64.6832403
2004	-14.1574758	85.1995585	-25.2967499	59.9028086	6.4579356	17.0623746	52.5252064	69.5875810
2005	-14.2938796	98.7248662	-24.7472457	73.9776205	8.2000395	20.1470366	62.1218210	82.2688576
2006	-14.0865037	73.7532775	-23.8861273	49.8671502	7.3537028	17.2560963	51.8001830	69.0562794
2007	-12.5169061	114.8767950	-25.0603889	89.8164061	9.9178810	23.6432753	73.3256647	96.9689400
2008	-13.8809446	121.5113727	-29.0198140	92.4915586	10.4927688	27.6055345	79.3590236	106.9645581
2009	-10.4812491	95.2195107	-25.6776114	69.5418993	6.8234223	15.8719352	63.2802119	79.1521471
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	117.6157058	-25.6245942	91.9911117	8.9322643	23.7719071	84.1388940	107.9108011
2013	-14.3636831	146.5979081	-25.5768325	121.0210756	12.2758874	30.9682610	94.4754307	125.4436917
2014	-13.8501107	216.7927492	-26.1248467	190.6679025	16.5452635	44.4019037	105.5874232	149.9893269
2015	-9.5070050	170.4706529	-16.0232032	154.4474497	19.9512238	42.8423483	154.3655108	197.2078591
2016	-13.5979285	185.4744358	-22.6624105	162.8120252	12.9705352	34.4871081	116.3653407	150.8524488
2017	-13.8072887	199.6954337	-23.1033537	176.5920799	13.6676352	36.5945816	122.5081158	159.1026974
2018	-15.5172542	238.6430645	-25.1480111	213.4950534	8.8475124	37.9694132	136.2112109	174.1806242
2019	-14.2191794	213.3363305	-22.9435935	190.3927370	8.8491410	32.2585392	136.2112338	168.4697730
2020	-14.5906910	213.2474639	-23.6182939	189.6291699	8.4771795	28.3108055	136.2112245	164.5220300
2021	-14.3714497	218.1476480	-23.2593917	194.8882563	8.4771795	34.5695154	136.2112245	170.7807400
2022	-14.7118974	217.0814769	-23.7429243	193.3385525	8.4771795	31.8126575	136.2112245	168.0238820
2023	-14.7161654	218.5029409	-23.7553889	194.7475520	8.4771795	31.3113471	136.2112245	167.5225716
2024	-14.9694008	214.4816030	-24.1656995	190.3159035	8.4771795	30.9801647	136.2112245	167.1913892
2025	-14.6844037	220.0936034	-23.7828148	196.3107886	8.4771795	33.6469738	136.2112245	169.8581983
2026	-14.3876216	208.3324769	-23.2885319	185.0439450	8.4771795	26.3521155	136.2112245	162.5633401
2027	-14.9601339	220.8381603	-24.2340229	196.6041374	8.4771795	33.7197740	136.2112245	169.9309985
2028	-14.5049251	216.5985081	-23.4080124	193.1904957	8.4771795	33.2330424	136.2112245	169.4442670
2029	-14.9179504	217.5966409	-24.0857073	193.5109336	8.4771795	31.6193039	136.2112245	167.8305285
2030	-14.4111385	212.6851049	-23.2523334	189.4327715	8.4771795	30.3264361	136.2112245	166.5376606
2031	-16.5266991	232.2457338	-26.8372338	205.4085000	8.4771795	34.5999196	136.2112245	170.8111442
2032	-13.7212275	205.1183497	-22.1928873	182.9254624	8.4771795	29.9816399	136.2112245	166.1928644
2033	-16.2738531	229.1161115	-26.3242701	202.7918414	8.4771795	31.9419137	136.2112245	168.1531382
2034	-13.7369394	208.0251895	-22.2064219	185.8187676	8.4771795	31.1475392	136.2112245	167.3587637
2035	-21.8356579	260.5690597	-35.6707528	224.8983070	8.4771795	40.4704558	136.2112245	176.6816803

## 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	291,009	533,196	824,204	1,699,115	1,002,951	2,485,566	5,187,632	534,590	2,364,779	2,899,369
2002	90,217	265,799	356,016	1,067,733	640,899	1,453,943	3,162,575	245,579	1,558,397	1,803,976
2003	130,522	263,508	394,031	1,076,994	647,813	2,301,227	4,026,034	288,034	1,744,378	2,032,412
2004	141,378	353,878	495,256	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	1,483,820	849,103	2,494,396	4,827,319	349,725	1,920,484	2,270,209
2006	181,883	313,938	498,821	1,297,386	734,802	2,170,785	4,202,973	290,658	1,607,285	1,897,943
2007	331,757	604,136	935,893	1,609,116	898,803	2,701,539	5,209,459	366,155	2,689,918	3,056,073
2008	393,877	525,604	919,481	1,562,449	765,191	1,934,855	4,262,495	363,893	1,967,399	2,331,293
2009	214,280	273,704	487,984	848,100	503,984	1,561,191	2,913,275	300,845	1,222,946	1,523,792
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	2,371,040	2,794,085
2012	251,967	317,489	569,456	1,727,866	655,705	2,352,928	4,736,500	425,600	2,101,455	2,527,055
2013	435,377	528,979	964,356	2,147,563	1,096,444	3,132,498	6,376,504	461,758	2,260,244	2,722,003
2014	594,139	397,108	991,247	1,538,951	1,199,142	2,151,590	4,889,683	478,247	2,495,277	2,973,524
2015	397,774	289,798	687,571	1,924,716	1,770,287	3,890,679	7,585,682	735,191	1,987,066	2,722,257
2016	535,722	638,768	1,174,489	2,525,183	1,414,766	3,368,490	7,308,439	1,990,498	4,117,065	6,107,563
2017	564,590	692,493	1,257,083	2,676,814	1,499,336	3,569,848	7,745,998	2,103,179	4,342,231	6,445,409
2018	1,034,337	909,700	1,944,037	2,964,721	1,648,543	3,925,102	8,538,366	2,306,500	4,753,738	7,060,237
2019	1,058,350	936,996	1,995,347	2,707,288	1,515,689	3,608,784	7,831,761	2,234,920	4,597,877	6,832,797
2020	884,141	681,493	1,565,633	2,735,328	1,425,033	3,392,936	7,553,297	2,035,631	4,490,135	6,525,766
2021	884,141	681,493	1,565,633	3,039,812	1,583,661	3,770,622	8,394,095	2,113,070	4,660,948	6,774,018
2022	884,141	681,493	1,565,633	2,904,239	1,513,031	3,602,455	8,019,724	2,078,959	4,585,708	6,664,667
2023	884,141	681,493	1,565,633	2,877,537	1,499,120	3,569,333	7,945,991	2,072,757	4,572,026	6,644,783
2024	884,141	681,493	1,565,633	2,866,258	1,493,244	3,555,343	7,914,846	2,068,659	4,562,987	6,631,646
2025	884,141	681,493	1,565,633	2,991,530	1,558,507	3,710,731	8,260,768	2,101,655	4,635,770	6,737,425
2026	884,141	681,493	1,565,633	2,644,418	1,377,671	3,280,169	7,302,258	2,011,396	4,436,679	6,448,075
2027	884,141	681,493	1,565,633	2,994,201	1,559,899	3,714,044	8,268,143	2,102,556	4,637,757	6,740,313
2028	884,141	681,493	1,565,633	2,975,408	1,550,108	3,690,734	8,216,249	2,096,534	4,624,473	6,721,007
2029	884,141	681,493	1,565,633	2,893,997	1,507,695	3,589,751	7,991,444	2,076,567	4,580,431	6,656,998
2030	884,141	681,493	1,565,633	2,836,120	1,477,543	3,517,959	7,831,621	2,060,570	4,545,146	6,605,716
2031	884,141	681,493	1,565,633	3,023,604	1,575,217	3,750,516	8,349,337	2,113,446	4,661,778	6,775,224
2032	884,141	681,493	1,565,633	2,829,003	1,473,835	3,509,132	7,811,970	2,056,304	4,535,736	6,592,040
2033	884,141	681,493	1,565,633	2,895,524	1,508,491	3,591,645	7,995,659	2,080,559	4,589,235	6,669,794
2034	884,141	681,493	1,565,633	2,883,088	1,502,012	3,576,219	7,961,319	2,070,730	4,567,555	6,638,285
2035	884,141	681,493	1,565,633	3,280,892	1,709,257	4,069,660	9,059,809	2,186,082	4,821,996	7,008,079
TOTAL	22,154,313	20,421,910	42,576,223	84,294,297	47,662,940	125,691,615	257,648,852	48,009,155	122,188,470	170,197,624

<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 County Water Agency		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	798,192	25,907	0	158,497	12,014,718	29,716	46,389	1,134,597	14,208,016
2002	425,664	12,226	0	183,569	8,013,780	24,836	29,691	839,772	9,529,537
2003	453,642	14,136	0	493,526	9,967,640	36,345	28,691	1,041,925	12,035,906
2004	520,466	37,773	0	1,406,702	8,942,327	96,002	33,670	861,689	11,898,629
2005	977,608	45,805	0	836,728	17,643,720	236,622	34,032	1,672,604	21,447,118
2006	713,765	32,500	0	987,951	13,704,881	94,370	28,832	1,071,508	16,633,806
2007	619,496	28,604	0	771,240	12,099,181	79,352	32,880	1,195,249	14,826,000
2008	379,458	16,206	0	755,740	7,692,385	65,645	24,500	580,191	9,514,124
2009	191,997	9,356	0	66,165	5,151,721	30,684	11,822	333,020	5,794,766
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	271,773	33,270	0	535,091	11,604,550	109,888	32,850	1,324,499	13,911,922
2013	505,554	29,291	0	633,337	12,187,267	86,826	36,839	824,896	14,304,010
2014	521,154	14,374	0	216	7,040,511	34,949	29,701	248,715	7,889,619
2015	309,135	14,513	0	64,141	8,885,733	56,032	35,748	400,457	9,765,759
<b>2016</b>	<b>650,123</b>	<b>38,730</b>	<b>0</b>	<b>2,041,588</b>	<b>14,155,217</b>	<b>122,501</b>	<b>50,958</b>	<b>1,129,254</b>	<b>18,188,372</b>
2017	692,738	41,269	0	2,178,275	15,091,061	130,502	54,296	1,203,275	19,391,415
2018	879,918	52,419	0	2,727,518	18,478,923	164,207	72,074	1,528,405	23,903,464
2019	636,993	42,137	0	2,246,577	15,273,339	132,314	54,044	1,248,962	19,634,366
2020	515,793	35,701	0	1,984,399	13,333,314	112,282	41,579	1,058,183	17,081,251
2021	678,557	46,966	0	2,467,719	16,519,139	147,225	63,107	1,392,104	21,314,817
2022	606,862	42,004	0	2,257,371	15,131,045	131,833	53,521	1,245,018	19,467,654
2023	593,825	41,102	0	2,222,725	14,900,154	129,034	51,633	1,218,271	19,156,745
2024	585,213	40,505	0	2,188,691	14,681,050	127,185	50,836	1,200,602	18,874,082
2025	654,566	45,306	0	2,402,442	16,085,173	142,074	59,693	1,342,884	20,732,138
2026	464,856	32,175	0	1,825,545	12,290,904	101,347	35,151	953,681	15,703,659
2027	656,459	45,437	0	2,409,596	16,131,375	142,481	59,882	1,346,768	20,791,997
2028	643,801	44,561	0	2,363,472	15,832,626	139,763	58,553	1,320,800	20,403,576
2029	601,834	41,656	0	2,243,917	15,041,447	130,754	52,797	1,234,702	19,347,106
2030	568,212	39,329	0	2,135,342	14,331,162	123,536	48,705	1,165,723	18,412,009
2031	679,348	47,021	0	2,501,499	16,722,109	147,395	61,961	1,393,727	21,553,059
2032	559,245	38,708	0	2,092,229	14,057,025	121,611	48,202	1,147,327	18,064,347
2033	610,224	42,237	0	2,294,034	15,355,975	132,555	52,905	1,251,914	19,739,843
2034	589,565	40,807	0	2,186,767	14,677,438	128,120	52,026	1,209,532	18,884,255
2035	832,017	57,588	0	3,007,628	20,023,953	180,170	80,152	1,706,937	25,888,444
<b>TOTAL</b>	<b>24,659,937</b>	<b>1,439,368</b>	<b>0</b>	<b>61,457,772</b>	<b>549,211,402</b>	<b>4,069,958</b>	<b>1,837,341</b>	<b>46,719,029</b>	<b>689,394,807</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 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	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	(335,712)	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	10,903,954	4,524,978	1,522,840	209,547	2,511,849	0	862,786	1,813,941	4,432,636	394,934
2002	3,940,463	1,972,885	737,668	102,480	1,216,898	0	332,517	1,250,856	3,146,931	1,094,108
2003	5,100,252	3,697,251	907,300	145,685	1,496,294	0	1,429,261	981,069	1,640,401	1,377,879
2004	5,219,257	3,252,472	1,018,599	192,784	1,395,675	0	1,344,311	1,061,872	3,812,710	826,010
2005	5,994,930	3,011,974	3,452,596	89,977	3,986,088	0	1,580,563	1,173,516	2,654,316	1,135,518
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	9,354,020	4,229,387	7,342,517	230,486	3,031,541	0	6,165,737	2,219,401	6,077,048	403,483
2008	5,826,272	3,777,613	4,821,845	114,405	2,609,529	3,036	3,532,800	1,731,104	4,058,313	751,115
2009	4,129,052	2,572,155	3,429,618	96,928	1,371,754	3,883	3,238,898	1,417,954	3,447,345	865,256
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	1,231,555	3,592,673	2,392,706
2012	10,145,380	3,559,732	11,623,954	81,108	4,481,185	0	1,562,432	2,010,009	9,855,244	2,191,658
2013	7,496,436	5,744,912	8,449,038	222,136	2,736,386	0	1,258,884	1,551,793	4,720,167	1,217,692
2014	3,633,825	5,091,116	2,545,143	296,754	635,961	0	841,005	1,745,280	2,511,021	250,179
2015	4,867,528	9,042,339	7,064,032	449,587	1,783,200	4,852	1,576,388	499,394	4,270,424	921,187
2016	15,345,557	9,299,823	13,802,141	676,750	5,561,759	243,624	10,265,162	3,315,404	6,910,215	2,873,160
2017	16,513,097	10,086,940	15,098,457	731,328	6,084,127	262,160	11,042,074	3,567,654	7,560,142	3,143,011
2018	19,721,599	12,194,837	17,938,768	866,352	7,228,669	313,100	13,066,129	4,260,889	8,981,270	3,734,272
2019	17,208,688	10,875,233	15,885,428	773,296	6,401,248	279,858	12,649,118	3,808,504	7,953,239	3,306,833
2020	17,183,326	7,873,729	15,907,757	775,075	6,410,245	279,502	12,674,830	2,588,436	11,805,233	3,311,481
2021	17,599,684	8,326,779	16,364,983	791,978	6,594,491	286,275	12,934,657	2,651,155	12,144,142	3,406,661
2022	17,374,504	8,370,958	16,192,388	782,920	6,524,941	282,612	12,796,330	2,617,234	12,016,010	3,370,732
2023	17,478,956	8,558,559	16,254,263	788,399	6,549,875	284,311	12,893,919	2,632,969	12,062,111	3,383,612
2024	17,178,280	8,518,453	15,915,977	773,015	6,413,558	279,420	12,623,230	2,587,676	11,811,150	3,313,192
2025	17,617,043	8,950,469	16,416,939	793,505	6,615,427	286,557	12,967,007	2,653,769	12,182,624	3,417,476
2026	16,645,600	8,443,795	15,395,185	751,774	6,203,698	270,756	12,300,802	2,507,435	11,424,976	3,204,780
2027	17,685,334	9,152,763	16,461,791	795,888	6,633,501	287,668	12,999,417	2,664,057	12,215,923	3,426,813
2028	17,341,250	9,078,052	16,087,137	780,985	6,482,529	282,071	12,760,270	2,612,225	11,938,141	3,348,822
2029	17,420,212	9,192,752	16,199,282	784,600	6,527,719	283,356	12,820,251	2,624,120	12,021,226	3,372,167
2030	17,014,043	9,091,330	15,776,659	767,224	6,357,418	276,749	12,543,596	2,562,936	11,707,835	3,284,191
2031	18,622,309	10,042,113	17,417,286	836,302	7,018,531	302,909	13,646,362	2,805,199	12,924,543	3,625,716
2032	16,404,263	9,058,878	15,175,362	739,648	6,115,117	266,830	12,089,510	2,471,081	11,261,739	3,159,020
2033	18,354,585	10,179,175	17,099,824	825,898	6,890,605	298,554	13,491,482	2,764,870	12,689,331	3,559,631
2034	16,636,537	9,469,945	15,437,199	750,273	6,220,628	270,608	12,265,599	2,506,070	11,455,890	3,213,526
2035	20,994,510	11,641,650	19,678,647	935,134	7,929,777	341,495	15,193,014	3,162,539	14,601,863	4,096,459
TOTAL	475,496,143	244,916,506	403,631,446	19,028,915	174,653,600	6,033,846	289,113,002	81,155,536	289,008,952	84,348,692

<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	160,786,985	270,327	188,234,777	0	0	0	0	0	211,353,998
2002	0	59,840,151	279,773	73,974,657	0	0	0	0	0	88,826,761
2003	7,287	94,319,637	358,004	111,460,319	0	0	0	0	0	129,948,701
2004	98,121	107,170,733	416,866	125,809,409	0	0	0	0	0	144,124,482
2005	84,202	113,937,486	123,173	137,224,336	0	0	0	0	0	166,351,199
2006	431,163	82,219,262	92,254	108,521,373	0	0	0	0	0	131,754,915
2007	609,382	137,454,206	316,813	177,434,021	0	0	0	0	0	201,461,445
2008	729,026	83,471,257	408,742	111,835,057	0	0	0	0	0	128,862,449
2009	752,587	60,622,818	351,466	82,299,715	0	0	0	0	0	93,019,531
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	168,814,228	0	0	0	0	0	200,397,197
2012	1,630,405	103,759,549	481,155	151,381,811	0	0	0	0	0	173,126,743
2013	1,842,291	108,546,539	407,094	144,193,369	0	0	0	0	0	168,560,242
2014	1,499,958	69,452,660	17,732	88,520,633	0	0	0	0	0	105,264,706
2015	572,354	84,895,970	164,542	116,111,798	0	0	0	0	0	136,873,068
<b>2016</b>	<b>2,916,659</b>	<b>159,435,141</b>	<b>531,268</b>	<b>231,176,663</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>263,955,526</b>
2017	3,160,762	167,959,641	573,442	245,782,834	0	0	0	0	0	280,622,740
2018	3,537,761	201,806,248	688,015	294,337,910	0	0	0	0	0	335,784,015
2019	3,281,001	178,718,289	614,542	261,755,278	0	0	0	0	0	298,049,547
2020	3,287,931	212,223,310	1,751,301	296,072,158	0	0	0	0	0	328,798,106
2021	3,345,105	218,440,530	1,797,955	304,684,395	0	0	0	0	0	342,732,959
2022	3,323,523	216,303,460	1,784,921	301,740,535	0	0	0	0	0	337,458,213
2023	3,331,260	217,453,517	1,797,626	303,469,376	0	0	0	0	0	338,782,528
2024	3,288,959	212,737,927	1,758,516	297,199,356	0	0	0	0	0	332,185,564
2025	3,351,602	219,510,745	1,811,747	306,574,910	0	0	0	0	0	343,870,875
2026	3,223,837	206,122,156	1,709,411	288,204,206	0	0	0	0	0	319,223,831
2027	3,357,211	219,985,187	1,815,240	307,480,791	0	0	0	0	0	344,846,878
2028	3,310,362	215,529,485	1,782,956	301,334,283	0	0	0	0	0	338,240,748
2029	3,324,385	216,434,316	1,787,120	302,791,507	0	0	0	0	0	338,352,688
2030	3,271,538	211,262,453	1,748,842	295,664,813	0	0	0	0	0	330,079,792
2031	3,476,691	231,385,812	1,899,399	324,003,171	0	0	0	0	0	362,246,424
2032	3,196,349	203,596,950	1,688,274	285,223,020	0	0	0	0	0	319,257,011
2033	3,436,993	227,667,361	1,874,879	319,133,189	0	0	0	0	0	355,104,119
2034	3,229,090	207,004,326	1,714,339	290,174,032	0	0	0	0	0	325,223,525
2035	3,759,463	257,815,977	2,091,502	362,242,030	0	0	0	0	0	405,763,996
<b>TOTAL</b>	<b>77,326,663</b>	<b>5,671,696,270</b>	<b>35,877,234</b>	<b>7,852,286,805</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>9,012,104,311</b>

<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)

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	663,900	603,483	1,985,220	3,252,603	115,961	229,807	345,768
1969	254,715	0	254,715	787,499	539,340	2,083,253	3,410,093	185,156	358,861	544,017
1970	277,547	0	277,547	823,295	532,567	2,202,767	3,558,629	200,150	387,675	587,825
1971	227,474	0	227,474	788,456	552,113	2,169,897	3,510,466	202,413	392,912	595,325
1972	224,978	0	224,978	830,315	678,520	2,320,421	3,829,256	209,057	406,589	615,646
1973	221,091	31,366	252,457	795,641	549,393	2,338,620	3,683,653	206,557	402,724	609,281
1974	240,498	32,938	273,437	819,512	564,593	2,506,358	3,890,463	208,545	407,090	615,635
1975	237,459	36,291	273,750	869,535	605,731	2,409,923	3,885,189	225,895	439,873	665,768
1976	271,292	40,836	312,127	960,380	734,812	2,500,506	4,195,697	228,976	447,299	676,275
1977	293,627	45,096	338,723	924,655	713,558	2,476,399	4,114,612	238,699	468,721	707,420
1978	273,870	49,178	323,048	980,127	692,587	2,785,987	4,458,701	245,331	484,259	729,590
1979	289,479	53,340	342,819	1,045,425	736,358	2,813,578	4,595,362	243,110	483,437	726,547
1980	310,846	67,748	378,594	1,163,573	866,372	3,028,204	5,058,149	269,858	537,074	806,932
1981	347,781	87,408	435,189	1,129,393	879,357	2,917,582	4,926,332	288,997	586,257	875,254
1982	438,335	106,918	545,254	1,167,421	850,483	3,262,104	5,280,008	290,049	582,757	872,806
1983	354,787	151,259	506,046	1,179,133	900,363	3,795,446	5,874,942	319,214	633,181	952,395
1984	467,336	224,245	691,581	1,471,373	1,097,480	5,737,801	8,306,655	351,620	695,559	1,047,179
1985	736,074	364,305	1,100,379	1,921,956	1,789,369	6,551,546	10,262,871	394,593	776,994	1,171,586
1986	1,084,728	692,479	1,777,207	1,749,297	1,528,732	6,863,230	10,141,259	385,545	762,684	1,148,229
1987	1,773,801	1,559,243	3,333,044	2,239,297	2,011,876	6,675,355	10,926,528	385,289	812,310	1,197,599
1988	2,231,563	2,333,792	4,565,355	2,241,061	2,210,523	6,368,850	10,820,434	420,153	978,621	1,398,774
1989	2,397,272	3,326,436	5,723,708	2,157,464	1,872,030	5,916,714	9,946,208	414,224	1,162,723	1,576,947
1990	2,746,135	3,433,320	6,179,455	2,576,862	2,261,914	6,668,440	11,507,216	487,609	1,234,409	1,722,018
1991	2,748,636	3,682,311	6,430,947	1,756,490	1,621,188	4,527,928	7,905,606	491,419	1,476,387	1,967,806
1992	2,554,528	3,528,958	6,083,486	2,077,671	2,003,328	5,385,858	9,466,857	551,042	1,491,156	2,042,198
1993	2,592,888	3,504,240	6,097,128	2,882,913	2,011,222	6,511,865	11,406,000	610,115	1,675,438	2,285,553
1994	2,718,329	3,537,459	6,255,788	2,909,664	2,642,460	7,314,515	12,866,638	767,900	2,473,449	3,241,348
1995	2,649,273	3,509,935	6,159,208	3,038,025	2,289,027	5,893,667	11,220,719	995,341	4,977,122	5,972,462
1996	2,699,210	3,891,715	6,590,926	2,587,167	2,137,443	6,675,492	11,400,101	1,837,384	13,766,531	15,603,915
1997	2,641,891	3,631,175	6,273,066	2,660,424	2,007,332	6,551,469	11,219,225	2,294,917	21,860,553	24,155,470
1998	2,538,764	3,478,062	6,016,827	2,266,820	2,064,166	6,296,050	10,627,036	2,976,896	26,690,793	29,667,689
1999	2,689,372	3,841,375	6,530,748	2,888,141	2,450,078	8,373,830	13,712,050	3,031,213	27,471,599	30,502,813
2000	2,832,886	4,308,518	7,141,404	3,919,990	2,304,770	7,033,063	13,257,822	2,947,330	27,838,836	30,786,166
2001	3,351,852	4,918,643	8,270,494	7,418,067	2,809,700	8,486,220	18,713,987	3,508,832	30,022,872	33,531,704
2002	3,554,907	5,049,045	8,603,952	7,050,733	2,777,653	9,920,357	23,548,742	3,212,688	29,615,606	32,828,294
2003	3,667,312	5,392,993	9,060,305	7,511,532	2,508,757	8,734,370	18,754,660	3,295,051	29,873,047	33,168,097
2004	4,144,297	5,618,796	9,763,093	5,714,795	2,814,607	8,207,840	16,737,242	3,306,731	30,299,978	33,606,709
2005	3,503,535	5,130,254	8,633,788	5,733,974	2,969,167	8,984,783	17,687,924	3,431,351	30,409,640	33,840,990
2006	3,416,972	4,640,384	8,057,356	5,683,749	2,954,826	9,089,376	17,727,951	3,274,782	30,064,414	33,339,196
2007	3,594,702	5,091,010	8,685,712	6,802,369	3,506,988	10,421,418	20,730,775	3,421,040	31,228,860	34,649,901
2008	4,309,214	5,068,768	9,377,982	7,642,932	3,794,837	10,576,591	22,014,360	3,924,429	32,523,307	36,447,736
2009	4,753,056	5,123,363	9,876,419	6,523,966	3,304,137	10,277,970	20,106,073	3,724,099	30,854,625	34,578,725
2010	5,003,573	6,539,316	11,542,889	7,456,916	3,692,609	11,230,515	22,380,041	4,093,258	33,095,488	37,188,746
2011	5,374,192	6,918,604	12,292,797	8,656,181	4,323,673	12,911,162	25,891,017	4,149,987	34,017,022	38,167,009
2012	5,813,740	6,865,677	12,679,417	9,470,012	4,300,209	15,066,091	28,836,312	4,192,742	34,518,520	38,711,262
2013	5,475,849	6,643,626	12,119,475	10,363,414	5,068,181	15,121,525	30,553,120	4,430,235	35,955,159	40,385,394
2014	6,093,093	7,186,473	13,279,566	10,036,019	5,300,867	15,089,103	30,425,989	4,252,062	33,091,908	37,343,970
2015	5,861,520	7,150,669	13,012,189	9,977,308	6,109,294	20,690,242	36,776,843	5,031,161	36,630,972	41,662,134
2016	6,147,231	7,782,909	13,930,140	11,348,880	6,050,119	22,187,729	39,586,728	5,850,367	35,414,141	41,264,508
2017	6,278,806	8,082,872	14,361,677	12,327,112	6,234,854	24,812,407	43,374,373	6,023,504	35,888,901	41,912,404
2018	6,546,137	8,103,934	14,650,071	11,654,798	6,148,629	20,581,810	38,385,236	6,273,585	37,237,690	43,511,275
2019	6,545,999	8,184,445	14,730,444	11,376,151	6,027,096	20,327,750	37,730,996	6,205,384	37,132,176	43,337,559
2020	6,390,301	7,971,673	14,361,974	11,435,642	5,957,109	20,210,436	37,603,187	6,019,902	37,097,068	43,116,969
2021	6,412,446	8,017,013	14,429,458	11,804,046	6,150,885	20,724,794	38,679,726	6,122,796	37,363,517	43,486,314
2022	6,431,299	8,058,731	14,490,030	11,721,809	6,109,118	20,676,224	38,507,150	6,104,611	37,362,422	43,467,033
2023	6,448,489	8,065,348	14,513,837	11,739,721	6,119,844	20,753,548	38,613,113	6,109,205	37,412,454	43,521,659
2024	6,464,646	8,105,066	14,569,713	11,776,168	6,140,002	20,855,018	38,771,188	6,117,657	37,471,702	43,589,360
2025	6,471,686	8,140,670	14,612,356	11,935,252	6,224,048	21,108,914	39,268,214	6,155,325	37,595,877	43,751,202
2026	6,488,466	8,180,092	14,668,558	11,645,008	6,074,007	20,806,576	38,525,591	6,083,866	37,478,601	43,562,467
2027	6,507,798	8,220,588	14,728,386	12,052,205	6,287,155	21,368,337	39,707,697	6,193,977	37,760,849	43,954,825
2028	6,525,813	8,260,686	14,786,499	12,085,563	6,305,554	21,467,026	39,858,142	6,200,300	37,816,139	44,016,439
2029	6,544,324	8,301,619	14,845,943	12,057,252	6,291,810	21,490,162	39,839,223	6,198,758	37,852,940	44,051,698
2030	6,555,112	8,331,192	14,886,304	12,051,452	6,290,042	21,542,856	39,884,350	6,199,185	37,893,574	44,092,760
2031	6,562,708	8,356,347	14,919,056	12,287,782	6,414,079	21,895,652	40,597,513	6,266,737	38,074,553	44,341,290
2032	6,572,659	8,382,091	14,954,750	12,156,652	6,347,254	21,794,751	40,298,656	6,230,529	38,044,229	44,274,758
2033	6,564,067	8,381,784	14,945,852	12,283,442	6,414,824	22,014,331	40,712,597	6,274,891	38,190,375	44,465,267
2034	6,514,673	8,352,783	14,867,455	12,320,706	6,435,317	22,121,454	40,877,477	6,283,941	38,253,618	44,537,559
2035	6,390,479	8,254,581	14,645,061	12,767,453	6,669,413	22,738,252	42,175,118	6,418,240	38,594,081	45,012,320
TOTAL	239,835,683	300,421,992	540,257,675	416,749,093	228,065,235	760,574,878	1,405,389,206	203,705,209	1,375,767,310	1,579,472,519

<sup>a</sup> Capital charges repaid through bond debt service prior to 2014 exclude bond cover; 2015 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 County Water Agency		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	186,740	9,016	54,588	445,439	1,553,679	13,770	11,777	210,704	2,485,712
1969	182,349	7,966	87,576	525,094	2,411,191	12,625	10,797	363,872	3,601,471
1970	204,572	14,733	94,675	573,998	2,938,124	12,790	13,342	298,769	4,151,002
1971	201,180	15,691	95,695	605,889	3,854,298	17,763	14,659	454,215	5,259,389
1972	224,059	16,559	98,788	631,615	5,040,349	15,220	21,163	1,098,293	7,146,046
1973	206,947	12,630	97,550	639,250	4,980,524	15,483	11,990	515,701	6,380,075
1974	288,628	12,599	98,460	698,247	5,289,750	15,590	13,104	608,870	7,025,249
1975	356,861	13,544	106,703	715,606	6,423,975	16,620	14,797	741,783	8,389,888
1976	310,246	14,090	108,084	774,291	6,783,833	16,993	16,511	574,216	8,598,264
1977	272,138	11,200	112,554	797,859	6,966,590	18,457	14,263	520,682	8,713,743
1978	361,352	4,441	115,521	890,945	8,430,090	18,921	18,321	515,021	10,354,612
1979	392,349	13,937	114,253	896,194	9,565,460	20,202	25,262	965,126	11,992,782
1980	413,891	12,287	125,950	888,893	10,133,465	20,749	24,795	749,570	12,369,600
1981	477,382	30,128	134,169	1,079,315	11,590,437	24,939	23,334	921,602	14,281,307
1982	471,891	13,278	135,057	1,004,667	12,433,875	22,955	22,817	759,675	14,864,215
1983	645,406	14,872	149,202	1,027,258	15,654,372	39,971	29,502	429,692	17,990,276
1984	918,340	15,286	164,505	2,063,179	23,792,889	54,427	60,087	794,644	27,863,358
1985	1,107,130	87,847	184,905	2,350,593	28,110,802	69,483	70,626	2,178,418	34,159,805
1986	1,271,611	34,303	180,445	2,365,159	30,683,218	80,769	76,505	2,198,929	36,890,939
1987	1,130,430	51,098	179,872	2,804,776	29,497,358	78,018	74,761	2,258,608	36,074,921
1988	1,116,281	61,893	193,735	2,750,424	29,420,530	74,168	60,655	2,216,918	35,894,603
1989	1,152,043	49,575	187,913	2,435,635	29,490,010	67,048	69,138	2,460,984	35,912,346
1990	870,529	34,737	221,392	2,541,316	27,613,380	51,058	49,576	1,889,232	33,271,218
1991	591,830	23,642	220,282	2,055,250	17,812,772	27,930	27,345	1,249,797	22,008,848
1992	961,982	39,478	241,455	2,369,788	26,110,893	55,795	51,399	1,926,937	31,757,728
1993	1,174,272	54,005	264,959	2,799,482	31,625,062	72,889	70,082	2,660,525	38,721,276
1994	1,029,362	44,131	306,359	2,808,829	29,500,873	60,460	57,849	2,136,455	35,944,317
1995	1,526,050	46,989	304,297	3,499,611	36,624,428	88,875	80,672	2,790,565	44,961,488
1996	1,355,019	48,621	389,203	3,560,139	36,601,316	86,092	74,320	4,336,456	46,451,166
1997	1,396,548	25,778	276,681	3,107,763	32,770,981	36,715	69,180	1,690,533	39,374,179
1998	1,240,432	34,733	381,847	2,654,434	29,527,385	41,835	60,476	1,820,777	35,761,918
1999	1,234,817	56,178	369,935	3,062,825	31,645,759	75,476	65,772	4,183,776	40,694,538
2000	1,073,299	38,376	302,623	2,320,236	26,675,285	61,957	55,333	2,807,199	33,334,309
2001	1,760,997	63,623	328,030	2,240,137	34,314,115	80,532	102,260	3,093,080	41,982,774
2002	1,326,474	43,981	320,646	2,331,452	29,126,163	73,388	78,365	2,566,461	35,866,931
2003	1,395,464	48,911	340,169	2,741,431	31,962,534	89,688	79,620	2,886,068	39,543,885
2004	1,452,788	78,294	342,218	3,752,287	30,588,821	234,455	82,240	2,399,641	38,930,745
2005	2,042,655	88,251	355,402	2,974,622	41,665,738	418,648	81,792	3,450,138	51,077,246
2006	1,789,700	75,118	294,943	3,271,535	37,644,915	251,983	79,137	2,797,828	46,205,158
2007	1,658,445	69,777	334,031	3,053,065	35,547,793	233,743	82,554	2,951,778	43,931,186
2008	1,514,291	62,150	469,403	3,441,437	34,840,215	247,062	80,732	2,429,232	43,084,520
2009	1,209,810	50,012	432,428	2,171,510	30,461,489	191,122	62,504	2,018,715	36,597,591
2010	1,479,868	110,900	507,508	2,352,005	36,743,128	255,538	88,425	2,708,317	44,245,689
2011	2,171,882	81,314	502,474	3,410,915	50,889,534	301,060	92,557	2,709,239	60,158,975
2012	1,251,459	87,903	465,436	3,196,902	40,449,997	313,879	92,460	3,437,114	49,295,150
2013	1,625,072	83,014	525,804	3,423,194	41,152,876	281,189	94,047	2,767,517	49,952,713
2014	1,590,421	65,218	628,028	2,754,610	35,745,406	224,178	93,375	2,077,970	43,179,204
2015	1,268,899	64,591	671,581	2,793,630	37,847,964	246,780	99,638	2,210,363	45,203,446
<b>2016</b>	<b>1,817,773</b>	<b>96,407</b>	<b>625,792</b>	<b>4,997,732</b>	<b>45,468,896</b>	<b>334,015</b>	<b>125,317</b>	<b>3,146,675</b>	<b>56,612,607</b>
2017	1,904,672	101,897	643,962	5,080,213	47,190,603	353,116	131,667	3,295,131	58,701,261
2018	1,993,252	107,283	638,216	5,360,657	48,932,262	362,414	141,848	3,450,682	60,986,615
2019	1,757,792	97,486	636,846	4,868,845	45,945,972	331,895	124,385	3,185,727	56,948,946
2020	1,554,098	91,524	641,510	4,608,550	44,215,565	313,425	112,471	3,008,876	54,546,019
2021	1,727,701	103,500	646,042	5,108,697	47,703,980	350,481	134,856	3,363,722	59,138,978
2022	1,663,330	99,005	651,326	4,916,594	46,529,493	336,590	125,811	3,230,337	57,552,485
2023	1,655,806	98,443	656,889	4,898,254	46,466,473	334,945	124,299	3,213,562	57,448,670
2024	1,653,520	98,244	662,165	4,882,310	46,436,204	334,346	123,951	3,207,521	57,398,260
2025	1,726,809	103,276	667,308	5,101,308	47,968,717	349,900	133,041	3,356,514	59,406,873
2026	1,545,447	90,681	672,804	4,544,446	44,415,175	310,803	109,126	2,983,060	54,671,541
2027	1,745,777	104,505	677,982	5,148,961	48,506,289	353,629	134,517	3,392,658	60,064,318
2028	1,740,963	104,129	681,427	5,120,816	48,436,034	352,364	133,768	3,381,375	59,950,876
2029	1,707,394	101,763	687,050	5,020,162	47,887,722	344,966	128,640	3,311,087	59,188,784
2030	1,681,570	99,932	692,758	4,928,185	47,405,370	339,222	125,121	3,256,673	58,528,831
2031	1,801,281	108,174	697,228	5,298,478	50,044,290	364,386	139,019	3,500,821	61,953,678
2032	1,689,844	100,417	703,336	4,914,264	47,629,771	340,348	125,908	3,270,737	58,774,625
2033	1,749,565	104,505	709,178	5,134,058	49,181,522	352,906	131,266	3,391,780	60,754,780
2034	1,737,735	103,642	714,801	5,043,586	48,758,301	350,086	131,047	3,366,018	60,205,216
2035	1,989,113	120,995	720,376	5,878,797	54,362,916	403,684	159,841	3,880,229	67,515,950
<b>TOTAL</b>	<b>82,727,630</b>	<b>4,072,504</b>	<b>26,091,380</b>	<b>202,986,155</b>	<b>2,114,019,197</b>	<b>11,742,807</b>	<b>5,245,814</b>	<b>155,925,185</b>	<b>2,602,810,672</b>

<sup>a</sup> Capital charges repaid through bond debt service prior to 2014 exclude bond cover; 2015 and after includes both bond debt service and bond cover.

TABLE B-19 Total 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	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	478,732	218,649	41,509	265,168	12,870	336,069	95,466	782,163	208,927
1969	1,090,136	725,506	334,105	61,226	394,024	18,693	500,365	138,063	1,205,834	321,755
1970	1,420,639	905,643	470,423	89,700	552,223	25,231	691,825	184,837	1,778,187	467,573
1971	1,760,670	1,089,908	627,331	128,360	754,065	31,837	931,125	231,280	2,538,219	659,414
1972	2,084,699	1,309,576	777,838	181,206	971,501	42,404	1,194,587	274,599	3,388,734	865,095
1973	2,177,324	1,325,991	920,218	183,713	1,184,696	43,482	1,261,172	287,315	3,971,543	946,686
1974	2,241,780	1,385,741	938,860	193,283	1,212,205	45,212	1,294,799	292,071	3,998,510	990,064
1975	2,419,858	1,454,353	983,580	206,040	1,280,804	48,490	1,364,081	304,281	4,159,094	1,088,341
1976	2,773,862	1,449,980	1,032,075	215,084	1,356,888	51,463	1,407,793	313,685	4,299,592	1,141,598
1977	2,717,286	1,519,418	929,532	226,032	1,194,916	47,348	1,480,723	329,365	4,553,831	1,197,216
1978	3,035,392	1,604,678	1,111,606	231,040	1,470,658	47,118	1,481,850	321,681	4,460,167	1,208,720
1979	3,589,381	1,639,725	1,180,841	237,955	1,569,175	48,396	1,610,607	332,472	4,422,382	1,152,375
1980	4,136,480	1,721,848	1,271,861	259,401	1,730,656	53,348	1,731,255	360,461	4,835,652	1,269,447
1981	4,469,204	1,975,999	1,355,504	271,181	1,850,802	77,806	1,857,044	391,869	5,224,182	1,357,680
1982	4,031,426	2,068,128	1,403,332	280,313	1,936,175	55,961	2,052,526	406,891	5,410,876	1,565,182
1983	5,224,176	2,330,891	1,997,502	333,081	2,880,959	69,381	2,128,897	494,688	6,020,929	1,556,652
1984	7,262,706	3,372,924	3,084,372	445,339	4,608,046	75,773	2,358,816	553,321	7,049,449	2,331,849
1985	8,979,937	3,757,786	3,882,496	540,388	5,883,196	79,232	2,470,631	759,052	7,740,359	2,378,394
1986	8,880,068	4,325,830	4,308,841	577,474	6,571,197	102,400	2,580,868	1,000,062	7,857,569	3,047,741
1987	8,897,753	4,166,936	4,164,707	604,982	6,418,841	211,809	2,614,265	1,026,398	9,224,608	3,034,142
1988	8,373,323	4,230,672	4,163,832	615,999	6,482,143	124,667	2,669,575	779,820	9,505,259	2,828,998
1989	8,750,651	4,110,883	3,808,646	586,595	5,952,262	170,570	2,617,580	1,442,627	8,944,266	2,930,395
1990	10,040,074	4,551,623	4,487,886	620,394	7,014,185	289,349	2,816,013	1,639,830	9,795,019	3,678,107
1991	6,542,001	3,520,555	2,996,131	567,450	4,550,559	175,137	3,575,955	1,294,608	8,921,839	3,035,638
1992	8,644,005	4,478,121	3,068,616	470,165	4,667,984	121,335	4,377,909	1,129,578	8,573,361	2,980,091
1993	9,028,570	4,109,536	3,267,678	472,817	4,993,632	157,747	4,257,472	1,347,511	9,505,683	3,320,012
1994	11,216,190	4,721,748	3,313,737	554,651	5,066,159	225,809	5,251,362	1,698,990	10,209,083	4,076,706
1995	10,817,875	4,979,587	4,087,603	509,163	6,340,703	155,561	4,339,589	1,527,248	9,443,228	3,715,377
1996	11,187,158	5,167,667	7,025,782	553,232	11,183,947	150,612	4,407,184	1,867,203	9,869,329	3,807,422
1997	11,437,950	4,934,388	6,588,591	579,281	7,422,990	144,833	4,711,437	1,869,307	11,268,380	4,037,862
1998	9,956,830	4,562,855	5,663,864	546,645	5,928,447	146,074	5,747,794	1,474,029	11,192,751	3,321,115
1999	11,473,042	4,986,389	4,648,108	637,393	6,003,270	146,909	5,986,000	1,853,582	12,338,933	4,177,208
2000	10,596,779	6,833,740	3,071,454	594,291	4,377,827	115,173	5,757,395	1,448,385	11,883,970	3,253,760
2001	20,766,919	12,535,366	4,127,214	800,509	6,393,709	127,899	6,467,771	3,367,303	17,922,957	3,401,358
2002	11,992,252	9,676,046	3,358,627	759,256	5,125,678	109,693	5,582,613	2,738,192	18,764,978	4,783,414
2003	13,369,623	11,277,397	3,481,466	729,928	5,326,569	115,385	7,247,851	2,277,556	17,180,763	4,952,499
2004	14,234,136	11,797,406	4,112,566	829,290	5,365,685	124,126	7,357,187	2,517,621	21,507,075	4,389,756
2005	14,640,645	10,845,456	17,793,865	654,158	10,284,315	114,286	7,158,894	2,567,009	19,557,919	4,653,763
2006	16,097,587	9,959,706	27,280,362	634,528	9,869,329	122,413	9,853,821	2,488,821	19,284,021	4,670,138
2007	19,629,080	13,368,791	26,153,214	882,338	9,375,945	126,855	13,681,665	4,029,039	25,528,702	3,844,288
2008	17,125,208	15,279,720	25,682,198	807,551	10,276,862	135,378	12,006,160	3,949,478	25,629,860	4,795,803
2009	14,863,319	12,972,579	23,329,904	781,844	8,144,259	133,487	11,670,341	3,680,208	25,432,067	5,265,461
2010	17,574,675	12,738,981	31,876,599	692,878	11,010,008	122,330	14,019,306	3,028,186	27,884,736	6,797,719
2011	23,805,830	12,327,787	33,223,830	747,890	11,917,134	135,879	7,551,798	2,975,712	24,994,788	7,456,458
2012	23,903,738	14,341,792	39,645,423	849,034	14,195,991	147,724	9,278,270	4,350,243	38,187,440	7,683,709
2013	19,432,620	17,147,426	32,132,724	1,071,908	10,926,385	167,614	9,384,140	3,490,169	29,548,120	5,977,303
2014	14,681,887	15,735,512	27,235,478	1,153,120	8,737,054	170,450	9,323,342	3,567,681	29,406,024	4,838,253
2015	16,112,779	20,127,797	30,781,564	1,347,855	9,945,530	184,736	10,632,595	2,154,572	34,645,920	5,774,688
<b>2016</b>	<b>26,137,941</b>	<b>19,532,778</b>	<b>38,303,645</b>	<b>1,551,897</b>	<b>13,595,008</b>	<b>419,620</b>	<b>19,217,717</b>	<b>4,934,792</b>	<b>38,127,596</b>	<b>7,707,404</b>
2017	27,352,544	20,317,520	41,149,496	1,648,642	14,492,881	442,814	20,379,168	5,206,850	41,128,732	8,200,262
2018	29,860,073	21,965,408	43,269,648	1,725,673	15,221,557	484,321	21,823,063	5,763,193	42,437,488	8,493,858
2019	27,220,196	20,537,597	41,670,981	1,626,878	14,422,430	448,906	21,363,475	5,292,767	41,588,382	8,042,721
2020	27,026,493	17,456,801	42,740,159	1,612,668	14,502,805	444,776	21,516,324	4,028,745	45,746,222	8,076,833
2021	27,437,649	18,054,979	43,390,413	1,610,808	14,650,169	450,489	21,729,889	4,087,314	45,823,478	8,109,910
2022	27,244,636	18,104,716	42,564,730	1,594,756	14,467,830	447,159	21,579,022	4,057,504	45,499,734	8,026,418
2023	27,409,150	18,388,466	42,103,731	1,603,001	14,437,733	449,727	21,711,835	4,081,336	45,578,509	8,043,566
2024	27,214,312	18,399,481	41,846,996	1,591,565	14,346,138	446,567	21,516,786	4,051,373	45,420,055	7,995,870
2025	27,635,764	18,851,627	42,302,677	1,610,952	14,532,989	453,440	21,839,480	4,114,490	45,795,030	8,094,867
2026	26,733,390	18,402,964	41,342,874	1,573,132	14,151,162	438,781	21,224,630	3,978,289	45,115,101	7,897,610
2027	27,853,989	19,176,475	42,511,905	1,622,494	14,624,148	457,048	21,988,888	4,146,867	46,022,844	8,145,543
2028	27,564,381	19,140,397	42,246,698	1,612,067	14,512,157	452,368	21,799,882	4,102,989	45,857,223	8,091,893
2029	27,706,904	19,292,046	42,490,570	1,621,068	14,604,861	454,728	21,921,400	4,124,308	46,073,976	8,145,445
2030	27,342,393	19,177,397	42,184,184	1,608,206	14,473,960	448,852	21,691,679	4,069,387	45,880,140	8,083,444
2031	28,933,092	20,061,914	43,853,848	1,678,182	15,142,038	474,733	22,806,007	4,309,398	47,151,771	8,433,737
2032	26,805,968	19,104,799	41,794,202	1,588,713	14,304,324	440,175	21,334,774	3,988,960	45,656,854	8,006,340
2033	28,756,417	20,230,754	43,807,943	1,677,731	15,105,885	471,961	22,774,239	4,284,207	47,173,954	8,424,553
2034	27,012,451	19,558,267	42,205,267	1,603,068	14,450,835	443,660	21,575,920	4,023,658	45,995,726	8,086,570
2035	31,374,803	21,788,190	46,537,322	1,790,530	16,187,342	514,588	24,546,247	4,682,634	49,228,298	8,986,126
<b>TOTAL</b>	<b>1,019,733,496</b>	<b>687,864,226</b>	<b>1,265,955,553</b>	<b>57,957,012</b>	<b>553,498,365</b>	<b>14,449,260</b>	<b>663,789,886</b>	<b>162,086,555</b>	<b>1,502,084,925</b>	<b>314,576,489</b>

<sup>a</sup> Capital charges repaid through bond debt service prior to 2014 exclude bond cover; 2015 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	18,783,554	0	0	564	564	46,945	25,043,774
1969	198,764	23,153,064	215,209	28,356,745	0	0	3,191	3,191	52,963	36,223,194
1970	289,633	30,617,164	273,605	37,766,682	0	0	15,121	15,121	69,744	46,426,550
1971	409,327	39,958,997	342,425	49,462,959	0	0	16,001	16,001	55,532	59,127,146
1972	537,186	52,948,599	422,304	64,998,328	0	0	17,372	17,372	80,412	76,912,038
1973	587,963	57,273,225	435,655	70,598,982	0	0	17,334	17,334	54,219	81,596,002
1974	611,428	61,776,466	455,565	75,435,985	0	0	17,477	17,477	76,783	87,335,029
1975	644,621	66,756,784	478,403	81,188,731	0	0	18,406	18,406	84,547	94,506,278
1976	668,315	68,485,047	475,587	83,670,969	0	0	17,477	17,477	106,717	97,577,527
1977	696,515	66,234,179	507,063	81,633,424	0	0	18,232	18,232	98,618	95,624,771
1978	709,040	72,934,779	523,177	89,139,905	0	0	17,381	17,381	100,786	105,124,022
1979	712,866	72,666,594	526,405	89,689,173	0	0	20,579	20,579	119,352	107,486,614
1980	777,981	79,926,555	571,232	98,646,179	0	0	17,761	17,761	178,812	117,456,027
1981	806,031	91,261,394	636,404	111,535,098	0	0	21,193	21,193	185,347	132,259,720
1982	853,400	93,144,741	670,375	113,879,325	0	0	28,423	28,423	173,894	135,643,924
1983	952,131	101,787,700	803,591	126,580,578	0	0	19,276	19,276	220,926	152,144,438
1984	1,072,639	137,507,077	868,967	170,591,278	0	0	21,114	21,114	225,959	208,747,125
1985	1,120,854	172,916,230	908,769	211,417,322	0	0	20,239	20,239	340,322	258,472,523
1986	1,149,714	193,242,026	937,311	234,581,100	0	0	20,139	20,139	279,227	284,838,100
1987	1,172,015	178,764,439	908,034	221,208,928	0	0	19,742	19,742	345,116	273,105,878
1988	1,208,206	190,243,523	904,868	232,130,885	0	0	17,900	17,900	365,207	285,193,158
1989	1,194,911	193,235,261	932,599	234,677,246	0	0	19,158	19,158	422,329	288,277,941
1990	1,297,621	239,540,417	1,486,755	287,257,273	0	0	18,148	18,148	474,284	340,429,612
1991	1,354,921	179,950,983	1,141,118	217,626,895	0	0	21,018	21,018	214,683	256,175,802
1992	1,349,184	196,166,977	1,025,285	237,052,612	0	0	18,014	18,014	443,676	286,864,570
1993	1,507,550	169,493,328	1,068,135	212,529,672	0	0	20,999	20,999	599,571	271,660,200
1994	1,497,753	209,282,955	1,008,952	258,124,095	0	0	19,649	19,649	609,966	317,061,802
1995	1,520,622	173,420,265	1,061,324	221,918,142	0	0	20,277	20,277	534,971	290,787,267
1996	1,527,165	181,404,029	1,103,254	239,253,985	0	0	25,378	25,378	571,857	319,897,328
1997	1,730,348	186,736,527	1,216,560	242,678,452	0	0	24,820	24,820	428,638	324,153,850
1998	1,920,021	168,571,967	1,237,386	220,269,778	0	0	0	0	465,095	302,808,343
1999	2,167,221	191,636,505	1,264,332	247,318,893	0	0	(0)	(0)	584,116	339,343,156
2000	2,399,072	185,238,178	1,321,281	236,891,306	0	0	0	0	0	321,411,007
2001	3,320,689	376,941,797	1,621,187	457,794,677	0	0	0	0	0	560,293,637
2002	4,666,551	264,616,282	1,648,493	333,822,075	0	0	(0)	(0)	0	434,669,993
2003	5,926,796	292,937,782	1,668,829	366,492,444	0	0	20,800	20,800	0	467,040,191
2004	6,248,465	340,001,928	1,909,852	420,395,093	0	0	20,830	20,830	0	519,453,712
2005	6,522,109	312,900,406	1,398,392	409,091,217	0	0	20,827	20,827	0	520,351,993
2006	7,002,949	288,510,776	1,330,209	397,104,657	0	0	21,256	21,256	0	502,455,574
2007	7,652,944	373,884,110	1,871,726	500,028,697	0	0	20,890	20,890	0	608,047,161
2008	8,923,040	339,952,083	2,268,900	466,832,242	0	0	22,383	22,383	0	577,779,224
2009	9,188,552	303,246,814	2,073,978	420,782,815	0	0	18,241	18,241	0	521,959,865
2010	10,247,440	350,432,514	2,107,740	488,533,111	0	0	18,459	18,459	0	603,908,935
2011	11,013,959	391,435,564	2,093,803	529,680,433	0	0	20,150	20,150	0	666,210,381
2012	11,824,250	374,749,918	2,336,818	541,494,350	0	0	18,471	18,471	0	671,034,961
2013	12,503,571	368,076,025	2,298,331	512,156,336	0	0	17,667	17,667	0	645,184,705
2014	14,969,725	315,849,958	1,825,415	447,493,901	0	0	17,493	17,493	0	571,740,123
2015	16,717,624	335,458,167	2,090,069	485,973,897	0	0	17,333	17,333	0	622,645,842
<b>2016</b>	<b>20,714,292</b>	<b>402,568,132</b>	<b>2,408,165</b>	<b>595,218,987</b>	<b>0</b>	<b>0</b>	<b>16,930</b>	<b>16,930</b>	<b>0</b>	<b>746,629,899</b>
2017	22,018,773	410,760,863	2,436,270	615,534,813	0	0	16,936	16,936	0	773,901,465
2018	22,592,530	436,016,727	2,518,350	652,171,889	0	0	17,014	17,014	0	809,722,099
2019	22,477,389	411,803,022	2,417,282	618,912,027	0	0	14,389	14,389	0	771,674,362
2020	22,599,200	447,846,999	3,556,851	657,154,875	0	0	2,462	2,462	0	806,785,485
2021	22,637,229	458,220,186	3,637,523	669,840,036	0	0	1,637	1,637	0	825,576,149
2022	22,599,263	453,982,783	3,621,503	663,790,055	0	0	254	254	0	817,807,006
2023	22,619,585	455,714,066	3,651,067	665,791,771	0	0	255	255	0	819,889,305
2024	22,602,596	451,347,431	3,618,691	660,397,861	0	0	256	256	0	814,726,638
2025	22,669,108	457,839,904	3,674,467	669,414,794	0	0	256	256	0	826,453,694
2026	22,566,287	445,466,667	3,582,166	652,473,053	0	0	257	257	0	803,901,468
2027	22,731,831	460,643,254	3,699,306	673,624,592	0	0	257	257	0	832,080,075
2028	22,714,548	457,134,004	3,673,765	668,902,371	0	0	257	257	0	827,514,585
2029	22,762,817	458,994,781	3,683,101	671,876,004	0	0	258	258	0	829,801,909
2030	22,740,488	453,892,798	3,639,303	665,232,231	0	0	258	258	0	822,624,734
2031	22,967,016	472,872,439	3,771,573	692,455,749	0	0	260	260	0	854,267,545
2032	22,727,011	446,066,580	3,563,574	655,382,274	0	0	260	260	0	813,685,324
2033	22,994,812	470,435,759	3,748,739	689,886,952	0	0	262	262	0	850,765,709
2034	22,808,394	450,414,408	3,593,471	661,771,694	0	0	264	264	0	822,259,665
2035	23,365,669	502,311,583	3,980,361	735,293,695	0	0	264	264	0	904,642,409
<b>TOTAL</b>	<b>623,564,285</b>	<b>18,190,646,154</b>	<b>123,022,731</b>	<b>25,179,228,937</b>	<b>0</b>	<b>0</b>	<b>881,699</b>	<b>881,699</b>	<b>8,748,370</b>	<b>31,316,789,080</b>

<sup>a</sup> Capital charges repaid through bond debt service prior to 2014 exclude bond cover; 2015 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 2015 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 2016</b>						
Total Costs of "Initial" Project Conservation Facilities to be Reimbursed and Project Water Table A Amounts During the Project Repayment Period.	\$8,122.53 <sup>b</sup>	445.57 af	\$7,624.18 <sup>c</sup>	445.57 af	\$15,746.72	445.57 af
Less, Project Power Revenues to be Realized During the Project Repayment Period.	(3,984.98)		(3,563.09)		(\$7,548.07)	
Less, Delta Water Charges Paid and Project Water Table A Amounts, Prior to 2016	(2,864.45) <sup>d</sup>	(391.81) af	(1,290.03)	(391.81) af	(\$4,154.48)	(391.81) af
<b>TOTAL</b>	<b>\$1,273.10</b>	<b>53.77 af</b>	<b>\$2,771.07</b>	<b>53.77 af</b>	<b>\$4,044.17</b>	<b>53.77 af</b>
Rate Applicable in 2016	\$23.68 per acre-foot		\$51.54 per acre-foot		\$75.22 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 2016</b>						
Total Costs of "Initial" Project Conservation Facilities to be Reimbursed and Project Water Table A Amounts during the Project Repayment Period.	\$8,104.46 <sup>b</sup>	445.57 af	\$7,592.07 <sup>c</sup>	445.57 af	\$15,696.53	445.57 af
Less, Project Power Revenues to be Realized During the Project Repayment Period.	(3,984.98)		(3,563.09)		(\$7,548.07)	
Less, Delta Water Charges Paid and Project Water Table A Amounts, Prior to 2016	(2,864.45) <sup>d</sup>	(391.81) af	(1,290.03)	(391.81) af	(\$4,145.48)	(391.81) af
<b>TOTAL</b>	<b>\$1,255.03</b>	<b>53.77 af</b>	<b>\$2,738.95</b>	<b>53.77 af</b>	<b>\$3,993.98</b>	<b>53.77 af</b>
Rate Applicable in 2016	\$23.34 per acre-foot		\$50.94 per acre-foot		\$74.28 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)**

<b>Item</b>	<b>Capital Cost Component</b>	<b>Minimum Operation, Maintenance, Power and Replacement Component</b>	<b>Total Delta Water Rate</b>
	[1]	[2]	[3]
<b>Initial Conservation Facilities</b>			
Oroville Division			
Water Supply and Power Costs <sup>a</sup>	90.87	60.15	151.02
Less, Oroville Power Revenues	<u>-51.10</u>	<u>-23.99</u>	<u>-75.09</u>
Subtotal	39.77	36.15	75.93
Delta Facilities <sup>b</sup>	26.92	53.31	80.24
California Aqueduct portion			
Reach1	5.50	11.00	16.50
Reach 2A	3.14	1.34	4.49
Reach 2B	1.60	0.92	2.52
Reach 3	<u>1.13</u>	<u>0.45</u>	<u>1.58</u>
Subtotal	11.37	13.72	25.09
San Luis Facilities	17.07	14.03	31.10
Planning and Preoperating Costs through 2014	4.50	0.00	4.50
45,000 af Relinquished Costs	0.34	0.60	0.93
Less, Capital Cost Credits	-2.18	0.00	-2.18
Less, Delta Water Charges paid prior to 2016	<u>-74.12</u>	<u>-66.27</u>	<u>-140.39</u>
Rate Applicable in 2016	23.68	51.54	75.22

<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 March 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	2,183,216	3,592,134	5,775,350	6,064,039	3,159,176	7,521,849	16,745,064	1,880,462	3,421,388	5,301,850
2017	2,183,216	3,592,134	5,775,350	6,064,039	3,159,176	7,521,849	16,745,064	1,880,462	3,421,388	5,301,850
2018	2,183,216	3,592,134	5,775,350	6,064,039	3,159,176	7,521,849	16,745,064	1,880,462	3,421,388	5,301,850
2019	2,183,216	3,592,134	5,775,350	6,064,039	3,159,176	7,521,849	16,745,064	1,880,462	3,421,388	5,301,850
2020	2,183,216	3,592,134	5,775,350	6,064,039	3,159,176	7,521,849	16,745,064	1,880,462	3,421,388	5,301,850
2021	2,183,216	3,592,134	5,775,350	6,064,039	3,159,176	7,521,849	16,745,064	1,880,462	3,421,388	5,301,850
2022	2,183,216	3,592,134	5,775,350	6,064,039	3,159,176	7,521,849	16,745,064	1,880,462	3,421,388	5,301,850
2023	2,183,216	3,592,134	5,775,350	6,064,039	3,159,176	7,521,849	16,745,064	1,880,462	3,421,388	5,301,850
2024	2,183,216	3,592,134	5,775,350	6,064,039	3,159,176	7,521,849	16,745,064	1,880,462	3,421,388	5,301,850
2025	2,183,216	3,592,134	5,775,350	6,064,039	3,159,176	7,521,849	16,745,064	1,880,462	3,421,388	5,301,850
2026	2,183,216	3,592,134	5,775,350	6,064,039	3,159,176	7,521,849	16,745,064	1,880,462	3,421,388	5,301,850
2027	2,183,216	3,592,134	5,775,350	6,064,039	3,159,176	7,521,849	16,745,064	1,880,462	3,421,388	5,301,850
2028	2,183,216	3,592,134	5,775,350	6,064,039	3,159,176	7,521,849	16,745,064	1,880,462	3,421,388	5,301,850
2029	2,183,216	3,592,134	5,775,350	6,064,039	3,159,176	7,521,849	16,745,064	1,880,462	3,421,388	5,301,850
2030	2,183,216	3,592,134	5,775,350	6,064,039	3,159,176	7,521,849	16,745,064	1,880,462	3,421,388	5,301,850
2031	2,183,216	3,592,134	5,775,350	6,064,039	3,159,176	7,521,849	16,745,064	1,880,462	3,421,388	5,301,850
2032	2,183,216	3,592,134	5,775,350	6,064,039	3,159,176	7,521,849	16,745,064	1,880,462	3,421,388	5,301,850
2033	2,183,216	3,592,134	5,775,350	6,064,039	3,159,176	7,521,849	16,745,064	1,880,462	3,421,388	5,301,850
2034	2,183,216	3,592,134	5,775,350	6,064,039	3,159,176	7,521,849	16,745,064	1,880,462	3,421,388	5,301,850
2035	2,183,216	3,592,134	5,775,350	6,064,039	3,159,176	7,521,849	16,745,064	1,880,462	3,421,388	5,301,850
TOTAL	59,467,290	104,073,270	163,540,560	177,670,813	100,570,778	245,874,359	524,115,950	56,838,525	104,033,062	160,871,587

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 County Water Agency		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	2,675,437	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	3,411,158	222,855	0	10,124,408	63,795,055	699,908	428,746	6,579,437	85,261,567
2017	3,411,158	222,855	0	10,124,408	63,795,055	699,908	428,746	6,579,437	85,261,567
2018	3,411,158	222,855	0	10,124,408	63,795,055	699,908	428,746	6,579,437	85,261,567
2019	3,411,158	222,855	0	10,124,408	63,795,055	699,908	428,746	6,579,437	85,261,567
2020	3,110,284	222,855	0	10,124,408	63,795,055	699,908	428,746	6,579,437	84,960,693
2021	3,110,284	222,855	0	10,124,408	63,795,055	699,908	428,746	6,579,437	84,960,693
2022	3,110,284	222,855	0	10,124,408	63,795,055	699,908	428,746	6,579,437	84,960,693
2023	3,110,284	222,855	0	10,124,408	63,795,055	699,908	428,746	6,579,437	84,960,693
2024	3,110,284	222,855	0	10,124,408	63,795,055	699,908	428,746	6,579,437	84,960,693
2025	3,110,284	222,855	0	10,124,408	63,795,055	699,908	428,746	6,579,437	84,960,693
2026	3,110,284	222,855	0	10,124,408	63,795,055	699,908	428,746	6,579,437	84,960,693
2027	3,110,284	222,855	0	10,124,408	63,795,055	699,908	428,746	6,579,437	84,960,693
2028	3,110,284	222,855	0	10,124,408	63,795,055	699,908	428,746	6,579,437	84,960,693
2029	3,110,284	222,855	0	10,124,408	63,795,055	699,908	428,746	6,579,437	84,960,693
2030	3,110,284	222,855	0	10,124,408	63,795,055	699,908	428,746	6,579,437	84,960,693
2031	3,110,284	222,855	0	10,124,408	63,795,055	699,908	428,746	6,579,437	84,960,693
2032	3,110,284	222,855	0	10,124,408	63,795,055	699,908	428,746	6,579,437	84,960,693
2033	3,110,284	222,855	0	10,124,408	63,795,055	699,908	428,746	6,579,437	84,960,693
2034	3,110,284	222,855	0	10,124,408	63,795,055	699,908	428,746	6,579,437	84,960,693
2035	3,110,284	222,855	0	10,124,408	63,795,055	699,908	428,746	6,579,437	84,960,693
TOTAL	112,265,799	7,387,139	0	361,726,094	2,047,219,897	19,762,338	13,879,431	225,596,647	2,787,837,345



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	10,894,947	7,160,800	10,406,477	436,267	4,193,431	173,003	6,453,746	1,602,153	7,717,417	2,166,293
2017	10,894,947	7,160,800	10,406,477	436,267	4,193,431	173,003	6,453,746	1,602,153	7,717,417	2,166,293
2018	10,894,947	7,160,800	10,406,477	436,267	4,193,431	173,003	6,453,746	1,602,153	7,717,417	2,166,293
2019	10,894,947	7,160,800	10,406,477	436,267	4,193,431	173,003	6,453,746	1,602,153	7,717,417	2,166,293
2020	10,894,947	7,160,800	10,406,477	436,267	4,193,431	173,003	6,754,620	1,602,153	7,717,417	2,166,293
2021	10,894,947	7,160,800	10,406,477	436,267	4,193,431	173,003	6,754,620	1,602,153	7,717,417	2,166,293
2022	10,894,947	7,160,800	10,406,477	436,267	4,193,431	173,003	6,754,620	1,602,153	7,717,417	2,166,293
2023	10,894,947	7,160,800	10,406,477	436,267	4,193,431	173,003	6,754,620	1,602,153	7,717,417	2,166,293
2024	10,894,947	7,160,800	10,406,477	436,267	4,193,431	173,003	6,754,620	1,602,153	7,717,417	2,166,293
2025	10,894,947	7,160,800	10,406,477	436,267	4,193,431	173,003	6,754,620	1,602,153	7,717,417	2,166,293
2026	10,894,947	7,160,800	10,406,477	436,267	4,193,431	173,003	6,754,620	1,602,153	7,717,417	2,166,293
2027	10,894,947	7,160,800	10,406,477	436,267	4,193,431	173,003	6,754,620	1,602,153	7,717,417	2,166,293
2028	10,894,947	7,160,800	10,406,477	436,267	4,193,431	173,003	6,754,620	1,602,153	7,717,417	2,166,293
2029	10,894,947	7,160,800	10,406,477	436,267	4,193,431	173,003	6,754,620	1,602,153	7,717,417	2,166,293
2030	10,894,947	7,160,800	10,406,477	436,267	4,193,431	173,003	6,754,620	1,602,153	7,717,417	2,166,293
2031	10,894,947	7,160,800	10,406,477	436,267	4,193,431	173,003	6,754,620	1,602,153	7,717,417	2,166,293
2032	10,894,947	7,160,800	10,406,477	436,267	4,193,431	173,003	6,754,620	1,602,153	7,717,417	2,166,293
2033	10,894,947	7,160,800	10,406,477	436,267	4,193,431	173,003	6,754,620	1,602,153	7,717,417	2,166,293
2034	10,894,947	7,160,800	10,406,477	436,267	4,193,431	173,003	6,754,620	1,602,153	7,717,417	2,166,293
2035	10,894,947	7,160,800	10,406,477	436,267	4,193,431	173,003	6,754,620	1,602,153	7,717,417	2,166,293
TOTAL	335,087,804	212,902,948	270,864,979	13,775,735	123,087,286	5,460,197	194,797,100	49,558,997	246,106,394	68,888,356

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	1,301,280	143,780,136	1,504,370	197,790,320	722,098	2,068,508	200,570	2,991,176	0	313,865,327
2017	1,301,280	143,780,136	1,504,370	197,790,320	722,098	2,068,508	200,570	2,991,176	0	313,865,327
2018	1,301,280	143,780,136	1,504,370	197,790,320	722,098	2,068,508	200,570	2,991,176	0	313,865,327
2019	1,301,280	143,780,136	1,504,370	197,790,320	722,098	2,068,508	200,570	2,991,176	0	313,865,327
2020	1,301,280	143,780,136	1,504,370	198,091,194	722,098	2,068,508	200,570	2,991,176	0	313,865,327
2021	1,301,280	143,780,136	1,504,370	198,091,194	722,098	2,068,508	200,570	2,991,176	0	313,865,327
2022	1,301,280	143,780,136	1,504,370	198,091,194	722,098	2,068,508	200,570	2,991,176	0	313,865,327
2023	1,301,280	143,780,136	1,504,370	198,091,194	722,098	2,068,508	200,570	2,991,176	0	313,865,327
2024	1,301,280	143,780,136	1,504,370	198,091,194	722,098	2,068,508	200,570	2,991,176	0	313,865,327
2025	1,301,280	143,780,136	1,504,370	198,091,194	722,098	2,068,508	200,570	2,991,176	0	313,865,327
2026	1,301,280	143,780,136	1,504,370	198,091,194	722,098	2,068,508	200,570	2,991,176	0	313,865,327
2027	1,301,280	143,780,136	1,504,370	198,091,194	722,098	2,068,508	200,570	2,991,176	0	313,865,327
2028	1,301,280	143,780,136	1,504,370	198,091,194	722,098	2,068,508	200,570	2,991,176	0	313,865,327
2029	1,301,280	143,780,136	1,504,370	198,091,194	722,098	2,068,508	200,570	2,991,176	0	313,865,327
2030	1,301,280	143,780,136	1,504,370	198,091,194	722,098	2,068,508	200,570	2,991,176	0	313,865,327
2031	1,301,280	143,780,136	1,504,370	198,091,194	722,098	2,068,508	200,570	2,991,176	0	313,865,327
2032	1,301,280	143,780,136	1,504,370	198,091,194	722,098	2,068,508	200,570	2,991,176	0	313,865,327
2033	1,301,280	143,780,136	1,504,370	198,091,194	722,098	2,068,508	200,570	2,991,176	0	313,865,327
2034	1,301,280	143,780,136	1,504,370	198,091,194	722,098	2,068,508	200,570	2,991,176	0	313,865,327
2035	1,301,280	143,780,136	1,504,370	198,091,194	722,098	2,068,508	200,570	2,991,176	0	313,865,327
TOTAL	36,645,345	4,599,426,773	45,896,296	6,202,498,210	21,587,746	52,337,936	5,391,123	79,316,805	0	9,918,180,457

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	776,968	926,899	1,703,867	1,520,228	668,200	1,874,994	4,063,422	464,184	2,935,718	3,399,902
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	781,605	935,161	1,716,766	1,529,164	672,046	1,881,012	4,082,222	467,458	2,952,326	3,419,784
2018	703,167	841,313	1,544,480	1,375,704	604,602	1,692,242	3,672,548	420,546	2,656,045	3,076,591
2019	739,480	884,760	1,624,240	1,446,748	635,825	1,779,633	3,862,206	442,264	2,793,209	3,235,473
2020	699,616	837,065	1,536,681	1,368,757	601,549	1,683,697	3,654,003	418,423	2,642,633	3,061,056
2021	693,195	829,383	1,522,578	1,356,196	596,029	1,668,245	3,620,470	414,583	2,618,381	3,032,964
2022	671,375	803,276	1,474,651	1,313,506	577,267	1,615,733	3,506,506	401,533	2,535,960	2,937,493
2023	668,638	800,001	1,468,639	1,308,152	574,914	1,609,147	3,492,213	399,896	2,525,623	2,925,519
2024	648,811	776,278	1,425,089	1,269,361	557,866	1,561,430	3,388,657	388,038	2,450,730	2,838,768
2025	601,319	719,456	1,320,775	1,176,446	517,031	1,447,136	3,140,613	359,634	2,271,340	2,630,974
2026	561,920	672,317	1,234,237	1,099,364	483,155	1,352,318	2,934,837	336,070	2,122,520	2,458,590
2027	607,372	726,699	1,334,071	1,188,289	522,236	1,461,704	3,172,229	363,254	2,294,205	2,657,459
2028	489,123	585,218	1,074,341	956,940	420,562	1,177,125	2,554,627	292,532	1,847,546	2,140,078
2029	522,036	624,597	1,146,633	1,021,334	448,862	1,256,334	2,726,530	312,217	1,971,869	2,284,086
2030	211,557	253,120	464,677	413,899	181,903	509,134	1,104,936	126,527	799,106	925,633
2031	211,839	253,457	465,296	414,450	182,145	509,812	1,106,407	126,696	800,171	926,867
2032	211,838	253,456	465,294	414,449	182,144	509,810	1,106,403	126,695	800,168	926,863
2033	211,935	253,572	465,507	414,638	182,228	510,043	1,106,909	126,753	800,534	927,287
2034	211,856	253,478	465,334	414,484	182,160	509,854	1,106,498	126,706	800,237	926,943
2035	211,836	253,454	465,290	414,445	182,143	509,805	1,106,393	126,694	800,161	926,855
TOTAL	16,693,448	21,469,914	38,163,362	32,976,236	15,749,447	44,118,818	92,844,501	11,305,818	68,086,060	79,391,878

<sup>a</sup> 1988 through 2014 charges are debt service only and do not include bond cover; 2015 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 County Water Agency		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	495,639	25,821	0	1,350,157	10,590,356	81,551	48,714	961,414	13,553,652
2016	503,415	26,336	0	1,371,356	10,760,127	83,031	49,670	977,911	13,771,846
2017	500,804	26,199	0	1,364,245	10,704,329	82,600	49,412	972,840	13,700,429
2018	450,546	23,570	0	1,227,335	9,630,093	74,311	44,454	875,210	12,325,519
2019	473,813	24,787	0	1,290,718	10,127,411	78,149	46,749	920,408	12,962,035
2020	448,271	23,451	0	1,221,138	9,581,464	73,936	44,229	870,791	12,263,280
2021	444,157	23,236	0	1,209,931	9,493,532	73,257	43,823	862,799	12,150,735
2022	430,176	22,505	0	1,171,845	9,194,698	70,951	42,444	835,640	11,768,259
2023	428,423	22,413	0	1,167,069	9,157,218	70,662	42,271	832,234	11,720,290
2024	415,718	21,748	0	1,132,461	8,885,675	68,567	41,017	807,556	11,372,742
2025	385,289	20,156	0	1,049,567	8,235,260	63,548	38,015	748,444	10,540,279
2026	360,044	18,836	0	980,798	7,695,678	59,384	35,524	699,405	9,849,669
2027	389,167	20,359	0	1,060,132	8,318,161	64,187	38,398	755,978	10,646,382
2028	313,400	16,395	0	853,735	6,698,697	51,691	30,922	608,797	8,573,637
2029	334,489	17,499	0	911,183	7,149,456	55,169	33,003	649,763	9,150,562
2030	135,553	7,091	0	369,260	2,897,341	22,357	13,374	263,319	3,708,295
2031	135,733	7,101	0	369,752	2,901,201	22,387	13,392	263,669	3,713,235
2032	135,733	7,101	0	369,751	2,901,189	22,387	13,392	263,668	3,713,221
2033	135,795	7,104	0	369,920	2,902,518	22,397	13,398	263,789	3,714,921
2034	135,745	7,101	0	369,783	2,901,440	22,389	13,393	263,691	3,713,542
2035	135,732	7,101	0	369,747	2,901,164	22,387	13,392	263,666	3,713,189
<b>TOTAL</b>	<b>12,677,897</b>	<b>627,877</b>	<b>0</b>	<b>32,265,217</b>	<b>239,021,253</b>	<b>1,786,505</b>	<b>1,177,611</b>	<b>24,397,225</b>	<b>311,953,585</b>

<sup>a</sup> 1988 through 2014 charges are debt service only and do not include bond cover; 2015 charges and after include bond cover.

TABLE B-22 Water System Revenue Bond Surcharge 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]
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	1,315,850	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	2,293,167	1,850,769	2,187,085	135,738	1,060,896	37,246	1,546,067	312,540	2,671,085	710,169
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	2,311,655	1,863,464	2,212,056	136,461	1,068,854	37,513	1,557,022	315,002	2,684,769	713,982
2018	2,079,668	1,676,456	1,990,065	122,766	961,589	33,749	1,400,766	283,390	2,415,338	642,330
2019	2,187,067	1,763,032	2,092,836	129,106	1,011,248	35,492	1,473,105	298,025	2,540,071	675,502
2020	2,069,167	1,667,990	1,980,015	122,146	956,733	33,578	1,393,693	281,959	2,403,142	639,087
2021	2,050,177	1,652,683	1,961,844	121,025	947,953	33,270	1,380,903	279,371	2,381,087	633,222
2022	1,985,643	1,600,660	1,900,090	117,216	918,114	32,223	1,337,435	270,577	2,306,136	613,289
2023	1,977,549	1,594,135	1,892,345	116,738	914,372	32,092	1,331,983	269,474	2,296,736	610,789
2024	1,918,908	1,546,864	1,836,230	113,276	887,257	31,140	1,292,486	261,484	2,228,630	592,677
2025	1,778,447	1,433,636	1,701,822	104,985	822,312	28,861	1,197,878	242,343	2,065,498	549,295
2026	1,661,921	1,339,703	1,590,317	98,106	768,433	26,970	1,119,392	226,465	1,930,165	513,304
2027	1,796,350	1,448,068	1,718,953	106,041	830,590	29,151	1,209,936	244,783	2,086,291	554,824
2028	1,446,618	1,166,143	1,384,290	85,396	668,882	23,476	974,374	197,126	1,680,110	446,805
2029	1,543,962	1,244,614	1,477,440	91,143	713,891	25,055	1,039,940	210,391	1,793,166	476,871
2030	625,696	504,384	598,737	36,936	289,307	10,154	421,439	85,262	726,687	193,254
2031	626,529	505,056	599,535	36,985	289,692	10,167	422,001	85,375	727,655	193,511
2032	626,527	505,054	599,532	36,985	289,691	10,167	421,999	85,375	727,652	193,510
2033	626,814	505,285	599,807	37,002	289,824	10,172	422,192	85,414	727,985	193,599
2034	626,581	505,098	599,584	36,988	289,716	10,168	422,035	85,382	727,715	193,527
2035	626,521	505,049	599,527	36,985	289,689	10,167	421,995	85,374	727,645	193,509
<b>TOTAL</b>	<b>53,733,531</b>	<b>46,829,931</b>	<b>45,059,436</b>	<b>3,249,418</b>	<b>24,047,022</b>	<b>893,272</b>	<b>36,520,030</b>	<b>7,379,120</b>	<b>64,194,888</b>	<b>17,015,744</b>

<sup>a</sup> 1988 through 2014 charges are debt service only and do not include bond cover; 2015 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	433,937	43,815,575	385,344	57,439,618	71,868	205,874	27,266	305,008	0	80,465,469
2016	438,500	44,298,522	389,777	58,094,826	73,332	210,067	28,720	312,119	0	81,445,618
2017	436,226	44,068,808	387,756	57,793,568	72,952	208,978	28,571	310,501	0	81,023,270
2018	392,448	39,646,269	348,842	51,993,676	65,631	188,006	25,704	279,341	0	72,892,155
2019	412,715	41,693,682	366,857	54,678,738	69,020	197,715	27,031	293,766	0	76,656,458
2020	390,467	39,446,066	347,081	51,731,124	65,299	187,056	25,574	277,929	0	72,524,073
2021	386,883	39,084,062	343,896	51,256,376	64,700	185,340	25,339	275,379	0	71,858,502
2022	374,705	37,853,786	333,071	49,642,945	62,663	179,506	24,542	266,711	0	69,596,565
2023	373,178	37,699,484	331,713	49,440,588	62,408	178,774	24,442	265,624	0	69,312,873
2024	362,112	36,581,565	321,876	47,974,505	60,557	173,473	23,717	257,747	0	67,257,508
2025	335,606	33,903,856	298,316	44,462,855	56,125	160,775	21,981	238,881	0	62,334,377
2026	313,617	31,682,444	278,770	41,549,607	52,447	150,241	20,541	223,229	0	58,250,169
2027	338,984	34,245,159	301,319	44,910,449	56,690	162,393	22,202	241,285	0	62,961,875
2028	272,987	27,577,961	242,655	36,166,823	45,653	130,777	17,880	194,310	0	50,703,816
2029	291,357	29,433,698	258,983	38,600,511	48,725	139,577	19,083	207,385	0	54,115,707
2030	118,073	11,928,106	104,954	15,642,989	19,746	56,564	7,733	84,043	0	21,930,573
2031	118,231	11,943,999	105,094	15,663,830	19,772	56,639	7,744	84,155	0	21,959,790
2032	118,230	11,943,945	105,093	15,663,760	19,772	56,639	7,744	84,155	0	21,959,696
2033	118,284	11,949,424	105,141	15,670,943	19,781	56,665	7,747	84,193	0	21,969,760
2034	118,240	11,944,981	105,102	15,665,117	19,774	56,644	7,744	84,162	0	21,961,596
2035	118,229	11,943,843	105,092	15,663,625	19,772	56,639	7,744	84,155	0	21,959,507
<b>TOTAL</b>	<b>8,750,362</b>	<b>1,051,764,036</b>	<b>9,196,139</b>	<b>1,368,632,929</b>	<b>1,721,656</b>	<b>3,471,729</b>	<b>587,486</b>	<b>5,780,871</b>	<b>0</b>	<b>1,896,767,126</b>

<sup>a</sup> 1988 through 2014 charges are debt service only and do not include bond cover; 2015 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	683,056	633,184	2,178,465	3,494,705	115,961	229,807	345,768
1969	254,715	0	254,715	817,823	583,436	2,298,736	3,699,996	185,156	358,861	544,017
1970	277,547	0	277,547	904,203	640,297	2,787,967	4,332,467	200,150	387,675	587,825
1971	227,474	0	227,474	845,776	675,193	2,807,017	4,327,986	202,413	392,912	595,325
1972	224,978	0	224,978	929,983	822,397	3,027,749	4,780,129	209,057	406,589	615,646
1973	221,091	31,366	252,457	916,521	716,492	3,120,787	4,753,799	206,557	402,724	609,281
1974	240,498	32,938	273,437	957,196	746,932	3,325,022	5,029,150	208,545	407,090	615,635
1975	237,459	36,291	273,750	1,015,739	793,055	3,214,046	5,022,840	225,895	439,873	665,768
1976	271,292	40,836	312,127	1,128,869	943,464	3,362,542	5,434,874	228,976	447,299	676,275
1977	293,627	45,096	338,723	1,097,586	922,203	3,303,461	5,323,250	238,699	468,721	707,420
1978	273,870	49,178	323,048	1,186,505	935,818	3,712,581	5,834,904	245,331	484,259	729,590
1979	289,479	53,340	342,819	1,283,196	1,009,566	3,819,533	6,112,296	243,110	483,437	726,547
1980	310,846	86,073	396,919	1,436,290	1,173,798	4,119,071	6,729,159	282,254	540,553	822,807
1981	347,781	112,848	460,629	1,544,957	1,349,125	4,507,566	7,401,648	307,065	596,671	903,736
1982	438,335	141,835	580,171	1,625,409	1,369,536	4,941,393	7,936,338	328,215	682,545	1,010,760
1983	354,787	163,294	518,081	1,495,836	1,260,138	4,910,241	7,666,215	357,218	702,083	1,059,301
1984	467,336	246,698	714,034	1,805,960	1,478,394	6,870,249	10,154,604	409,529	801,057	1,210,586
1985	736,074	386,306	1,122,380	2,303,926	2,225,097	7,796,485	12,325,508	500,696	969,931	1,470,626
1986	1,120,086	714,246	1,834,332	2,172,675	2,014,104	8,193,845	12,380,624	536,751	1,038,031	1,574,782
1987	1,773,801	1,582,227	3,356,028	2,669,321	2,505,662	7,980,255	13,155,238	570,644	1,148,974	1,719,618
1988	2,349,572	2,524,763	4,874,335	2,730,611	2,774,430	7,830,285	13,335,326	673,071	1,439,620	2,112,691
1989	2,548,764	3,701,385	6,250,149	2,714,660	2,515,471	7,578,850	12,808,981	772,570	1,814,759	2,587,329
1990	2,900,024	3,848,934	6,748,958	3,150,056	2,929,775	8,355,392	14,435,223	933,367	2,046,370	2,979,737
1991	2,941,321	4,170,227	7,111,548	2,421,988	2,384,246	6,430,834	11,237,068	979,709	2,366,841	3,346,550
1992	2,797,727	4,144,993	6,942,720	2,896,463	2,927,115	7,656,940	13,480,518	1,118,807	2,526,861	3,645,668
1993	2,855,497	4,172,491	7,027,988	3,753,239	2,977,354	8,849,995	15,580,588	1,185,665	2,726,057	3,911,722
1994	2,987,938	4,225,291	7,213,229	3,790,332	3,586,255	9,613,545	16,990,131	1,335,974	3,518,042	4,854,015
1995	2,961,322	4,405,219	7,366,541	4,038,972	3,313,350	8,393,828	15,746,150	1,647,817	6,195,415	7,843,231
1996	3,045,021	4,898,210	7,943,232	3,646,810	3,178,398	9,228,554	16,053,761	2,592,043	15,232,542	17,824,585
1997	3,028,005	4,734,808	7,762,813	3,873,320	3,145,550	9,338,016	16,356,886	3,002,832	23,737,164	26,739,996
1998	2,936,062	4,588,897	7,524,960	3,480,160	3,201,607	9,077,806	15,759,573	3,254,940	28,393,640	31,648,580
1999	3,162,567	5,081,250	8,243,818	4,199,693	3,688,287	11,423,226	19,311,207	3,809,439	29,668,071	33,477,511
2000	3,462,393	5,621,720	9,084,113	5,809,158	3,595,423	10,222,502	19,627,082	3,764,366	30,292,112	34,056,478
2001	4,083,037	6,375,139	10,458,175	9,848,315	4,096,039	11,663,532	25,607,886	4,322,524	32,454,672	36,777,196
2002	4,325,355	6,566,325	10,891,680	13,357,097	4,087,626	13,157,473	30,602,195	4,041,927	32,105,005	36,146,932
2003	4,446,522	6,913,712	11,360,234	10,003,186	3,809,174	11,953,610	25,765,971	4,120,644	32,396,298	36,516,941
2004	4,982,337	7,257,867	12,240,204	8,384,271	4,210,732	11,655,083	24,250,086	4,189,346	32,928,018	37,117,364
2005	4,330,677	6,735,749	11,066,425	8,425,874	4,337,748	12,359,557	25,123,179	4,294,685	32,945,435	37,240,119
2006	4,297,534	6,329,646	10,627,180	8,512,397	4,391,872	12,636,707	25,540,976	4,182,868	32,760,863	36,943,731
2007	4,396,321	6,652,323	11,048,644	9,442,321	4,849,699	13,699,072	27,991,092	4,255,189	33,444,989	37,700,179
2008	5,210,895	6,777,870	11,988,765	10,665,228	5,254,577	14,168,862	30,088,667	4,845,383	35,161,887	40,007,270
2009	5,755,467	7,004,070	12,759,537	9,669,051	4,904,555	14,219,375	28,792,981	4,731,564	33,774,176	38,505,741
2010	6,382,117	8,764,194	15,146,311	11,185,600	5,598,706	15,894,082	32,678,389	5,280,311	36,294,912	41,575,223
2011	6,885,979	9,361,146	16,247,126	12,746,929	6,415,477	18,026,914	37,189,321	5,451,778	37,508,416	42,960,194
2012	7,467,355	9,405,536	16,872,891	13,752,244	6,469,047	20,376,478	40,597,769	5,516,388	37,965,647	43,482,035
2013	7,236,776	9,347,167	16,583,943	14,918,616	7,374,045	20,767,936	43,060,597	5,838,077	39,646,187	45,484,264
2014	7,823,630	9,825,404	17,649,034	14,474,829	7,539,483	20,589,330	42,603,642	5,622,960	36,814,528	42,437,488
2015	8,375,209	10,935,066	19,310,275	16,321,403	9,290,580	28,548,772	54,160,754	6,991,229	42,288,361	49,279,591
2016	9,116,126	12,315,079	21,431,205	18,950,054	9,884,844	31,600,395	60,435,293	8,200,724	41,803,245	50,003,969
2017	9,243,627	12,610,167	21,853,793	19,920,315	10,066,076	34,215,268	64,201,659	8,371,424	42,262,615	50,634,038
2018	9,432,520	12,537,381	21,969,901	19,094,541	9,912,407	29,795,901	58,802,848	8,574,593	43,315,123	51,889,716
2019	9,468,695	12,661,339	22,130,034	18,886,938	9,822,097	29,629,232	58,338,266	8,528,110	43,346,773	51,874,882
2020	9,273,133	12,400,872	21,674,005	18,868,438	9,717,834	29,415,982	58,002,254	8,318,787	43,161,089	51,479,875
2021	9,288,857	12,438,530	21,727,386	19,224,281	9,906,090	29,914,888	59,045,260	8,417,841	43,403,286	51,821,128
2022	9,285,890	12,454,141	21,740,031	19,099,354	9,845,561	29,813,806	58,758,720	8,386,606	43,319,770	51,706,376
2023	9,300,343	12,457,483	21,757,826	19,111,912	9,853,934	29,884,544	58,850,390	8,389,563	43,359,465	51,749,028
2024	9,296,673	12,473,478	21,770,152	19,109,568	9,857,044	29,938,297	58,904,909	8,386,157	43,343,820	51,729,978
2025	9,256,221	12,452,260	21,708,481	19,175,737	9,900,255	30,077,899	59,153,891	8,395,421	43,288,605	51,684,026
2026	9,233,602	12,444,543	21,678,145	18,808,411	9,716,338	29,680,743	58,205,492	8,300,398	43,022,509	51,322,907
2027	9,298,386	12,539,421	21,837,807	19,304,533	9,968,567	30,351,890	59,624,990	8,437,693	43,476,442	51,914,134
2028	9,198,152	12,438,038	21,636,190	19,106,542	9,885,292	30,166,000	59,157,833	8,373,294	43,085,073	51,458,367
2029	9,249,576	12,518,350	21,767,926	19,142,625	9,899,848	30,268,345	59,310,817	8,391,437	43,246,197	51,637,634
2030	8,949,885	12,176,446	21,126,331	18,529,390	9,631,121	29,573,839	57,734,350	8,206,174	42,114,068	50,320,243
2031	8,957,763	12,201,938	21,159,702	18,766,271	9,755,400	29,927,313	58,448,984	8,273,895	42,296,112	50,570,007
2032	8,967,713	12,227,681	21,195,394	18,635,140	9,688,574	29,826,410	58,150,123	8,237,686	42,265,785	50,503,471
2033	8,959,218	12,227,490	21,186,709	18,762,119	9,756,228	30,046,223	58,564,570	8,282,106	42,412,297	50,694,404
2034	8,909,745	12,198,395	21,108,139	18,799,229	9,776,653	30,153,157	58,729,039	8,291,109	42,475,243	50,766,352
2035	8,785,531	12,100,169	20,885,701	19,245,937	10,010,732	30,769,906	60,026,575	8,425,396	42,815,630	51,241,025
TOTAL	315,996,421	425,965,176	741,961,597	627,396,142	344,385,460	1,050,568,055	2,022,349,657	271,849,552	1,547,886,432	1,819,735,984

<sup>a</sup> Capital charges repaid through bond debt service prior to 2014 exclude bond cover; capital charges for 2015 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 County Water Agency		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	227,435	19,485	54,588	445,439	1,719,201	16,947	19,850	309,312	2,812,256
1969	243,616	11,247	87,576	525,094	2,748,877	16,825	19,602	466,350	4,119,188
1970	308,977	34,683	94,675	573,998	3,903,039	21,435	30,632	526,864	5,494,302
1971	330,776	37,411	95,695	605,889	5,232,070	27,175	34,931	718,475	7,082,421
1972	384,815	40,672	98,788	631,615	7,216,184	26,473	64,294	2,003,350	10,466,191
1973	402,488	39,294	97,550	1,025,888	7,353,691	28,816	39,543	789,008	9,776,278
1974	512,830	40,508	98,460	1,144,792	8,071,345	29,544	42,874	1,054,008	10,994,362
1975	686,549	40,957	106,703	1,197,166	9,465,023	31,240	48,499	1,569,374	13,145,510
1976	724,491	43,478	108,084	1,323,840	10,715,618	32,666	52,477	1,451,367	14,452,021
1977	584,670	39,395	112,554	1,367,404	11,037,808	34,434	54,552	1,146,892	14,377,709
1978	703,560	36,029	115,521	1,565,884	13,381,049	38,927	59,386	1,181,537	17,081,893
1979	787,872	48,231	114,253	1,668,951	15,467,446	43,065	70,987	1,736,739	19,937,543
1980	969,232	49,966	125,950	1,770,264	17,117,491	48,021	95,453	1,683,051	21,859,428
1981	1,218,171	84,332	134,169	2,430,802	22,731,167	66,495	101,026	2,294,770	29,060,933
1982	1,254,287	70,526	135,057	2,523,660	25,137,311	70,662	108,690	2,290,118	31,590,311
1983	1,188,868	52,876	149,202	2,085,047	24,795,687	75,442	87,775	508,198	28,943,096
1984	1,498,719	28,858	164,505	3,396,379	33,534,512	94,320	121,857	1,550,776	40,389,927
1985	1,774,870	130,288	184,905	3,891,204	39,514,722	117,583	139,946	2,822,801	48,576,320
1986	2,017,058	79,665	180,445	4,079,838	43,608,331	136,715	153,620	3,668,654	53,924,326
1987	1,892,610	95,583	179,872	4,570,841	42,908,175	137,332	151,869	3,762,209	53,698,491
1988	1,977,936	109,961	193,735	4,734,502	44,854,794	138,278	147,046	3,917,346	56,073,597
1989	2,132,937	102,088	187,913	4,677,357	47,053,823	137,085	166,890	4,399,413	58,857,506
1990	1,888,166	87,292	221,392	4,827,893	45,837,690	121,154	149,202	3,978,733	57,111,520
1991	1,697,456	80,581	220,282	4,535,869	37,713,345	103,909	135,212	3,519,743	48,006,397
1992	2,243,847	105,400	241,455	5,550,167	48,910,441	143,783	176,195	4,558,573	61,929,862
1993	2,466,002	120,403	264,959	5,806,060	54,811,608	161,522	195,760	5,312,427	69,138,741
1994	2,270,825	107,908	306,359	5,210,309	52,282,148	145,625	178,572	4,685,127	65,186,872
1995	2,867,285	115,826	304,297	6,621,491	60,742,303	180,802	210,905	5,543,961	76,586,871
1996	2,059,170	125,515	389,203	6,671,115	58,816,370	178,474	190,517	7,109,727	75,540,091
1997	2,770,433	100,920	276,681	6,521,956	57,593,801	138,117	212,717	4,731,857	72,346,482
1998	2,616,114	120,212	381,847	5,733,156	54,168,871	143,433	204,327	4,985,157	68,353,116
1999	2,711,834	136,525	369,935	6,368,370	57,841,173	184,155	219,319	7,453,508	75,284,819
2000	2,602,694	121,054	302,623	6,100,811	51,515,868	174,245	213,821	6,191,335	67,222,452
2001	3,286,671	146,228	328,030	5,653,261	58,885,645	192,579	260,428	6,469,139	75,221,981
2002	2,993,991	128,006	320,646	6,168,829	53,682,617	187,362	579,276	6,519,963	69,519,963
2003	3,044,938	131,856	340,169	6,533,281	56,220,123	202,308	238,495	6,083,364	72,794,534
2004	3,232,805	168,512	342,218	7,850,475	56,818,002	356,178	254,086	5,840,394	74,862,671
2005	3,792,118	177,118	355,402	7,005,567	67,404,725	690,464	250,886	6,678,242	86,354,522
2006	3,622,863	168,174	294,943	7,492,746	64,593,947	536,709	256,156	5,913,845	82,879,382
2007	3,409,148	159,369	334,031	7,106,638	61,424,685	521,548	253,205	5,853,179	79,061,803
2008	3,385,075	157,173	469,403	7,758,847	62,421,212	547,675	261,810	5,550,476	80,551,669
2009	3,260,809	154,047	432,428	6,900,730	60,665,814	520,793	260,966	5,439,708	77,635,296
2010	3,654,584	236,986	507,508	8,078,100	72,679,352	654,006	329,180	6,536,204	92,675,920
2011	4,560,390	218,909	502,474	9,701,548	90,371,403	738,764	357,081	6,913,684	113,364,253
2012	3,726,335	229,970	465,436	9,755,290	83,026,006	761,316	365,932	7,840,353	106,170,638
2013	4,243,470	233,726	525,804	10,383,268	86,126,893	755,874	384,164	7,480,310	110,061,509
2014	4,018,846	209,913	628,028	9,462,574	79,223,473	680,850	372,382	6,484,990	101,081,054
2015	4,478,072	267,369	671,581	54,891,951	56,492,160	885,099	489,414	8,405,635	126,581,281
2016	5,732,346	345,598	625,792	16,493,496	120,024,078	1,116,954	603,733	10,704,023	155,646,020
2017	5,816,634	350,951	643,962	16,568,866	121,689,987	1,135,624	609,825	10,847,408	157,663,257
2018	5,854,956	353,708	638,216	16,712,400	122,357,410	1,136,633	615,048	10,905,329	158,573,701
2019	5,642,763	345,128	636,846	16,283,971	119,868,438	1,109,952	599,880	10,685,572	155,172,548
2020	5,112,653	337,830	641,510	15,954,096	117,592,084	1,087,269	585,446	10,459,104	151,769,992
2021	5,282,142	349,591	646,042	16,443,036	120,992,567	1,123,646	607,425	10,805,958	156,250,406
2022	5,203,790	344,365	651,326	16,212,847	119,519,246	1,107,449	597,001	10,645,414	154,281,437
2023	5,194,513	343,711	656,889	16,189,731	119,418,746	1,105,515	595,316	10,625,233	154,129,653
2024	5,179,522	342,847	662,165	16,139,179	119,116,934	1,102,821	593,714	10,594,514	153,731,695
2025	5,222,382	346,287	667,308	16,275,283	119,999,032	1,113,356	599,802	10,684,395	154,907,845
2026	5,015,775	332,372	672,804	15,649,652	115,905,908	1,070,095	573,396	10,261,902	149,481,903
2027	5,245,228	347,719	677,982	16,333,501	120,619,505	1,117,724	601,661	10,728,073	155,671,393
2028	5,164,647	343,379	681,427	16,098,959	118,929,786	1,103,963	593,436	10,569,609	153,485,206
2029	5,152,167	342,117	687,050	16,055,753	118,832,233	1,100,043	590,389	10,540,287	153,300,039
2030	4,927,407	329,878	692,758	15,421,853	114,097,766	1,061,487	567,241	10,099,429	147,197,819
2031	5,047,298	338,130	697,228	15,792,638	116,740,546	1,086,681	581,157	10,343,927	150,627,606
2032	4,935,861	330,373	703,336	15,408,423	114,326,015	1,062,643	568,046	10,113,842	147,448,539
2033	4,995,644	334,464	709,178	15,628,386	115,879,095	1,075,211	573,410	10,235,006	149,430,394
2034	4,983,764	333,598	714,801	15,537,777	115,454,796	1,072,383	573,186	10,209,146	148,879,451
2035	5,235,129	350,951	720,376	16,372,952	121,059,135	1,125,979	601,979	10,723,332	156,189,832
TOTAL	207,671,326	12,087,520	26,091,380	596,977,466	4,400,260,347	33,291,650	20,302,856	405,919,057	5,702,601,602

<sup>a</sup> Capital charges repaid through bond debt service prior to 2014 exclude bond cover; capital charges for 2015 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	491,792	218,649	41,509	265,168	12,870	336,069	95,466	782,163	208,927
1969	1,090,136	743,310	334,105	61,226	394,024	18,693	500,365	138,063	1,205,834	321,755
1970	1,420,639	943,548	470,423	89,700	552,223	25,231	691,825	184,837	1,778,187	467,573
1971	1,760,670	1,138,416	627,331	128,360	754,065	31,837	931,125	231,280	2,538,219	659,414
1972	2,245,455	1,384,327	819,635	185,868	1,035,804	43,771	1,262,105	287,620	3,758,473	950,297
1973	2,399,531	1,433,154	971,770	190,992	1,264,690	46,059	1,356,276	313,446	4,026,451	961,024
1974	2,520,870	1,529,007	998,399	204,074	1,305,235	48,933	1,416,668	331,702	4,463,660	1,104,491
1975	2,739,680	1,620,660	1,047,544	219,290	1,381,319	53,242	1,504,803	355,270	4,638,827	1,208,046
1976	3,204,880	1,657,653	1,106,524	232,129	1,474,438	57,732	1,582,159	381,276	4,838,364	1,278,740
1977	3,187,208	1,745,920	1,008,676	245,111	1,317,096	54,209	1,670,571	406,620	5,094,241	1,336,313
1978	3,635,572	1,879,497	1,208,919	255,468	1,618,071	56,805	1,718,763	420,026	5,091,935	1,374,033
1979	4,309,554	1,959,802	1,295,874	267,791	1,740,645	60,285	1,895,247	449,757	5,136,839	1,342,135
1980	4,994,298	2,098,693	1,406,781	295,350	1,941,392	67,604	2,068,432	499,051	5,647,604	1,485,141
1981	5,824,304	2,568,630	1,574,217	328,818	2,194,094	100,752	2,391,857	603,265	6,461,840	1,688,324
1982	5,582,860	2,732,210	1,657,630	346,721	2,336,914	82,296	2,365,583	641,991	6,752,799	1,929,664
1983	6,335,170	2,803,412	2,181,785	380,840	3,172,326	88,383	2,563,414	658,613	6,964,704	1,808,748
1984	7,713,111	3,882,526	3,287,286	497,586	4,929,764	96,492	2,831,098	727,821	8,053,209	2,598,232
1985	9,545,818	4,349,132	4,122,840	601,928	6,265,166	103,706	3,022,365	959,657	8,893,342	2,686,799
1986	9,515,134	4,985,089	4,584,188	647,634	7,009,695	130,222	3,206,862	1,223,847	9,142,822	3,398,540
1987	9,550,203	4,843,112	4,452,838	678,086	6,885,936	240,873	3,262,267	1,255,052	10,544,337	3,398,921
1988	9,149,230	5,030,365	4,510,360	704,411	7,052,631	158,845	3,437,212	1,044,206	11,095,193	3,271,137
1989	11,039,912	5,040,056	4,218,204	691,191	6,635,387	210,634	3,518,650	1,746,763	10,811,990	3,453,679
1990	12,432,751	5,508,460	4,916,384	729,229	7,720,886	331,172	3,752,314	1,953,905	11,722,946	4,221,266
1991	9,293,533	4,622,224	3,471,782	688,867	5,335,009	221,166	4,612,572	1,640,084	11,104,874	3,642,610
1992	11,850,715	5,810,913	3,626,099	612,895	5,587,383	174,998	5,591,191	1,532,325	11,144,101	3,694,099
1993	12,264,759	5,457,576	3,830,889	617,198	5,922,476	211,904	5,482,733	1,753,971	12,107,175	4,042,324
1994	14,334,329	6,024,035	3,857,907	694,421	5,963,596	278,012	6,434,433	2,090,724	12,731,704	4,776,753
1995	14,201,115	6,399,682	4,680,553	661,811	7,318,575	212,244	5,627,388	1,952,494	12,204,445	4,480,933
1996	14,628,006	6,630,826	7,634,303	710,651	12,187,480	208,356	5,725,756	2,300,206	12,730,931	4,599,073
1997	15,198,058	6,524,480	7,251,237	750,419	8,515,792	207,887	6,148,541	2,342,198	14,400,157	4,897,487
1998	13,714,014	6,147,286	6,324,675	717,140	7,018,227	209,057	7,751,561	1,946,444	14,309,132	4,177,167
1999	15,562,020	6,743,659	5,377,230	826,782	7,205,669	215,608	8,415,849	2,579,362	15,799,362	5,133,387
2000	14,851,382	10,264,468	3,835,085	793,396	5,637,117	186,737	8,308,742	2,080,356	15,532,480	4,260,296
2001	25,007,278	15,948,271	4,887,615	998,687	7,647,677	199,213	9,007,796	4,013,069	21,553,035	4,403,001
2002	16,404,417	13,157,841	4,133,658	961,330	6,403,768	182,329	8,172,025	3,395,054	22,467,820	5,804,949
2003	17,749,695	14,758,690	4,253,493	931,557	6,599,696	187,535	9,829,314	2,929,262	20,881,015	5,972,570
2004	18,936,429	15,496,182	4,937,290	1,044,158	6,725,729	201,518	10,111,619	3,217,858	25,441,663	5,475,586
2005	19,250,092	14,451,923	18,600,259	863,988	11,614,140	190,117	9,850,487	3,253,712	23,395,913	5,713,519
2006	20,937,689	13,762,768	31,750,241	855,523	11,715,055	202,066	12,687,174	3,209,642	23,329,886	5,786,801
2007	24,150,819	16,785,388	30,491,618	1,082,209	11,093,827	200,982	16,269,334	3,705,372	29,152,207	4,849,299
2008	22,068,545	19,102,552	30,217,338	1,031,247	12,150,172	216,704	14,878,046	4,687,583	29,859,233	5,924,156
2009	20,253,521	17,168,052	28,284,055	1,026,313	10,189,940	222,125	14,808,252	4,483,559	29,898,706	6,499,465
2010	23,993,906	17,602,828	38,429,576	978,548	13,657,569	227,666	17,997,544	3,986,917	33,074,073	8,235,440
2011	30,850,442	17,656,060	40,410,485	1,061,001	14,820,600	251,460	11,913,795	4,027,989	30,680,443	9,031,981
2012	31,184,230	19,424,869	46,774,631	1,170,183	17,160,303	266,856	13,634,159	5,437,348	44,002,412	9,296,308
2013	27,170,431	22,554,706	39,714,775	1,413,771	14,079,327	294,223	14,015,743	4,645,110	35,740,004	7,693,954
2014	22,395,263	21,006,503	34,594,871	1,487,780	11,809,527	293,408	13,830,211	4,687,289	35,485,188	6,521,329
2015	27,072,739	27,674,893	41,246,871	1,830,638	14,342,248	359,603	17,312,536	3,741,605	43,456,113	8,208,115
<b>2016</b>	<b>39,356,593</b>	<b>28,566,756</b>	<b>50,933,709</b>	<b>2,125,336</b>	<b>18,862,865</b>	<b>630,332</b>	<b>27,236,601</b>	<b>6,853,589</b>	<b>48,543,777</b>	<b>10,591,401</b>
2017	40,559,146	29,341,784	53,768,029	2,221,370	19,755,166	653,330	28,389,936	7,124,005	51,530,918	11,080,537
2018	42,834,688	30,802,664	55,666,190	2,284,706	20,376,577	691,073	29,677,575	7,648,736	52,570,243	11,302,481
2019	40,302,210	29,461,429	54,170,294	2,192,251	19,627,109	657,401	29,290,326	7,192,945	51,845,870	10,884,516
2020	39,990,607	26,285,591	55,126,651	2,171,081	19,652,969	651,357	29,664,637	5,912,857	55,866,781	10,882,213
2021	40,382,773	26,868,462	55,758,734	2,168,100	19,791,553	656,762	29,865,412	5,968,838	55,921,982	10,909,425
2022	40,125,226	26,866,176	54,871,297	2,148,239	19,579,375	652,385	29,671,077	5,930,234	55,523,287	10,806,000
2023	40,281,646	27,143,401	54,402,553	2,156,006	19,545,536	654,822	29,798,438	5,952,963	55,592,662	10,820,648
2024	40,028,167	27,107,145	54,089,703	2,141,108	19,426,826	650,710	29,563,892	5,915,010	55,366,102	10,754,840
2025	40,309,158	27,446,063	54,410,976	2,152,204	19,548,732	655,304	29,791,978	5,958,986	55,577,945	10,810,455
2026	39,290,258	26,903,467	53,339,668	2,107,505	19,113,026	638,754	29,098,642	5,806,907	54,762,683	10,577,207
2027	40,545,286	27,785,343	54,637,335	2,164,802	19,648,169	659,202	29,953,444	5,993,803	55,826,552	10,866,660
2028	39,905,946	27,467,340	54,037,465	2,133,730	19,374,470	648,847	29,528,876	5,902,268	55,254,750	10,704,991
2029	40,145,813	27,697,460	54,374,487	2,148,478	19,512,183	652,786	29,715,960	5,936,852	55,584,559	10,788,609
2030	38,863,036	26,842,581	53,189,398	2,081,409	18,956,698	632,009	28,867,738	5,756,802	54,324,244	10,442,991
2031	40,454,568	27,727,770	54,859,860	2,151,434	19,625,161	657,903	29,982,628	5,996,926	55,596,843	10,793,541
2032	38,327,442	26,770,653	52,800,211	2,061,965	18,787,446	623,345	28,511,393	5,676,488	54,101,923	10,366,143
2033	40,278,178	27,896,839	54,814,227	2,151,000	19,589,140	655,136	29,951,051	5,971,774	55,619,356	10,784,445
2034	38,533,979	27,224,165	53,211,328	2,076,323	18,933,982	626,831	28,752,575	5,711,193	54,440,858	10,446,390
2035	42,896,271	29,454,039	57,543,326	2,263,782	20,670,462	697,758	31,722,862	6,370,161	57,673,360	11,345,928
<b>TOTAL</b>	<b>1,408,554,831</b>	<b>947,597,105</b>	<b>1,581,879,968</b>	<b>74,982,165</b>	<b>700,632,673</b>	<b>20,802,729</b>	<b>895,107,016</b>	<b>219,024,672</b>	<b>1,812,386,207</b>	<b>400,480,589</b>

<sup>a</sup> Capital charges repaid through bond debt service prior to 2014 exclude bond cover; capital charges for 2015 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	18,796,614	0	1,050	1,439	2,489	46,945	25,627,405
1969	198,764	23,153,064	215,209	28,374,549	0	1,225	4,120	5,345	52,963	37,050,772
1970	289,633	30,617,164	273,605	37,804,587	0	3,848	17,116	20,964	69,744	48,587,436
1971	409,327	39,958,997	342,425	49,511,467	0	4,546	19,187	23,733	55,532	61,823,938
1972	537,186	54,991,810	422,304	67,924,655	0	4,929	21,150	26,079	80,412	84,118,090
1973	587,963	59,591,118	435,655	73,578,128	0	7,059	21,778	28,837	54,219	89,053,000
1974	611,428	66,008,399	455,565	80,998,432	0	8,336	22,408	30,744	76,783	98,018,543
1975	644,621	71,830,070	478,403	87,721,776	0	9,416	23,523	32,939	84,547	106,947,129
1976	668,315	74,907,214	475,587	91,865,011	0	7,004	23,257	30,261	106,717	112,877,287
1977	696,515	73,338,457	507,063	90,608,000	0	16,917	24,059	40,976	98,618	111,494,695
1978	709,040	81,951,168	523,177	100,442,473	0	12,635	24,225	36,860	100,786	124,549,553
1979	712,866	83,601,786	526,405	103,298,985	0	16,575	28,352	44,927	119,352	130,582,469
1980	862,275	93,029,351	583,628	114,979,602	0	19,834	26,562	46,396	178,812	145,013,123
1981	946,961	112,171,493	672,540	137,527,093	0	21,682	34,563	56,245	185,347	175,595,631
1982	1,021,329	117,143,301	727,623	143,320,920	0	16,117	43,117	59,234	173,894	184,671,627
1983	1,076,279	118,991,007	854,263	147,878,944	0	15,202	29,410	44,612	220,926	186,331,174
1984	1,211,621	156,273,535	933,311	193,035,592	20,590	15,442	31,795	67,827	225,959	245,798,530
1985	1,287,789	194,967,204	993,651	237,799,395	24,050	16,976	32,405	73,431	340,322	301,707,981
1986	1,344,770	218,331,684	1,058,276	264,578,762	31,753	18,145	33,596	83,494	279,227	334,655,547
1987	1,379,613	204,859,482	1,056,318	252,407,037	37,071	17,794	33,384	88,249	345,116	324,769,777
1988	1,465,829	221,667,115	1,124,102	269,710,636	48,058	19,117	33,605	100,780	365,207	346,572,572
1989	1,505,481	230,328,278	1,232,379	280,432,604	61,184	20,809	37,188	119,181	422,329	361,478,078
1990	1,624,763	277,194,766	1,855,991	333,964,833	66,041	20,855	36,812	123,708	474,284	415,838,263
1991	1,720,878	221,887,061	1,549,955	269,790,615	180,212	22,526	42,200	244,938	214,683	339,951,798
1992	1,779,902	245,365,618	1,503,480	298,273,720	208,216	26,028	43,517	277,761	443,676	384,993,924
1993	1,943,336	219,238,180	1,551,253	274,423,775	209,613	26,203	47,588	283,404	599,571	370,965,790
1994	1,920,217	257,365,883	1,475,069	317,947,083	201,284	25,161	46,079	272,524	609,966	413,073,821
1995	1,982,808	225,863,369	1,568,401	287,153,815	216,945	27,118	50,022	294,085	534,971	395,525,664
1996	1,651,239	235,410,311	1,622,641	306,039,780	217,250	27,155	56,622	301,027	571,857	424,274,333
1997	1,758,607	245,453,567	1,777,266	315,225,694	236,300	29,847	59,915	326,062	428,638	439,186,571
1998	1,947,195	227,090,227	1,796,534	293,148,659	128,021	29,927	36,222	194,170	465,095	417,094,153
1999	2,267,918	256,513,586	1,879,946	328,309,518	254,675	31,834	40,585	327,094	584,116	465,538,081
2000	2,541,030	253,213,554	1,968,482	323,473,126	262,163	79,001	43,704	384,868	0	453,848,119
2001	3,485,499	444,612,431	2,265,814	544,029,385	261,699	93,471	45,056	400,226	0	692,494,850
2002	4,834,914	333,605,680	2,305,363	421,829,148	266,107	95,018	47,297	408,422	0	569,398,339
2003	6,119,848	361,727,561	2,322,514	454,262,750	262,547	93,638	68,989	425,174	0	601,125,604
2004	6,479,019	413,382,090	2,609,148	514,058,289	284,387	102,404	29,286	416,077	0	662,944,691
2005	6,759,896	384,596,987	2,082,643	500,623,676	280,033	727,066	28,810	1,035,909	0	661,443,831
2006	7,266,909	360,238,943	2,049,735	493,792,429	292,991	43,185	38,593	374,769	0	650,158,467
2007	7,902,637	438,757,442	2,533,477	587,974,611	291,100	40,957	46,069	378,126	0	744,154,455
2008	9,656,199	412,570,504	3,000,298	565,362,578	306,916	804,536	86,494	1,197,946	0	729,196,896
2009	9,794,694	382,666,494	2,872,726	528,167,904	328,896	855,850	90,646	1,275,392	0	687,136,852
2010	10,981,782	443,480,303	3,050,470	615,696,621	400,358	1,064,565	108,884	1,573,807	0	799,346,271
2011	11,820,730	493,439,318	3,127,770	669,092,075	451,483	1,197,315	122,000	1,770,798	0	880,623,767
2012	12,796,585	481,108,781	3,403,337	685,600,002	460,139	1,318,107	130,852	1,909,098	0	894,692,432
2013	13,538,727	480,236,757	3,432,550	664,530,078	483,119	1,383,934	141,270	2,008,323	0	881,728,714
2014	15,985,068	425,608,386	2,930,847	596,635,672	473,134	1,355,332	140,896	1,969,362	0	802,376,252
2015	18,186,712	493,649,032	3,672,120	700,753,226	646,288	1,851,346	197,962	2,695,596	0	952,780,723
2016	22,454,072	590,646,790	4,302,312	851,104,133	795,430	2,278,575	246,220	3,320,225	0	1,141,940,844
2017	23,756,279	598,609,807	4,328,396	871,118,701	795,050	2,277,486	246,077	3,318,613	0	1,168,790,062
2018	24,286,258	619,443,132	4,371,562	901,955,885	787,729	2,256,514	243,288	3,287,531	0	1,196,479,581
2019	24,191,384	597,276,840	4,288,509	871,381,085	791,118	2,266,223	241,990	3,299,331	0	1,162,196,147
2020	24,290,947	631,073,201	5,408,302	906,977,193	787,397	2,255,564	228,606	3,271,567	0	1,193,174,885
2021	24,325,392	641,084,384	5,485,789	919,187,606	786,798	2,253,848	227,546	3,268,192	0	1,211,299,978
2022	24,275,248	635,616,705	5,458,944	911,524,194	784,761	2,248,014	225,366	3,258,141	0	1,201,268,898
2023	24,294,043	637,193,686	5,487,150	913,323,553	784,506	2,247,282	225,267	3,257,055	0	1,203,067,505
2024	24,265,988	631,709,132	5,444,937	906,463,560	782,655	2,241,981	224,543	3,249,179	0	1,195,849,473
2025	24,305,994	635,523,896	5,477,153	911,968,843	778,223	2,229,283	222,807	3,230,313	0	1,202,653,398
2026	24,181,184	620,929,247	5,365,306	892,113,854	774,545	2,218,749	221,368	3,214,662	0	1,176,016,964
2027	24,372,095	638,668,549	5,504,995	916,626,235	778,788	2,230,901	223,029	3,232,718	0	1,208,907,277
2028	24,288,815	628,492,101	5,420,790	903,160,388	767,751	2,199,285	218,707	3,185,743	0	1,192,083,728
2029	24,355,454	632,208,615	5,446,454	908,567,709	770,823	2,208,085	219,911	3,198,819	0	1,197,782,943
2030	24,159,841	609,601,040	5,248,627	878,966,414	741,844	2,125,072	208,561	3,075,477	0	1,158,420,634
2031	24,386,527	628,596,574	5,381,037	906,210,773	741,870	2,125,147	208,574	3,075,591	0	1,190,092,662
2032	24,146,521	601,790,661	5,173,037	869,137,228	741,870	2,125,147	208,574	3,075,591	0	1,149,510,347
2033	24,414,376	626,165,319	5,358,250	903,649,089	741,879	2,125,173	208,579	3,075,631	0	1,186,600,796
2034	24,227,914	606,139,525	5,202,943	875,528,005	741,872	2,125,152	208,578	3,075,602	0	1,158,086,588
2035	24,785,178	658,035,562	5,589,823	949,048,514	741,870	2,125,147	208,578	3,075,595	0	1,240,467,243
TOTAL	668,959,992	23,841,836,963	178,115,166	32,750,360,076	23,309,402	55,809,665	6,860,308	85,979,375	8,748,370	43,131,736,663

<sup>a</sup> Capital charges repaid through bond debt service prior to 2014 exclude bond cover; capital charges for 2015 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	141.72	12.53	154.24
Butte	0.00	0.00	0.00	0.00	0.00	533.44	36.05	569.49
Plumas	38.57	4.26	0.00	0.00	42.84	79.91	9.03	131.77
Feather River Area	8.58	0.95	0.00	0.00	9.53	230.81	17.92	258.26
NORTH BAY AREA								
Napa	177.99	74.01	4.91	17.12	274.04	46.47	15.43	335.94
Solano	105.78	69.67	5.36	10.07	190.89	52.57	12.44	255.89
North Bay Area	132.70	71.29	5.19	12.70	221.88	50.30	13.55	285.73
SOUTH BAY AREA								
Alameda-Zone 7	51.35	59.64	9.20	21.84	142.03	47.87	8.70	198.60
Alameda County	30.51	36.31	7.47	14.55	88.84	32.61	4.64	126.09
Santa Clara	25.04	29.73	6.64	11.33	72.74	21.28	3.18	97.19
South Bay Area	30.28	35.75	7.20	13.59	86.82	27.53	4.33	118.68
SAN JOAQUIN VALLEY AREA								
Kings	6.36	9.60	3.84	8.37	28.17	39.27	3.61	71.05
Dudley Ridge	5.54	6.03	3.36	4.89	19.82	21.57	2.09	43.48
Empire	2.30	5.63	2.55	4.63	15.11	24.40	1.71	41.22
Kern	9.90	11.82	5.13	6.94	33.79	27.14	2.71	63.64
Oak Flat	2.27	3.23	2.04	3.16	10.70	23.07	1.72	35.49
Tulare	5.70	6.13	3.27	4.82	19.92	22.62	2.14	44.69
San Joaquin Valley Area	9.16	10.86	4.81	6.59	31.43	26.40	2.61	60.45
CENTRAL COASTAL AREA								
San Luis Obispo	416.77	272.31	14.31	130.02	833.41	214.83	46.54	1,094.78
Santa Barbara	1,154.38	282.14	21.51	106.72	1,564.75	112.59	74.87	1,752.21
Central Coastal Area	990.96	279.96	19.92	111.88	1,402.72	135.24	68.59	1,606.55
SOUTHERN CALIFORNIA AREA								
AVEK	58.51	59.72	33.48	70.05	221.77	58.03	9.22	289.02
Castaic Lake	62.79	64.99	25.99	44.93	198.70	50.74	11.84	261.27
Coachella	87.42	101.43	44.91	81.10	314.86	56.84	10.53	382.24
Crestline	160.74	156.29	35.04	87.18	439.26	84.10	19.11	542.47
Desert	54.62	58.86	53.23	45.86	212.56	34.98	6.91	254.45
Littlerock	98.21	100.04	30.74	72.05	301.04	94.32	14.91	410.28
Mojave	171.88	202.93	31.00	155.88	561.69	145.54	28.70	735.93
Palmdale	66.23	71.43	43.53	98.93	280.12	73.75	10.70	364.58
San Bernardino	308.99	225.57	32.55	80.38	647.49	101.51	24.65	773.66
San Gabriel	126.21	123.72	48.71	52.07	350.72	62.38	14.46	427.55
San Geronio	1,809.25	624.49	38.37	256.94	2,729.05	172.79	40.88	2,942.72
Metropolitan	93.62	80.23	39.95	45.42	259.23	51.42	11.14	321.79
Ventura	387.41	336.79	28.91	127.65	880.76	238.07	51.00	1,169.83
Southern California Area	98.74	85.07	39.51	50.55	273.87	54.31	11.57	339.75
ALL AREAS	56.73	48.11	20.75	27.52	153.11	40.02	7.21	200.33

<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	46.05	15.07	17.55	2.52	1.49	82.68	46.05	15.07	17.55	2.52	1.49	82.68
2	49.01	16.04	7.67	0.00	0.00	72.72	95.06	31.11	25.22	2.52	1.49	155.40
3A	8.73	2.86	15.25	5.00	2.41	34.25	103.79	33.97	40.47	7.52	3.90	189.65
3B	56.20	18.39	34.48	3.83	5.36	118.26	151.26	49.50	59.70	6.35	6.85	273.66
<b>SBA</b>												
1	8.05	2.63	20.57	5.62	5.59	42.46	10.30	3.37	24.62	8.36	8.20	54.85
2	0.76	0.25	2.32	0.00	0.00	3.33	11.06	3.62	26.94	8.36	8.20	58.18
4	2.53	0.83	3.96	0.00	0.00	7.32	13.59	4.45	30.90	8.36	8.20	65.50
5	5.31	1.74	3.11	0.00	0.00	10.16	18.90	6.19	34.01	8.36	8.20	75.66
6	0.31	0.10	0.33	0.00	0.00	0.74	19.21	6.29	34.34	8.36	8.20	76.40
7	2.36	0.77	0.60	0.00	0.00	3.73	21.57	7.06	34.94	8.36	8.20	80.13
8	3.20	1.05	1.00	0.00	0.00	5.25	24.77	8.11	35.94	8.36	8.20	85.38
9	6.60	2.16	3.73	0.00	0.00	12.49	31.37	10.27	39.67	8.36	8.20	97.87
<b>CA</b>												
1	2.25	0.74	4.05	2.74	2.61	12.39	2.25	0.74	4.05	2.74	2.61	12.39
2A	1.43	0.47	0.80	0.00	0.00	2.70	3.68	1.21	4.85	2.74	2.61	15.09
2B	0.73	0.24	0.40	0.00	0.00	1.37	4.41	1.45	5.25	2.74	2.61	16.46
3	0.64	0.21	0.30	0.00	0.00	1.15	5.05	1.66	5.55	2.74	2.61	17.61
4	1.02	0.33	2.01	1.31	1.18	5.85	6.07	1.99	7.56	4.05	3.79	23.46
5	0.78	0.26	0.40	0.00	0.00	1.44	6.85	2.25	7.96	4.05	3.79	24.90
6	0.20	0.07	0.20	0.00	0.00	0.47	7.05	2.32	8.16	4.05	3.79	25.37
7	1.17	0.38	0.48	0.00	0.00	2.03	8.22	2.70	8.64	4.05	3.79	27.40
8C	0.02	0.01	0.09	0.00	0.00	0.12	8.24	2.71	8.73	4.05	3.79	27.52
8D	0.45	0.15	0.38	0.00	0.00	0.98	8.69	2.86	9.11	4.05	3.79	28.50
9	0.38	0.12	0.36	0.00	0.00	0.86	9.07	2.98	9.47	4.05	3.79	29.36
10A	0.40	0.13	0.47	0.00	0.00	1.00	9.47	3.11	9.94	4.05	3.79	30.36
11B	0.59	0.19	0.30	0.00	0.00	1.08	10.06	3.30	10.24	4.05	3.79	31.44
12D	0.56	0.18	0.27	0.00	0.00	1.01	10.62	3.48	10.51	4.05	3.79	32.45
12E	0.39	0.13	0.46	0.00	0.00	0.98	11.01	3.61	10.97	4.05	3.79	33.43
13B	0.84	0.27	0.53	0.00	0.00	1.64	11.85	3.88	11.50	4.05	3.79	35.07
14A	3.24	1.06	4.06	2.32	2.22	12.90	15.09	4.94	15.56	6.37	6.01	47.97
14B	0.51	0.17	0.50	0.00	0.00	1.18	15.60	5.11	16.06	6.37	6.01	49.15
14C	0.43	0.14	0.37	0.00	0.00	0.94	16.03	5.25	16.43	6.37	6.01	50.09
15A	2.40	0.79	4.23	2.83	2.41	12.66	18.43	6.04	20.66	9.20	8.42	62.75
16A	3.98	1.30	6.56	6.14	5.63	23.61	22.41	7.34	27.22	15.34	14.05	86.36
17E	13.42	4.39	18.42	21.47	20.80	78.50	35.83	11.73	45.64	36.81	34.85	164.86
17F	3.48	1.14	0.23	0.00	0.00	4.85	39.31	12.87	45.87	36.81	34.85	169.71
18A	3.12	1.02	2.21	0.00	-2.19	4.16	42.43	13.89	48.08	36.81	32.66	173.87
19	2.31	0.76	1.34	0.00	0.00	4.41	44.74	14.65	49.42	36.81	32.66	178.28
19C	2.51	0.82	0.00	0.00	0.00	3.33	47.25	15.47	49.42	36.81	32.66	181.61
20A	1.83	0.60	2.21	0.00	0.00	4.64	49.08	16.07	51.63	36.81	32.66	186.25
20B	2.23	0.73	1.45	0.00	0.00	4.41	51.31	16.80	53.08	0.00	32.66	153.85
21	1.12	0.37	1.01	0.00	0.00	2.50	52.43	17.17	54.09	0.00	32.66	156.35
22A	1.17	0.38	0.53	0.00	0.00	2.08	53.60	17.55	54.62	0.00	32.66	158.43
22B	11.50	3.76	14.25	6.53	6.86	42.90	65.10	21.31	68.87	6.53	39.52	201.33
23	3.16	1.03	0.98	0.00	-2.79	2.38	68.26	22.34	69.85	6.53	36.73	203.71
24	6.13	2.01	2.77	0.00	0.00	10.91	74.39	24.35	72.62	6.53	36.73	214.62
25	4.47	1.46	0.16	0.00	0.00	6.09	78.86	25.81	72.78	6.53	36.73	220.71
26A	4.89	1.60	9.24	0.00	-19.02	(3.29)	83.75	27.41	82.02	6.53	17.71	217.42
28G	9.10	2.98	3.49	0.00	0.00	15.57	92.85	30.39	85.51	6.53	17.71	232.99
28H	8.76	2.87	3.66	0.00	0.00	15.29	101.61	33.26	89.17	6.53	17.71	248.28
28J	98.25	32.15	50.93	0.00	0.00	181.33	199.86	65.41	140.10	6.53	17.71	429.61
<b>EBX</b>												
1	N/A	0.00	0.20	0.00	0.00	0.20	N/A	27.41	82.22	6.53	17.71	133.87
2A	N/A	0.00	1.72	0.00	0.00	1.72	N/A	27.41	83.94	6.53	17.71	135.59
2B	N/A	0.00	53.55	8.02	31.31	92.88	N/A	27.41	137.49	14.55	49.02	228.47
2C	N/A	0.00	7.05	0.00	0.00	7.05	N/A	27.41	144.53	14.55	49.02	235.52
2D	N/A	0.00	0.00	0.00	0.00	0.00	N/A	27.41	144.53	14.55	49.02	235.52
2E	N/A	0.00	0.00	0.00	0.00	0.00	N/A	27.41	144.53	14.55	49.02	235.52
3A	N/A	0.00	141.99	9.63	41.86	193.47	N/A	27.41	286.52	24.18	90.88	428.99
3B	N/A	0.00	1.79	0.00	0.00	1.79	N/A	27.41	288.31	24.18	90.88	430.78
4A	N/A	0.00	4.44	0.00	0.00	4.44	N/A	27.41	292.75	24.18	90.88	435.22
4B	N/A	0.00	41.65	1.14	10.81	53.60	N/A	27.41	334.39	25.32	101.69	488.82
<b>WB</b>												
29A	4.56	1.49	10.58	2.81	2.44	21.88	43.87	14.36	56.45	39.62	37.29	191.59
29F	3.33	1.09	1.27	0.00	0.00	5.69	47.20	15.45	57.72	39.62	37.29	197.28
29G	11.04	3.61	6.02	0.00	-8.80	11.87	58.24	19.06	63.74	39.62	28.49	209.15
29H	6.88	2.25	5.70	0.00	0.00	14.83	65.12	21.31	69.44	39.62	28.49	223.98
29J	11.53	3.77	1.64	0.00	-16.45	0.49	76.65	25.08	71.08	39.62	12.04	224.47
30	18.50	6.05	5.12	0.00	0.00	29.67	95.15	31.13	76.20	39.62	12.04	254.14
<b>CB</b>												
31A	8.37	2.74	24.15	2.11	2.10	39.47	17.06	5.60	33.26	6.16	5.89	67.97
33A	312.68	102.32	45.54	15.04	27.47	503.05	329.74	107.92	78.80	21.20	33.36	571.02
34	223.40	73.10	1.27	0.00	0.00	297.77	553.14	181.02	80.07	21.20	33.36	868.79
35	0.00	0.00	0.00	0.00	0.00	0.00	553.14	181.02	80.07	21.20	33.36	868.79

<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 2016 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 (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	0	0	0	0	0	0	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>7,376,742</b>	<b>9,441,000</b>	<b>9,815,757</b>	<b>11,064,457</b>	<b>2,363,000</b>	<b>108,873,541</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 (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	0	0	0	0	0	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
TOTAL	53,304,000	0	246,909,497	0	143,418,000	8,607,000	152,025,000	398,934,497

**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 (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	1,029,962	0
2002	1,639	690	861	546	510	226	1,535,510	0
2003	0	0	0	0	0	0	1,816,604	0
2004	2,132	27,868	18,579	18,731	10,355	8,528	1,476,572	0
2005	1,243	16,250	10,833	10,922	6,038	4,973	1,031,662	0
2006	3,279	42,860	28,573	28,807	15,926	13,116	1,471,831	0
2007	0	0	0	0	0	0	1,427,751	0
2008	0	0	0	0	0	0	2,076,185	0
2009	(4)	(46)	(31)	(31)	(17)	(14)	1,723,387	0
2010	(1)	(8)	(5)	(5)	(3)	(2)	1,809,258	0
2011	0	0	0	0	0	0	1,900,875	0
2012	4	54	36	36	20	17	1,919,778	0
2013	0	0	0	0	0	0	2,070,724	0
2014	393	5,137	3,424	3,453	1,909	1,572	2,478,563	0
2015	0	0	0	0	0	0	2,740,996	0
<b>2016</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2,968,016</b>	<b>0</b>
2017	0	0	0	0	0	0	3,545,563	0
2018	0	0	0	0	0	0	3,545,563	0
2019	0	0	0	0	0	0	3,545,563	0
2020	0	0	0	0	0	0	3,545,563	0
2021	0	0	0	0	0	0	3,545,563	0
2022	0	0	0	0	0	0	3,545,563	0
2023	0	0	0	0	0	0	3,545,563	0
2024	0	0	0	0	0	0	3,545,563	0
2025	0	0	0	0	0	0	3,545,563	0
2026	0	0	0	0	0	0	3,545,563	0
2027	0	0	0	0	0	0	3,545,563	0
2028	0	0	0	0	0	0	3,545,563	0
2029	0	0	0	0	0	0	3,545,563	0
2030	0	0	0	0	0	0	3,545,563	0
2031	0	0	0	0	0	0	3,545,563	0
2032	0	0	0	0	0	0	3,545,563	0
2033	0	0	0	0	0	0	3,545,563	0
2034	0	0	0	0	0	0	3,545,563	0
2035	0	0	0	0	0	0	3,545,563	0
<b>TOTAL</b>	<b>14,713</b>	<b>95,344</b>	<b>65,440</b>	<b>64,468</b>	<b>36,616</b>	<b>29,246</b>	<b>104,323,912</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 (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	812,061	0	1,842,972	0	792,074	0	792,074	2,635,045
2002	727,301	0	2,267,283	0	1,135,218	0	1,135,218	3,402,501
2003	899,762	0	2,716,366	0	1,240,911	0	1,240,911	3,957,277
2004	913,700	0	2,476,465	0	1,809,888	0	1,809,888	4,286,353
2005	1,036,879	0	2,118,800	0	1,853,810	0	1,853,810	3,972,610
2006	841,625	0	2,446,017	0	1,763,810	0	1,763,810	4,209,827
2007	1,322,354	0	2,750,105	0	2,833,715	0	2,833,715	5,583,820
2008	1,074,244	0	3,150,429	0	2,732,538	0	2,732,538	5,882,966
2009	1,538,648	0	3,261,893	0	2,832,628	0	2,832,628	6,094,520
2010	1,446,682	0	3,255,916	0	2,419,224	0	2,419,224	5,675,140
2011	1,818,990	0	3,719,865	0	2,099,267	0	2,099,267	5,819,133
2012	1,265,320	0	3,185,266	0	2,323,674	0	2,323,674	5,508,940
2013	1,569,787	0	3,640,511	0	2,862,501	0	2,862,501	6,503,012
2014	1,867,381	0	4,361,831	0	3,243,823	0	3,243,823	7,605,654
2015	1,506,544	0	4,247,540	0	3,302,271	0	3,302,271	7,549,811
2016	2,177,444	0	5,145,460	0	3,746,521	0	3,746,521	8,891,981
2017	2,214,153	0	5,759,716	0	3,938,388	0	3,938,388	9,698,104
2018	2,214,153	0	5,759,716	0	3,938,388	0	3,938,388	9,698,104
2019	2,214,153	0	5,759,716	0	3,938,388	0	3,938,388	9,698,104
2020	2,214,153	0	5,759,716	0	3,938,388	0	3,938,388	9,698,104
2021	2,214,153	0	5,759,716	0	3,022,378	0	3,022,378	8,782,094
2022	2,214,153	0	5,759,716	0	3,022,378	0	3,022,378	8,782,094
2023	2,214,153	0	5,759,716	0	3,022,378	0	3,022,378	8,782,094
2024	2,214,153	0	5,759,716	0	3,022,378	0	3,022,378	8,782,094
2025	2,214,153	0	5,759,716	0	3,022,378	0	3,022,378	8,782,094
2026	2,214,153	0	5,759,716	0	3,022,378	0	3,022,378	8,782,094
2027	2,214,153	0	5,759,716	0	3,022,378	0	3,022,378	8,782,094
2028	2,214,153	0	5,759,716	0	3,022,378	0	3,022,378	8,782,094
2029	2,214,153	0	5,759,716	0	3,022,378	0	3,022,378	8,782,094
2030	2,214,153	0	5,759,716	0	3,022,378	0	3,022,378	8,782,094
2031	2,214,153	0	5,759,716	0	3,022,378	0	3,022,378	8,782,094
2032	2,214,153	0	5,759,716	0	3,022,378	0	3,022,378	8,782,094
2033	2,214,153	0	5,759,716	0	3,022,378	0	3,022,378	8,782,094
2034	2,214,153	0	5,759,716	0	3,022,378	0	3,022,378	8,782,094
2035	2,214,153	0	5,759,716	0	3,022,378	0	3,022,378	8,782,094
TOTAL	65,510,062	0	170,139,802	0	108,110,101	0	108,110,101	278,249,903

<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 (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	1,608,030	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	626,722	792,210
2013	216	2,082	179	1,875	16	0	16,544	20,913
2014	1,344	12,940	1,114	11,655	102	0	102,836	129,990
2015	0	0	0	0	0	0	0	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>743,533</b>	<b>44,534,247</b>	<b>13,094,253</b>	<b>18,904,059</b>	<b>127,637</b>	<b>5,870,912</b>	<b>315,659,855</b>	<b>398,934,498</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	63,554	4,279,244	1,283,935	1,749,463	11,676	0	30,203,013	37,590,885
<b>2016</b>	<b>64,929</b>	<b>4,224,099</b>	<b>1,261,425</b>	<b>1,741,435</b>	<b>11,665</b>	<b>0</b>	<b>29,840,781</b>	<b>37,144,334</b>
2017	67,954	4,386,779	1,309,237	1,809,693	12,135	0	30,991,640	38,577,438
2018	66,015	4,276,271	1,277,261	1,761,263	11,807	0	30,205,304	37,597,921
2019	66,347	4,286,517	1,280,201	1,765,408	11,840	0	30,277,225	37,687,538
2020	65,236	4,186,723	1,248,461	1,729,800	11,607	0	29,583,228	36,825,055
2021	66,293	4,280,257	1,277,971	1,763,958	11,830	0	30,235,315	37,635,624
2022	63,855	4,117,343	1,229,264	1,696,808	11,383	0	29,084,342	36,202,995
2023	52,876	3,377,517	1,007,210	1,394,595	9,366	0	23,863,138	29,704,702
2024	55,175	3,546,362	1,058,255	1,462,865	9,816	0	25,053,591	31,186,064
2025	62,974	4,034,262	1,202,677	1,667,604	11,193	0	28,507,429	35,486,139
2026	26,099	1,589,526	472,694	657,487	4,446	0	11,230,843	13,981,095
2027	26,496	1,617,660	481,317	668,416	4,519	0	11,428,231	14,226,639
2028	18,224	1,051,513	310,266	440,689	2,998	0	7,440,020	9,263,710
2029	18,736	1,104,054	326,918	459,849	3,122	0	7,806,395	9,719,074
2030	19,942	192,049	16,534	172,971	1,508	0	1,526,217	1,929,221
2031	19,875	191,402	16,479	172,389	1,503	0	1,521,074	1,922,722
2032	19,925	191,886	16,520	172,824	1,506	0	1,524,918	1,927,579
2033	19,907	191,709	16,505	172,665	1,505	0	1,523,517	1,925,808
2034	19,945	192,072	16,536	172,992	1,509	0	1,526,403	1,929,457
2035	19,896	191,610	16,496	172,576	1,505	0	1,522,730	1,924,813
<b>TOTAL</b>	<b>1,958,546</b>	<b>121,308,771</b>	<b>35,914,219</b>	<b>50,827,757</b>	<b>342,133</b>	<b>0</b>	<b>858,544,083</b>	<b>1,068,895,509</b>

<sup>a</sup>1988 through 2014 charges are debt service only and do not include bond cover; 2015 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	306,085	89,149	93,468	3	32,424	2,113,906	2,635,045
2002	49	389,610	108,153	139,619	15	46,471	2,718,584	3,402,501
2003	0	452,587	124,214	164,705	0	50,798	3,164,973	3,957,277
2004	1,278	500,000	153,330	141,551	265	74,089	3,415,840	4,286,353
2005	745	472,788	157,225	98,013	154	75,887	3,167,798	3,972,610
2006	1,965	489,188	147,870	145,250	407	72,203	3,352,944	4,209,827
2007	0	666,779	226,259	129,449	0	116,000	4,445,333	5,583,820
2008	0	687,903	214,966	188,241	0	111,858	4,679,998	5,882,966
2009	(2)	723,817	238,749	156,241	0	115,956	4,859,759	6,094,520
2010	0	668,968	212,952	164,037	0	99,033	4,530,150	5,675,140
2011	0	685,280	213,682	172,346	0	85,935	4,661,890	5,819,133
2012	2	645,131	200,384	174,075	1	95,121	4,394,226	5,508,940
2013	0	766,491	244,809	187,746	0	117,178	5,186,789	6,503,013
2014	236	894,675	282,786	226,138	49	132,788	6,068,982	7,605,654
2015	0	881,095	271,415	248,517	0	135,181	6,013,603	7,549,811
<b>2016</b>	<b>0</b>	<b>1,044,737</b>	<b>328,320</b>	<b>269,100</b>	<b>0</b>	<b>153,366</b>	<b>7,096,458</b>	<b>8,891,981</b>
2017	0	1,131,593	345,369	321,464	0	161,221	7,738,457	9,698,104
2018	0	1,131,593	345,369	321,464	0	161,221	7,738,457	9,698,104
2019	0	1,131,593	345,369	321,464	0	161,221	7,738,457	9,698,104
2020	0	1,131,593	345,369	321,464	0	161,221	7,738,457	9,698,104
2021	0	1,016,719	295,967	321,464	0	123,723	7,024,221	8,782,094
2022	0	1,016,719	295,967	321,464	0	123,723	7,024,221	8,782,094
2023	0	1,016,719	295,967	321,464	0	123,723	7,024,221	8,782,094
2024	0	1,016,719	295,967	321,464	0	123,723	7,024,221	8,782,094
2025	0	1,016,719	295,967	321,464	0	123,723	7,024,221	8,782,094
2026	0	1,016,719	295,967	321,464	0	123,723	7,024,221	8,782,094
2027	0	1,016,719	295,967	321,464	0	123,723	7,024,221	8,782,094
2028	0	1,016,719	295,967	321,464	0	123,723	7,024,221	8,782,094
2029	0	1,016,719	295,967	321,464	0	123,723	7,024,221	8,782,094
2030	0	1,016,719	295,967	321,464	0	123,723	7,024,221	8,782,094
2031	0	1,016,719	295,967	321,464	0	123,723	7,024,221	8,782,094
2032	0	1,016,719	295,967	321,464	0	123,723	7,024,221	8,782,094
2033	0	1,016,719	295,967	321,464	0	123,723	7,024,221	8,782,094
2034	0	1,016,719	295,967	321,464	0	123,723	7,024,221	8,782,094
2035	0	1,016,719	295,967	321,464	0	123,723	7,024,221	8,782,094
<b>TOTAL</b>	<b>4,452</b>	<b>32,397,118</b>	<b>9,762,175</b>	<b>9,485,933</b>	<b>945</b>	<b>4,425,562</b>	<b>222,173,718</b>	<b>278,249,903</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	3,553,348	1,056,260	1,443,643	9,014	32,424	25,079,654	31,223,401
2002	47,943	3,560,458	1,052,506	1,458,021	8,814	46,471	25,143,902	31,318,115
2003	40,765	3,151,458	928,001	1,286,865	7,489	50,798	22,252,310	27,717,686
2004	45,477	3,426,222	1,024,828	1,358,241	8,385	74,089	24,111,077	30,048,319
2005	33,889	2,667,087	810,739	1,010,377	6,243	75,887	18,686,624	23,290,846
2006	48,944	3,599,464	1,074,183	1,438,467	9,038	72,203	25,349,870	31,592,169
2007	45,289	3,665,149	1,119,244	1,376,137	8,321	116,000	25,650,821	31,980,961
2008	42,491	3,501,021	1,052,779	1,357,903	7,806	111,858	24,575,326	30,649,184
2009	43,668	3,614,999	1,099,811	1,358,362	8,023	115,956	25,307,183	31,548,002
2010	44,839	3,637,587	1,097,077	1,398,355	8,238	99,033	25,525,234	31,810,363
2011	43,190	3,544,699	1,065,284	1,361,260	7,935	85,935	24,884,675	30,992,978
2012	43,706	3,538,580	1,062,121	1,377,138	8,030	95,121	24,857,685	30,982,381
2013	37,663	3,259,960	987,423	1,224,502	6,919	117,178	22,821,449	28,455,094
2014	40,074	3,532,157	1,068,290	1,322,773	7,368	132,788	24,722,148	30,825,598
2015	63,554	5,160,339	1,555,350	1,997,980	11,676	135,181	36,216,616	45,140,696
<b>2016</b>	<b>64,929</b>	<b>5,268,836</b>	<b>1,589,745</b>	<b>2,010,535</b>	<b>11,665</b>	<b>153,366</b>	<b>36,937,239</b>	<b>46,036,315</b>
2017	67,954	5,518,372	1,654,606	2,131,157	12,135	161,221	38,730,097	48,275,542
2018	66,015	5,407,864	1,622,630	2,082,727	11,807	161,221	37,943,761	47,296,025
2019	66,347	5,418,110	1,625,570	2,086,872	11,840	161,221	38,015,682	47,385,642
2020	65,236	5,318,316	1,593,830	2,051,264	11,607	161,221	37,321,685	46,523,159
2021	66,293	5,296,976	1,573,938	2,085,422	11,830	123,723	37,259,536	46,417,718
2022	63,855	5,134,062	1,525,231	2,018,272	11,383	123,723	36,108,563	44,985,089
2023	52,876	4,394,236	1,303,177	1,716,059	9,366	123,723	30,887,359	38,486,796
2024	55,175	4,563,081	1,354,222	1,784,329	9,816	123,723	32,077,812	39,968,158
2025	62,974	5,050,981	1,498,644	1,989,068	11,193	123,723	35,531,650	44,268,233
2026	26,099	2,606,245	768,661	978,951	4,446	123,723	18,255,064	22,763,189
2027	26,496	2,634,379	777,284	989,880	4,519	123,723	18,452,452	23,008,733
2028	18,224	2,068,232	606,233	762,153	2,998	123,723	14,464,241	18,045,804
2029	18,736	2,120,773	622,885	781,313	3,122	123,723	14,830,616	18,501,168
2030	19,942	1,208,768	312,501	494,435	1,508	123,723	8,550,438	10,711,315
2031	19,875	1,208,121	312,446	493,853	1,503	123,723	8,545,295	10,704,816
2032	19,925	1,208,605	312,487	494,288	1,506	123,723	8,549,139	10,709,673
2033	19,907	1,208,428	312,472	494,129	1,505	123,723	8,547,738	10,707,902
2034	19,945	1,208,791	312,503	494,456	1,509	123,723	8,550,624	10,711,551
2035	19,896	1,208,329	312,463	494,040	1,505	123,723	8,546,951	10,706,907
<b>TOTAL</b>	<b>1,962,998</b>	<b>153,705,889</b>	<b>45,676,394</b>	<b>60,313,690</b>	<b>343,078</b>	<b>4,425,562</b>	<b>1,080,717,801</b>	<b>1,347,145,412</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 acre-foot=approximately 325,851 gallons=43,560 cubic feet</p> <p>1 cubic foot per second (cfs)=450 gallons per minute (gpm)      1 million gallons=3.07 acre-feet</p> <p>1 cfs=646,320 gallons per day=1.98 af a day      1 million gallons per day (mgd)=1,120 af a year</p>				



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